Global Albany Annual H₂S Model Assumptions

-	General Parameters	
Parameter		Value
Projection		UTM
Datum		WGS84
UTM Zone		18
Hemisphere AERMET		Northern
		2015-2019 MET Data
AERMAP Sources	Assumptions / Blokes	1-deg DEM Data from webgis.com Value
Marine VCU (VCUM2) (Point Source	Assumptions/ Notes	Ivalue
Emission Rate (lb/hr)	See Calculations Attachment	9.13E-04
Emission Rate (lb/yr)	See Calculations Attachment	9.13E-04 8
Stack Height (ft)		60
	Actual Stack Height	
Stack Temperature	Release Temperature Assumed	1500 50
Stack Velocity (ft/s)		
Stack Diameter (ft) Emissions Limit (mg/L)	Actual Stack Diameter	10 2
Marine VCU (VCUM2) (Point Source	 	2
Emission Rate (lb/hr)	See Calculations Attachment	8.20E-04
Emission Rate (lb/yr)	See Calculations Attachment	7.18
Stack Height (ft)		60
<u> </u>	Actual Stack Height	1500
Stack Temperature Stack Velocity (ft/s)	Release Temperature Assumed	50
Stack Diameter (ft)	Actual Stack Diameter	
Emissions Limit (mg/L)	Actual Stack Diameter	10
Barge Fugitives (Area Source) Crud	0 OS#2 Only	2
Emission Rate (lb/hr/ft²)	See Calculations Attachment	0.635.00
		9.62E-09
Emission Rate (lb/yr)	See Calculations Attachment	0.773
Release Height (ft)	Barge Height	20
Initial Vertical Dimension (ft)	Barge height divided by 2.15	9.3
Area (ft²)	Barge Area	9178.8
Tank 31 (Crude) (Volume Source)		
Emission Rate (lb/hr)	See Calculations Attachment	1.51E-03
Emission Rate (lb/yr)	See Calculations Attachment	13.22
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 32 (Crude) (Volume Source)	Con Coloniations Attack as at	1.545.03
Emission Rate (lb/hr)	See Calculations Attachment	1.51E-03
Emission Rate (lb/yr)	See Calculations Attachment	13.23
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 39 (Crude) (Volume Source)	Soo Calculations Attachment	1 225 02
Emission Rate (lb/hr)	See Calculations Attachment	1.33E-03
Emission Rate (lb/yr)	See Calculations Attachment	11.63
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank Diameter divided by 4.2	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93

See Calculations Attachment	7.60E-04
	6.66
	48
· · · · · · · · · · · · · · · · · · ·	80
	18.6
	22.33
Talik Height divided by 2.13	22.33
See Calculations Attachment	1.10E-03
	9.67
	48
	120
	27.9
	22.33
Talik Height divided by 2.13	22.33
Soo Calculations Attachment	1.67E-03
	14.63
	48
· · · · · · · · · · · · · · · · · · ·	150
	34.9
<u> </u>	22.33
Talik Height divided by 2.15	22.33
Soo Calculations Attachment	8.30E-04
	7.28
	48 110
	25.6
·	
Tank neight divided by 2.15	22.33
See Calculations Attachment	1 115 02
	1.11E-03
	9.69 48
	100
	23.3
Tank neight divided by 2.15	22.33
See Calculations Attachment	1 055 03
	1.05E-03
	9.20
	48
	80
	18.6
Trank neight divided by 2.15	22.33
Con Coloulations Attackers	2.475.02
	2.17E-03
	19.04
	лО
Tank height. Approx. height of roof vents	48
Tank diameter Tank Diameter divided by 4.3	150 34.9
	See Calculations Attachment See Calculations Attachment Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 See Calculations Attachment See Calculations Attachment Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 See Calculations Attachment See Calculations Attachment See Calculations Attachment Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 See Calculations Attachment See Calculations Attachment See Calculations Attachment Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 See Calculations Attachment See Calculations Attachment Tank height divided by 2.15 See Calculations Attachment Tank height divided by 4.3 Tank height divided by 2.15 See Calculations Attachment Tank height divided by 2.15

ATTACHMENT 2

Model Protocol Calculations

A summary table of the parameters to use in the modeling is attached to the modeling protocol. The following sections detail the calculations used to determine emission rates for the modeling. Calculations for non-HTACs will be completed using the same methods as benzene, and emission rates used in the modeling will be provided in the report.

<u>Annual Modeling Benzene – Tank Sources</u>

Each tank is modeled as a volume source with the worst-case emissions, as described below. Annual emission rates are provided in the attached tables.

Vertical Fixed Roof Tanks

Tanks 28, 29, 30, 33, and 64 will be modeled based on PTE emissions with distillate fuel oil 2, with both standing and working losses included.

IFR Tanks without Blendstock Storage

Tanks 31, 32, 39, and 120 will be modeled based on the worst-case standing and working losses and landings as follows:

- Standing Losses worst case of standing losses (gasoline)
- Working Losses worst case benzene emissions from working losses (gasoline) plus crude working losses
- Example calculation for Tank 31:
 - Benzene emissions (lb/yr) = Benzene standing losses for gasoline (lb/yr) + Benzene working losses for gasoline (lb/yr) + Benzene working losses for crude (lb/yr) + Benzene losses due to landings (lb/yr) = 43.94 lb/yr + 6.56 lb/yr + 2.82 lb/yr + 30.36 lb/yr = 83.7 lb/yr

IFR Tanks with Blendstock Storage

IFR Tanks 114, 115, 117, 118, 119, and 121 – Modeled based on the worst-case standing and working losses and landings as follows:

- Standing Losses worst case of standing losses (blendstock)
- Working Losses worst case benzene emissions from working losses of gasoline and distillate (gasoline) plus blendstock working losses plus crude working losses
- o Example calculation for Tank 117:
 - Benzene emissions (lb/yr) = Benzene standing losses for blendstock (lb/yr) + Benzene working losses for gasoline (lb/yr) + Benzene working losses for blendstock (lb/yr) + Benzene working losses for crude (lb/yr) + Benzene losses due to landings (lb/yr) = 20.99 lb/yr + 4.94 lb/yr + 1.45 lb/yr + 2.14 lb/yr + 30.36 lb/yr = 59.9 lb/yr

Tank Landings in Annual Model

The initial model iteration will be completed assuming that the 22 tons per year of emissions from landings will be evenly distributed between the tanks (2.2 tons per year per tank) and the worst-case speciation for July (0.69% benzene). A sensitivity analysis will then be completed to determine the impact of changing the number of landings at different tanks, while staying within the 22 tons per year limit.

Tank 130 – Product Water Tank

IFR tank 130 will be modeled with standing and working losses as calculated in the PTE.

Hourly Modeling Benzene – Tank Sources

Each tank is modeled as a volume source. Vertical fixed roof tanks are modeled with the same emission rates as the annual model. IFRs are modeled assuming one tank is landing, with annual emission rates at the other IFR tanks. The worst-case hour of landing is used for the hourly model, with filling losses assumed as the worst-case. Landings for Tanks 31 and 32, though modeled in the PTE as ethanol, will be recalculated for the purposes of the modeling with the worst-case product assumed.

The time to fill the tank is calculated based on a filling rate of 1000 to 1500 bph provided by the terminal. Multiple tank landings at the same time may be evaluated based on the results. An example is provided below, but, because this calculation could be scenario and product-dependent, the emission rates are not provided with this protocol. The final emission rates will be provided in the report.

Hourly cleaning calculations will also be completed as part of the modeling to determine the worst-case hour and emission rates provided with the final report. An example calculation is provided at the end of this attachment for tank 117.

Example calculation for Landing Tank 117:

The landing in this calculation is assumed to occur in July with filling emissions calculated based on the vapor molecular weight and true vapor pressure of RVP 9 gasoline at Albany, NY temperatures and a 1500 bph refill rate to refloat the roof.

Worst-case hourly landing losses = Filling losses for one landing * July Speciation for Blendstock/ 4.5 hours = 1862 lb/ landing for filling * 0.00691/ 4.5 hours = 2.9 lb/hr

<u>Annual Modeling Benzene – Loading Calculations</u>

For the annual model, iterative modeling will be completed to determine worst-case loading scenarios based on the Operating Scenarios proposed for the facility. Given that there are many different emission rate options that will be evaluated, specific annual emission rates are not included in the accompanying tables for loading scenarios. An example calculation is provided below to demonstrate the method for calculating emission rates. An exhaustive list of modeling scenarios will not be provided in advance of

the modeling effort because it will be iterative and will depend on results obtained as modeling is completed.

Example calculations for a potential loading scenario are provided for truck, rail and marine. This is shown as an example only and may not be submitted as part of the model report. The actual loading scenarios used in the modeling will be submitted in the final report. Calculations for other scenarios would be calculated using the same methods, with throughputs and emission limits adjusted as necessary depending on the assumptions for the specific model run. As described in the Permit Application submitted December 16, 2020, compliance with the emissions limits for refined product loading is determined based on the following equation:

Total Throughput of Refined Product (kgal) = (kgal loaded from OS #1) + (kgal loaded from OS#2/ 0.81) + (kgal loaded from OS#3/ 0.2) + (kgal loaded from OS#3/ 0.2)

The upper limit for the total throughput of refined product is 1,928,300 kgal. The Operating Scenarios are defined as follows:

#1: Loading at truck, rail and/or marine at 2 mg/L with vac assist

#2: Marine loading of inerted vessels at 2 mg/L (99.9%)

#3: Marine loading with VCUM1 (10 mg/L) with vac assist

#4: Truck loading with no vac assist (2 mg/L and 8 mg/L fugitives)

#5: Rail loading with no vac assist (2 mg/L and 8 mg/L fugitives)

For the example calculations in this section, the following throughputs were assumed:

- 100,000,000 gallons of refined product under Operating Scenario 4
- 50,000,000 gallons of refined product under Operating Scenario 5
- 235,660,000 gallons of refined product under Operating Scenario 3

The total throughput used for the compliance equation would be calculated as follows:

Total Throughput of Refined Product (kgal) = $0 \text{ kgal loaded from OS} + 1 + 0 \text{ kgal loaded from OS} + 235,660 \text{ kgal from OS} + 100,000 \text{ kgal from OS} + 200,000 \text{ kgal from O$

Total Throughput of Refined Product (kgal) = 0 kgal + 0 kgal + 1,178,300 kgal + 500,000 kgal + 250,000 kgal = 1,928,300 kgal

Example Calculations – Truck Loading

Example of Truck VRU calculation:

The following assumes that 100,000,000 gallons of refined product are loaded at the truck rack under Operating Scenario #4 as an example calculation:

Emissions (lbs), Total VOCs = Refined Product Throughput at Truck Rack (gallons) * 3.785 liters/gallon * Overall Emission Rate (mg/liter) * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg

Emissions (lbs), Total VOCs = 100,000,000 gallons * 3.785 liters/gallon * 2 mg/l * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg = 1,668.9 lb/yr

Benzene emissions, lbs = Total VOCs * Benzene fraction in refined product (gasoline) = 1,668.9 lb/yr * 0.0046 = 7.68 lb/yr

Benzene emissions, lb/hr = 7.68 lb/yr * 1 yr/ 8760 hrs = 8.76E-4 lb/hr

Example of Truck Fugitives calculation:

The following assumes that 100,000,000 gallons of refined product are loaded at the truck rack under Operating Scenario #4 as an example calculation:

Emissions (lbs), Total VOCs = Refined Product Throughput at Truck Rack (gallons) * 3.785 liters/gallon * Overall Emission Rate (mg/liter) * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg

Emissions (lbs), Total VOCs = 100,000,000 gallons * 3.785 liters/gallon * 8 mg/l * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg = 6,675.5 lb/yr

Benzene emissions, lbs = Total VOCs * Benzene fraction in refined product (gasoline) = 6,675.5 lb/yr * 0.0046 = 30.7 lb/yr

Benzene emissions, lb/hr = 30.7 lb/yr * 1 yr/ 8760 hrs = 0.0035 lb/hr

Example Calculations - Rail Loading

Example of Rail VCU calculation:

The following assumes that 50,000,000 gallons of refined product are loaded at rail under Operating Scenario #5 as an example calculation:

Emissions (lbs), Total VOCs = Refined Product Throughput at Rail (gallons) * 3.785 liters/gallon * Overall Emission Rate (mg/liter) * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg

Emissions (lbs), Total VOCs = 50,000,000 gallons * 3.785 liters/gallon * 2 mg/l * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg = 834.4 lb/yr

Benzene emissions, lbs = Total VOCs * Benzene fraction in refined product (gasoline) = 834.4 lb/yr * 0.0046 = 3.84 lb/yr

Benzene emissions, lb/hr = 3.84 lb/yr * 1 yr/ 8760 hrs = 4.38E-4 lb/hr

Example of Rail Fugitives calculation:

The following assumes that 50,000,000 gallons of refined product are loaded at rail under Operating Scenario #5 as an example calculation:

Emissions (lbs), Total VOCs = Refined Product Throughput at Rail (gallons) * 3.785 liters/gallon * Overall Emission Rate (mg/liter) * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg

Emissions (lbs), Total VOCs = 50,000,000 gallons * 3.785 liters/gallon * 8 mg/l * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg = 3,337.8 lb/yr

Benzene emissions, lbs = Total VOCs * Benzene fraction in refined product (gasoline) = 3,337.8 lb/yr * 0.0046 = 15.4 lb/yr

Benzene emissions, lb/hr = 15.4 lb/yr * 1 yr/ 8760 hrs = 0.00175 lb/hr

Example Calculations - Marine Loading

Example of Marine VCUM1 calculation:

The following assumes that 235,660,000 gallons of refined product are loaded at VCUM1 under Operating Scenario #3 as an example calculation:

Emissions (lbs), Total VOCs = Refined Product Throughput at Marine (gallons) * 3.785 liters/gallon * Overall Emission Rate (mg/liter) * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg

Emissions (lbs), Total VOCs = 235,660,000 gallons * 3.785 liters/gallon * 10 mg/l * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg = 19,664.4 lb/yr

Benzene emissions, lbs = Total VOCs * Benzene fraction in refined product (gasoline) = 19,664.4 lb/yr * 0.0046 = 90.46 lb/yr

Benzene emissions, lb/hr = 90.46 lb/yr * 1 yr/ 8760 hrs = 0.0103 lb/hr

Hourly Modeling Benzene – Loading Calculations

Hourly emission rates for loading are provided in the attached tables. Details on how these emission rates were calculated and how they would be utilized in the model are provided below.

Truck Rack VRU Hourly Modeling

The hourly emission rate at the truck rack VRU is based on a maximum loading rate of 4000 gpm and an emissions limit of 2 mg/l to calculate the total VOC emissions. Benzene emissions are then calculated based on the average speciation for the year for gasoline (0.46%) as a worst-case. The calculation is as follows:

Maximum Short Term Loading Rate (liters/hr) = 4000 gallons/minute * 3.785 liters/gallon * 60 minutes/hr = 908,498.8 liters/hr

Total VOCs (g/hr) = 2 mg/l * 908,498.8 liters/hr * 1 g/ 1000 mg = 1,816.998 g/hr

Total VOCs (lb/hr) = 1,816.998 g/hr * 0.00220462 lb/g = 4.006 lb/hr

Benzene (lb/hr) = Total VOCs * 0.0046 = 4.006 lb/hr * 0.0046 = 0.0184 lb/hr

Truck Fugitives Hourly Modeling

Truck fugitives, which are only part of Operating Scenario #4, are calculated based on an emission limit of 8 mg/l and a maximum short-term loading rate of 4000 gpm. The emissions calculation was completed using the same method as the truck rack VRU, with 8 mg/l used instead of 2 mg/l. Benzene emissions are calculated based on the average speciation for the year for gasoline (0.46%).

Rail VCU Hourly Modeling

The hourly emission rate at the truck rack VRU is based on a maximum loading rate of 4500 gpm and an emissions limit of 2 mg/l to calculate the total VOC emissions. Benzene emissions are then calculated based on the average speciation for the year for gasoline (0.46%). The emissions calculation was completed using the same method as the truck rack VRU, with 4500 gpm used as the maximum loading rate.

Rail Fugitives Hourly Modeling

Rail fugitives, which are only part of Operating Scenario #5, are calculated based on an emission limit of 8 mg/l and a maximum short-term loading rate of 4500 gpm. The emissions calculation was completed using the same method as the truck rack VRU, with 8 mg/l used instead of 2 mg/l. Benzene emissions are calculated based on the average speciation for the year for gasoline (0.46%).

Marine VCU (VCUM1) Hourly Modeling

Benzene emissions are calculated based on the average speciation for the year for blendstock (0.46%) or crude (0.26%), depending on the assumptions in the model iteration. The maximum loading rate for VCUM1 used for the modeling will be 4000 barrels/hr (168,000 gallons/hr) with an emission rate of 10 mg/l. The example calculation for blendstock is provided below:

Maximum Short Term Loading Rate (liters/hr) = 168,000 gallons/hr * 3.785 liters/gallon = 635,949.2 l/hr

Total VOCs (g/hr) = 10 mg/l * 635,949.2 liters/hr * 1 g/ 1000 mg = 6,359.5 g/hr

Total VOCs (lb/hr) = 6,359.5 g/hr * 0.00220462 lb/g = 14.02 lb/hr

Benzene (lb/hr) = Total VOCs * 0.0046 = 14.02 lb/hr * 0.0046 = 0.0645 lb/hr

If one of the model iterations were to include only crude at VCUM1, the same calculation would be completed only with 0.26% benzene used for the speciation for crude loading.

Marine VCU (VCUM2) Hourly Modeling

The emissions calculation was completed using the same method as the example for VCUM1, with the maximum loading rate for VCUM2 of 25,000 barrels/hr (1,050,000 gallons/hr) and an emission rate of 2 mg/l used in the calculation. Benzene emissions are calculated based on the average speciation for the year for blendstock (0.46%) or crude (0.26%), depending on the assumptions in the model iteration.

Marine Fugitives Hourly Modeling

Marine fugitives, which are part of Refined Operating Scenario #2 and Crude Operating Scenario #2 (CRD2), are calculated based on an emission factor of 3.9 lb/1000 gallons for an uncleaned barge and 25,000 barrels per hour as a worst-case short term loading rate. It is assumed that 99.9% of emissions go to the VCU with 0.1% emitted as fugitives. Benzene emissions are calculated based on the average speciation for the year for blendstock (0.46%) or crude (0.26%), depending on the assumptions in the model iteration. The example calculation for blendstock is provided below:

Total VOCs emitted as Fugitives (lb/hr) = Emission Factor * Volume Loaded kgal/hr * fraction emitted as fugitives = 3.9 lb/1000 gallons * 1,050 kgal/hr * 0.001 = 4.1 lb/hr

Benzene emitted as fugitives (lb/hr) = 4.1 lb/hr * 0.0046 = 0.0188 lb/hr

Benzene emitted as fugitives ($lb/hr/ft^2$) = 0.0188 $lb/hr/9178.8 ft^2$ = 2.05E-6 $lb/hr/ft^2$

Annual Modeling Hydrogen Sulfide

A table of annual model inputs is provided with the modeling protocol.

Tank Sources

For each of the IFR tanks, H_2S emissions were calculated by multiplying the total standing and working losses during crude storage by the vapor fraction of 0.00118 for H_2S . One crude landing per tank is assumed for the purposes of this modeling only.

Example calculation for tank 117:

 H_2S emissions (lb/yr) = (Total standing losses during crude storage (lb/yr) + working losses during crude storage (lb/yr) + Total Landing Losses (lb/yr)) * vapor fraction of H_2S

 H_2S emissions (lb/yr) = (2410.11 lb/yr + 357.34 lb/yr + 3402 lb/yr) * 0.00118 = 7.28 lb/yr

Loading calculations

Example calculation with vac assist only

The calculations provided in the PTE for VCUM2 will be used to derive the H₂S emissions for this point source for one of the model iterations, as follows:

VCUM2 H_2S Emissions (lb/yr) = Emissions in tons/yr * 2000 lbs/ton = 0.004 tons/yr * 2000 lbs/ton = 8 lb/yr

Example calculation for Crude Operating Scenario #2 with fugitives

A model iteration will also be completed assuming the maximum loading of crude under Operating Scenario 2 (CRD2) to calculate the emissions including barge fugitives. This calculation assumes that no crude loading occurs under the other 2 model scenarios as a worst-case for fugitive emissions.

Control device emission rate (lb/1000 gallons) = Emission rate in mg/l * 0.00834540445 (conversion factor) = 2 mg/l * 0.00834540445 = 0.0167 lb/1000 gallons

Emission factor (in lb/1000 gallons) = 1.7975 (see Marine Loading – Crude Oil in PTE)

VCUM2 Total VOC Emissions (lb/yr) = Control device emission rate (lb/1000 gallons) * Throughput in kgal = 0.0167 lb/1000 gallons * 364,500 kgal = 6,087 lb/yr

VCUM2 H₂S Emissions (lb/yr) = Total VOC Emissions in lb/yr * vapor fraction of H₂S = 6,087 lb/yr * 0.00118 = 7.18 lb/yr

Barge Fugitive Total VOC Emissions (lb/yr) = Emission factor (lb/1000 gallons) * Throughput in kgal * Fraction of emissions as fugitives = 1.7975 lb/1000 gallons * 364,500 kgal * 0.001 = 655.2 lb/yr

Barge Fugitive H_2S Emissions (lb/yr) = Total VOC Emissions in lb/yr * vapor fraction of H_2S = 655.2 lb/yr * 0.00118 = 0.773 lb/yr

Barge Fugitive H_2S Emissions (lb/hr) = H_2S Emissions in lb/yr * 1 yr/ 8760 hrs = 0.773 lb/yr * 1/8760 = 8.83E-5 lb/hr

Barge Fugitive H_2S Emissions (lb/hr/ft²) = H_2S Emissions in lb/hr/ Surface Area of Barge in ft² = 8.83E-5 lb/hr/ 9178.8 ft² = 9.62E-9 lb/hr/ft²

Hourly Modeling Hydrogen Sulfide

Tank Sources

IFRs will be modeled assuming one tank is landing, with annual emission rates at the other IFR tanks. The worst-case hour of landing is used for the hourly model, with filling losses assumed as the worst-case. The time for filling will be calculated based on a filling rate of 1000 to 1500 bph.

Tank landing emissions were calculated for crude tanks only for the purposes of the hourly H₂S modeling and are presented in the following table. Crude landings were not included for the benzene modeling because gasoline speciation results in a higher benzene content so that would be considered the worst-case.

For each tank that is landed, the emissions will be calculated as follows:

 H_2S Emissions During Landing (lb/hr) = Filling losses for one landing * H_2S vapor fraction/ hours for filling

Example calculation for Tank 117 (Assuming 1500 bph filling rate):

H₂S Emissions During Landing (lb/hr) = 2,609 lb/landing * 0.00118 / 4.51 hours = 0.68 lb/hr

Emissions rates will be provided with the modeling report since they are dependent on the filling rates assumed for the different model iterations.

Loading Sources

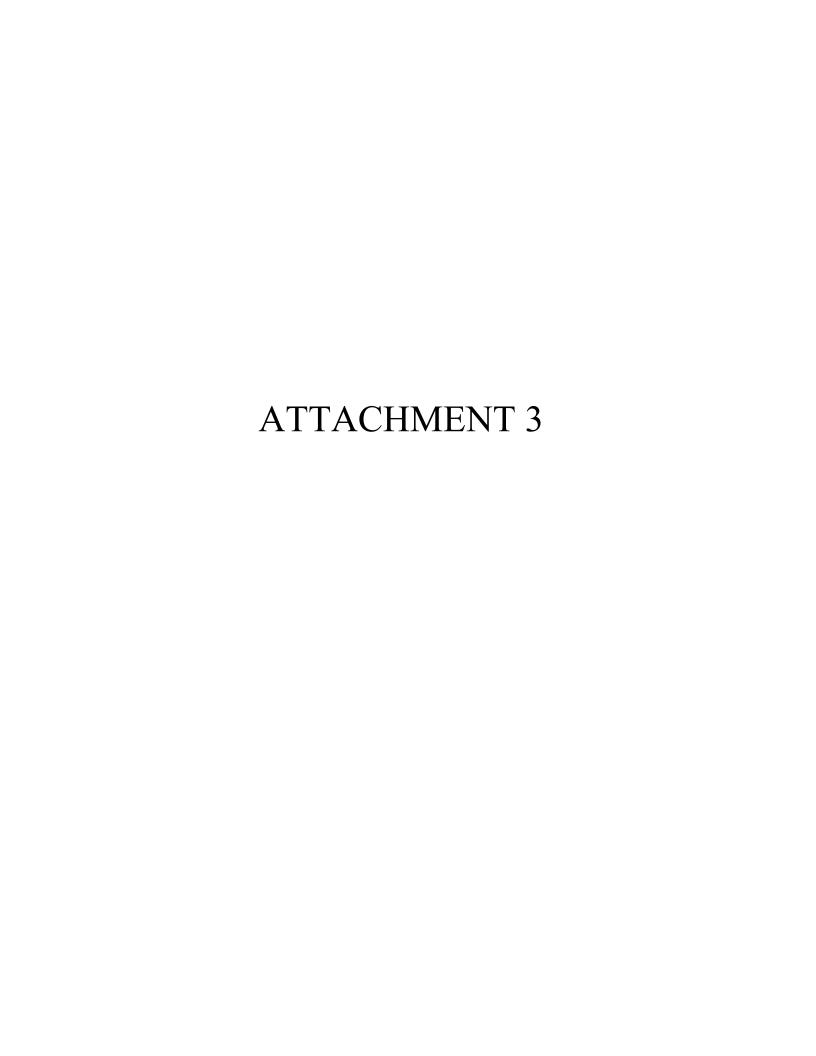
Total VOC emissions would be calculated in the same way for the hourly H_2S modeling as for the hourly benzene model, with the vapor fraction of H_2S of 0.00118 applied.

		CRUDE LANDING Tank Numbers								
	117	118	119	120	121	114	115	31	32	39
Tank Diameter (ft)	110	100	80	80	150	120	150	125	125	125
Heel Height (ft)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Volume (ft3)	38,013	31,416	20,106	20,106	70,686	45,239	70,686	49,087	49,087	49,087
Volume (bbl)	6,771	5,596	3,581	3,581	12,590	8,058	12,590	8,743	8,743	8,743
Volume (gal)	284,377	235,023	150,414	150,414	528,801	338,432	528,801	367,223	367,223	367,223
Volume (liters)	1,076,368	889,560	569,319	569,319	2,001,511	1,280,967	2,001,511	1,389,938	1,389,938	1,389,938
Avg Temp (F) (T)	54.18	54.18	54.18	54.18	54.18	54.18	54.18	54.18	54.18	54.18
Avg Temp (K) (T)	285.47	285.47	285.47	285.47	285.47	285.47	285.47	285.47	285.47	285.47
temp corr	0.9568	0.9568	0.9568	0.9568	0.9568	0.9568	0.9568	0.9568	0.9568	0.9568
Moles	45,978	37,998	24,319	24,319	85,496	54,718	85,496	59,372	59,372	59,372
VP of VOC (psia)	12.61	12.61	12.61	12.61	12.61	12.61	12.61	12.61	12.61	12.61
VOC theo fraction	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Saturation Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Moles VOC	23,665	19,558	12,517	12,517	44,004	28,163	44,004	30,559	30,559	30,559
Molecular weight (g/g-mole)	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
VOC (grams/landing)	1,183,230	977,876	625,841	625,841	2,200,221	1,408,141	2,200,221	1,527,931	1,527,931	1,527,931
VOC (lbs/landing)	2,608.53	2,156	1,380	1,380	4,851	3,104	4,851	3,368	3,368	3,368
Number of Landings per Yr	1	1	1	1	1	1	1	1	1	1
Average Days per Landing	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
VOC (lbs) Filling	2,609	2,156	1,380	1,380	4,851	3,104	4,851	3,368.45	3,368.45	3,368
VOC (lbs) Standing	793	655	419	419	1,475	944	1,475	1,024.01	1,024.01	1,024
VOC (lbs) Filling - One landing	2,609	2,156	1,380	1,380	4,851	3,104	4,851	3,368.45	3,368.45	3,368
Total VOC (lbs) (Lf + Ls)	3,402	2,811	1,799	1,799	6,325	4,048	6,325	4,392	4,392	4,392
Total VOC (tons)	1.70	1.41	0.90	0.90	3.16	2.02	3.16	2.20	2.20	2.20

	es associated with t Symbol		Units		Symbol		Units				i
otal Cleaning Losses LFV = LP+LCV+ LF+LS	LFV	-,	lb/event ton/event								
Product in tan	k prior to cleaning	Gasoline - RVP	9								i
Month the c	leaning occurred:	July						Additional Purge Emi	ssions		i
libration Gas		Propane (C3)		Standing Idle Losses Eq. 3-7 $L_{SL} = n_d * KE*((P_{VA}*V_V)/R*TV))*N$	L _{SL}	755.85	lb		Day 2	Day 3	i
ration of the continued forced ventilation	n _{CV}	3	days	Number of days the tank stays idle	n _d	3		L _P	943.875	944.829	i
ht of deck during cleaning (assume 6 ft if unknown)	h _d	6	ft	Vapor space expansion factor, per day	K _E	0.1848		S *	0.25	0.25	*S is based on fixed r
ber of days standing idle before cleaning	n _d	3	days	True vapor pressure of stock liquid (avg. ambient temp. of mor	P_{VA}	5.774	psia	H _I	0.230	0.22	i
ht of the stock liquid	h _i	0.250	ft	Volume of the vapor space	V_{V}	54644.08	ft ³	V _v	54,832.33	54,887.72	i
rage ventilation rate during continued forced ventilation	Q_V	10000	ft ³ /min	Ideal gas constant	R	10.731	(psia-ft3)/(lb-	h _v	5.77	5.78	i
s per day of force ventilation	t _V	8	hrs/day	Average vapor temperature (average ambient temp of the mon	T _V (T _{AA})	531.35	°R	h _{d2}	6.00	6.00	İ
age LEL Reading	LEL	10	%	Stock vapor molecular weight	M_V	68	lb/lb-mol				İ
of Calibration Gas		2.1	%	Standing idle saturation factor	Ks	0.36					
rage vapor concentration by volume during continued forced ventila	C _V	0.0021		-	-						
bration Gas Molecular Weight	M _{CG}		lb/lb-mole	Filling Losses Eq. 3-18 $L_{FL} = (P_{VA}V_{V}/RT_{V})M_{V}(C_{sf}S)$	L _{FL}	564.38	lb				
ř				True vapor pressure of stock liquid (avg. ambient temp. of mor	P _{VA}	5.774	psia				
or Space Purge Losses				Volume of the vapor space	V _V	54644.08					
4-2 LP=(PVA*VV/R*TV)*MV*S	Lp	1881.270		Ideal gas constant	R	10.731	(psia-ft3)/(lb-	mole deaR)			
ration Factor (0.5 for IFR with a partial liquid heel)	S	0.5		Average vapor temperature (average ambient temp of the mor	T _V (T _{AA})	531.4	() (I ,			
gas constant	R			ole Stock vapor molecular weight	M _V	68	lb/lb-mole				
age temperature of the vapor space = average ambient temperatu	T _V (T _{AA})	531.35	(1 -) (Filling saturation correction factor for wind (1.0 for IFT and DE	C _{sf}	1					
vapor pressure of the exposed volatile material in the tank	P _{VA}	5.774	11	Filling Saturation Factor (0.15 for drain dry)	S	0.15					
me of vapor space	V _V	54,644.08		- I ming summan, asser (5.15 is aram al),		0.10					
k vapor molecular weight	M _V		lb/lb-mol	Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-4	KE	0.1848	per day				
vapor molocular weight	111V		ID/ID IIIOI	Average Daily Vapor Temperature Range	ΔΤν	22.87	. ,				
tinued Forced Ventiliation Emissions				Average Daily Vapor Pressure Range	ΔΡν	1.2440					
=60*Qv*n _{CV} *tv*C _V *(P _a *M _{CG})/(R*T _V)	L _{cv}	3.403.00		Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ		psi				
rage ventilation rate during continued forced ventilation	Q _V	.,	ft ³ /min	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	5.7736					
tion of continued forced ventilation, days	n _{CV}		days	Average Daily Liquid Surface Temperature (TLA=TAA)	TAA	531.35					
y period of forced ventilation	t _V		hrs/day	Atmospheric Pressure	P _A	14.55					
, ·	C _V	0.0021	nis/uay	Authospheric Plessure	ГА	14.55	psia				
rage vapor concentration by volume during continued forced ventila	Pa	14.55		- Avenage Bailty Vanage Tagenage true Banga (ATv)							
ospheric pressure at the tank location	M _{CG}	14.55 44.1	_	Average Daily Vapor Temperature Range (ΔTv)	ΔΤν	22.87	0n				
bration gas molecular weight			—	Equation 1-7 (Δ TV = 0.7 Δ TA + 0.02 α I)							
rage temperature of vapor below the floating roof = average ambie	T _V (T _{AA})	531.35	.	Average daily ambient temperature range - Equation 1-11 (ΔΤ/	ΔΤΑ	19.3	-K				
- Otal-Barratus - LOV			ļ	Average tank surface solar absorptance, dimensionless, Table	α	0.25					
or Stock Remains = LCV max			.	Daily total solar insolation on a horizontal surface	1		Btu/ft ² -day				
$L_{CV} \text{ max} = 5.9 \text{*}D^{2} \text{*}(\text{hl})$	*WI	99946		Average daily maximum ambient temperature for the month	TAX	541.00					
Cvmax = P _{VA} /Pa		0.396813954	ļ	Average daily minimum ambient temperature for the month	TAN	521.70	°R				
			ļ	┩							
rage Ambient Temp during Month TAA = (TAX+TAN) /2	TAA	531.35		Average Daily Vapor Pressure Range (ΔPv)							
age daily monthly maximum ambient temperature, Table 7.1-2	TAX	541		Equation 1-9: ΔPV = PVX - PVN	ΔΡν	1.244					
age daily montlhy minimum ambient temperature, Table 7.1-2	TAN	521.7	°R	Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	6.42					
Į				Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	5.18					
uct Vapor Pressure				Average daily max liquid surface temp TLX = TAA + 0.25ΔTV	TLX	537.07					
exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P_{VA}	5.774	psia	Average daily min liquid surface temp TLN = TAA - 0.25∆TV	TLN	525.63	°R				
Pressure Equation Constant A (Table 7.1-2)	Α	11.756		Vapor Pressure Equation Constant A	Α	11.756					
r Pressure Equation Constant B (Table 7.1-2)	В	5,315.1	°R	Vapor Pressure Equation Constant B	В	5,315					
age ambient temperature during month	TAA	531.4	°R	Average Daily Liquid Surface Temperature (TLA=TAA for landi	TAA	531.35					
· · · · · · · · · · · · · · · · · · ·				Average Daily Vapor Temperature Range	ΔΤν	22.87					
or Space Volume V _V =h _v ((PI)D ² /4)	V _v	54,644.08	ft ³			•	•	1			
ht of vapor space under landed deck (h _{v=} h _d -h _l)	h _v	5.75		1							
k height	hd	6.00		┪							
		5.00	 	-							

	HAPS Speciation														
	Product type- select from	list:	Gasoline												
Total HAP (lb/event):	264.014	Vapor We	eight Concentration	\$	Vapor Mole Fract	ion		Liquid Mole F	raction			Component Vapor Press	sure		
Individual HAPS		Eq. 40-6 Z	ZVi = yiMi / MV		Eq. 40-5 yi = Pi / I	PVA		Eq. 40-4 xi = (Z	LiML)/Mi			PVAi=(0.019337)10^(A-(B	3/(TLA+C)))		
Eq. 40-2 L _{Ti} =Z _{Vi} (L _T)	L _{Ti} (lb/event)	M,	M _V	Z _{Vi}	$P_i = P_{VAI}(x_i)$	P _{VA}	Уi	Z _{Li}	M _L	Mi	X,	А	В	С	P _{VAi}
hexane	51.1805	86.18	68	0.00603	0.027453	5.774	0.00475	0.0100000	92	86.18	0.01068	6.878	1171.5	224.37	2.5710
benzene	57.4944	78.11	68	0.00677	0.034026	5.774	0.00589	0.0180000	92	78.11	0.02120	6.906	1211	220.79	1.604
2,2,4 TMP	65.8601	114.23	68	0.00775	0.026652	5.774	0.00462	0.0400000	92	114.23	0.03222	6.812	1257.8	220.74	0.827
toluene	65.6567	92.14	68	0.00773	0.032940	5.774	0.00571	0.0700000	92	92.14	0.06989	7.017	1377.6	222.64	0.471
ethylbenzene	4.2949	106.17	68	0.00051	0.001870	5.774	0.00032	0.0140000	92	106.17	0.01213	6.95	1419.3	212.61	0.154
xylenes	18.7657	106.17	68	0.00221	0.008171	5.774	0.00142	0.0700000	92	106.17	0.06066	7.009	1462.3	215.11	0.134
cumene	0.7292	120.19	68	0.00009	2.80E-04	5.774	4.86E-05	0.0050000	92	120.19	0.00383	6.929	1455.8	207.2	0.07
naphthalene	0.0329	128.17	68	3.88E-06	1.19E-05	5.774	2.06E-06	0.0041500	92	128.17	0.00298	7.146	1831.6	211.82	0.004

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Global Albany Terminal Hourly ERP Evaluation

		hexane	2,2,4-TMP	toluene	ethylbenzene	xylenes
Actual 2020 (lb/year) - (all reported	sources)	668.39	923.4	1262.34	210.37	1334.04
Toxicity Rating from DAR-1			M	L	М	М
ERP - VRUTK (lb/hr) ^a	ERP - VRUTK (lb/hr) ^a		0.021	0.096	0.012	0.228
ERP - VCURR (lb/hr) ^b	ERP - VCURR (lb/hr) ^b		0.023	0.108	0.013	0.256
ERP - VCUM1 (lb/hr) ^c	ERP - VCUM1 (lb/hr) ^c				0.041	0.797
ERP - VCUM2 (lb/hr) ^d					0.051	0.996
ERP - Tank 31 (lb/hr) ^{e,f}	1000 bph refill rate	0.695	0.900	2.600	0.349	6.810
ERP - Tank 31 (lb/nr)	1500 bph refill rate	1.042	1.350	3.901	0.524	10.215
ERP - Tank 32 (lb/hr) ^{e,f}	1000 bph refill rate	0.695	0.900	2.600	0.349	6.810
ERF - Talik 32 (ID/III)	1500 bph refill rate	1.042	1.350	3.901	0.524	10.215
ERP - Tank 39 (lb/hr) ^{e,f}	1000 bph refill rate	1.513	1.959	5.661	0.760	14.826
LRF - Talik 39 (ID/III)	1500 bph refill rate	2.269	2.939	8.491	1.140	22.238
ERP - Tank 120 (lb/hr) ^{e,f}	1000 bph refill rate	1.513	1.959	5.661	0.760	14.826
ERF - Talik 120 (ID/III)	1500 bph refill rate	2.269	2.939	8.491	1.140	22.239
ERP - Tank 114 (lb/hr) ^{e,g}	1000 bph refill rate	12.352	1.959	5.660	0.760	14.825
ERF - Talik 114 (ID/III)	1500 bph refill rate	18.528	2.939	8.491	1.140	22.237
ERP - Tank 115 (lb/hr) ^{e,g}	1000 bph refill rate	12.353	1.959	5.661	0.760	14.825
LIVE - TAIK 113 (ID/III)	1500 bph refill rate	18.529	2.939	8.491	1.140	22.238
ERP - Tank 117 (lb/hr) ^{e,g}	1000 bph refill rate	12.352	1.959	8.491	1.140	22.237
LIVE - TAILK IIT (ID/III)	1500 bph refill rate	18.528	2.939	8.491	1.140	22.237
ERP - Tank 118 (lb/hr) ^{e,g}	1000 bph refill rate	15.187	2.409	6.959	0.934	18.227
LIVE - TAIN ITO (ID/III)	1500 bph refill rate	15.187	2.409	6.959	0.934	18.227
ERP - Tank 119 (lb/hr) ^{e,g}	1000 bph refill rate	18.530	2.939	8.491	1.140	22.239
Lite - Idlik 115 (lb/ill)	1500 bph refill rate	18.530	2.939	8.491	1.140	22.239
ERP - Tank 121 (lb/hr) ^{e,g}	1000 bph refill rate	5.271	0.836	2.415	0.324	6.326
	1500 bph refill rate	5.271	0.836	2.415	0.324	6.326

^a = The ERP for VRUTK is based on the short-term loading rate of 4000 gpm and the emission limit of 2 mg/l.

^b = The ERP for VCURR is based on the short-term loading rate of 4500 gpm and the emission limit of 2 mg/l.

^c = The ERP for VCUM1 is based on the short-term loading rate of 4000 bph and the emissions limit of 10 mg/l.

^d = The ERP for VCUM2 is based on the short-term loading rate of 25,000 bph and the emissions limit of 2 mg/l.

^e = Worst-case hour based on refilling the tank after a landing. Refill rates range from 1000 bph to 1500 bph. Both ERPs are provided in the table.

f = Speciation for gasoline used as worst-case.

^g = speciation for blendstock used as worst-case.

Attachment XIV

Modeling Report

PART 212 REVIEW AIR DISPERSION MODEL REPORT ALBANY, NY

January 2023

Prepared for:

Global Companies LLC 800 South Street Waltham, MA 02454

Prepared by:



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Envirospec Engineering Project E21-2818

1.0 Introduction:

Air dispersion modeling was conducted for the Global Companies LLC (Global) Albany Terminal (Terminal) located in Albany, NY. This facility is classified as a gasoline and distillate loading terminal. It consists of ten (10) permitted petroleum product storage tanks and five (5) exempt distillate storage tanks. The facility has one (1) truck loading rack, one (1) rail loading rack, and a marine loading dock. The truck loading rack is controlled by a Vapor Recovery Unit (VRUTK), rail loading is controlled by a Vapor Combustion Unit (VCURR), and marine loading is controlled by two VCUs (VCUM1 and VCUM2).

This report is being submitted as part of a significant Title V air permit modification application for the facility. Air dispersion modeling is required to determine compliance with 6 NYCRR Part 212. 6 NYCRR Part 212 regulates air pollution from process operations, as defined in the regulation. Each contaminant is assigned an Environmental Rating, which is used to determine the degree of air pollution control required. Facilities with process operations subject to New Source Performance Standards (NSPS) (40 CFR Part 60) and National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR 63) are considered in compliance with Part 212 with the exception of compounds on the high toxicity air contaminant (HTAC) list. Facility Potential to Emit (PTE) calculations are completed to determine maximum potential emissions of Volatile Organic Compounds (VOCs) and Hazardous Air Pollutants (HAPs). Pollutants that are considered HTACs are then compared to the mass emission limits specified on 212-2.2 Table 2 - High Toxicity Air Contaminant List. HTACs that exceed the mass emission limit are modeled to demonstrate that fence-line concentrations are below Annual Guideline Concentrations (AGC) for annual emission rates and Short-Term Guideline Concentrations (SGC) for hourly emission rates for the applicable contaminant. HTACs that are below SGC/AGC limits are in compliance with Part 212. The only HTAC emitted from process operations at this facility with emissions exceeding the specified mass emission limit is benzene. Other HAPs are emitted from facility operations, but they are not considered HTACs per 212-2.2 Table 2. These HAPs, which are non-HTACs, are included in this modeling report if actual annual emissions of the non-HTAC is greater than 100 lb/yr.

Air dispersion modeling was conducted to assess if facility emissions result in off-site impacts that exceed the SGC and AGC levels for benzene and non-HTACs with actual annual emissions greater than 100 lb/yr. Modeling was also completed for H_2S emissions from crude oil storage and loading at the request of NYSDEC.

The air dispersion model was completed using Lakes AERMOD View Software (version 10.0.1). The following sections provide the model results as well as information on variables and modeling assumptions that were used when developing the model.

2.0 Facility Overview and Process Description:

Global's Albany Terminal is located at 50 Church Street in Albany, NY. The facility is permitted for petroleum product loading and storage operations. The facility has an overall refined product (gasoline, ethanol, blendstock, distillate, and biodiesel) throughput limit of 1,928,300,000 gallons with subcaps at each rack. There is an additional permitted 450,000,000 gallon throughput for crude oil at the marine dock. The facility has ten (10) permitted petroleum product storage tanks and five (5) exempt distillate storage tanks.



3.0 Modeling Methodology:

The projection to be used for the model will be UTM NAD83, zone 18. An aerial image of the site was used to determine source locations. The modeling methodology used for this analysis is described below. The following subsections describe the details of the modeling analysis.

3.1 Selection of Dispersion Model:

The latest version of the American Meteorological Society/Environmental Protection Agency Regulatory Model AERMOD was used. All standard regulatory default options of AERMOD were used.

To facilitate the implementation of AERMOD, the Lakes AERMOD View software was used.

3.2 Site Characterization:

The Albany Terminal is located at 50 Church Street in Albany, NY on the western bank of the Hudson River. The base elevation for the terminal is approximately 18 ft. Based on a land use analysis of the area surrounding the terminal and the latest guidance from NYSDEC in DAR-10, the surrounding area were considered rural in the air dispersion model.

3.3 Source Emissions:

3.3.1 Benzene Model

Total benzene emissions from the facility's PTE calculations were used for modeling. The PTE calculations were performed using the latest AP-42 methodology (June 2020). Tank emissions (standing and working) and tank landing and cleaning emissions were calculated using AP-42 calculation methods (AP-42 Chapter 7). Two (2) tanks are heated for biodiesel storage. Emissions were calculated as heated tanks per AP-42 (7.1 Organic Liquid Storage Tanks).

Transfer emissions are calculated using the standard AP-42 method for calculating rack transfers using maximum facility throughput values and design efficiency of the control device. Transfer fugitives use 99.2% capture efficiency factor when loading without vacuum assisted loading (AP-42 [5.2 Transportation and Marketing of Petroleum Liquids]).

Liquid weight concentrations for benzene for gasoline, crude, and distillate were based on speciation data from API 19.4. A benzene liquid weight concentration of 2% was used for blendstock. Vapor weight concentrations calculations for each month of the year were completed based on AP-42 Chapter 7 as part of the PTE. The benzene emissions were determined for each month of the year for each tank. The total benzene emissions for each tank for the worst-case product stored were used in the model.

The average annual benzene vapor weight percent based on monthly AP-42 meteorological data for Albany, NY was used for loading for each product. Gasoline was used as a worst-case for refined product loading as it has the highest vapor benzene concentration. The average annual blendstock benzene vapor weight concentration is used for blendstock loading. The average annual benzene vapor weight concentration for crude is used for crude loading calculations.



The attached tables summarize the parameters assumed for the modeling (Attachments 1 and 2). Detailed descriptions of the calculations, which were provided with the protocol, are also provided in Attachment 4. Detailed landing and cleaning calculations used for the hourly modeling for each tank have also been included in Attachment 4. Several different iterations representing different throughputs at each rack were completed to determine the impact on the model results.

3.3.1.1 Gasoline Storage Tanks:

The facility currently has ten (10) permitted petroleum product storage tanks. The tanks are equipped with internal floating roofs and have varying capacities. Each tank was modeled as two volume sources. One volume source was modeled with the actual tank height as the release height, which represented 80% of the emissions for the tank. The second volume source was modeled with half of the tank height as the release height, which represented 20% of the emissions for the tank. The diameter of the tank was used to calculate the initial lateral dimension by dividing the diameter by 4.3.

To determine the landing scenario that causes the worst-case short-term (1-hour) impact, landing emissions were evaluated for each tank separately in the short-term model. The tank with the worst-case estimate of emissions during landing based on the model results was then used to determine the maximum hourly emission rate of benzene during landings. Variable monthly emission rates were calculated and used in the model. These calculations are described in detail in Attachment 4.

Cleanings were also modeled, with the vapor space purge assumed to be the worst-case hour. The vapor space purge at each tank during cleaning was modeled as one volume source for each tank with the release height set to the height of the manway above the ground, which ranged from approximately 2.3 to 2.75 ft. The initial lateral dimension was calculated based on the diameter of the tank divided by 4.3. Uncontrolled vapor space purge was modeled for each tank. Model runs were completed for controlled cleanings (at 98% control). Controlled cleaning run assumptions assumed the use of a thermal oxidizer and were modeled as a horizontal point source. The controlled concentrations were calculated for the remaining tanks assuming 2% of the result obtained for the uncontrolled scenario. Detailed modeling parameters are provided in Attachment 1.

3.3.1.2 Distillate Storage Tanks:

The facility currently has five (5) exempt vertical fixed roof (VFR) distillate storage tanks with two (2) of those having the capability of being heated. Each VFR tank was modeled as a point source with the vent placed at the center of the tank. Detailed modeling parameters assumed for each tank are provided in Attachment 1.

3.3.1.3 Truck Loading Rack:

The facility has one (1) truck loading rack where gasoline, ethanol, and distillate are loaded. The truck rack has a refined product throughput subcap of 879,300,000 gallons per year. Loading operations are controlled with a VRU. The permitted emissions limit is 2 mg/L. The PTE calculation for the loading rack assumed maximum annual throughput of 879,300,000 gallons, controlled by the VRU. Loading rack fugitive emissions are controlled using a vac assist. Under an alternate operating scenario (AOS), loading can occur up to a lower throughput with fugitive emissions. Loading rack fugitive emissions were modeled as a volume source and controlled rack loading emissions from the VRU were modeled as a point source. Manufacturer information was used to develop source parameters such as stack height,



stack diameter, stack temperature, and stack velocity. For the short term dispersion model, the truck loading rack was assumed to load gasoline at the maximum loading rate as this is the worst case scenario product. Modeling was conducted for the primary and alternate operating scenarios. The model runs completed, including loading assumptions and emissions rates, are summarized in Attachment 2.

3.3.1.4 Rail Loading:

The facility has one (1) rail loading area where gasoline, ethanol, distillate, and biodiesel are loaded. The rail rack has a proposed refined product throughput subcap of 300,000,000 gallons. Loading operations are controlled with a VCU. The permitted emissions limit will be 2 mg/L. The PTE calculation for the loading rack assumed maximum annual throughput for each product loaded, controlled by the VCU. The controlled loading emissions were modeled as a point source. Rail loading fugitive emissions will be controlled using a vac assist. Under an AOS, loading can occur up to a lower throughput with fugitive emissions. Rail rack fugitive emissions, which used 99.2% capture efficiency, were modeled as a volume source. Manufacturer information was used to develop source parameters such as stack height, stack diameter, stack temperature, and stack velocity. For the short term dispersion model, the rail loading is assumed to load gasoline at the maximum loading rate as this is the worst case scenario product. Modeling was conducted for the primary and alternate operating scenarios. The model runs completed, including loading assumptions and emissions rates, are summarized in Attachment 2.

3.3.1.5 Marine Loading:

The facility has one (1) marine loading rack where refined products (gasoline, ethanol, blendstock, distillate, and biodiesel) and crude oil are loaded. The marine dock has a proposed refined product subcap throughput of 900,000,000 gallons and a reduced crude throughput cap of 450,000,000 gallons. Loading operations are controlled by two VCUs. The PTE calculation for the loading rack assumed maximum annual throughput for each product loaded, controlled by two VCUs (VCUM1 at 10 mg/L and VCUM2 at 2 mg/L). Marine loading fugitive emissions will be controlled unless loading under an AOS for inerted vessels using VCUM2. Loading can occur up to a lower throughput with fugitive emissions, assuming 99.9% capture efficiency. Fugitive emissions were modeled as an elevated area source and controlled rack landing emissions were modeled as a point source. Manufacturer information was used to develop source parameters such as stack height, stack diameter, stack temperature, and stack velocity for each VCU. For the short term dispersion model, the marine loading was assumed to load gasoline at the maximum loading rack as this is the worst case scenario product. Modeling was conducted for the primary and alternate operating scenarios. The model runs completed, including loading assumptions and emissions rates, are summarized in Attachment 2.

3.3.2 Non-HTAC Modeling

Hourly Emission Rate Potentials (ERP) were calculated for each of the emission sources at the facility for the following non-HTACs, for which actual annual emissions were greater than 100 lb/yr:

- Hexane
- 2,2,4-TMP
- Toluene
- Ethylbenzene
- Xylenes



The calculated hourly ERPs for the non-HTACs listed above were provided in the model protocol. Modeling was completed for each of the non-HTACs in the hourly ERP evaluation to determine the final Environmental Rating (ER) for each non-HTAC. The initial ERs, based on toxicity alone, are B for hexane, 2,2,4-TMP, ethylbenzene, and xylene and C for toluene.

Emission rates from each source were calculated using the same methodology as for benzene, which is outlined in Attachment 4, with the speciation for each non-HTAC used instead of the speciation for benzene. The worst-case speciation for each non-HTAC at each source was used in the modeling, depending on the product loaded. For hourly emissions for the tanks, the speciation for the product being modeled for the landing or cleaning (gasoline or blendstock) for each month was used to calculate the variable emission rates. The emission rates used in the model are provided in Attachments 1 and 2.

Table 1 below summarizes the AGCs and SGCs for the non-HTACs included in this analysis.

Non-HTAC	AGC (ug/m³)	SGC (ug/m³)
hexane	700	NA
2,2,4-TMP	3,300	NA
toluene	5,000	37,000
ethylbenzene	1,000	NA
xylenes	100	22,000

Table 1. AGCs and SGCs for non-HTACs.

3.3.3 H₂S Model

Modeling was completed for potential H₂S emissions for each of the IFR tanks storing crude oil. A separate table of the parameters used in the annual model is provided (Attachment 3). Each tank was modeled as two volume sources. One volume source was modeled with the actual tank height as the release height, which represented 80% of the emissions for the tank. The second volume source was modeled with half of the tank height as the release height, which represented 20% of the emissions for the tank. The diameter of the tank was used to calculate the initial lateral dimension by dividing the diameter by 4.3.

Modeling was completed for both annual emissions and hourly emission rates, assuming a vapor fraction of 0.00118, which is based on a liquid H₂S content of 10 ppm. For the annual model, the H₂S vapor fraction was multiplied by the total standing and working losses from crude oil storage in each tank and landing emissions, assuming one landing per tank.

For the hourly model, the H₂S vapor fraction was multiplied by the emission rate for the worst case hour during refill after landing or during vapor space purge during cleaning. Four hourly model iterations were completed during refill after landing. Model iterations were completed assuming that Tank 32 and Tank 117 were landing separately both with and without marine fugitives as a comparison. These tanks were chosen because they were the worst-case results for gasoline and blendstock tanks in the benzene



modeling for refill after a landing. Variable emission rates were also used for each month for the hourly model.

Model iterations were also completed for vapor space purge during cleaning. Uncontrolled vapor space purge was modeled for tanks 32 and 121 with marine fugitives. These tanks were chosen because they were the worst-case results for gasoline and blendstock tanks in the benzene modeling for vapor space purge during cleaning. Controlled vapor space purge concentrations were calculated by taking 2% of the uncontrolled model results for each tank. Additional details on H₂S model runs are provided in Attachments 3 and 6.

Annual model results were compared to the AGC for H_2S of 2 $\mu g/m^3$. Hourly model results were compared to the NYS H_2S standard of 0.01 ppm for 1-hour (14 $\mu g/m^3$).

3.4 Building Downwash Analysis:

All of the storage tanks at the facility, as well as office buildings, were utilized in the building downwash analysis. Direction-specific building dimensions were generated using BPIP-PRIME.

3.5 Meteorological Data:

Meteorological data which has been pre-processed for AERMOD for the years 2016-2020 were obtained from NYSDEC. Surface Met Data and Upper Air Met Data is from the Station located at the Albany International Airport in Colonie, NY located approximately 8 miles northwest of the terminal. This station was chosen because of its close proximity to the Terminal.

3.6 Modeled Receptors

Boundary receptors were modeled at the property lines from the facility site plan. Receptors were located every 25 meters along the facility boundaries. A Cartesian receptor grid was used to monitor the area surrounding the facility, using the following spacing:

- 70 meter spacing from the facility boundary out to 1 km
- 100 meter spacing from 1 to 2 km
- 250 meter spacing from 2 to 5 km
- 500 meter spacing from 5 to 10 km

Given the low emission release heights and the near ambient release temperatures it is not anticipated that significant emissions will be carried beyond these receptor points.

3.7 Terrain Considerations

The effects of terrain were considered in the modeling analysis. Elevations (above mean sea level) corresponding to the base elevation of the facility were assigned to all sources and buildings at the facility, as well as the modeled receptors.

The terrain processor for AERMOD, AERMAP, was used to generate terrain maxima (also referred to as hill heights) for the sources, buildings, and receptors. To generate these terrain maxima, object locations and Digital Elevation Model (DEM) data in 1 degree format were input to AERMAP.



4.0 Model Results

Detailed model results for each run are provided in Attachment 5 for benzene and non-HTACs and in Attachment 6 for H₂S. The maximum concentrations at the property line are summarized in the following sections.

4.1 Benzene Model Results

Annual model results ranged from $0.24~\mu g/m^3$ to $0.29~\mu g/m^3$ when the range of operating scenarios was explored in different model iterations, which exceeds the AGC of $0.13~\mu g/m^3$. However, this result is below the 10-in-a-million cancer risk level, which is identified as the acceptable residual risk management range in DAR-1 Section F.1(c).

The results of the hourly model runs are summarized in Table 2 below. The range of concentrations is provided for each scenario. Detailed results are in Attachment 5.

Scenario ModeledRange of Benzene Results for Maximum 1-hr at the Fenceline (μg/m³)No Cleanings or Landings28.0 μg/m³Refill after a landing88.1 μg/m³ to 220.1 μg/m³Uncontrolled vapor space purge3,110.2 μg/m³ to 30,660.2 μg/m³Vapor space purge, 98% control18.8 μg/m³ to 70.7 μg/m³

Table 2. Benzene Hourly Model Results Summary.

The results exceed the SGC of $27 \mu g/m^3$ for all of the uncontrolled scenarios. For controlled vapor space purge, two tanks (tanks 119 and 120) pass for all months of the year.

4.2 Non-HTAC Model Results

Annual model results were significantly below the AGCs for all of the non-HTACs, which can be seen in the detailed results in Attachment 5.

Only xylenes and toluene were included in the hourly modeling because SGCs are provided for these non-HTACs.

The results of the hourly model runs are summarized in Table 3 below. The range of concentrations is provided for each scenario. Detailed results are in Attachment 5.



Scenario Modeled Range of Xylene Results for Range of Toluene Results for Maximum 1-hr at the Fenceline Maximum 1-hr at the Fenceline $(\mu g/m^3)$ $(\mu g/m^3)$ $1\overline{44.9} \,\mu \overline{g/m^3}$ No Cleanings or Landings $344.8 \, \mu g/m^3$ Refill after a landing $345.8 \,\mu g/m^3 \text{ to } 346 \,\mu g/m^3$ 148.1 $\mu g/m^3$ to 252.2 $\mu g/m^3$ Uncontrolled vapor space $1,068.7 \,\mu\text{g/m}^3$ to $9,105.9 \,\mu\text{g/m}^3$ $3,550.2 \,\mu\text{g/m}^3$ to $33,752.2 \,\mu\text{g/m}^3$ $52.8 \,\mu g/m^3 \text{ to } 60.7 \,\mu g/m^3$ 29.3 $\mu g/m^3$ to 79.9 $\mu g/m^3$ Vapor space purge, 98% control

Table 3. Xylene and Toluene Hourly Model Results Summary.

No exceedances of the SGC for xylene (22,000 $\mu g/m^3$) or toluene (37,000 $\mu g/m^3$) were observed in the hourly modeling results.

4.3 H₂S Model Results

Detailed H₂S model results are provided in Attachment 6. There were no exceedances of the AGC in the annual model results. Runs were completed with and without marine fugitives (crude loading is only permitted at the marine dock)

As discussed in Section 3.3.3, model iterations were completed for refill after a landing and uncontrolled vapor space purge during cleaning with marine fugitives, Controlled vapor space purge during cleaning was calculated by taking 2% of the uncontrolled results for each tank. There were no differences observed in the model results with and without fugitives. The following results were obtained:

- No cleanings or landings: result was 0.84 μg/m³
- Refill after a tank landing: results were 58.9 $\mu g/m^3$ and 52.3 $\mu g/m^3$ for Tanks 32 and 117, respectively
- <u>Uncontrolled vapor space purge</u>: results were 7,455.1 μg/m³ and 7,127 μg/m³ for Tanks 32 and 121, respectively
- <u>Controlled vapor space purge</u>: results were 149.1 μ g/m³ and 142.5 μ g/m³ for Tanks 32 and 121, respectively

The hourly model runs exceeded the NYS H2S standard of $14 \mu g/m^3$ for 1 hour.

5.0 TBACT Analysis

As per 6 NYCRR 212-1.5, "in instances where a facility owner or operator can demonstrate to the satisfaction of the department that the facility owner or operator will apply BACT for criteria air contaminants or T-BACT for non-criteria air contaminants, the department may specify a less restrictive permissible emission rate or degree of air cleaning for the process emission source or emission point than required under Subpart 212-2 of this Part." 6 NYCRR 212-1.2(b)(20) defines T-BACT as "the maximum degree of reduction or the emission limitation for each non-criteria air contaminant that the department determines is achievable for a process operation on a case-by-case basis." The Terminal meets T-BACT



as outlined below for the loading rack and tank emissions from standing and working losses. The Terminal is proposing to implement T-BACT for tank cleanings.

The EPA RACT/BACT/LAER Clearinghouse was used for this evaluation as well as BACT determinations from several state agencies. State and Federal regulations were also reviewed. Specifically, Texas, New Jersey and Massachusetts were used in this evaluation. Each of these states have regulations and/or BACT determinations that addressed the three areas of emissions evaluated – loading rack emissions, Internal Floating Roof (IFR) tank losses from routine operations and IFR tank losses from maintenance emissions (landings and cleanings). The Texas Commission on Environmental Quality (TCEQ) Tier 1 BACT Requirements were used as well as Massachusetts Department of Environmental Protection (MassDEP) Top Case Best Available Control Technology (BACT) Guidelines for VOC Emitting Sources. New Jersey "advances in the art of air pollution control" requirements, commonly referred to as "State-of-the-Art" or "SOTA" were reviewed along with the NJ Reasonably Available Control Technology (RACT) regulations.

5.1 Loading Emissions

For loading emissions, BACT has been identified by TCEQ as 10 mg VOC/liter of gasoline loaded. NJ SOTA performance level for transfer operations for truck terminal and marine vessel operations is 10 mg VOC/liter of liquid transferred. MA defines BACT as 2 mg/L with a Vacuum Assist, negative pressure (VANP) vapor collection system with 100% collection efficiency with the installation and operation of CEMS. However, this is often considered Lowest Achievable Emission Rate (LAER) as opposed to BACT. Federal MACT regulations (Subpart R) require 10 mg/L while area source NESHAPS (Subpart BBBBBB) require 80 mg/L and NSPS Subpart XX requires 35 mg/L. The Global Terminal currently has a limit of 2 mg/L for the truck rack VRU with vacuum assisted loading. This exceeds BACT requirements.

5.2 Storage Tanks

For IFR tanks storing products with a true vapor pressure (TVP) <11.0 psia, TCEQ BACT requires storage tanks that have uninsulated exterior surfaces exposed to the sun to be white or aluminum. Required seals are either a primary mechanical or liquid mounted seal, or alternatively, a primary vapor mounted seal and secondary rim mounted seal. NJ requires a tank to have a floating roof with floating roof configurations that are similar to New Source Performance Standard (NSPS - 40 CFR Part 60 Subpart Kb), except with additional seal gap and fitting closure requirements, including leg socks, and allowing no visible gaps. MA requirements are specified in Regulations 310 CMR 7.24, which are consistent with 40 CFR 60 Subpart Kb. In addition, all new tanks are to be equipped with cable suspended full contact floating roofs (leg-supported floating roofs shall not be allowed). Federal regulations, specifically Subpart Kb, are consistent with BACT requirements. MACT Subpart R also requires that Kb requirements are met. GDGACT regulations require a modified Kb for tanks (secondary seal on a primary wiper seal is not required) not subject to Kb regulations or WW which has similar requirements to Kb. Global tanks meet federal regulations, including Subpart Kb requirements for Kb



applicable tanks and GDGACT for non-Kb applicable tanks.

5.3 Tank Cleanings and Landings

Currently, there is no level of control provided for maintenance emissions (landings or cleanings) at the Terminal, as they have not been previously required to control emissions from these activities based on short term modeling. With the new short term modeling limits in NY, landings and cleanings now exceed the SGC for benzene. Therefore, T-BACT was evaluated specifically related to landing and cleaning emissions from the IFR storage tanks. A summary of TX, NJ and MA regulations and/or BACT determinations specific to landings/clearings are outlined below.

5.3.1 Texas Regulatory Summary

TCEQ regulations pertaining to VOC storage tanks are outlined in Chapter 115 - Control of Air Pollution from Volatile Organic Compounds, Subchapter F: Miscellaneous Industrial Sources, Division 3: Degassing of Storage Tanks, Transport Vessels, and Marine Vessels §§115.540 - 115.542, 115.543, 115.544, 115.545, 115.546, 115.547, 115.549.

Per §115.541, all VOC vapors from a storage tank must be routed to a control during degassing operations unless the VOC concentration is less than 34,000 parts per million by volume (ppmv) expressed as methane or 50% of the lower explosive limit. In addition, all VOC vapors from a floating roof storage tank that is not a drain-dry tank must be routed to a control device as soon as practical but no later than:

- (1) 24 hours after the tank has been emptied to the extent practical or the drain pump loses suction for a floating roof storage tank containing VOC liquids with a true vapor pressure greater than or equal to 1.5 pounds per square inch absolute (psia) under actual storage conditions;
- (2) 72 hours after the tank has been emptied to the extent practical or the drain pump loses suction for a floating roof storage tank containing VOC liquids with a true vapor pressure less than 1.5 psia under actual storage conditions; or.
- (3) the time limit specified in a permit issued under Chapter 116 of this title (relating to Control of Air Pollution by Permits for New Construction or Modification) up to a maximum of 72 hours after the tank has been emptied to the extent practical or the drain pump loses suction.

TCEQ Tier 1 BACT is defined for cleanings and landings as follows:

- Cleanings: "route to appropriate control device when degassing. Control must be maintained until the VOC concentration is less than 10,000 ppmv VOC (or equivalent for non-VOCs). If there is any standing liquid within the tank, and the tank is opened to the atmosphere or ventilated, the vapor stream must be controlled until there is no standing liquid or the VOC vapor pressure is less than 0.02 psia. Route to control device during roof refloating if emissions from filling tanks without degassing and cleaning is > 5tpy. In this case, if controlling through fixed



roof vent, route to control device during entire tank refill. New tanks must be designed to be drain dry with connections to control vapors under a landed roof. Commence under-roof degassing within 24 hours of landing. Degas every 24 hours unless no standing liquid in tank or vapor pressure of liquid in tank has a VOC partial pressure <0.02 psi."

- Floating roof tank landings at bulk gasoline terminals:
 - o "May land roof without control for two landings per tank per year when required for Reid Vapor Pressure changes.
 - Floating roof tank landing, change of service: May land roof without control for a change of service (incompatible liquids) if total site change of service tank landing emissions are less than 5 tpy."

For control requirements, TCEQ defines BACT for a flare for VOCs as meeting 40 CFR 60.18 and having a destruction efficiency of 99% for certain compounds up to three carbons and 98% otherwise. No flaring of halogenated compounds is allowed.

5.3.2 New Jersey Regulatory Summary

- N.J. Admin Code § 7:27-16.2(p) states the following requirements for VOC stationary storage tanks:
- "(p) The owner or operator of any floating roof tank, not exempt pursuant to (f)6 or (f)7 above, used to store a VOC shall:
 - 1. Submit a complete facility-wide tank VOC control plan to the Department for approval at the address listed at (v) below as follows:
 - i. For any floating roof tank not exempt pursuant to (f)6 above, and existing as of May 19, 2009, submit to the Department in writing the complete facility-wide tank VOC control plan by December 1, 2009; or
 - ii. For any new tank, excluding a tank exempt pursuant to (f)6 above, added to a facility, submit to the Department in writing a new or updated complete facility-wide tank VOC control plan by 120 days after the installation of the newly constructed tank(s);
 - 2. Include in the facility-wide tank VOC control plan, for all floating roof tanks, except those floating roof tanks exempt pursuant to (f)6 above, the information in (p)2i and ii below or (p)2i and iii below, as applicable:
 - i. A list of each tank at the facility and the following for each tank:
 - (1) The tank type;
 - (2) The tank volume;
 - (3) The tank diameter;
 - (4) The tank contents;
 - (5) The permit activity number;
 - (6) Any other identifying numbers; and
 - (7) The Bureau of Release Prevention schedule for tank inspection.
 - ii. A schedule to implement one or more of the following emission controls, which must be implemented by May 19, 2019. This schedule shall be consistent with the facility's



- schedule for tank removal from service for normal inspection and maintenance and with the facility's schedule for the installation of any new tank(s):
- (1) A tank configuration such that the bottom of the roof deck can be lowered to one foot or less from the top-most point of the surface of the tank floor;
- (2) A method that routes all vapors from the tank to a vapor control device with a control efficiency of at least 90 percent, from the time the roof is landed until it is within 10 percent by volume of being refloated; or
- (3) Other measures approved by the Department as being equally or more effective in preventing VOC emissions to the outdoor atmosphere."
- iii. An emissions averaging plan to operate all Range III floating roof tanks that store gasoline, except those tanks exempt pursuant to (f)6 above, such that their average annual in-service roof landing VOC emissions, as calculated in accordance with Chapter 7.1.3.2.2 "Roof Landings" of AP-42, as supplemented or amended and incorporated herein by reference, or as calculated using another method approved by the Department in accordance with (v) below, and after applying any applicable control efficiencies, is less than:
 - (1) Five tons per tank per calendar year from 2011 through 2013;
 - (2) Four tons per tank per calendar year from 2014 through 2016;
 - (3) Three tons per tank per calendar year from 2017 through 2019; and
 - (4) Two tons per tank per calendar year in 2020 and subsequent years.

(f) The following exemptions apply:

- 6. Any floating roof tank subject to a Federally enforceable condition limiting its annual inservice roof landing VOC emissions to less than five tons as calculated by AP-42, Chapter 7, may be exempt from (p) below, at the owner or operator's discretion, provided that the owner or operator shall maintain the records of these calculations pursuant to (s) below and the tank's Operating Permit or Preconstruction Permit, as applicable.
- 7. Any floating roof tank subject to a Federally enforceable condition in its Operating Permit or Preconstruction Permit, as applicable, limiting the vapor pressure of its contents to less than 1.5 psia at standard conditions, shall be exempt from (p) below only if the tank's records, maintained pursuant to (s)1 below, show that the vapor pressure of the tank's contents is less than 1.5 psia under standard conditions."

NJ requires control of cleanings in ozone season, between May 1 to September 30 per N.J. Admin. Code § 7:27-16.2(q):

- "(q) On and after May 1, 2010, any part of a degassing and cleaning operation of a stationary storage tank performed during the period May 1 through September 30 shall be performed only as follows:
 - 1. The owner or operator shall degas a tank storing a VOC with a vapor pressure equal to or greater than 0.5 psia at standard conditions as follows:
 - i. Empty the tank of the VOC liquid;



- ii. Minimize VOC vapors in the tank vapor space by one of the following methods:
 - (1) Exhaust VOCs contained in the tank vapor space to a vapor control system rated at a minimum 95 percent efficiency until the organic vapor concentration is 5,000 parts per million by volume (ppmv) or less as methane, or is 10 percent or less of the lower explosive limit, whichever is less;
 - (2) Displace VOCs contained in the tank vapor space to a vapor control system rated at a minimum 95 percent efficiency by filling the tank with a suitable liquid until 90 percent or more of the maximum operating level of the tank is filled. Suitable liquids are organic liquids having a TVP of less than 0.5 psia, water, clean produced water, or produced water derived from crude oil having a TVP less than 0.5 psia; or
 - (3) If the tank is a free-water knockout tank, a person may degas the tank vapor space by restricting the outflow of water and floating off the oilpad, such that at least 90 percent of the tank volume is displaced;
- iii. Discharge or displace the VOC vapors contained in the tank vapor space to a vapor control system that is vapor-tight and free of liquid leaks; and
- **iv.** As appropriate, temporarily remove for no longer than one hour, a suitable tank fitting, such as a manway, to facilitate connection to an external vapor control system.
- 2. The owner or operator shall clean a tank storing a VOC with vapor pressure equal to or greater than 0.5 psia at standard conditions only if:
 - i. At least one of the following cleaning agents is used:
 - (1) Diesel fuel;
 - (2) A solvent with an initial boiling point of greater than 302 degrees Fahrenheit;
 - (3) A solvent with a vapor pressure less than 0.5 psia;
 - (4) A solvent with 50 grams per liter VOC content or less; or
 - (5) Some other Department-approved cleaning agent; or
 - ii. Steam cleaning is performed.
- 3. The owner or operator shall control emissions from the sludge removed from a tank that stores a VOC with a vapor pressure equal to or greater than 1.5 psia at standard conditions by:
 - i. During sludge removal, controlling emissions from the receiving vessel by operating a vapor control system that reduces VOC emissions by at least 95 percent;
- **ii.** Transporting removed sludge in containers that are vapor-tight and free of liquid leaks; and
 - iii. Storing removed sludge, until final disposal, in containers that are vapor-tight and free of liquid leaks, or in tanks that comply with (b) above."

NJ does not have a regulation requiring landings to be controlled unless you need it to comply with the emissions levels outlined in § 7:27-16.2(p)iii. above. However, control of landings is being required on a case by case basis depending on hourly air dispersion modeling results. Required control for cleanings during ozone season is 95%.



5.3.3 Massachusetts Regulatory Summary

There are no regulations specific to maintenance emissions for organic material storage and distribution per 310 CMR 7.24.

MassDEP Top Case BACT Guidelines for Bulk Gasoline Storage Tanks state the following minimum requirements for VOCs:

"In addition to requirements specified in Regulations 310 CMR 7.24 and 40 CFR 60 Subpart Kb

- All tanks shall be equipped with cable suspended full contact floating roofs (leg-supported floating roofs shall not be allowed)
- Tanks designed such that there will be no standing liquid when emptied
- Tanks must include a connection for a control device (98% VOC/HAPs control efficiency or 5000 ppmv VOC/HAPs tank concentration) that will control vapors when roofs are not floating (when tanks are emptied, cleaned, during seasonal fuel switching/tank landings, etc.)
- Utilize 98% overall efficiency VOC/HAPs control device when seasonal fuel switching/tank landing event would cause potential VOC/HAPs emission of one or more tons."

Control is required when landing emissions are greater than 1 ton. The required control is 98%.

5.4 Conclusion

The truck rack VRU at the Global Albany Terminal is considered LAER as outlined in Section 5.1. The IFR tanks at the Terminal are in compliance with T-BACT requirements outlined in Section 5.2.

Based on the regulatory review provided in Section 5.3, controlled cleanings could be considered BACT. Although control is often required only during ozone season, some states are requiring controlled cleanings all year. BACT control efficiency is between 95%-98%. Landing emissions are not typically controlled and therefore not considered BACT.



Attachment 1 Modeling Parameters for Tanks

Global Albany Annual Benzene Model Assumptions - TANKS

General Parameters		
Parameter		Value
Projection		UTM
Datum		NAD83
UTM Zone		18
Hemisphere		Northern
AERMET		2016-2020 MET Data
AERMAP		1-deg DEM Data from webgis.com
Sources	Assumptions/ Notes	Value
Tank 28 (Distillate) (Point Source		
Emission Rate (lb/hr)	From PTE Calculations	6.59E-04
Emission Rate (lb/yr)	From PTE Calculations	5.77
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 29 (Distillate) (Point Source	ce)	
Emission Rate (lb/hr)	From PTE Calculations	6.59E-04
Emission Rate (lb/yr)	From PTE Calculations	5.77
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 30 (Distillate) (Point Source	ce)	
Emission Rate (lb/hr)	From PTE Calculations	6.59E-04
Emission Rate (lb/yr)	From PTE Calculations	5.77
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 33 (Distillate) (Point Source	ce)	
Emission Rate (lb/hr)	From PTE Calculations	6.55E-04
Emission Rate (lb/yr)	From PTE Calculations	5.74
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 64 (Distillate) (Point Source	ce)	
Emission Rate (lb/hr)	From PTE Calculations	5.40E-04
Emission Rate (lb/yr)	From PTE Calculations	4.73
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient

Global Albany Annual Benzene Model Assumptions - TANKS

Tank 31 (Gasoline) (UPPER Volume	Source, 80% of emissions)	
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	7.65E-03
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	66.99
Emission Rate for Annual Run 8	From PTE Calculations, no landings at this	
(lb/hr)	tank	4.87E-03
Emission Rate for Annual Run 8	From PTE Calculations, no landings at this	
(lb/yr)	tank	42.66
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 31 (Gasoline) (LOWER Volume	e Source, 20% of emissions)	
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	1.91E-03
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	16.75
Emission Rate for Annual Run 8	From PTE Calculations, no landings at this	
(lb/hr)	tank	1.22E-03
Emission Rate for Annual Run 8	From PTE Calculations, no landings at this	
(lb/yr)	tank	10.67
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47
Tank 32 (Gasoline) (UPPER Volume	Source, 80% of emissions)	
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	7.65E-03
Emission Rate for Annual Runs 1	France DTF Coloralations with landings at 2.2	
Ellission kate for Allitual kulls 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	67.00
		67.00
through 7 and 9 (lb/hr)	TPY per tank	67.00 4.87E-03
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8	TPY per tank From PTE Calculations, no landings at this	
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr)	TPY per tank From PTE Calculations, no landings at this tank	
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this	4.87E-03
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr)	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank	4.87E-03 42.68
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents	4.87E-03 42.68 45
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft)	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter	4.87E-03 42.68 45 125
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft)	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15	4.87E-03 42.68 45 125 29.1
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft)	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15	4.87E-03 42.68 45 125 29.1
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 32 (Gasoline) (LOWER Volume	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 E Source, 20% of emissions)	4.87E-03 42.68 45 125 29.1
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 32 (Gasoline) (LOWER Volume Emission Rate for Annual Runs 1	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 E Source, 20% of emissions) From PTE Calculations, with landings at 2.2	4.87E-03 42.68 45 125 29.1 20.93
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 32 (Gasoline) (LOWER Volume Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 E Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank	4.87E-03 42.68 45 125 29.1 20.93
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 32 (Gasoline) (LOWER Volume Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 E Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2	4.87E-03 42.68 45 125 29.1 20.93
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 32 (Gasoline) (LOWER Volume Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 E Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank	4.87E-03 42.68 45 125 29.1 20.93
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 32 (Gasoline) (LOWER Volume Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 E Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, no landings at this	4.87E-03 42.68 45 125 29.1 20.93 1.91E-03
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 32 (Gasoline) (LOWER Volume Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr)	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 E Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, no landings at this tank	4.87E-03 42.68 45 125 29.1 20.93 1.91E-03
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 32 (Gasoline) (LOWER Volume Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr)	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 E Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this	4.87E-03 42.68 45 125 29.1 20.93 1.91E-03 16.75 1.22E-03
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 32 (Gasoline) (LOWER Volume Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr)	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 E Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank	4.87E-03 42.68 45 125 29.1 20.93 1.91E-03 16.75 1.22E-03 10.67
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 32 (Gasoline) (LOWER Volume Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 E Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents	4.87E-03 42.68 45 125 29.1 20.93 1.91E-03 16.75 1.22E-03 10.67 22.5
through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 32 (Gasoline) (LOWER Volume Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft)	TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 E Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter	4.87E-03 42.68 45 125 29.1 20.93 1.91E-03 16.75 1.22E-03 10.67 22.5 125

Global Albany Annual Benzene Model Assumptions - TANKS

Tank 39 (Gasoline) (UPPER Volume	Source, 80% of emissions)	
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	6.63E-03
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	58.11
Emission Rate for Annual Run 8	From PTE Calculations, no landings at this	
(lb/hr)	tank	3.86E-03
Emission Rate for Annual Run 8	From PTE Calculations, no landings at this	
(lb/yr)	tank	33.78
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 39 (Gasoline) (LOWER Volume	Source, 20% of emissions)	
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	1.66E-03
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	14.53
Emission Rate for Annual Run 8	From PTE Calculations, no landings at this	
(lb/hr)	tank	9.64E-04
Emission Rate for Annual Run 8	From PTE Calculations, no landings at this	
(lb/yr)	tank	8.45
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47
Tank 120 (Gasoline) (UPPER Volum	e Source, 80% of emissions)	
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	5.51E-03
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	48.29
Emission Rate for Annual Run 8	France DTE Coloniations and londings at this	
Linission Nate for Annual Name	From PTE Calculations, no landings at this	
(lb/hr)	tank	2.74E-03
		2.74E-03
(lb/hr)	tank	2.74E-03 23.97
(lb/hr) Emission Rate for Annual Run 8	tank From PTE Calculations, no landings at this	
(lb/hr) Emission Rate for Annual Run 8 (lb/yr)	tank From PTE Calculations, no landings at this tank	23.97
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents	23.97 48
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft)	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter	23.97 48 80
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft)	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15	23.97 48 80 18.6
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft)	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15	23.97 48 80 18.6
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 120 (Gasoline) (LOWER Volun	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Tank Source, 20% of emissions)	23.97 48 80 18.6
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 120 (Gasoline) (LOWER Volumemission Rate for Annual Runs 1	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Tank height divided by 2.15 Tank PTE Calculations, with landings at 2.2	23.97 48 80 18.6 22.33
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 120 (Gasoline) (LOWER Volume Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Tank height divided by 2.15 Te Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank	23.97 48 80 18.6 22.33
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 120 (Gasoline) (LOWER Volun Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Tank height divided by 2.15 Tes Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2	23.97 48 80 18.6 22.33
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 120 (Gasoline) (LOWER Volun Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Tank height divided by 2.15 Tes Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank	23.97 48 80 18.6 22.33
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 120 (Gasoline) (LOWER Volume Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Tank height divided by 2.15 Tome Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, no landings at this	23.97 48 80 18.6 22.33 1.38E-03
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 120 (Gasoline) (LOWER Volune Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr)	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Tank height divided by 2.15 Test Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, no landings at this tank	23.97 48 80 18.6 22.33 1.38E-03
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 120 (Gasoline) (LOWER Volune Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Tank height divided by 2.15 Tes Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this	23.97 48 80 18.6 22.33 1.38E-03 12.07 6.84E-04
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 120 (Gasoline) (LOWER Volun Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr)	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Tank height divided by 2.15 Tank PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank	23.97 48 80 18.6 22.33 1.38E-03 12.07 6.84E-04
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 120 (Gasoline) (LOWER Volun Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 The Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents	23.97 48 80 18.6 22.33 1.38E-03 12.07 6.84E-04 5.99 24
(lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 120 (Gasoline) (LOWER Volun Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft)	tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 The Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, no landings at this tank From PTE Calculations, no landings at this tank Tank height. Approx. height of roof vents Tank diameter	23.97 48 80 18.6 22.33 1.38E-03 12.07 6.84E-04 5.99 24 80

Toul: 114 (Blowdeteck) (UBBER Vol	Global Albany Annual Benzene Wodel Assumpt	ions TAINS
Tank 114 (Blendstock) (UPPER Vol Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
		7.005.03
through 7 and 9 (lb/hr)	TPY per tank	7.09E-03
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	50.00
through 7 and 9 (lb/hr)	TPY per tank	62.08
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	0.045.00
(lb/hr)	blendstock tank	8.94E-03
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	70.00
(lb/yr)	blendstock tank	78.29
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 114 (Blendstock) (LOWER Vol	ume Source, 20% of emissions)	
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	1.77E-03
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	15.52
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	
(lb/hr)	blendstock tank	2.23E-03
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	
(lb/yr)	blendstock tank	19.57
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
· ,	,	11.10
Tank 115 (Blendstock) (UPPER Vol Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
	TPY per tank	0.705.03
through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	8.79E-03
through 7 and 9 (lb/hr)	TPY per tank	76.06
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	76.96
(lb/hr)	blendstock tank	1.005.03
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	1.06E-02
	blendstock tank	02.10
(lb/yr)		93.18
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 115 (Blendstock) (LOWER Vol	ume Source, 20% of emissions)	
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	2.20E-03
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	19.24
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	
(lb/hr)	blendstock tank	2.66E-03
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	
(lb/yr)	blendstock tank	23.29
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
		J-1.J
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

Tank 117 (Blendstock) (UPPER Vol	ume Source 80% of emissions)	
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	5.47E-03
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	3.47E-03
through 7 and 9 (lb/hr)	TPY per tank	47.94
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	47.54
(lb/hr)	blendstock tank	7.32E-03
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	7.32E-03
(lb/yr)	blendstock tank	64.15
. , , ,		
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 117 (Blendstock) (LOWER Vol		
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	1.37E-03
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	11.98
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	
(lb/hr)	blendstock tank	1.83E-03
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	
(lb/yr)	blendstock tank	16.04
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 118 (Blendstock) (UPPER Vol	- '	
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
	TPY per tank	
ithrough / and 9 (lb/hr)		7 54F-03
through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1	·	7.54E-03
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	From PTE Calculations, with landings at 2.2 TPY per tank	7.54E-03 66.06
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per	66.06
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per	66.06 9.39E-03
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank	66.06 9.39E-03 82.27
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents	66.06 9.39E-03 82.27 48
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter	66.06 9.39E-03 82.27 48 100
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3	66.06 9.39E-03 82.27 48 100 23.3
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15	66.06 9.39E-03 82.27 48 100
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Vol	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 lume Source, 20% of emissions)	66.06 9.39E-03 82.27 48 100 23.3
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Vol	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Iume Source, 20% of emissions	66.06 9.39E-03 82.27 48 100 23.3 22.33
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Vol Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Jume Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank	66.06 9.39E-03 82.27 48 100 23.3
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Vol Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Jume Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2	66.06 9.39E-03 82.27 48 100 23.3 22.33
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Vol Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Jume Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank	66.06 9.39E-03 82.27 48 100 23.3 22.33
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Tank 118 (Blendstock) (LOWER Vol Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Jume Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per	66.06 9.39E-03 82.27 48 100 23.3 22.33 1.89E-03 16.51
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Vol Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 (lb/hr)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Jume Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank	66.06 9.39E-03 82.27 48 100 23.3 22.33
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Vol Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 ume Source, 20% of emissions From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per	66.06 9.39E-03 82.27 48 100 23.3 22.33 1.89E-03 16.51
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Vol Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Jume Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank	66.06 9.39E-03 82.27 48 100 23.3 22.33 1.89E-03 16.51
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Vol Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 ume Source, 20% of emissions From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per	66.06 9.39E-03 82.27 48 100 23.3 22.33 1.89E-03 16.51 2.35E-03
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Vol Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 ume Source, 20% of emissions	66.06 9.39E-03 82.27 48 100 23.3 22.33 1.89E-03 16.51 2.35E-03 20.57
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Vol Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank Diameter divided by 4.3 Tank height divided by 2.15 Iume Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents	66.06 9.39E-03 82.27 48 100 23.3 22.33 1.89E-03 16.51 2.35E-03 20.57 24
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Vol Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank Diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Iume Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter	66.06 9.39E-03 82.27 48 100 23.3 22.33 1.89E-03 16.51 2.35E-03 20.57 24 100

Tank 119 (Blendstock) (UPPER Volu	me Source 80% of emissions)	
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	7.99E-03
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	7.332 03
through 7 and 9 (lb/hr)	TPY per tank	70.00
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	70.00
(lb/hr)	blendstock tank	9.84E-03
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	3.84L-03
(lb/yr)	blendstock tank	86.21
Release Height (ft)	Tank height. Approx. height of roof vents	48
	Tank diameter	
Diameter (ft)		80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 119 (Blendstock) (LOWER Volu		
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	2.00E-03
Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2	
through 7 and 9 (lb/hr)	TPY per tank	17.50
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	
(lb/hr)	blendstock tank	2.46E-03
Emission Rate for Annual Run 8	From PTE Calculations, 3.7 TPY landings per	
(lb/yr)	blendstock tank	21.55
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vartical Director (ft)	Release height divided by 2.15	11.10
Initial Vertical Dimension (ft)	Release fieight divided by 2.15	11.16
	· '	11.16
Tank 121 (Blendstock) (UPPER Volu Emission Rate for Annual Runs 1	· '	11.10
Tank 121 (Blendstock) (UPPER Volu	ime Source, 80% of emissions)	1.21E-02
Tank 121 (Blendstock) (UPPER Volu Emission Rate for Annual Runs 1	Ime Source, 80% of emissions) From PTE Calculations, with landings at 2.2	
Tank 121 (Blendstock) (UPPER Volu Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	From PTE Calculations, with landings at 2.2 TPY per tank	
Tank 121 (Blendstock) (UPPER Volu Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2	1.21E-02
Tank 121 (Blendstock) (UPPER Volu Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank	1.21E-02
Tank 121 (Blendstock) (UPPER Volu Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per	1.21E-02 105.60
Tank 121 (Blendstock) (UPPER Volu Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank	1.21E-02 105.60
Tank 121 (Blendstock) (UPPER Volu Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per	1.21E-02 105.60 1.39E-02
Tank 121 (Blendstock) (UPPER Volu Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank	1.21E-02 105.60 1.39E-02 121.82 48
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter	1.21E-02 105.60 1.39E-02 121.82 48 150
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3	1.21E-02 105.60 1.39E-02 121.82 48 150 34.9
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15	1.21E-02 105.60 1.39E-02 121.82 48 150
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volue	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 IMME Source, 20% of emissions)	1.21E-02 105.60 1.39E-02 121.82 48 150 34.9
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volue Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Ime Source, 20% of emissions) From PTE Calculations, with landings at 2.2	1.21E-02 105.60 1.39E-02 121.82 48 150 34.9 22.33
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Ime Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank	1.21E-02 105.60 1.39E-02 121.82 48 150 34.9
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Ime Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2	1.21E-02 105.60 1.39E-02 121.82 48 150 34.9 22.33
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Ime Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank	1.21E-02 105.60 1.39E-02 121.82 48 150 34.9 22.33
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 Ime Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per	1.21E-02 105.60 1.39E-02 121.82 48 150 34.9 22.33 3.01E-03 26.40
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 IMME Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank	1.21E-02 105.60 1.39E-02 121.82 48 150 34.9 22.33
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 IMME Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per	1.21E-02 105.60 1.39E-02 121.82 48 150 34.9 22.33 3.01E-03 26.40 3.48E-03
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 IMME Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank	1.21E-02 105.60 1.39E-02 121.82 48 150 34.9 22.33 3.01E-03 26.40 3.48E-03 30.45
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 IMME Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents	1.21E-02 105.60 1.39E-02 121.82 48 150 34.9 22.33 3.01E-03 26.40 3.48E-03 30.45 24
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 IMME Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter	1.21E-02 105.60 1.39E-02 121.82 48 150 34.9 22.33 3.01E-03 26.40 3.48E-03 30.45 24 150
Tank 121 (Blendstock) (UPPER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volue Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 IMME Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents	1.21E-02 105.60 1.39E-02 121.82 48 150 34.9 22.33 3.01E-03 26.40 3.48E-03 30.45 24

Tank 130 (Product/ Water Mixture) (UPPER Volume Source, 80% of emissions)		
Emission Rate (lb/hr)	From PTE Calculations	3.04E-03
Emission Rate (lb/yr)	From PTE Calculations	26.62
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	75
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 130 (Product/ Water Mixture	(LOWER Volume Source, 20% of emissions)	
Emission Rate (lb/hr)	From PTE Calculations	7.60E-04
Emission Rate (lb/yr)	From PTE Calculations	6.65
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	75
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

See Separate Table for Vapor Space Purge During Cleanings

General Parameters		
Parameter		Value
Projection		итм
Datum		NAD83
UTM Zone		18
Hemisphere		Northern
AERMET		2016-2020 MET Data
AERMAP		1-deg DEM Data from webgis.com
Sources	Assumptions/ Notes	Value
Tank 28 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	6.59E-04
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 29 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	6.59E-04
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 30 (Distillate) (Point Source)	, issumes	Amalent
Emission Rate (lb/hr)	From PTE Calculations	6.59E-04
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 33 (Distillate) (Point Source)	, 1553.1153	Ambient
Emission Rate (lb/hr)	From PTE Calculations	6.55E-04
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 64 (Distillate) (Point Source)	rissamed	Ambient
Emission Rate (lb/hr)	From PTE Calculations	5.40E-04
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Vendenty (17/3) Gas Exit Temperature	Assumed	Ambient
Tank 31 (Gasoline) (UPPER Volume Source		Ambient
Emission Rate (lb/hr) Not During Landing of	•	
Cleaning	From PTE Calculations	7.65E-03
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet
Landing	•	r Benzene
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93

Tank 120 (Gasoline) (UPPER Volume Sour	ai Albany Hourly Benzene Model Assumpti	IOIIS - TAINKS
Emission Rate (lb/hr) Not During Landing of	•	
Cleaning	From PTE Calculations	5.51E-03
Emission Rate (lb/hr) During Refill After		Iculations in Variable Emissions Rate Spreadsheet
Landing	for Benzene	
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 120 (Gasoline) (LOWER Volume Sou		
Emission Rate (lb/hr) Not During Landing of	•	
Cleaning	From PTE Calculations	1.38E-03
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and ca	Iculations in Variable Emissions Rate Spreadsheet
Landing	for B	Benzene
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 114 (Blendstock) (UPPER Volume So	urce, 80% of emissions)	
Emission Rate (lb/hr) Not During Landing o	r	
Cleaning	From PTE Calculations	7.09E-03
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and ca	Iculations in Variable Emissions Rate Spreadsheet
Landing	for E	Benzene
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 114 (Blendstock) (LOWER Volume So	ource, 20% of emissions)	
Emission Rate (lb/hr) Not During Landing of	r	
Cleaning	From PTE Calculations	1.77E-03
Emission Rate (lb/hr) During Refill After		Iculations in Variable Emissions Rate Spreadsheet
Landing	for Benzene	
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 115 (Blendstock) (UPPER Volume So		
Emission Rate (lb/hr) Not During Landing of		
Cleaning	From PTE Calculations	8.79E-03
Emission Rate (lb/hr) During Refill After	· ·	Iculations in Variable Emissions Rate Spreadsheet
Landing		Benzene
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33

· · · · · · · · · · · · · · · · · · ·	INITIALIS	
	2.20E-03	
· ·	Benzene	
Tank height. Approx. height of roof vents	24	
	150	
	34.9	
,	11.16	
	11.10	
•		
	5.47E-03	
· ·	Benzene	
	48	
	110	
	25.6	
,	22.33	
,	22.33	
	1.37E-03	
· ·	Benzene	
	24	
	110	
	25.6	
'	11.16	
	11.10	
	7.54E-03	
•	Benzene	
	48	
	100	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	23.3	
•	22.33	
<u> </u>	22.33	
•		
	1.89E-03	
·	Calculated based on 1500 bph refill rate and calculations in Variable Emissions Rate Spreadsheet for Benzene	
Tank height. Approx. height of roof vents	24	
Tank diameter	100	
Tank diameter Tank Diameter divided by 4.3	100 23.3	
	From PTE Calculations Calculated based on 1500 bph refill rate and cafor E Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Release height divided by 2.15 rce, 80% of emissions) From PTE Calculations Calculated based on 1500 bph refill rate and cafor E Tank height. Approx. height of roof vents Tank Diameter divided by 4.3 Tank height divided by 2.15 urce, 20% of emissions) From PTE Calculations Calculated based on 1500 bph refill rate and cafor E Tank Diameter divided by 4.3 Release height divided by 2.15 rce, 80% of emissions) From PTE Calculations Calculated based on 1500 bph refill rate and cafor E Tank Diameter divided by 2.15 rce, 80% of emissions) From PTE Calculations Calculated based on 1500 bph refill rate and cafor E Tank height. Approx. height of roof vents Tank Diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 urce, 20% of emissions) From PTE Calculations Calculated based on 1500 bph refill rate and cafor E Tank Diameter divided by 2.15 urce, 20% of emissions) From PTE Calculations Calculated based on 1500 bph refill rate and cafor E	

Tank 119 (Blendstock) (UPPER Volume Sou	rce, 80% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	7.99E-03
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and cal	culations in Variable Emissions Rate Spreadsheet
Landing	for Benzene	
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 119 (Blendstock) (LOWER Volume Sou	rce, 20% of emissions)	
Emission Rate (lb/hr) Not During Landing or	<u> </u>	
Cleaning	From PTE Calculations	2.00E-03
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and ca	culations in Variable Emissions Rate Spreadsheet
Landing	for B	enzene
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 121 (Blendstock) (UPPER Volume Sou	rce, 80% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	1.21E-02
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and ca	culations in Variable Emissions Rate Spreadsheet
Landing	for B	enzene
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 121 (Blendstock) (LOWER Volume Sou	rce, 20% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	3.01E-03
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and cal	culations in Variable Emissions Rate Spreadsheet
Landing		enzene
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 130 (Product/ Water Mixture) (UPPER	Volume Source, 80% of emissions)	
Emission Rate (lb/hr)	From PTE Calculations	3.04E-03
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	75
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 130 (Product/ Water Mixture) (LOWE	R Volume Source, 20% of emissions)	
Emission Rate (lb/hr)	From PTE Calculations	7.60E-04
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	75
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
	1	11:10

General Parameters		
Parameter		Value
Projection		итм
Datum		NAD83
UTM Zone		18
Hemisphere		Northern
AERMET		2016-2020 MET Data
AERMAP	I (1)	1-deg DEM Data from webgis.com
Sources	Assumptions/ Notes	Value
Tank 28 (Distillate) (Point Source)		
	See Hourly Assumptions Table	
Tank 29 (Distillate) (Point Source)		
- 100/51:111:125	See Hourly Assumptions Table	
Tank 30 (Distillate) (Point Source)		
	See Hourly Assumptions Table	
Tank 33 (Distillate) (Point Source)		
	See Hourly Assumptions Table	
Tank 64 (Distillate) (Point Source)		
- 12/2 11 1/2 12 13	See Hourly Assumptions Table	
Tank 31 (Gasoline) (During Uncontrolled Cleaning -	1	
Model Assumptions Not During Cleaning		rly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for Benzene Table
D-1 11-i-h4/f4\	A -t	25
Release Height (ft)	Actual Height of Manway above ground	2.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.16
Tank 31 (Gasoline) (During Controlled Cleaning - Ho	rizontal Point Source)	
Model Assumptions Not During Cleaning	See Hourly Model Assumptions Table	
Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for Benzene Table
Deleges Height (ft)	Charle Unicht ab account	42
Release Height (ft)	Stack Height above ground	13
Diameter (ft)	Inside diameter of stack	2.5
Exit Velocity (ft/s)	Calculated from contractor data	5.1
Gas Exit Temperature (degrees F)	From cleaning contractor	1400
Tank 32 (Gasoline) (During Uncontrolled Cleaning -	, , ,	
Model Assumptions Not During Cleaning	See Hourly Model Assumptions Table	
Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for Benzene Table
Pologo Hoight (ft)	Actual Height of Manway above ground	2.75
Release Height (ft)		
Diameter (ft)	Tank Diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.30
Tank 32 (Gasoline) (During Controlled Cleaning - Ho	•	1.04.114
Model Assumptions Not During Cleaning		'ly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for Benzene Table
Release Height (ft)	Stack Height above ground	12
Diameter (ft)	Inside diameter of stack	13
		2.5
Exit Velocity (ft/s)	Calculated from contractor data	5.1
Gas Exit Temperature (degrees F)	From cleaning contractor	1400
Tank 39 (Gasoline) (During Uncontrolled Cleaning -	1	h. Mandal Annuarities - Table
Model Assumptions Not During Cleaning		rly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for Benzene Table
Delegan Hairly (ft)	A struct Unicht of Man	
LEGIGGEO HOIGHT (TT)	Actual Height of Manway above ground	2.54
Release Height (ft)		
Diameter (ft)	Tank diameter	125
	Tank diameter Tank Diameter divided by 4.3 Release height divided by 2.15	125 29.1 1.18

Tank 39 (Gasoline) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning Emission Rate (Ib/hr) During Cleaning See Hourly Model Assumptions Table See Variable Emission Rate for Benzene Table Release Height (ft) Stack Height above ground Diameter (ft) Inside diameter of stack 2.5		
Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Benzene Table Release Height (ft) Stack Height above ground 13		
Release Height (ft) Stack Height above ground 13		
Diameter (ft) Inside diameter of stack 2.5		
2.3		
Exit Velocity (ft/s) Calculated from contractor data 5.1		
Gas Exit Temperature (degrees F) From cleaning contractor 1400		
Tank 120 (Gasoline) (During Uncontrolled Cleaning - Volume Source at Manway Height)		
Model Assumptions Not During Cleaning See Hourly Model Assumptions Table		
Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Benzene Table		
Release Height (ft) Actual Height of Manway above ground 2.58		
Diameter (ft) Tank diameter 80		
Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3		
Initial Vertical Dimension (ft) Release height divided by 2.15 1.20		
Tank 120 (Gasoline) (During Controlled Cleaning - Horizontal Point Source)		
Model Assumptions Not During Cleaning See Hourly Model Assumptions Table		
Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Benzene Table		
Release Height (ft) Stack Height above ground 13		
Diameter (ft) Inside diameter of stack 2.5		
Exit Velocity (ft/s) Calculated from contractor data 5.1		
Gas Exit Temperature (degrees F) From cleaning contractor 1400		
Tank 114 (Blendstock) (During Uncontrolled Cleaning - Volume Source at Manway Height)		
Model Assumptions Not During Cleaning See Hourly Model Assumptions Table		
Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Benzene Table		
Release Height (ft) Actual Height of Manway above ground 2.71		
Release Height (ft) Actual Height of Manway above ground 2.71 Diameter (ft) Tank diameter 120		
Initial Vertical Dimension (ft) Release height divided by 2.15 1.26 Tank 114 (Blendstock) (During Controlled Cleaning - Horizontal Point Source)		
Model Assumptions Not During Cleaning See Hourly Model Assumptions Table		
See variable clinission rate for benzene rable	See Variable Emission Rate for Benzene Table	
Release Height (ft) Stack Height above ground 13		
Diameter (ft) Inside diameter of stack 2.5		
Exit Velocity (ft/s) Calculated from contractor data 5.1		
Gas Exit Temperature (degrees F) From cleaning contractor 1400		
Tank 115 (Blendstock) (During Uncontrolled Cleaning - Volume Source at Manway Height)		
Model Assumptions Not During Cleaning See Hourly Model Assumptions Table		
Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Benzene Table		
Release Height (ft) Actual Height of Manway above ground 2.33		
Diameter (ft) Tank diameter 150		
Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 34.9		
Initial Vertical Dimension (ft) Release height divided by 2.15 1.10		
Tank 115 (Blendstock) (During Controlled Cleaning - Horizontal Point Source)		
INIQUEL ASSUMPTIONS NOT DUTING CLEANING SECTION SECTIO		
Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Benzene Table		
Emission Rate (lb/hr) During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Benzene Table		
Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Benzene Table		
Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Benzene Table Release Height (ft) Stack Height above ground 13		

Tank 117 (Blendstock) (During Uncontrolled Clea	aning - Volume Source at Manway Height)	
Model Assumptions Not During Cleaning	See Hourly Model Assumptions Table	
Emission Rate (lb/hr) During Cleaning	See Variable Emission Rate for Benzene Table	
Release Height (ft)	Actual Height of Manway above ground	2.5
Diameter (ft)	Tank diameter	110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.20
Tank 117 (Blendstock) (During Controlled Cleani		1120
Model Assumptions Not During Cleaning		ly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning		Emission Rate for Benzene Table
		The state of the s
Release Height (ft)	Stack Height above ground	13
Diameter (ft)	Inside diameter of stack	2.5
Exit Velocity (ft/s)	Calculated from contractor data	5.1
Gas Exit Temperature (degrees F)	From cleaning contractor	1400
Tank 118 (Blendstock) (During Uncontrolled Clea	aning - Volume Source at Manway Height)	
Model Assumptions Not During Cleaning		ly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning		Emission Rate for Benzene Table
Release Height (ft)	Actual Height of Manway above ground	2.42
Diameter (ft)	Tank diameter	100
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.12
Tank 118 (Blendstock) (During Controlled Cleani	<u> </u>	
Model Assumptions Not During Cleaning	-	ly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning		Emission Rate for Benzene Table
zimssion nate (is/im/ zaimg eleaim.g	See variable	Emission rate for Benzene rasic
Release Height (ft)	Stack Height above ground	13
Diameter (ft)	Inside diameter of stack	2.5
Exit Velocity (ft/s)	Calculated from contractor data	5.1
Gas Exit Temperature (degrees F)	From cleaning contractor	1400
Tank 119 (Blendstock) (During Uncontrolled Clea	aning - Volume Source at Manway Height)	
Model Assumptions Not During Cleaning	1	ly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning	See Variable I	Emission Rate for Benzene Table
Release Height (ft)	Actual Height of Manway above ground	2.38
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.10
Tank 119 (Blendstock) (During Controlled Cleani		2120
Model Assumptions Not During Cleaning	See Hourly Model Assumptions Table	
Emission Rate (lb/hr) During Cleaning	See Hourly Model Assumptions Table See Variable Emission Rate for Benzene Table	
zimssion nate (is/im/ zaimg eleaim.g	See variable	Emission rate for Benzene rasie
Release Height (ft)	Stack Height above ground	13
Diameter (ft)	Inside diameter of stack	2.5
Exit Velocity (ft/s)	Calculated from contractor data	5.1
Gas Exit Temperature (degrees F)	From cleaning contractor	1400
Tank 121 (Blendstock) (During Uncontrolled Clea		
Model Assumptions Not During Cleaning	<u> </u>	ly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning		Emission Rate for Benzene Table
	Jee variable	
Release Height (ft)	Actual Height of Manway above ground	2.5
Diameter (ft)	Tank diameter	2.5 150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	
Initial Vertical Dimension (ft)	·	34.9
initiai verticai Dimensiofi (It)	Release height divided by 2.15	1.16

Tank 119 (Blendstock) (During Controlled Cleaning - Horizontal Point Source)			
Model Assumptions Not During Cleaning	See Hourly Model Assumptions Table		
Emission Rate (lb/hr) During Cleaning	See Variable Emission Rate for Benzene Table		
Release Height (ft)	Stack Height above ground	13	
Diameter (ft)	Inside diameter of stack	2.5	
Exit Velocity (ft/s)	Calculated from contractor data	5.1	
Gas Exit Temperature (degrees F)	From cleaning contractor	1400	
Tank 130 (Product/ Water Mixture) (UPPER Volume Source, 80% of emissions)			
See Hourly Assumptions Table			
Tank 130 (Product/ Water Mixture) (LOWER Volume Source, 20% of emissions)			
See Hourly Assumptions Table			

Variable Emission Rate Calculations for Benzene Modeling

			Ratios Used for Variable Emission Rates ¹							July Benzene Emission Rates ²						
Tank	Product Assumed	January	February	March	April	May	June	July	August	September	October	November	December	Refill after landing (lb/hr)	Uncontrolled Vapor Space Purge (lb/hr)	Controlled Vapor Space Purge (lb/hr)
31	Gasoline - PTE RVP schedule	0.277	0.300	0.377	0.539	0.713	0.908	1.000	0.971	0.793	0.574	0.454	0.329	1.35	16.44	0.3288
32	Gasoline - PTE RVP schedule	0.277	0.300	0.377	0.539	0.713	0.908	1.000	0.971	0.793	0.574	0.454	0.329	1.35	16.44	0.3288
39	Gasoline - PTE RVP schedule	0.277	0.300	0.377	0.539	0.713	0.908	1.000	0.971	0.793	0.574	0.454	0.329	1.35	16.44	0.3288
120	Gasoline - PTE RVP schedule	0.277	0.300	0.377	0.539	0.713	0.908	1.000	0.971	0.793	0.574	0.454	0.329	1.35	6.74	0.1348
114	Blendstock RVP 15	0.266	0.288	0.377	0.539	0.713	0.908	1.000	0.971	0.793	0.574	0.435	0.316	1.56	17.6	0.352
115	Blendstock RVP 15	0.266	0.288	0.377	0.539	0.713	0.908	1.000	0.971	0.793	0.574	0.435	0.316	1.57	27.5	0.55
117	Component RVP 14.33	0.266	0.288	0.377	0.539	0.713	0.908	1.000	0.971	0.793	0.574	0.435	0.316	1.5	14.2	0.284
118	Component RVP 14.33	0.266	0.288	0.377	0.539	0.713	0.908	1.000	0.971	0.793	0.574	0.435	0.316	1.5	11.7	0.234
119	Component RVP 14.33	0.266	0.288	0.377	0.539	0.713	0.908	1.000	0.971	0.793	0.574	0.435	0.316	1.5	7.48	0.1496
121	Blendstock RVP 15	0.266	0.288	0.377	0.539	0.713	0.908	1.000	0.971	0.793	0.574	0.435	0.316	1.57	27.45	0.549

Notes

1. The ratio was calculated and used as follows:

Landing or cleaning total VOC emissions were calculated for each month.

The benzene emissions for each month were calculated based on the speciation for that month for the given product.

The ratio used for variable emission rate factors in AERMOD was calculated by dividing the benzene emission rate for a given month by the July benzene emission rate.

The July benzene emission rate was then entered as the emission rate for the source in the Source inputs screen in AERMOD View.

2. Emission rates represent the total benzene emissions for the tank. For landings, 80% of that value was at a release height at the top of the tank. The remaining 20% was at half of the tank height. For vapor space purge, all of the emissions were placed at the height of the manway.

General Parameters		
Parameter		Value
Projection		UTM
Datum		NAD83
UTM Zone		18
Hemisphere		Northern
AERMET		2016-2020 MET Data
AERMAP		1-deg DEM Data from webgis.com
Sources	Assumptions/ Notes	Value
Tank 28 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	1.34E-04
Emission Rate (lb/yr)	From PTE Calculations	1.17
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 29 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	1.34E-04
Emission Rate (lb/yr)	From PTE Calculations	1.17
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 30 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	1.34E-04
Emission Rate (lb/yr)	From PTE Calculations	1.17
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 33 (Distillate) (Point Source)	·	
Emission Rate (lb/hr)	From PTE Calculations	1.32E-04
Emission Rate (lb/yr)	From PTE Calculations	1.16
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 64 (Distillate) (Point Source)	•	
Emission Rate (lb/hr)	From PTE Calculations	1.10E-04
Emission Rate (lb/yr)	From PTE Calculations	0.96
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient

Global Albany Annual Hexane Wodel Assumptions - LANKS			
Tank 31 (Gasoline) (UPPER Volume Source, 80% of emiss	-		
Foreign Date for Assessed Doors 4 through 7 and 0 (He/les)	From PTE Calculations, with landings at 2.2	6.635.03	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, with landings at 2.2	6.62E-03	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	58.02	
Ellission Rate for Allifual Runs 1 till ough 7 and 9 (15/11)	From PTE Calculations, no landings at this	38.02	
Emission Rate for Annual Run 8 (lb/hr)	tank	4.16E-03	
Emission Rate for Affida Ruff & (15) fif)	From PTE Calculations, no landings at this	4.101-03	
Emission Rate for Annual Run 8 (lb/yr)	tank	36.44	
Release Height (ft)	Tank height. Approx. height of roof vents	45	
Diameter (ft)	Tank diameter	125	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1	
Initial Vertical Dimension (ft)	Tank height divided by 4.5	20.93	
` '		20.93	
Tank 31 (Gasoline) (LOWER Volume Source, 20% of emis	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	1.66E-03	
chinssion Rate for Affilian Runs 1 through 7 and 9 (15/111)	From PTE Calculations, with landings at 2.2	1.00E-05	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	14.50	
Emission Rate for Affidat Rans 1 through 7 and 3 (15/111)	From PTE Calculations, no landings at this	14.50	
Emission Rate for Annual Run 8 (lb/hr)	tank	1.04E-03	
	From PTE Calculations, no landings at this	1.0 12 03	
Emission Rate for Annual Run 8 (lb/yr)	tank	9.11	
Release Height (ft)	Tank height. Approx. height of roof vents	22.5	
Diameter (ft)	Tank diameter	125	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1	
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47	
Tank 32 (Gasoline) (UPPER Volume Source, 80% of emiss		10.47	
Talk 32 (dasolile) (OFFER Volume 30urce, 80% of emiss	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	6.62E-03	
zimosion nace ioi i minaar nano zimoagni i ana si (iai min	From PTE Calculations, with landings at 2.2	0.022 03	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	58.03	
	From PTE Calculations, no landings at this	36.65	
Emission Rate for Annual Run 8 (lb/hr)	tank	4.16E-03	
, i ,	From PTE Calculations, no landings at this		
Emission Rate for Annual Run 8 (lb/yr)	tank	36.45	
Release Height (ft)	Tank height. Approx. height of roof vents	45	
Diameter (ft)	Tank diameter	125	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1	
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93	
Tank 32 (Gasoline) (LOWER Volume Source, 20% of emis	ssions)		
	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	1.66E-03	
	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	14.51	
	From PTE Calculations, no landings at this		
Emission Rate for Annual Run 8 (lb/hr)	tank	1.04E-03	
	From PTE Calculations, no landings at this		
Emission Rate for Annual Run 8 (lb/yr)	tank	9.11	
Release Height (ft)	Tank height. Approx. height of roof vents	22.5	
Diameter (ft)	Tank diameter	125	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1	
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47	

Global Albany Annual Hexane Model Assumptions - TANKS			
Tank 39 (Gasoline) (UPPER Volume Source, 80% of emiss	•		
Ensisting Data for Append Dura 1 through 7 and 0 (lb/bg)	From PTE Calculations, with landings at 2.2	5.765.00	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, with landings at 2.2	5.76E-03	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	50.42	
Ellission Rate for Allitual Runs 1 till ough 7 and 9 (10/111)	From PTE Calculations, no landings at this	50.42	
Emission Rate for Annual Run 8 (lb/hr)	tank	3.29E-03	
Emission rate for Affidal Run o (15/111)	From PTE Calculations, no landings at this	3.291-03	
Emission Rate for Annual Run 8 (lb/yr)	tank	28.84	
Release Height (ft)	Tank height. Approx. height of roof vents	45	
Diameter (ft)	Tank diameter	125	
` '			
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1	
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93	
Tank 39 (Gasoline) (LOWER Volume Source, 20% of emis			
	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	1.44E-03	
Fusing Data for Association of the Association of Total O (III /In)	From PTE Calculations, with landings at 2.2	42.50	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	12.60	
Emission Data for Annual Dun 9 (lb/br)	From PTE Calculations, no landings at this	0.225.04	
Emission Rate for Annual Run 8 (lb/hr)	tank	8.23E-04	
Emission Pate for Annual Pun 9 (lb/ur)	From PTE Calculations, no landings at this	7.24	
Emission Rate for Annual Run 8 (lb/yr)	tank	7.21	
Release Height (ft)	Tank height. Approx. height of roof vents	22.5	
Diameter (ft)	Tank diameter	125	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1	
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47	
Tank 120 (Gasoline) (UPPER Volume Source, 80% of emis			
	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	4.81E-03	
	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	42.10	
	From PTE Calculations, no landings at this		
Emission Rate for Annual Run 8 (lb/hr)	tank	2.34E-03	
Englishing Data for Annual Dun (2/11/4/11)	From PTE Calculations, no landings at this		
Emission Rate for Annual Run 8 (lb/yr)	tank	20.52	
Release Height (ft)	Tank height. Approx. height of roof vents	48	
Diameter (ft)	Tank diameter	80	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6	
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33	
Tank 120 (Gasoline) (LOWER Volume Source, 20% of em			
	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	1.20E-03	
	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	10.52	
	From PTE Calculations, no landings at this		
Emission Rate for Annual Run 8 (lb/hr)	tank	5.86E-04	
	From PTE Calculations, no landings at this		
Emission Rate for Annual Run 8 (lb/yr)	tank	5.13	
Release Height (ft)	Tank height. Approx. height of roof vents	24	
Diameter (ft)	Tank diameter	80	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6	
Initial Vertical Dimension (ft)			

Global Albany Annual Hexane Wodel Assumptions - TANKS			
Tank 114 (Blendstock) (UPPER Volume Source, 80% of e	-		
Fusing Pote for Assembly Pour Atherms 17 and 0 (III /Isa)	From PTE Calculations, with landings at 2.2	6 075 00	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, with landings at 2.2	6.07E-02	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	531.58	
Emission Rate for Amidal Runs 1 through 7 and 9 (15/111)	From PTE Calculations, 3.7 TPY landings per	551.56	
Emission Rate for Annual Run 8 (lb/hr)	blendstock tank	7.59E-02	
Emission rate for Affidal Run o (15/111)	From PTE Calculations, 3.7 TPY landings per	7.591-02	
Emission Rate for Annual Run 8 (lb/yr)	blendstock tank	664.70	
Release Height (ft)	Tank height. Approx. height of roof vents	48	
Diameter (ft)	Tank diameter		
· ,		120	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9	
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33	
Tank 114 (Blendstock) (LOWER Volume Source, 20% of e			
5	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	1.52E-02	
Ensisting Rote for Append Dure 1 through 7 and 0 (lb/by)	From PTE Calculations, with landings at 2.2	422.00	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per	132.89	
Emission Rate for Annual Run 8 (lb/hr)	blendstock tank	1 005 02	
Ellission Rate for Almaa Run 8 (10/111)	From PTE Calculations, 3.7 TPY landings per	1.90E-02	
Emission Rate for Annual Run 8 (lb/yr)	blendstock tank	166.18	
Release Height (ft)	Tank height. Approx. height of roof vents		
5 , ,	0 11	24	
Diameter (ft)	Tank diameter	120	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9	
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16	
Tank 115 (Blendstock) (UPPER Volume Source, 80% of e			
	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	7.81E-02	
	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	683.74	
5	From PTE Calculations, 3.7 TPY landings per		
Emission Rate for Annual Run 8 (lb/hr)	blendstock tank	9.32E-02	
Emission Date for Annual Dun 8 (lb (m)	From PTE Calculations, 3.7 TPY landings per	045.05	
Emission Rate for Annual Run 8 (lb/yr)	blendstock tank	816.86	
Release Height (ft)	Tank height. Approx. height of roof vents	48	
Diameter (ft)	Tank diameter	150	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9	
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33	
Tank 115 (Blendstock) (LOWER Volume Source, 20% of e			
	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	1.95E-02	
	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	170.93	
	From PTE Calculations, 3.7 TPY landings per		
le	blendstock tank	2.33E-02	
Emission Rate for Annual Run 8 (lb/hr)		2.552 02	
	From PTE Calculations, 3.7 TPY landings per		
Emission Rate for Annual Run 8 (lb/yr)	From PTE Calculations, 3.7 TPY landings per blendstock tank	204.22	
Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents	204.22 24	
Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft)	From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter	204.22	
Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents	204.22 24	

Global Albany Annual Hexane Model Assumptions - TANKS			
Tank 117 (Blendstock) (UPPER Volume Source, 80% of e	-		
Foreign Data for Assessed Description 7 and 0 (He/lea)	From PTE Calculations, with landings at 2.2	4.545.00	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, with landings at 2.2	4.54E-02	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	207.52	
Ellission Rate for Allifual Rulis 1 tillough 7 and 9 (10/11)	From PTE Calculations, 3.7 TPY landings per	397.52	
Emission Rate for Annual Run 8 (lb/hr)	blendstock tank	6.06E-02	
Emission Rate for Amidal Run 8 (18/111)	From PTE Calculations, 3.7 TPY landings per	0.00E-02	
Emission Rate for Annual Run 8 (lb/yr)	blendstock tank	530.65	
Release Height (ft)	Tank height. Approx. height of roof vents	48	
Diameter (ft)	Tank diameter	110	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3		
Initial Vertical Dimension (ft)	,	25.6	
` '	Tank height divided by 2.15	22.33	
Tank 117 (Blendstock) (LOWER Volume Source, 20% of e			
Franciscian Data for Americal Diviso 1 there is a 7 and 0 (lb/bm)	From PTE Calculations, with landings at 2.2	4.435.03	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, with landings at 2.2	1.13E-02	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	99.38	
Emission Rate for Amual Runs 1 through 7 and 9 (15/111)	From PTE Calculations, 3.7 TPY landings per	99.30	
Emission Rate for Annual Run 8 (lb/hr)	blendstock tank	1.51E-02	
Emission rate for ruman ran o (is/m)	From PTE Calculations, 3.7 TPY landings per	1.512 02	
Emission Rate for Annual Run 8 (lb/yr)	blendstock tank	132.66	
Release Height (ft)	Tank height. Approx. height of roof vents	24	
Diameter (ft)	Tank diameter	110	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6	
Initial Vertical Dimension (ft)	Release height divided by 2.15		
		11.16	
Tank 118 (Blendstock) (UPPER Volume Source, 80% of e	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	6.91E-02	
Emission Rate for Affidal Runs I through 7 and 3 (15/111)	From PTE Calculations, with landings at 2.2	0.91E-02	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	604.99	
Emission rate for Amada Rans I through 7 and 3 (15/111)	From PTE Calculations, 3.7 TPY landings per	004.55	
Emission Rate for Annual Run 8 (lb/hr)	blendstock tank	8.43E-02	
(,)	From PTE Calculations, 3.7 TPY landings per	57.192.02	
Emission Rate for Annual Run 8 (lb/yr)	blendstock tank	738.12	
Release Height (ft)	Tank height. Approx. height of roof vents	48	
Diameter (ft)	Tank diameter	100	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3	
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33	
` '		22.33	
Tank 118 (Blendstock) (LOWER Volume Source, 20% of e	From PTE Calculations, with landings at 2.2		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	1.73E-02	
Emission Rate for Affidal Rans I through 7 and 3 (15/111)	From PTE Calculations, with landings at 2.2	1.731-02	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	151.25	
Emission rate for Armaar rans 1 through 7 and 3 (15/111)	From PTE Calculations, 3.7 TPY landings per	151.25	
Emission Rate for Annual Run 8 (lb/hr)	blendstock tank	2.11E-02	
1			
	From PTE Calculations, 3.7 TPY landings per	l l	
Emission Rate for Annual Run 8 (lb/yr)	From PTE Calculations, 3.7 TPY landings per blendstock tank	184.53	
Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	blendstock tank	184.53 24	
Release Height (ft)	blendstock tank Tank height. Approx. height of roof vents	24	
Release Height (ft) Diameter (ft)	blendstock tank Tank height. Approx. height of roof vents Tank diameter	24 100	
Release Height (ft)	blendstock tank Tank height. Approx. height of roof vents	24	

Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 34.9	Global Albany Annual Hexane Wodel Assumptions - LANKS			
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 8 (lb/hr) From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, with landings at 2.2 Prom PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Prom PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 8 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr) From PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings at 2.2 Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock t	Tank 119 (Blendstock) (UPPER Volume Source, 80% of e	-		
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE Calculations, 3.7 TPY landings per blendstock tank plantal Horizontal Dimension (ft) From PTE	Foriaring Bata for Annual Burn 4 through 7 and 0 (lls/lan)		7.545.00	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Firm PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, with landings at 2.2 Prom PTE Calculations, with landings at 2.2 Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, with landings at 2.2 Prom PTE Calculations, with landings at 2.2 Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, with landings at 2.2 Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, with landings at 2.2 Prom PTE Calculations, with landings at 2.2 Prom PTE Calculations, with	Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	•	7.51E-02	
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual Run 8 (lb/hr) Tank height. Approx. height of roof vents 24 Diameter (ft) Tank height. Approx. height of roof vents 24 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, with landings at 2.2 Try Per tank Emission Rate for Annual Runs 8 (lb/hr) From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height Approx. height of r	Emission Pate for Annual Puns 1 through 7 and 0 (lh/hr)		657.62	
Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual Run 8 (lb/yr) Tank height. Approx. height of roof vents 80 Initial Horizontal Dimension (ft) Tank Diameter (ft) Tank Diameter divided by 4.3 18.6 Initial Horizontal Dimension (ft) Tank 19 (lelendstock) (LOWER Volume Source, 20% of emissions) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Tank height. Approx. height of roof vents 2.26E-02 Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Tank diameter Initial Horizontal Dimension (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank 121 (Blendstock) (UPPER Volume Source, 80% of emissions) From PTE Calculations, with landings at 2.2 Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Tank Diameter (ft)	Ellission Rate for Allifual Runs 1 till ough 7 and 9 (15/111)	· ·	057.03	
Emission Rate for Annual Run 8 (lb/yr) Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, 3.7 TPY landings per blendstock tank Prom PTE Calculations, with landings at 2.2 Text and the promise of	Emission Rate for Annual Run & (lh/hr)		0.035.03	
Emission Rate for Annual Run 8 (lb/yr) Relaces Height (ft) Tank deight. Approx. height of roof vents A8 Diameter (ft) Tank height. Approx. height of roof vents A8 Diameter (ft) Tank height. Approx. height of roof vents B0 Initial Horizontal Dimension (ft) Tank blaimeter B0 Initial Horizontal Dimension (ft) Tank height. Approx. height of roof vents B0 Initial Horizontal Dimension (ft) Tank height. Approx. height of roof vents Tank 119 (Blendstock) (LOWER Volume Source, 20% of emissions) From PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Try per tank Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, 3.7 TPY landings per blendstock tank Emission Rate for Annual Run 8 (lb/yr) Tank blaimeter divided by 4.3 Tank blaimeter (lt) Tank Diameter (lt) Tank Diameter divided by 4.3 Tank blaimeter divided by 4.3 Tank blaimeter divided by 2.15 Try per tank Trom PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) The Per tank Trom PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Try per tank Trom PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 8 (lb/yr) Try per tank Trom PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 8 (lb/yr) Try per tank Trom PTE Calculations, with landings at 2.2 Try per tank Trom PTE Calculations, 3.7 TPY landings per blendstock tank Diameter (ft) Tank height Approx. height of ro	Linission Nate for Annual Nun 8 (15/111)	II.	9.03E-02	
Release Height (ft) Tank height. Approx. height of roof vents A8 Diameter (ft) Tank diameter Tank Diameter divided by 4.3 18.6 Initial Vertical Dimension (ft) Tank Diameter divided by 4.3 18.6 Initial Vertical Dimension (ft) Tank height divided by 2.15 22.33 Tank 119 (Blendstock) (LOWER Volume Source, 20% of emissions) From PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, 3.7 TPY landings per blendstock tank 2.26E-02 Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual Run 8 (lb/yr) Tank height. Approx. height of roof vents Diameter (ft) Tank height. Approx. height of roof vents Tank Diameter (ft) Tank diameter Tank Diameter divided by 4.3 Tank 116 (Derental Dimension) Tank 121 (Blendstock) (UPPER Volume Source, 80% of emissions) From PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Tank Diameter divided by 2.15 Tank 121 (Blendstock) (UPPER Volume Source, 80% of emissions) From PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Try per tank From PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, 3.7 TPY landings per Diendstock tank Try per tank From PTE Calculations, 3.7 TPY landings per Diendstock tank Try per tank From PTE Calculations, 3.7 TPY landings per Diendstock tank Try per tank From PTE Calculations, 3.7 TPY landings per Diendstock tank Try per tank From PTE Calculations, 3.7 TPY landings per Diendstock tank Try per tank From PTE Calculations, 3.7 TPY landings per Diendstock tank Try per tank From PTE Calculations, 3.7 TPY landings per Diendstock tank Try per tank From PTE Calculations, 3.7 TPY landings per Diendstock tank Try per tank From PTE Calculations, 3.7 TPY landings per Diendstock t	Emission Rate for Annual Run 8 (lh/vr)		790.76	
Diameter (ft) Intitial Horizontal Dimension (ft) Intitial Horizontal Dimension (ft) Intitial Horizontal Dimension (ft) Intitial Vertical Dimension (ft) Intitial Horizontal Dimens				
Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank Name Diameter divided by 4.3 Tank Name Diameter Divided by 2.15 Tank Name Diameter Divided by 2.15 Tank Name Diameter Divided by 2.15 Tank Name Diameter Divided by 2.15 Tank Name Diameter Divided by 2.15 Tank Name Diameter Divided by 2.15 Tank Name Diameter Divided by 2.15 Tank Name Diameter Divided by 2.15 Tank Name Diameter Divided by 2.15 Tank Name Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter Divided by 4.3 Tank Name Diameter (ft) Tank Diameter Divided by 4.3 Tank Name Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter Divided by 2.15 Tank Name Divided by 2.15 Tank Name Diameter (ft) Tank Diameter Divided by 2.15 Tank Name Divided Divided by 2.15 Tank Name Divided Div				
Initial Vertical Dimension (ft) Tank height divided by 2.15 22.33 Tank 119 (Blendstock) (LOWER Volume Source, 20% of emissions) From PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Typer tank 16.441 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Typer tank 16.441 Emission Rate for Annual Run 8 (lb/hr) blendstock tank 2.26E-02 Emission Rate for Annual Run 8 (lb/hr) blendstock tank 2.26E-02 Emission Rate for Annual Run 8 (lb/hr) blendstock tank 2.26E-02 Emission Rate for Annual Run 8 (lb/yr) blendstock tank 197.69 Release Height (ft) Tank height. Approx. height of roof vents 24 Diameter (ft) Tank diameter 180 Initial Vertical Dimension (ft) Release height divided by 4.3 18.6 Initial Vertical Dimension (ft) Release height divided by 2.15 11.16 Tank 121 (Blendstock) (UPPER Volume Source, 80% of emissions) From PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Typer tank 1.15E-01 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Typer tank 1.15E-01 Emission Rate for Annual Run 8 (lb/hr) blendstock tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) blendstock tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) blendstock tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) blendstock tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) blendstock tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) blendstock tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) Typer tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) Typer tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) Typer tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) Typer tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) Typer tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) Typer tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) Typer tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) Typer tank 1.30E-01 Emission Rate for Annual Run 8 (lb/hr) Typer tank 1.30E-01 Emission Rate for Annual Run 8 (lb	. ,			
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Initial Vertical Dimension (ft) Tank height divided by 2.15 Tank 121 (Blendstock) (LOWER Volume Source, 20% of emissions) From PTE Calculations, with landings at 2.2 TPY per tank Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, with landings at 2.2 TPY per tank TPY per tank TPY per tank TPY per tank TPY per tank TPY per tank TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank TPY per tank TRY per tank TPY per	, ,			
Tank 121 (Blendstock) (LOWER Volume Source, 20% of emissions) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual Run 8 (lb/yr) Tank height. Approx. height of roof vents 24 Diameter (ft) Tank diameter Tank Diameter divided by 4.3 34.9	` ,	·	34.9	
From PTE Calculations, with landings at 2.2 TPY per tank Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, with landings at 2.2 TPY per tank Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, 3.7 TPY landings per blendstock tank Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual Run 8 (lb/	· · ·	I .	22.33	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, 3.7 TPY landings per blendstock tank Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual R	Tank 121 (Blendstock) (LOWER Volume Source, 20% of e			
From PTE Calculations, with landings at 2.2 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, 3.7 TPY landings per blendstock tank 5.25E-02 From PTE Calculations, 3.7 TPY landings per blendstock tank 5.25E-02 From PTE Calculations, 3.7 TPY landings per blendstock tank 6.284.55 Release Height (ft) 7.284 Tank height. Approx. height of roof vents 7.24 Diameter (ft) Tank diameter 1.50 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 3.25E-02				
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) From PTE Calculations, 3.7 TPY landings per blendstock tank Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Tank height. Approx. height of roof vents 24 Diameter (ft) Tank diameter Tank Diameter divided by 4.3 34.9	Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)		2.87E-02	
From PTE Calculations, 3.7 TPY landings per blendstock tank 3.25E-02 From PTE Calculations, 3.7 TPY landings per blendstock tank 3.25E-02 Emission Rate for Annual Run 8 (lb/yr) blendstock tank 284.55 Release Height (ft) Tank height. Approx. height of roof vents 24 Diameter (ft) Tank diameter 150 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 34.9				
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Tank height. Approx. height of roof vents Diameter (ft) Tank diameter Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 3.25E-02 284.55 284.55 Tank height of roof vents 150 Tank Diameter divided by 4.3	Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	· ·	251.27	
From PTE Calculations, 3.7 TPY landings per blendstock tank 284.55 Release Height (ft) Tank height. Approx. height of roof vents 24 Diameter (ft) Tank diameter 150 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 34.9				
Emission Rate for Annual Run 8 (lb/yr) blendstock tank 284.55 Release Height (ft) Tank height. Approx. height of roof vents 24 Diameter (ft) Tank diameter 150 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 34.9	Emission Rate for Annual Run 8 (lb/hr)	II.	3.25E-02	
Release Height (ft)Tank height. Approx. height of roof vents24Diameter (ft)Tank diameter150Initial Horizontal Dimension (ft)Tank Diameter divided by 4.334.9	_ , , _ , , , , , , , , , , , , , , , ,			
Diameter (ft) Tank diameter 150 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 34.9				
Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 34.9			24	
	Diameter (ft)		150	
Initial Vertical Dimension (ft) Release height divided by 2.15 11.16	Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9	
	Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16	

Tank 130 (Product/ Water Mixture) (UPPER Volume Source, 80% of emissions)				
Emission Rate (lb/hr)	From PTE Calculations	2.75E-03		
Emission Rate (lb/yr)	From PTE Calculations	24.06		
Release Height (ft)	Tank height. Approx. height of roof vents	48		
Diameter (ft)	Tank diameter	75		
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4		
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33		
Tank 130 (Product/ Water Mixture) (LOWER \	Volume Source, 20% of emissions)			
Emission Rate (lb/hr)	From PTE Calculations	6.87E-04		
Emission Rate (lb/yr)	From PTE Calculations	6.01		
Release Height (ft)	Tank height. Approx. height of roof vents	24		
Diameter (ft)	Tank diameter	75		
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4		
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16		

General Parameters		
Parameter		Value
Projection		UTM
Datum		NAD83
UTM Zone		18
Hemisphere		Northern
AERMET		2016-2020 MET Data
AERMAP		1-deg DEM Data from webgis.com
Sources	Assumptions/ Notes	Value
Tank 28 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	0.00
Emission Rate (lb/yr)	From PTE Calculations	0.00
	Tank height. Approx. height of roof	1
Release Height (ft)	vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 29 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	0.00
Emission Rate (lb/yr)	From PTE Calculations	0.00
	Tank height. Approx. height of roof	
Release Height (ft)	vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 30 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	0.00
Emission Rate (lb/yr)	From PTE Calculations	0.00
	Tank height. Approx. height of roof	
Release Height (ft)	vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 33 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	0.00
Emission Rate (lb/yr)	From PTE Calculations	0.00
	Tank height. Approx. height of roof	
Release Height (ft)	vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 64 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	0.00
Emission Rate (lb/yr)	From PTE Calculations	0.00
Delegge Height /ft\	Tank height. Approx. height of roof	45
Release Height (ft)	vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient

Global Albany Annual 2,2,4-TMP Model Assumptions - TANKS				
Tank 31 (Gasoline) (UPPER Volume Source, 80% o	•			
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	9.10E-03		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	79.69		
Fraciacion Data for Arguel Dun () (lb /br)	From PTE Calculations, no landings at	5.045.03		
Emission Rate for Annual Run 8 (lb/hr)	this tank	5.91E-03		
Emission Pata for Annual Pun 9 (lh/vr)	From PTE Calculations, no landings at this tank	51.74		
Emission Rate for Annual Run 8 (lb/yr)	Tank height. Approx. height of roof	51.74		
Release Height (ft)	vents	45		
	Tank diameter			
Diameter (ft)		125		
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1		
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93		
Tank 31 (Gasoline) (LOWER Volume Source, 20% of				
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	2.27E-03		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	19.92		
	From PTE Calculations, no landings at			
Emission Rate for Annual Run 8 (lb/hr)	this tank	1.48E-03		
Encircian Data for Annual Dun (1/11/11)	From PTE Calculations, no landings at			
Emission Rate for Annual Run 8 (lb/yr)	this tank	12.94		
Dalaman Haisha (ft)	Tank height. Approx. height of roof	22.5		
Release Height (ft)	vents	22.5		
Diameter (ft)	Tank diameter	125		
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1		
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47		
Tank 32 (Gasoline) (UPPER Volume Source, 80% o				
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	9.10E-03		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	79.69		
	From PTE Calculations, no landings at			
Emission Rate for Annual Run 8 (lb/hr)	this tank	5.91E-03		
	From PTE Calculations, no landings at			
Emission Rate for Annual Run 8 (lb/yr)	this tank	51.74		
	Tank height. Approx. height of roof			
Release Height (ft)	vents	45		
Diameter (ft)	Tank diameter	125		
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1		
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93		
Tank 32 (Gasoline) (LOWER Volume Source, 20% of				
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	2.27E-03		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	19.92		
	From PTE Calculations, no landings at			
Emission Rate for Annual Run 8 (lb/hr)	this tank	1.48E-03		
	From PTE Calculations, no landings at			
Emission Rate for Annual Run 8 (lb/yr)	this tank	12.94		
	Tank height. Approx. height of roof			
Release Height (ft)	vents	22.5		
Diameter (ft)	Tank diameter	125		
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1		

Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47

Tank 39 (Gasoline) (UPPER Volume Source, 80% of emissions)				
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	7 965 03		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	7.86E-03		
(lb/hr)	at 2.2 TPY per tank	68.85		
(10/111)	From PTE Calculations, no landings at	08.63		
Emission Rate for Annual Run 8 (lb/hr)	this tank	4.67E-03		
Emission Rate for Affilian Run 8 (19/11)	From PTE Calculations, no landings at	4.07L-03		
Emission Rate for Annual Run 8 (lb/yr)	this tank	40.90		
Emission rate for Amada Ran & (187 yr)	Tank height. Approx. height of roof	40.30		
Release Height (ft)	vents	45		
Diameter (ft)	Tank diameter	125		
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1		
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93		
Tank 39 (Gasoline) (LOWER Volume Source, 20% o				
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	1.96E-03		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	47.04		
(lb/hr)	at 2.2 TPY per tank	17.21		
Envisaion Data for Annual Dun C (lla/lan)	From PTE Calculations, no landings at	4.475.00		
Emission Rate for Annual Run 8 (lb/hr)	this tank	1.17E-03		
Emission Data for Annual Dun 9 (lb/w)	From PTE Calculations, no landings at	40.22		
Emission Rate for Annual Run 8 (lb/yr)	this tank Tank height. Approx. height of roof	10.23		
Release Height (ft)	1	22.5		
Release Height (ft)	vents	22.5		
Diameter (ft)	Tank diameter	125		
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1		
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47		
Tank 120 (Gasoline) (UPPER Volume Source, 80% o	-			
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	6.50E-03		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	56.93		
	From PTE Calculations, no landings at			
Emission Rate for Annual Run 8 (lb/hr)	this tank	3.31E-03		
	From PTE Calculations, no landings at			
Emission Rate for Annual Run 8 (lb/yr)	this tank	28.98		
1	Tank height. Approx. height of roof			
Release Height (ft)	vents	48		
Diameter (ft)	Tank diameter	80		
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6		
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33		
Tank 120 (Gasoline) (LOWER Volume Source, 20%	of emissions)			
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	1.62E-03		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings			
(lb/hr)	at 2.2 TPY per tank	14.23		
	From PTE Calculations, no landings at			
Emission Rate for Annual Run 8 (lb/hr)	this tank	8.27E-04		
	From PTE Calculations, no landings at			
Emission Rate for Annual Run 8 (lb/yr)	this tank	7.25		
	Tank height. Approx. height of roof			
Release Height (ft)	vents	24		
Diameter (ft)	Tank diameter	80		
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6		
	•			

Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

Tank 114 (Blendstock) (UPPER Volume Source, 80	Millian 2,2,4-Tivir Woder Assumptions % of emissions)	
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	8.34E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	0.542 05
(lb/hr)	at 2.2 TPY per tank	73.03
(,	From PTE Calculations, 3.7 TPY	73.03
Emission Rate for Annual Run 8 (lb/hr)	landings per blendstock tank	1.05E-02
Emission rate for Annual Ran 6 (15) iii)	From PTE Calculations, 3.7 TPY	1.032-02
Emission Rate for Annual Run 8 (lb/yr)	landings per blendstock tank	91.66
Ellission Rate for Allitual Run & (lb/ yr)	Tank height. Approx. height of roof	31.00
Release Height (ft)	vents	48
Diameter (ft)	Tank diameter	
	1 11 111	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 114 (Blendstock) (LOWER Volume Source, 20		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	2.08E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	18.26
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/hr)	landings per blendstock tank	2.62E-03
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/yr)	landings per blendstock tank	22.92
	Tank height. Approx. height of roof	
Release Height (ft)	vents	24
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
· · ·		
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 115 (Blendstock) (UPPER Volume Source, 80		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	1.01E-02
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	88.58
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/hr)	landings per blendstock tank	1.22E-02
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/yr)	landings per blendstock tank	107.21
	Tank height. Approx. height of roof	
Release Height (ft)	vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
···		22.55
Tank 115 (Blendstock) (LOWER Volume Source, 20	-	
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	2.525.02
(lb/hr)	at 2.2 TPY per tank	2.53E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	22.4-
(lb/hr)	at 2.2 TPY per tank	22.15
Enterior Bata for A 10 0 (11 ft)	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/hr)	landings per blendstock tank	3.06E-03
_ , , _ , , , , , ,	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/yr)	landings per blendstock tank	26.80
	Tank height. Approx. height of roof	
Release Height (ft)	vents	24
Diameter (ft)	Tank diameter	150

Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

Tank 117 (Blendstock) (UPPER Volume Source, 80	Annual 2,2,4-TIVIP WOODELASSUMPTIO	I ANNO
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	6.44E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	0.44L-03
(lb/hr)	at 2.2 TPY per tank	56.43
(10,711)	From PTE Calculations, 3.7 TPY	50.43
Emission Rate for Annual Run 8 (lb/hr)	landings per blendstock tank	8.57E-03
Emission Rate for Annual Run 6 (15/111)	From PTE Calculations, 3.7 TPY	8.371-03
Emission Rate for Annual Run 8 (lb/yr)	landings per blendstock tank	75.06
Emission rate for Annual Ran & (1877).	Tank height. Approx. height of roof	73.00
Release Height (ft)	vents	48
Diameter (ft)	Tank diameter	110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
· · ·	· · · · · · · · · · · · · · · · · · ·	
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 117 (Blendstock) (LOWER Volume Source, 20		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	1.61E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	14.11
Emission Data for Americal Dura C (lla /lau)	From PTE Calculations, 3.7 TPY	2.445.02
Emission Rate for Annual Run 8 (lb/hr)	landings per blendstock tank	2.14E-03
Emission Data for Americal Dura C (lla / m)	From PTE Calculations, 3.7 TPY	40.77
Emission Rate for Annual Run 8 (lb/yr)	landings per blendstock tank	18.77
Delegas Haisak (ft)	Tank height. Approx. height of roof	24
Release Height (ft)	vents	24
Diameter (ft)	Tank diameter	110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 118 (Blendstock) (UPPER Volume Source, 80	-	
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	8.54E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	74.85
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/hr)	landings per blendstock tank	1.07E-02
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/yr)	landings per blendstock tank	93.49
	Tank height. Approx. height of roof	
Release Height (ft)	vents	48
Diameter (ft)	Tank diameter	100
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 118 (Blendstock) (LOWER Volume Source, 20	% of emissions)	
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	2.14E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	18.71
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/hr)	landings per blendstock tank	2.67E-03
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/yr)	landings per blendstock tank	23.37
	Tank height. Approx. height of roof	
Release Height (ft)	vents	24
Diameter (ft)	Tank diameter	100
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3

Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

	Annual 2,2,4-TMP Model Assumptio	ns - TANKS
Tank 119 (Blendstock) (UPPER Volume Source, 80		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	0.055.00
(lb/hr)	at 2.2 TPY per tank	8.95E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	70.40
(lb/hr)	at 2.2 TPY per tank From PTE Calculations, 3.7 TPY	78.40
Envisarion Data for Annual Dun O (Ib/ba)	· · · · · · · · · · · · · · · · · · ·	4.445.02
Emission Rate for Annual Run 8 (lb/hr)	landings per blendstock tank	1.11E-02
Emission Data for Annual Dun 9 (lb /ur)	From PTE Calculations, 3.7 TPY landings per blendstock tank	07.03
Emission Rate for Annual Run 8 (lb/yr)		97.03
Rologeo Height (ft)	Tank height. Approx. height of roof	40
Release Height (ft)	vents	48
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 119 (Blendstock) (LOWER Volume Source, 20		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	2.24E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	19.60
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/hr)	landings per blendstock tank	2.77E-03
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/yr)	landings per blendstock tank	24.26
	Tank height. Approx. height of roof	
Release Height (ft)	vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 121 (Blendstock) (UPPER Volume Source, 80	% of emissions)	
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	1.36E-02
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	118.99
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/hr)	landings per blendstock tank	1.57E-02
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/yr)	landings per blendstock tank	137.62
	Tank height. Approx. height of roof	
Release Height (ft)	vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 121 (Blendstock) (LOWER Volume Source, 20	% of emissions)	
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	3.40E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings	
(lb/hr)	at 2.2 TPY per tank	29.75
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/hr)	landings per blendstock tank	3.93E-03
	From PTE Calculations, 3.7 TPY	
Emission Rate for Annual Run 8 (lb/yr)	landings per blendstock tank	34.41
	Tank height. Approx. height of roof	
Release Height (ft)	vents	24
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)		

Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

Tank 130 (Product/ Water Mixture) (UPPI	ER Volume Source, 80% of emissions)	
Emission Rate (lb/hr)	From PTE Calculations	3.45E-03
Emission Rate (lb/yr)	From PTE Calculations	30.25
	Tank height. Approx. height of roof	
Release Height (ft)	vents	48
Diameter (ft)	Tank diameter	75
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 130 (Product/ Water Mixture) (LOWI	ER Volume Source, 20% of emissions)	
Emission Rate (lb/hr)	From PTE Calculations	8.63E-04
Emission Rate (lb/yr)	From PTE Calculations	7.56
	Tank height. Approx. height of roof	
Release Height (ft)	vents	24
Diameter (ft)	Tank diameter	75
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

General Parameters		
Parameter		Value
Projection		UTM
Datum		NAD83
UTM Zone		18
Hemisphere		Northern
AERMET		2016-2020 MET Data
AERMAP		1-deg DEM Data from webgis.com
Sources	Assumptions/ Notes	Value
Tank 28 (Distillate) (Point Source)	·	•
Emission Rate (lb/hr)	From PTE Calculations	1.94E-02
Emission Rate (lb/yr)	From PTE Calculations	169.76
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 29 (Distillate) (Point Source)		•
Emission Rate (lb/hr)	From PTE Calculations	1.94E-02
Emission Rate (lb/yr)	From PTE Calculations	169.76
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 30 (Distillate) (Point Source)	•	
Emission Rate (lb/hr)	From PTE Calculations	1.94E-02
Emission Rate (lb/yr)	From PTE Calculations	169.76
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 33 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	1.93E-02
Emission Rate (lb/yr)	From PTE Calculations	169.06
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 64 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	1.55E-02
Emission Rate (lb/yr)	From PTE Calculations	135.47
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient

	ny Annual Xylenes Model Assumption	S - TAINKS
Tank 31 (Gasoline) (UPPER Volume Source, 80% of	•	
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	2.83E-02
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	247.63
Foriarian Data for Arrayal Days O (III /Ian)	From PTE Calculations, no landings at this	4.425.02
Emission Rate for Annual Run 8 (lb/hr)	tank	4.13E-03
Emissian Data for Annual Dun 9 (lh/ur)	From PTE Calculations, no landings at this tank	20.45
Emission Rate for Annual Run 8 (lb/yr)		36.15
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 31 (Gasoline) (LOWER Volume Source, 20% of	•	
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	7.07E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	61.91
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/hr)	tank	1.03E-03
Foriarian Data for Arrayal Days O (III (m)	From PTE Calculations, no landings at this	0.04
Emission Rate for Annual Run 8 (lb/yr)	tank	9.04
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47
Tank 32 (Gasoline) (UPPER Volume Source, 80% of		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	2.83E-02
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	247.67
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/hr)	tank	4.13E-03
Foriarian Data for Arrayal Days O (III (cm)	From PTE Calculations, no landings at this	26.40
Emission Rate for Annual Run 8 (lb/yr)	tank	36.19
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 32 (Gasoline) (LOWER Volume Source, 20% of	-	
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	7.07E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	61.92
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/hr)	tank	1.03E-03
5	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/yr)	tank	9.05
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47

	ny Annual Xylenes Model Assumption	S - TANKS
Tank 39 (Gasoline) (UPPER Volume Source, 80% of	•	
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	2.73E-02
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	239.19
Englasian Data for Annual Dun O (III /In)	From PTE Calculations, no landings at this	2.465.02
Emission Rate for Annual Run 8 (lb/hr)	tank	3.16E-03
Emission Data for Annual Dun 9 (lh/ur)	From PTE Calculations, no landings at this tank	27.74
Emission Rate for Annual Run 8 (lb/yr)		27.71
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 39 (Gasoline) (LOWER Volume Source, 20% of		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	6.83E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	59.80
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/hr)	tank	7.91E-04
Englishing Bata for Annual Burn O (III (m)	From PTE Calculations, no landings at this	6.00
Emission Rate for Annual Run 8 (lb/yr)	tank	6.93
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47
Tank 120 (Gasoline) (UPPER Volume Source, 80% o		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	2.64E-02
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	231.31
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/hr)	tank	2.26E-03
Englasian Bata for Annual Burn O (III (m)	From PTE Calculations, no landings at this	40.00
Emission Rate for Annual Run 8 (lb/yr)	tank	19.83
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 120 (Gasoline) (LOWER Volume Source, 20% o	•	
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	6.60E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	57.83
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/hr)	tank	5.66E-04
_ , , _ , , , , ,	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/yr)	tank	4.96
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

Tank 114 (Blendstock) (UPPER Volume Source, 80%	ny Annual Xylenes Model Assumption: 6 of emissions)	
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	2.88E-02
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	252.23
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	4.49E-02
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	393.22
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 114 (Blendstock) (LOWER Volume Source, 205		22.33
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	7.20E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	63.06
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	1.12E-02
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	98.31
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 115 (Blendstock) (UPPER Volume Source, 809		11.10
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	2.96E-02
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	2.501 02
(lb/hr)	TPY per tank	259.16
(Carrier)	From PTE Calculations, 3.7 TPY landings	255.10
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	4.57E-02
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	400.15
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
		22.33
Tank 115 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	7.40E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	7. 4 0E-03
(lb/hr)	TPY per tank	64.79
V - 1	From PTE Calculations, 3.7 TPY landings	07.73
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	1.14E-02
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	100.04
Release Height (ft)	Tank height. Approx. height of roof vents	24
	The state of the s	<u> </u>
Diameter (ft)	Tank diameter	150
Diameter (ft)	Tank diameter Tank Diameter divided by 4.3	150
Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft)	Tank diameter Tank Diameter divided by 4.3 Release height divided by 2.15	150 34.9 11.16

Tank 117 (Blendstock) (UPPER Volume Source, 80% of emissions)		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	2.73E-02
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	2./3E-UZ
(lb/hr)	TPY per tank	239.47
(15/111)	From PTE Calculations, 3.7 TPY landings	235.47
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	4.34E-02
Emission rate for Affidat Rain's (15/111)	From PTE Calculations, 3.7 TPY landings	4.54E 02
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	380.45
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 117 (Blendstock) (LOWER Volume Source, 209		22.33
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	6.83E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	0.83L-03
(lb/hr)	TPY per tank	59.87
(1.5/111)	From PTE Calculations, 3.7 TPY landings	33.07
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	1.09E-02
(,,	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	95.11
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 118 (Blendstock) (UPPER Volume Source, 809	,	11.10
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	2.77E-02
i i i		2.772 02
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	From PTE Calculations, with landings at 2.2 TPY per tank	242.81
Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank	242.81
(lb/hr)		242.81 4.38E-02
	TPY per tank From PTE Calculations, 3.7 TPY landings	
(lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank	
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank	4.38E-02
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings	4.38E-02 383.80 48
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter	4.38E-02 383.80 48 100
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3	4.38E-02 383.80 48 100 23.3
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15	4.38E-02 383.80 48 100
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Volume Source, 209	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions)	4.38E-02 383.80 48 100 23.3
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2	4.38E-02 383.80 48 100 23.3 22.33
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank	4.38E-02 383.80 48 100 23.3
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2	4.38E-02 383.80 48 100 23.3 22.33
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Volume Source, 20) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2	4.38E-02 383.80 48 100 23.3 22.33 6.93E-03
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Volume Source, 20) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank	4.38E-02 383.80 48 100 23.3 22.33 6.93E-03
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings	4.38E-02 383.80 48 100 23.3 22.33 6.93E-03
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank	4.38E-02 383.80 48 100 23.3 22.33 6.93E-03
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings	4.38E-02 383.80 48 100 23.3 22.33 6.93E-03 60.70 1.10E-02
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank	4.38E-02 383.80 48 100 23.3 22.33 6.93E-03 60.70 1.10E-02 95.95
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents	4.38E-02 383.80 48 100 23.3 22.33 6.93E-03 60.70 1.10E-02 95.95 24
(lb/hr) Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 118 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter	4.38E-02 383.80 48 100 23.3 22.33 6.93E-03 60.70 1.10E-02 95.95 24 100

Tank 119 (Blendstock) (UPPER Volume Source, 80% of emissions)		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	2.76E-02
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	2.70E-02
(lb/hr)	TPY per tank	241.84
(13/111)	From PTE Calculations, 3.7 TPY landings	241.04
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	4.37E-02
Emission Rate for Affidal Rain & (15/111)	From PTE Calculations, 3.7 TPY landings	4.37L-02
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	382.83
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	80
· · · · · · · · · · · · · · · · · · ·		
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 119 (Blendstock) (LOWER Volume Source, 209		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	6.90E-03
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	60.10
(lb/hr)	TPY per tank	60.46
Facining Data for Associal Days O (lla/las)	From PTE Calculations, 3.7 TPY landings	4.005.00
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	1.09E-02
Emission Data for Annual Dun 9 (lb / m)	From PTE Calculations, 3.7 TPY landings	05.74
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	95.71
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 121 (Blendstock) (UPPER Volume Source, 80%		
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	3.09E-02
Emission Rate for Annual Runs 1 through 7 and 9	From PTE Calculations, with landings at 2.2	
(lb/hr)	TPY per tank	270.26
		270.26
(lb/hr) Emission Rate for Annual Run 8 (lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank	270.26 4.69E-02
Emission Rate for Annual Run 8 (lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings	4.69E-02
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank	
Emission Rate for Annual Run 8 (lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings	4.69E-02
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank	4.69E-02 411.25
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents	4.69E-02 411.25 48
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter	4.69E-02 411.25 48 150
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15	4.69E-02 411.25 48 150 34.9
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15	4.69E-02 411.25 48 150 34.9
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volume Source, 205)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions)	4.69E-02 411.25 48 150 34.9
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volume Source, 205) Emission Rate for Annual Runs 1 through 7 and 9	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2	4.69E-02 411.25 48 150 34.9 22.33
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volume Source, 205) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank	4.69E-02 411.25 48 150 34.9 22.33
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volume Source, 202 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2	4.69E-02 411.25 48 150 34.9 22.33
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volume Source, 202 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank	4.69E-02 411.25 48 150 34.9 22.33 7.71E-03
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings	4.69E-02 411.25 48 150 34.9 22.33 7.71E-03
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank	4.69E-02 411.25 48 150 34.9 22.33 7.71E-03
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volume Source, 205 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings	4.69E-02 411.25 48 150 34.9 22.33 7.71E-03 67.56
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr) Emission Rate for Annual Run 8 (lb/hr)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank	4.69E-02 411.25 48 150 34.9 22.33 7.71E-03 67.56 1.17E-02
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volume Source, 209 Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents	4.69E-02 411.25 48 150 34.9 22.33 7.71E-03 67.56 1.17E-02 102.81 24
Emission Rate for Annual Run 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft) Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft) Tank 121 (Blendstock) (LOWER Volume Source, 2000) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7 and 9 (lb/hr) Emission Rate for Annual Runs 8 (lb/hr) Emission Rate for Annual Run 8 (lb/yr) Release Height (ft) Diameter (ft)	TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter Tank Diameter divided by 4.3 Tank height divided by 2.15 6 of emissions) From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, with landings at 2.2 TPY per tank From PTE Calculations, 3.7 TPY landings per blendstock tank From PTE Calculations, 3.7 TPY landings per blendstock tank Tank height. Approx. height of roof vents Tank diameter	4.69E-02 411.25 48 150 34.9 22.33 7.71E-03 67.56 1.17E-02 102.81 24 150

Tank 130 (Product/ Water Mixture) (UPPER Volume Source, 80% of emissions)		
Emission Rate (lb/hr)	From PTE Calculations	9.56E-04
Emission Rate (lb/yr)	From PTE Calculations	8.38
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	75
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 130 (Product/ Water Mixture) (LOW	ER Volume Source, 20% of emissions)	
Emission Rate (lb/hr)	From PTE Calculations	2.39E-04
Emission Rate (lb/yr)	From PTE Calculations	2.09
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	75
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

General Parameters		
Parameter		Value
Projection		итм
Datum		NAD83
JTM Zone		18
Hemisphere		Northern
AERMET		2016-2020 MET Data
AERMAP		1-deg DEM Data from webgis.com
Sources	Assumptions/ Notes	Value
Tank 28 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	1.94E-02
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 29 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	1.94E-02
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 30 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	1.94E-02
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 33 (Distillate) (Point Source)	<u> </u>	
Emission Rate (lb/hr)	From PTE Calculations	1.93E-02
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 64 (Distillate) (Point Source)		
Emission Rate (lb/hr)	From PTE Calculations	1.55E-02
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient

	e Separate Table for Vapor Space Purge During Cleanings	
Tank 31 (Gasoline) (UPPER Volume Source, 80%	of emissions)	
Emission Rate (lb/hr) Not During Landing or	From DTF Coloulations	2.025.02
Cleaning	From PTE Calculations Calculated based on 1500 bph refill rate and calculations i	2.83E-02
 Emission Rate (lb/hr) During Refill After Landing	Xylene	ii variable Emissions Rate Spreadsheet for
Release Height (ft)	Tank height. Approx. height of roof vents	45
	9 11 9	
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 31 (Gasoline) (LOWER Volume Source, 209	% of emissions)	
Emission Rate (lb/hr) Not During Landing or	From PTF Caladations	7.075.00
Cleaning	From PTE Calculations	7.07E-03
Emission Rate (lb/hr) During Refill After Landing	Calculated based on 1500 bph refill rate and calculations i Xylene	n variable Emissions Rate Spreadsneet for
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47
Tank 32 (Gasoline) (UPPER Volume Source, 80%		
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	2.83E-02
Emission Rate (lb/hr) During Refill After Landing	Calculated based on 1500 bph refill rate and calculations i Xylene	n Variable Emissions Rate Spreadsheet for
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 32 (Gasoline) (LOWER Volume Source, 209	% of emissions)	
Emission Rate (lb/hr) Not During Landing or	,	
Cleaning	From PTE Calculations	7.07E-03
	Calculated based on 1500 bph refill rate and calculations i	n Variable Emissions Rate Spreadsheet for
Emission Rate (lb/hr) During Refill After Landing	Xylene	
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47
Tank 39 (Gasoline) (UPPER Volume Source, 80%	6 of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	2.73E-02
Emission Pata (lb/hr) During Pofill After Landing	Calculated based on 1500 bph refill rate and calculations i	n Variable Emissions Rate Spreadsheet for
Emission Rate (lb/hr) During Refill After Landing	Xylene Tank height Approx height of roof years	۸۳
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93

36	ee Separate Table for Vapor Space Purge During Cleanings	
Tank 39 (Gasoline) (LOWER Volume Source, 20	% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	6.83E-03
	Calculated based on 1500 bph refill rate and calculations	in Variable Emissions Rate Spreadsheet for
Emission Rate (lb/hr) During Refill After Landing	Xylene	
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47
Tank 120 (Gasoline) (UPPER Volume Source, 80	% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	2.64E-02
	Calculated based on 1500 bph refill rate and calculations	in Variable Emissions Rate Spreadsheet for
Emission Rate (lb/hr) During Refill After Landing	Xylene	
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 120 (Gasoline) (LOWER Volume Source, 2	0% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	6.60E-03
Emission Rate (lb/hr) During Refill After Landing	Calculated based on 1500 bph refill rate and calculations Xylene	in Variable Emissions Rate Spreadsheet for
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 114 (Blendstock) (UPPER Volume Source,	80% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	2.88E-02
	Calculated based on 1500 bph refill rate and calculations	in Variable Emissions Rate Spreadsheet for
Emission Rate (lb/hr) During Refill After Landing	Xylene	
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 114 (Blendstock) (LOWER Volume Source		
Emission Rate (lb/hr) Not During Landing or	·	
Cleaning	From PTE Calculations	7.20E-03
	Calculated based on 1500 bph refill rate and calculations	in Variable Emissions Rate Spreadsheet for
Emission Rate (lb/hr) During Refill After Landing	Xylene	
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

	e Separate Table for Vapor Space Purge During Cleanings	
Tank 115 (Blendstock) (UPPER Volume Source,	80% of emissions)	
Emission Rate (lb/hr) Not During Landing or	From PTE Calculations	3.065.03
Cleaning	Calculated based on 1500 bph refill rate and calculations is	2.96E-02
 Emission Rate (lb/hr) During Refill After Landing	Xylene	ii variable Emissions Rate Spreadsheet for
Release Height (ft)	Tank height. Approx. height of roof vents	48
	9 9	
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 115 (Blendstock) (LOWER Volume Source,	20% of emissions)	
Emission Rate (lb/hr) Not During Landing or	From PTF Calculations	7.405.00
Cleaning	From PTE Calculations	7.40E-03
Emission Rate (lb/hr) During Refill After Landing	Calculated based on 1500 bph refill rate and calculations i Xylene	n variable Emissions Rate Spreadsneet for
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 117 (Blendstock) (UPPER Volume Source,	-	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	2.73E-02
Emission Rate (lb/hr) During Refill After Landing	Calculated based on 1500 bph refill rate and calculations i Xylene	n Variable Emissions Rate Spreadsheet for
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 117 (Blendstock) (LOWER Volume Source,	20% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	6.83E-03
	Calculated based on 1500 bph refill rate and calculations i	n Variable Emissions Rate Spreadsheet for
Emission Rate (lb/hr) During Refill After Landing	Xylene	
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 118 (Blendstock) (UPPER Volume Source,	80% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	2.77E-02
Emission Rate (lb/hr) During Refill After Landing	Calculated based on 1500 bph refill rate and calculations i	n Variable Emissions Rate Spreadsheet for
Release Height (ft)	Xylene Tank height. Approx. height of roof vents	48
- · · ·	9	
Diameter (ft)	Tank diameter	100
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33

36	e Separate Table for Vapor Space Purge During Cleanings	
Tank 118 (Blendstock) (LOWER Volume Source	20% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	6.93E-03
	Calculated based on 1500 bph refill rate and calculations	in Variable Emissions Rate Spreadsheet for
Emission Rate (lb/hr) During Refill After Landing	Xylene	
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	100
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 119 (Blendstock) (UPPER Volume Source,	80% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	2.76E-02
	Calculated based on 1500 bph refill rate and calculations	in Variable Emissions Rate Spreadsheet for
Emission Rate (lb/hr) During Refill After Landing	Xylene	
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 119 (Blendstock) (LOWER Volume Source,	20% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	6.90E-03
Emission Rate (lb/hr) During Refill After Landing	Calculated based on 1500 bph refill rate and calculations Xylene	in Variable Emissions Rate Spreadsheet for
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 121 (Blendstock) (UPPER Volume Source,	80% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	3.09E-02
	Calculated based on 1500 bph refill rate and calculations	in Variable Emissions Rate Spreadsheet for
Emission Rate (lb/hr) During Refill After Landing	Xylene	
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 121 (Blendstock) (LOWER Volume Source	20% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	7.71E-03
	Calculated based on 1500 bph refill rate and calculations	in Variable Emissions Rate Spreadsheet for
Emission Rate (lb/hr) During Refill After Landing	Xylene	
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

the specific of the specific o		
Tank 130 (Product/ Water Mixture) (UPPER Volume Source, 80% of emissions)		
Emission Rate (lb/hr)	From PTE Calculations	9.56E-04
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	75
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 130 (Product/ Water Mixture) (LO	WER Volume Source, 20% of emissions)	
Emission Rate (lb/hr)	From PTE Calculations	2.39E-04
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	75
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

General Parameters		
Parameter Parameters		Value
Projection		UTM
Datum		NAD83
UTM Zone		18
Hemisphere		Northern
AERMET		2016-2020 MET Data
AERMAP		1-deg DEM Data from webgis.com
Sources	Assumptions/ Notes	Value
Tank 28 (Distillate) (Point Source)		
	See Hourly Assumptions Table	
Tank 29 (Distillate) (Point Source)		
	See Hourly Assumptions Table	
Tank 30 (Distillate) (Point Source)		
	See Hourly Assumptions Table	
Tank 33 (Distillate) (Point Source)		
	See Hourly Assumptions Table	
Tank 64 (Distillate) (Point Source)		
	See Hourly Assumptions Table	
Tank 31 (Gasoline) (During Cleaning - Volume S	, , ,	
Model Assumptions Not During Cleaning		ly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning		Emission Rate for Xylene Table
Release Height (ft)	Actual Height of Manway above ground	2.5
Diameter (ft)	Tank diameter	125
. ,	Tank Diameter divided by 4.3	
Initial Horizontal Dimension (ft)	Release height divided by 2.15	29.1
Initial Vertical Dimension (ft)	,	1.16
Tank 31 (Gasoline) (During Controlled Cleaning		
Model Assumptions Not During Cleaning		ly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for xylene Table
Release Height (ft)	Stack Height above ground	13
Diameter (ft)	Inside diameter of stack	2.5
Exit Velocity (ft/s)	Calculated from contractor data	5.1
Gas Exit Temperature (degrees F)	From cleaning contractor	1400
Tank 32 (Gasoline) (During Cleaning - Volume S	ource at Manway Height)	
Model Assumptions Not During Cleaning	See Hour	ly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for Xylene Table
Release Height (ft)	Actual Height of Manway above ground	2.75
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.30
Tank 32 (Gasoline) (During Controlled Cleaning	- Horizontal Point Source)	
Model Assumptions Not During Cleaning		ly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning		Emission Rate for xylene Table
, 5 5	333 74114876	,
Release Height (ft)	Stack Height above ground	13
Diameter (ft)	Inside diameter of stack	2.5
Exit Velocity (ft/s)	Calculated from contractor data	5.1
Gas Exit Temperature (degrees F)	From cleaning contractor	1400
Tank 39 (Gasoline) (During Cleaning - Volume So		1.00
Model Assumptions Not During Cleaning		ly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning		Emission Rate for Xylene Table
Release Height (ft)	Actual Height of Manway above ground	2.54
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.18
Tank 39 (Gasoline) (During Controlled Cleaning		
Model Assumptions Not During Cleaning		ly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for xylene Table
D	la	
Release Height (ft)	Stack Height above ground	13
Diameter (ft)	Inside diameter of stack	2.5
Exit Velocity (ft/s)	Calculated from contractor data	5.1
Gas Exit Temperature (degrees F)	From cleaning contractor	1400

Emission Rate IIB/M During Cleaning Excess Height (P) Task Gameeter (P) Task Gameete	Tank 120 (Gasoline) (During Cleaning - Volume	Source at Manway Height)	
Reference Freight (ff)	Model Assumptions Not During Cleaning	See Hourl	y Model Assumptions Table
Dameter (II) Tank diameter 80 Initial bringhold Dimension (II) Tank Dimension (II) Tank Dimension (II) Tank Dimension (II) Tank Dimension (III)	Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for Xylene Table
Initial Horizontal Dimension (1) Fank Dalmeter divided by 4.3 Fank 120 (Sasaline) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning Enission Rate (10/hr) During Cleaning Enission Rate (10/hr) During Cleaning Enission Rate (10/hr) During Cleaning See Voriable Enission Rate for sylene Table Enission Rate (10/hr) During Cleaning See Voriable Enission Rate for sylene Table Belease Height (17) Sasaling Cleaning See Variable Enission Rate for sylene Table See Variable Enission Rate for sylene Table See Variable Enission Rate for sylene Table 1 3 Demander (17) Sasaling Cleaning Sasaling Controlled Cleaning - Volume Source at Manivary Height) Model Assumptions Nate During Cleaning Actual Height of Manivary above ground See Variable Enission Rate for Xylene Table Release Height (17) Actual Height of Manivary above ground See Variable Enission Rate for Xylene Table Initial Horizontal Dimension (10) Tank 118 (Bendescod) During Cleaning See Variable Enission Rate for Xylene Table Release Height (17) Sasaling Controlled Cleaning - Notional Source Source Attended by 2.15 Tank 118 (Bendescod) During Cleaning See Variable Enission Rate for Xylene Table Release Height (17) Sasal Release	Release Height (ft)	Actual Height of Manway above ground	2.58
Initial Vertical Dimension (ft) Actual register of Stack Height above ground seek Height (ft) Carbonic Stack Height above ground seek Height (ft) Stack Height above ground seek Height above ground seek Height (ft) Stack Height above ground seek Height (ft) Height (ft) Height (ft) Height (ft) Height (ft) Height (ft) Height (ft) Height (ft) Height (ft) Height (ft) Heig	Diameter (ft)	Tank diameter	80
Tank 120 (Sacaline) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Not During Cleaning See Variable Emission Rate for xylene Table Release Height (P) Inside diameter of stack Ext Velocity (Mr.) Calculated from contractor data Gar Gall Temperature (degrees F) From cleaning contractor Tank 126 (Benditods) (During Cleaning See Variable Emission Rate for xylene Table See Variable Tribuston Not During Cleaning Actual Height of Manway above ground Actual Height (P) Tank Claimeter of Stack See Variable Emission Rate (Rylene) Actual Height (P) Tank Claimeter of Stack See Variable Emission Rate (Rylene) Actual Height (P) Tank Claimeter (P) See Hourly Model Assumptions Table Model Assumptions (P) Release Height (P) Inside diameter of Stack See Variable Emission Rate for xylene Table Release Height (P) Inside diameter of Stack See Variable Emission Rate for xylene Table Release Height (P) Inside diameter (P) Inside diameter of Stack See Variable Emission Rate for xylene Table Release Height (P) Inside diameter of Stack See Variable Emission Rate for xylene Table Release Height (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside Gameter (P) Inside	Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission flats (Dyhr) During Cleaning See Variable Emission flats for ryteine Table See Variable Emission flats (Dyhr) During Cleaning Se	Initial Vertical Dimension (ft)	Release height divided by 2.15	1.20
Release Height (ft) During Cleaning Stack Height above ground 13 Domester (ft) 13 Domester (ft) 15 Domester (ft) 15 Domester (ft) 16 Domester (ft) 17 Domester (ft) 18 Domester	Tank 120 (Gasoline) (During Controlled Cleaning	g - Horizontal Point Source)	
Release Height (ft) Slack Height above ground Is Diameter (ft) Inside diameter of stack 2.5 Size Velocity (ft/s) Gas Isst Temperature (degrees F) From deaning contractor First 156 (Bindes) From deaning contractor From Seaning Contractor	Model Assumptions Not During Cleaning	See Hourl	y Model Assumptions Table
Diameter (ft) Inside diameter of stack 2.5 Ext Velocity (ft/s) (Sculated from contractor data 5.1 Social Temperature (degrees F) From cleaning contractor (1900) From Cleaning Contractor (190	Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for xylene Table
Diameter (ft) Inside diameter of stack 2.5 Ext Velocity (ft/s) (Sculated from contractor data 5.1 Social Temperature (degrees F) From cleaning contractor (1900) From Cleaning Contractor (190			
Calculated from contractor data	Release Height (ft)	Stack Height above ground	13
Gas East Emperature (degrees F) From cleaning contractor 1400 Tank 134 (Blendstock) (During Cleaning See Hourly Model Assumptions Table Emission Rate (DyPr) During Cleaning See Variable Emission Rate (DyPr) During Cl	Diameter (ft)	Inside diameter of stack	2.5
Tank 114 (Blendstock) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Variable Emission Rate (Ib/W) During Cleaning Release Height (ft) Actual Height of Manway above ground 2.71 Diameter (ft) Tank diameter Tank diameter Tank Diameter (divided by 4.3 2.79 Initial Horizontal Dimension (ft) Tank Diameter (divided by 4.3 2.79 Initial Horizontal Dimension (ft) Release Height (ft) See Variable Emission Rate for xylene Table Release Height (ft) See Variable Emission Not During Cleaning Release Height (ft) Stack Height above ground 13 Diameter (ft) Stack Height above ground 13 Diameter (ft) See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack See Variable Emission Rate for xylene Table Release Height (ft) See Nourly Model Assumptions Table Tank 115 (Bendstock) (During Cleaning Release Height (ft) See Hourly Model Assumptions Table Release Height (ft) Release Height (ft) See Hourly Model Assumptions Table Release Height (ft) Release Height (ft) Actual Height of Manway above ground 2.33 Diameter (ft) Tank diameter 150 Diameter (ft) Tank Diameter (ft	Exit Velocity (ft/s)	Calculated from contractor data	5.1
Model Assumptions Not During Cleaning Entission Rate (Ib/hry) During Cleaning Entission Rate (Ib/hry During Cleaning Entiss	Gas Exit Temperature (degrees F)	From cleaning contractor	1400
Emission Rate (It/Pin) During Cleaning Actual Height of Manway above ground 2.71 Diameter (R) Tank Diameter divided by 4.3 27.9 Initial Horizontal Dimension (R) Tank Diameter divided by 4.3 27.9 Initial Horizontal Dimension (R) Release Height (Melder by 2.15 Tank 134 (Belendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During (Cleaning Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Hourly Model Assumptions Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (It/Pin) During Cleaning See Hourly Model Assumptions Table Emiss	Tank 114 (Blendstock) (During Cleaning - Volum	ne Source at Manway Height)	
Release Height (ft) Diameter (ft) Tank diameter Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank Diameter (ft) Tank La (Release height (ft)) Tank La (Release Height (ft)) Tank La (Release Height (ft)) Tank Dameter (ft) Tank Diameter (ft) Tank Diam	Model Assumptions Not During Cleaning	See Hourl	y Model Assumptions Table
Diameter (ft) Initial Horizontal Dimension (ft) Initial Horizontal Dimension (ft) Initial Horizontal Dimension (ft) Initial Horizontal Dimension (ft) Release height divided by 4.3 27.9 Initial Vertical Dimension (ft) Release height divided by 2.15 1.26 See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Initial deritaci During (Iesaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Variable Emission Rate for Xylene Table Release Height (Ift) See Sut Temperature (degrees F) From cleaning contractor 1000 Tarink 115 (Blendstock) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning - Volume Source at Manway Height of Manway above ground 2.33 Diameter (ft) Tank 115 (Blendstock) (During Cleaning - Volume Source at Manway Height of Manway above ground 2.33 Diameter (ft) Tank Diameter divided by 4.3 3.9,9 Initial Vertical Dimension (ft) Release Height of Manway above ground 3.10 Tark 115 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Variable Emission Rate for xylene Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Initial Horizontal Dimension (ft) Tank Ail (Blendstock) (During Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Variable Emission Rate for Xylene Table Release Height (ft) Actual Height of Manway above ground 2.5 Diameter (ft) Tank Diameter (ft) Tank Diamete	Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for Xylene Table
Initial Horizontal Dimension (ft) Release height divided by 4.3 1.76 Tark Diameter divided by 4.3 1.76 Tark 114 (Biendstock) (During Cleaning Emission Rate (Ib/hr) During Cleaning Release height (ft) Diameter (ft) Inside diameter of stack 2.5 Sait Venocity (ft/s) Calculated from contractor data Sait Surpersature (degrees F) From cleaning contractor Tark 134 (Biendstock) (During Cleaning From cleaning contractor Tark 135 (Biendstock) Tark 135 (Biendstock) Tark 136 (Biendstock) Tark 136 (Biendstock) Tark 136 (Biendstock) Tark 137 (Biendstock) Tark 136 (Biendstock) Tark 136 (Biendstock) Tark 136 (Biendstock) Tark 137 (Biendstock) Tark 137 (Biendstock) Tark 137 (Biendstock) Tark 138 (Biendstock) Tark 138 (Biendstock) Tark 138 (Biendstock) Tark 138 (Biendstock) Tark 138 (Biendstock) Tark 138 (Biendstock) Tark 138 (Biendstock) Tark 139 (Biendstock) Tar	Release Height (ft)	Actual Height of Manway above ground	2.71
Initial Vertical Dimension (ft) Release height (living Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning Emission Rate (lip/hr) During Cleaning Release Height (ft) Stack Height above ground Initial Vertical Dimension (lip/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground Initial Vertical Dimension (lip/hr) During Cleaning See Variable Emission Rate (lip/hr) During Cleaning Release Height (ft) Inside diameter of stack 2.5 Exit Velocity (lify) Gas Exit Temperature (degrees F) From cleaning contractor Intial Stack Height above ground Initial Sumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lib/hr) During Cleaning Release Height (ft) Actual Height of Manway above ground Initial Horizontal Dimension (lt) Tank diameter Initial Horizontal Dimension (lt) Tank diameter Initial Horizontal Dimension (lt) Release Height (living Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Hourly Model Assumptions Table Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning See Variable Emission Rate (lib/hr) During Cleaning	Diameter (ft)	Tank diameter	120
Model Assumptions Not During Cleaning	Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
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Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 115 (Blendstock) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for Xylene Table Release Height (ft) Actual Height of Manway above ground 2.33 Diameter (ft) Tank diameter 150 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 34.9 Initial Vertical During Cleaning See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 117 (Blendstock) (During Cleaning See Variable Emission Rate for Xylene Table See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for xylene Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for xylene Table See Variable Emission Rate for xylene Table See Variabl	Diameter (ft)	Inside diameter of stack	2.5
Model Assumptions Not During Cleaning See Hourly Model Assumptions Table	Exit Velocity (ft/s)	Calculated from contractor data	5.1
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Emission Rate (lb/hr) During Cleaning Release Height (ft) Stack Height above ground Diameter (ft) Inside diameter of stack Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor Tank 117 (Blendstock) (During Cleaning From Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Xylene Table Release Height (ft) Actual Height of Manway above ground Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 Initial Vertical Dimension (ft) Release height divided by 2.15 Tank 17 (Blendstock) (During Cleaning See Hourly Model Assumptions Table See Variable Emission Rate for Xylene Table 110 Initial Horizontal Dimension (ft) Release height divided by 2.15 1.20 Tank 117 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1	Tank 115 (Blendstock) (During Controlled Clean	ing - Horizontal Point Source)	
Release Height (ft) Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor Tank 117 (Blendstock) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Xylene Table Release Height (ft) Tank diameter 110 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 25.6 Initial Vertical Dimension (ft) Release height divided by 2.15 Tank 117 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table See Variable Emission Rate for xylene Table See Variable Emission Rate for xylene Table See Variable Emission Rate for xylene Table Assumptions Rate (lb/hr) During Cleaning See Variable Emission Rate for xylene Table Calculated from contractor data 5.1	Model Assumptions Not During Cleaning	See Hourl	y Model Assumptions Table
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 117 (Blendstock) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Xylene Table Release Height (ft) Actual Height of Manway above ground 2.5 Diameter (ft) Tank diameter 110 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 25.6 Initial Vertical Dimension (ft) Release height divided by 2.15 1.20 Tank 117 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1	Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for xylene Table
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 117 (Blendstock) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Xylene Table Release Height (ft) Actual Height of Manway above ground 2.5 Diameter (ft) Tank diameter 110 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 25.6 Initial Vertical Dimension (ft) Release height divided by 2.15 1.20 Tank 117 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1			
Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor Tank 117 (Blendstock) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Xylene Table Release Height (ft) Actual Height of Manway above ground 2.5 Diameter (ft) Tank diameter 110 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 Release height divided by 2.15 1.20 Tank 117 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1	Release Height (ft)	Stack Height above ground	13
Gas Exit Temperature (degrees F) From cleaning contractor Tank 117 (Blendstock) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Xylene Table Release Height (ft) Actual Height of Manway above ground 2.5 Diameter (ft) Tank diameter 110 Initial Horizontal Dimension (ft) Release height divided by 4.3 25.6 Initial Vertical Dimension (ft) Release height divided by 2.15 1.20 Tank 117 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1	Diameter (ft)	Inside diameter of stack	2.5
Tank 117 (Blendstock) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Xylene Table Release Height (ft) Actual Height of Manway above ground 2.5 Diameter (ft) Tank diameter 110 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 25.6 Initial Vertical Dimension (ft) Release height divided by 2.15 1.20 Tank 117 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1	Exit Velocity (ft/s)	Calculated from contractor data	5.1
Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning Release Height (ft) Actual Height of Manway above ground 2.5 Diameter (ft) Tank diameter 110 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 25.6 Initial Vertical Dimension (ft) Release height divided by 2.15 1.20 Tank 117 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data	Gas Exit Temperature (degrees F)	From cleaning contractor	1400
Emission Rate (lb/hr) During Cleaning Release Height (ft) Actual Height of Manway above ground Diameter (ft) Tank diameter Tank Diameter divided by 4.3 Initial Horizontal Dimension (ft) Release height divided by 2.15 Tank 117 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack Exit Velocity (ft/s) Calculated from contractor data	Tank 117 (Blendstock) (During Cleaning - Volum	ne Source at Manway Height)	
Release Height (ft) Actual Height of Manway above ground Diameter (ft) Tank diameter Tank Diameter divided by 4.3 Initial Horizontal Dimension (ft) Release height divided by 2.15 Tank 117 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack Exit Velocity (ft/s) Calculated from contractor data 2.5 Tank 110 2.5 2.6 2.5 2.5 2.5 2.5 2.5 2.5 2.5 3.7 3.7 3.7 3.7 3.7 3.7 3.7 3.7 3.7 3.7	Model Assumptions Not During Cleaning	See Hourl	y Model Assumptions Table
Diameter (ft) Di	Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for Xylene Table
Initial Horizontal Dimension (ft) Initial Horizontal Dimension (ft) Release height divided by 4.3 Initial Vertical Dimension (ft) Release height divided by 2.15 Initial Vertical Dimension (ft) Release height divided by 2.15 Initial Vertical Dimension (ft) Initial Vertical Dimension (ft) Release Horizontal Point Source) See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground Inside diameter of stack Inside diameter of stack Inside diameter of stack See Variable Emission Rate for xylene Table 13 Diameter (ft) Calculated from contractor data Stack Height above ground	Release Height (ft)	Actual Height of Manway above ground	2.5
Initial Vertical Dimension (ft) Release height divided by 2.15 Tank 117 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack Exit Velocity (ft/s) Calculated from contractor data 1.20 1.20	Diameter (ft)	Tank diameter	110
Initial Vertical Dimension (ft) Release height divided by 2.15 Tank 117 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack Exit Velocity (ft/s) Calculated from contractor data 1.20 1.20	Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Tank 117 (Blendstock) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1	Initial Vertical Dimension (ft)		1.20
Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for xylene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data See Hourly Model Assumptions Table See Variable Emission Rate for xylene Table 2.5 Calculated From Contractor data	Tank 117 (Blendstock) (During Controlled Clean	ing - Horizontal Point Source)	
Emission Rate (lb/hr) During Cleaning Release Height (ft) Stack Height above ground Inside diameter of stack Exit Velocity (ft/s) See Variable Emission Rate for xylene Table 13 Laborate (ft) Calculated from contractor data See Variable Emission Rate for xylene Table 13 Laborate (ft) Calculated from contractor data See Variable Emission Rate for xylene Table 13 Laborate (ft) Stack Height above ground 13 Laborate (ft) Stack Height above ground 13 Laborate (ft) Stack Height above ground 15 Laborate (ft) Stack Height above ground 16 Laborate (ft) Stack Height above ground 17 Laborate (ft) Stack Height above ground 18 Laborate (ft			y Model Assumptions Table
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1			
Exit Velocity (ft/s) Calculated from contractor data 5.1	Release Height (ft)	Stack Height above ground	13
	Diameter (ft)		
	Exit Velocity (ft/s)	Calculated from contractor data	5.1
	Gas Exit Temperature (degrees F)	From cleaning contractor	

Model Assumptions Not During Cleaning	See Hourly Mod	del Assumptions Table	
Emission Rate (lb/hr) During Cleaning	·	ion Rate for Xylene Table	
Release Height (ft)	Actual Height of Manway above ground	2.42	
Diameter (ft)	Tank diameter	100	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3	
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.12	
Tank 118 (Blendstock) (During Controlled Clean	ing - Horizontal Point Source)		
Model Assumptions Not During Cleaning	See Hourly Mod	del Assumptions Table	
Emission Rate (lb/hr) During Cleaning	See Variable Emiss	ion Rate for xylene Table	
Release Height (ft)	Stack Height above ground	13	
Diameter (ft)	Inside diameter of stack	2.5	
Exit Velocity (ft/s)	Calculated from contractor data	5.1	
Gas Exit Temperature (degrees F)	From cleaning contractor	1400	
Tank 119 (Blendstock) (During Cleaning - Volum	e Source at Manway Height)		
Model Assumptions Not During Cleaning	See Hourly Mod	del Assumptions Table	
Emission Rate (lb/hr) During Cleaning	See Variable Emiss	ion Rate for Xylene Table	
Release Height (ft)	Actual Height of Manway above ground	2.38	
Diameter (ft)	Tank diameter	80	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6	
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.10	
Tank 119 (Blendstock) (During Controlled Clean	ing - Horizontal Point Source)		
Model Assumptions Not During Cleaning	See Hourly Mod	del Assumptions Table	
Emission Rate (lb/hr) During Cleaning	See Variable Emission Rate for xylene Table		
Release Height (ft)	Stack Height above ground	13	
Diameter (ft)	Inside diameter of stack	2.5	
Exit Velocity (ft/s)	Calculated from contractor data	5.1	
Gas Exit Temperature (degrees F)	From cleaning contractor	1400	
Tank 121 (Blendstock) (During Cleaning - Volum	e Source at Manway Height)		
Model Assumptions Not During Cleaning	See Hourly Mod	del Assumptions Table	
Emission Rate (lb/hr) During Cleaning	See Variable Emiss	ion Rate for Xylene Table	
Release Height (ft)	Actual Height of Manway above ground	2.5	
Diameter (ft)	Tank diameter	150	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9	
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.16	
Tank 121 (Blendstock) (During Controlled Clean	ing - Horizontal Point Source)		
Model Assumptions Not During Cleaning	See Hourly Mod	del Assumptions Table	
Emission Rate (lb/hr) During Cleaning	See Variable Emiss	See Variable Emission Rate for xylene Table	
Delegae Height (ft)	Canali Halisha ah aya sasari I	4.5	
Release Height (ft)	Stack Height above ground	13	
Diameter (ft)	Inside diameter of stack	2.5	
Exit Velocity (ft/s)	Calculated from contractor data	5.1	
Gas Exit Temperature (degrees F)	From cleaning contractor	1400	
Tank 130 (Product/ Water Mixture) (UPPER Vol	·		
	See Hourly Assumptions Table		
Tank 130 (Product/ Water Mixture) (LOWER Vo	lume Source, 20% of emissions)		

Variable Emission Rate Calculations for Xylene Modeling

		Ratios Used for Variable Emission Rates ¹						July Xylene Emission Rates ²								
Tank	Product Assumed	January	February	March	April	May	June	July	August	September	October	November	December	Refill after landing (lb/hr)	Uncontrolled Vapor Space Purge (lb/hr)	Controlled Vapor Space Purge (lb/hr)
31	Gasoline - PTE RVP schedule	0.189	0.209	0.284	0.451	0.646	0.884	1.000	0.963	0.742	0.489	0.357	0.236	0.44	5.37	0.1074
32	Gasoline - PTE RVP schedule	0.189	0.209	0.284	0.451	0.646	0.884	1.000	0.963	0.742	0.489	0.357	0.236	0.44	5.37	0.1074
39	Gasoline - PTE RVP schedule	0.189	0.209	0.284	0.451	0.646	0.884	1.000	0.963	0.742	0.489	0.357	0.236	0.44	5.37	0.1074
120	Gasoline - PTE RVP schedule	0.189	0.209	0.284	0.451	0.646	0.884	1.000	0.963	0.742	0.489	0.357	0.236	0.44	2.2	0.044
114	Blendstock RVP 15	0.181	0.201	0.284	0.451	0.646	0.884	1.000	0.963	0.742	0.489	0.342	0.226	0.46	5.16	0.1032
115	Blendstock RVP 15	0.181	0.201	0.284	0.451	0.646	0.884	1.000	0.963	0.742	0.489	0.342	0.226	0.46	8.07	0.1614
117	Component RVP 14.33	0.181	0.201	0.284	0.451	0.646	0.884	1.000	0.963	0.742	0.489	0.342	0.226	0.44	4.16	0.0832
118	Component RVP 14.33	0.181	0.201	0.284	0.451	0.646	0.884	1.000	0.963	0.742	0.489	0.342	0.226	0.44	3.44	0.0688
119	Component RVP 14.33	0.181	0.201	0.284	0.451	0.646	0.884	1.000	0.963	0.742	0.489	0.342	0.226	0.44	2.2	0.044
121	Blendstock RVP 15	0.181	0.201	0.284	0.451	0.646	0.884	1.000	0.963	0.742	0.489	0.342	0.226	0.46	8.07	0.1614

Notes

1. The ratio was calculated and used as follows:

Landing or cleaning total VOC emissions were calculated for each month.

The xylene emissions for each month were calculated based on the speciation for that month for the given product.

The ratio used for variable emission rate factors in AERMOD was calculated by dividing the xylene emission rate for a given month by the July xylene emission rate.

The July xylene emission rate was then entered as the emission rate for the source in the Source inputs screen in AERMOD View.

2. Emission rates represent the total xylene emissions for the tank. For landings, 80% of that value was at a release height at the top of the tank. The remaining 20% was at half of the tank height. For vapor space purge, all of the emissions were placed at the height of the manway.

General Parameters		
Parameter		Value
Projection		UTM
Datum		NAD83
UTM Zone		18
Hemisphere		Northern
AERMET		2016-2020 MET Data
AERMAP		1-deg DEM Data from webgis.com
Sources	Assumptions/ Notes	Value
Tank 28 (Distillate) (Point Source)	Assumptions/ Notes	value
Emission Rate (lb/hr)	From PTE Calculations	7.61E-03
Emission Rate (lb/yr)	From PTE Calculations	66.64
Emission Rate (15/ yr)	Tank height. Approx. height of roof	00.04
Release Height (ft)	vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 29 (Distillate) (Point Source)	Assumed	Ambient
Emission Rate (lb/hr)	From PTE Calculations	7.61E-03
` ' '	From PTE Calculations	
Emission Rate (lb/yr)	Tank height. Approx. height of roof	66.64
Release Height (ft)	vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
	Assumed	
Gas Exit Temperature	Assumed	Ambient
Tank 30 (Distillate) (Point Source)	From DTF Coloulations	7.645.02
Emission Rate (lb/hr)	From PTE Calculations	7.61E-03
Emission Rate (lb/yr)	From PTE Calculations Tank height. Approx. height of roof	66.64
Release Height (ft)	vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature	Assumed	
	Assumed	Ambient
Tank 33 (Distillate) (Point Source) Emission Rate (lb/hr)	From PTE Calculations	7.505.02
		7.58E-03
Emission Rate (lb/yr)	From PTE Calculations Tank height. Approx. height of roof	66.37
Release Height (ft)	vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	
, , , ,		0.00328
Gas Exit Temperature	Assumed	Ambient
Tank 64 (Distillate) (Point Source)	From DTE Cole Latters	6.465.00
Emission Rate (lb/hr)	From PTE Calculations	6.16E-03
Emission Rate (lb/yr)	From PTE Calculations	53.99
Release Height (ft)	Tank height. Approx. height of roof vents	45
Stack Inside Diameter (ft)	Assumed	0.00328
Gas Exit Velocity (ft/s)	Assumed	0.00328
Gas Exit Temperature		
das Exit Terriperature	Assumed	Ambient

	ny Annual Toluene Model Assump	tions - TANKS
Tank 31 (Gasoline) (UPPER Volume Source, 80%		
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	1.90E-02
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	166.14
	From PTE Calculations, no landings at	
Emission Rate for Annual Run 8 (lb/hr)	this tank	7.15E-03
	From PTE Calculations, no landings at	
Emission Rate for Annual Run 8 (lb/yr)	this tank	62.66
	Tank height. Approx. height of roof	
Release Height (ft)	vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 31 (Gasoline) (LOWER Volume Source, 209	% of emissions)	
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	4.74E-03
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	4.742 03
9 (lb/hr)	2.2 TPY per tank	41.54
3 (13/111)	From PTE Calculations, no landings at	41.54
Emission Rate for Annual Run 8 (lb/hr)	this tank	1.79E-03
Emission rate for Annual Run 6 (18/111)	From PTE Calculations, no landings at	1.73L-03
Emission Rate for Annual Run 8 (lb/yr)	this tank	15.66
Linission Rate for Annual Run 8 (15/ yr)	Tank height. Approx. height of roof	15.00
Rologeo Hoight (ft)	vents	22.5
Release Height (ft)		22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47
Tank 32 (Gasoline) (UPPER Volume Source, 80%	of emissions)	
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	1.90E-02
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	166.18
	From PTE Calculations, no landings at	
Emission Rate for Annual Run 8 (lb/hr)	this tank	7.16E-03
	From PTE Calculations, no landings at	
Emission Rate for Annual Run 8 (lb/yr)	this tank	62.69
	Tank height. Approx. height of roof	
Release Height (ft)	vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
` ,	· ·	
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 32 (Gasoline) (LOWER Volume Source, 209	-	
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	4.74E-03
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	41.54
	From PTE Calculations, no landings at	
Emission Rate for Annual Run 8 (lb/hr)	this tank	1.79E-03
	From PTE Calculations, no landings at	
Emission Rate for Annual Run 8 (lb/yr)	this tank	15.67
	Tank height. Approx. height of roof	
Release Height (ft)	vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
	Release height divided by 2.15	10.47
Initial Vertical Dimension (ft)		

Tank 39 (Gasoline) (UPPER Volume Source, 80%	of emissions)	
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	1.74E-02
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	1.74L-02
9 (lb/hr)	2.2 TPY per tank	152.66
3 (10/111)	From PTE Calculations, no landings at	132.00
Emission Rate for Annual Run 8 (lb/hr)	this tank	5.61E-03
Linission Rate for Annual Run 8 (18/111)	From PTE Calculations, no landings at	3.01L-03
Emission Rate for Annual Run 8 (lb/yr)	this tank	49.18
Linission Rate for Annual Run 8 (15) yr)	Tank height. Approx. height of roof	49.10
Release Height (ft)	vents	45
	Tank diameter	
Diameter (ft)		125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 39 (Gasoline) (LOWER Volume Source, 20	-	
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	4.36E-03
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	38.17
	From PTE Calculations, no landings at	
Emission Rate for Annual Run 8 (lb/hr)	this tank	1.40E-03
	From PTE Calculations, no landings at	
Emission Rate for Annual Run 8 (lb/yr)	this tank	12.29
	Tank height. Approx. height of roof	
Release Height (ft)	vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47
Tank 120 (Gasoline) (UPPER Volume Source, 80	· '	20.17
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	1.58E-02
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	1.502 02
9 (lb/hr)	2.2 TPY per tank	138.35
5 (12) 111 /	From PTE Calculations, no landings at	130.33
Emission Rate for Annual Run 8 (lb/hr)	this tank	3.98E-03
	From PTE Calculations, no landings at	3.302 03
Emission Rate for Annual Run 8 (lb/yr)	this tank	34.86
Emission rate for familiar rains (15/7/1)	Tank height. Approx. height of roof	34.00
Release Height (ft)	vents	48
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)		
	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 120 (Gasoline) (LOWER Volume Source, 20		
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	3.95E-03
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	34.59
	From PTE Calculations, no landings at	
Emission Rate for Annual Run 8 (lb/hr)	this tank	9.95E-04
	From PTE Calculations, no landings at	
Emission Rate for Annual Run 8 (lb/yr)	this tank	8.72
	Tank height. Approx. height of roof	
Release Height (ft)	vents	24
Diameter (ft)	Tank diameter	80
1		
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6

Tank 114 (Blendstock) (UPPER Volume Source,	20% of emissions)	
, , ,	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	1.89E-02
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	1.83L-02
9 (lb/hr)	2.2 TPY per tank	165.81
3 (ID/111)	From PTE Calculations, 3.7 TPY landings	103.81
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	2.68E-02
Linission Rate for Annual Run 8 (19/11)	From PTE Calculations, 3.7 TPY landings	2.00L-02
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	234.80
Linission Rate for Annual Run 8 (10/ yr)	Tank height. Approx. height of roof	234.60
Release Height (ft)	vents	48
Diameter (ft)	Tank diameter	
, , ,		120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 114 (Blendstock) (LOWER Volume Source,	-	
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	4.73E-03
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	41.45
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	6.70E-03
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	58.70
	Tank height. Approx. height of roof	
Release Height (ft)	vents	24
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 115 (Blendstock) (UPPER Volume Source,	80% of emissions)	
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	2.09E-02
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	183.47
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	2.88E-02
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	252.46
	Tank height. Approx. height of roof	
Release Height (ft)	vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
1 1	,	22.33
Tank 115 (Blendstock) (LOWER Volume Source, Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	,	E 245 02
Emission Rate for Annual Runs 1 through 7 and	2.2 TPY per tank From PTE Calculations, with landings at	5.24E-03
9 (lb/hr)	2.2 TPY per tank	45.87
J (10/111)	From PTE Calculations, 3.7 TPY landings	43.87
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	7 215 02
Emission Rate for Annual Rull 6 (ID/III)	From PTE Calculations, 3.7 TPY landings	7.21E-03
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	62.12
Linission Rate for Annual Rull 6 (ID/ yr)	Tank height. Approx. height of roof	63.12
 Release Height (ft)	vents	24
Release Height (ft)		24
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

Tank 117 (Blendstock) (UPPER Volume Source,	20% of emissions)	
	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	1.64E-02
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	1.04L-02
9 (lb/hr)	2.2 TPY per tank	143.88
3 (10/111)	From PTE Calculations, 3.7 TPY landings	143.00
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	2.43E-02
Ellission Rate for Allitual Rull 8 (19/111)	From PTE Calculations, 3.7 TPY landings	2.43L-02
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	212.87
Ellission Rate for Allifual Rull 8 (15/ yll)	Tank height. Approx. height of roof	212.87
Release Height (ft)	vents	48
	Tank diameter	
Diameter (ft)		110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 117 (Blendstock) (LOWER Volume Source,		
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	4.11E-03
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	35.97
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	6.08E-03
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	53.22
	Tank height. Approx. height of roof	
Release Height (ft)	vents	24
Diameter (ft)	Tank diameter	110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 118 (Blendstock) (UPPER Volume Source,		
	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	1.85E-02
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	1.032 02
9 (lb/hr)	2.2 TPY per tank	162.09
5 (15) 111)	From PTE Calculations, 3.7 TPY landings	102.03
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	2.64E-02
(,)	From PTE Calculations, 3.7 TPY landings	2.042 02
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	231.08
Emission rate for ramadi ram 5 (15) (17)	Tank height. Approx. height of roof	231.00
Release Height (ft)	vents	48
Diameter (ft)	Tank diameter	100
Initial Horizontal Dimension (ft)		
	Tank Diameter divided by 4.3	23.3
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 118 (Blendstock) (LOWER Volume Source,		
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	4.63E-03
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	40.52
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	6.59E-03
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	57.77
	per blendstock tank Tank height. Approx. height of roof	57.77
Emission Rate for Annual Run 8 (lb/yr) Release Height (ft)	per blendstock tank	57.77 24
	per blendstock tank Tank height. Approx. height of roof	
Release Height (ft)	per blendstock tank Tank height. Approx. height of roof vents	24

Tank 119 (Blendstock) (UPPER Volume Source,	11) Allitual Toldelle Wodel Assumpt	
	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	1.88E-02
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	1.88E-U2
9 (lb/hr)	2.2 TPY per tank	165.02
9 (10/111)	From PTE Calculations, 3.7 TPY landings	103.02
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	2.67E-02
Linission Rate for Annual Run 8 (19/11)	From PTE Calculations, 3.7 TPY landings	2.07L-02
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	234.02
Emission rate for Annual Run 6 (16/ yr)	Tank height. Approx. height of roof	234.02
Release Height (ft)	vents	48
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 119 (Blendstock) (LOWER Volume Source,	-	
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	4.71E-03
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	41.26
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	6.68E-03
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	58.50
_ , , , , , , , , , , , , , , , , , , ,	Tank height. Approx. height of roof	
Release Height (ft)	vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 121 (Blendstock) (UPPER Volume Source,	80% of emissions)	
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	2.47E-02
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	216.75
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	3.26E-02
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	285.74
	Tank height. Approx. height of roof	
Release Height (ft)	vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 121 (Blendstock) (LOWER Volume Source,	20% of emissions)	
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	6.19E-03
Emission Rate for Annual Runs 1 through 7 and	From PTE Calculations, with landings at	
9 (lb/hr)	2.2 TPY per tank	54.19
·	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	8.15E-03
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	71.44
	Tank height. Approx. height of roof	
Release Height (ft)	vents	24
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
miliar vertical billerision (it)	mercase rieignic divided by 2.13	11.10

	,		
Tank 130 (Product/ Water Mixture) (UI	PPER Volume Source, 80% of emissions)		
Emission Rate (lb/hr)	From PTE Calculations	3.39E-03	
Emission Rate (lb/yr)	From PTE Calculations	29.68	
	Tank height. Approx. height of roof		
Release Height (ft)	vents	48	
Diameter (ft)	Tank diameter	75	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4	
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33	
Tank 130 (Product/ Water Mixture) (LO	WER Volume Source, 20% of emissions)		
Emission Rate (lb/hr)	From PTE Calculations	8.47E-04	
Emission Rate (lb/yr)	From PTE Calculations	7.42	
	Tank height. Approx. height of roof		
Release Height (ft)	vents	24	
Diameter (ft)	Tank diameter	75	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4	
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16	

General Parameters				
Parameter		Value		
Projection		итм		
Datum		NAD83		
UTM Zone		18		
Hemisphere		Northern		
AERMET		2016-2020 MET Data		
AERMAP		1-deg DEM Data from webgis.com		
Sources	Assumptions/ Notes	Value		
Tank 28 (Distillate) (Point Source)				
Emission Rate (lb/hr)	From PTE Calculations	7.61E-03		
Release Height (ft)	Tank height. Approx. height of roof vents	45		
Stack Inside Diameter (ft)	Assumed	0.00328		
Gas Exit Velocity (ft/s)	Assumed	0.00328		
Gas Exit Temperature	Assumed	Ambient		
Tank 29 (Distillate) (Point Source)	1	Amount		
Emission Rate (lb/hr)	From PTE Calculations	7.61E-03		
Release Height (ft)	Tank height. Approx. height of roof vents	45		
Stack Inside Diameter (ft)	Assumed	0.00328		
Gas Exit Velocity (ft/s)	Assumed	0.00328		
Gas Exit Temperature	Assumed	Ambient		
Tank 30 (Distillate) (Point Source)	J. 65464	Amount		
Emission Rate (lb/hr)	From PTE Calculations	7.61E-03		
Release Height (ft)	Tank height. Approx. height of roof vents	45		
Stack Inside Diameter (ft)	Assumed	0.00328		
Gas Exit Velocity (ft/s)	Assumed	0.00328		
Gas Exit Temperature	Assumed	Ambient		
Tank 33 (Distillate) (Point Source)	J. 65464	Amsteri		
Emission Rate (lb/hr)	From PTE Calculations	7.58E-03		
Release Height (ft)	Tank height. Approx. height of roof vents	45		
Stack Inside Diameter (ft)	Assumed	0.00328		
Gas Exit Velocity (ft/s)	Assumed	0.00328		
Gas Exit Temperature	Assumed	Ambient		
Tank 64 (Distillate) (Point Source)	J. 65464	Ambient		
Emission Rate (lb/hr)	From PTE Calculations	6.16E-03		
Release Height (ft)	Tank height. Approx. height of roof vents	45		
Stack Inside Diameter (ft)	Assumed	0.00328		
Gas Exit Velocity (ft/s)	Assumed	0.00328		
Gas Exit Temperature	Assumed	Ambient		
Tank 31 (Gasoline) (UPPER Volume Source		Allocat		
Emission Rate (lb/hr) Not During Landing or	•			
Cleaning	From PTE Calculations	1.90E-02		
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	d calculations in Variable Emissions Rate Spreadsheet for		
Landing		Toluene		
Release Height (ft)	Tank height. Approx. height of roof vents	45		
Diameter (ft)	Tank diameter	125		
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1		
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93		

Tank 31 (Gasoline) (LOWER Volume Source	a 20% of amissions	
Emission Rate (lb/hr) Not During Landing o	•	
Cleaning	From PTE Calculations	4.74E-03
Emission Rate (lb/hr) During Refill After		calculations in Variable Emissions Rate Spreadsheet for
Landing		Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47
Tank 32 (Gasoline) (UPPER Volume Source	<u> </u>	
Emission Rate (lb/hr) Not During Landing o	•	
Cleaning	From PTE Calculations	1.90E-02
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for
Landing	·	Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 32 (Gasoline) (LOWER Volume Source	e, 20% of emissions)	
Emission Rate (lb/hr) Not During Landing o	r	
Cleaning	From PTE Calculations	4.74E-03
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for
Landing		Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47
Tank 39 (Gasoline) (UPPER Volume Source	e, 80% of emissions)	
Emission Rate (lb/hr) Not During Landing o	r	
Cleaning	From PTE Calculations	1.74E-02
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for
Landing		Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 39 (Gasoline) (LOWER Volume Sourc		
Emission Rate (lb/hr) Not During Landing o		
Cleaning	From PTE Calculations	4.36E-03
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for
Landing	Touch height Aggress 1 1 1 1 C C C	Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47

Tank 120 (Gasoline) (UPPER Volume Source	e, 80% of emissions)	
Emission Rate (lb/hr) Not During Landing o		
Cleaning	From PTE Calculations	1.58E-02
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for
Landing		Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 120 (Gasoline) (LOWER Volume Sour	ce, 20% of emissions)	
Emission Rate (lb/hr) Not During Landing o	r	
Cleaning	From PTE Calculations	3.95E-03
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for
Landing		Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 114 (Blendstock) (UPPER Volume So	urce, 80% of emissions)	
Emission Rate (lb/hr) Not During Landing o	r	
Cleaning	From PTE Calculations	1.89E-02
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for
Landing		Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 114 (Blendstock) (LOWER Volume So	urce, 20% of emissions)	
Emission Rate (lb/hr) Not During Landing o	r	
Cleaning	From PTE Calculations	4.73E-03
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for
Landing		Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 115 (Blendstock) (UPPER Volume So		
Emission Rate (lb/hr) Not During Landing o		
Cleaning	From PTE Calculations	2.09E-02
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for
Landing		Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33

Tank 115 (Blendstock) (LOWER Volume So	urce 20% of emissions)	ng cicannigs	
Emission Rate (lb/hr) Not During Landing or	-		
Cleaning	From PTE Calculations	5.24E-03	
Emission Rate (lb/hr) During Refill After		calculations in Variable Emissions Rate Spreadsheet for	
Landing	Toluene		
Release Height (ft)	Tank height. Approx. height of roof vents	24	
Diameter (ft)	Tank diameter	150	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9	
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16	
Tank 117 (Blendstock) (UPPER Volume Sou		11120	
Emission Rate (lb/hr) Not During Landing or		T	
Cleaning	From PTE Calculations	1.64E-02	
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for	
Landing	·	Toluene	
Release Height (ft)	Tank height. Approx. height of roof vents	48	
Diameter (ft)	Tank diameter	110	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6	
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33	
Tank 117 (Blendstock) (LOWER Volume So	urce, 20% of emissions)		
Emission Rate (lb/hr) Not During Landing or	1		
Cleaning	From PTE Calculations	4.11E-03	
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for	
Landing		Toluene	
Release Height (ft)	Tank height. Approx. height of roof vents	24	
Diameter (ft)	Tank diameter	110	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6	
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16	
Tank 118 (Blendstock) (UPPER Volume Sou	rce, 80% of emissions)		
Emission Rate (lb/hr) Not During Landing or			
Cleaning	From PTE Calculations	1.85E-02	
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for	
Landing		Toluene	
Release Height (ft)	Tank height. Approx. height of roof vents	48	
Diameter (ft)	Tank diameter	100	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3	
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33	
Tank 118 (Blendstock) (LOWER Volume So			
Emission Rate (lb/hr) Not During Landing or			
Cleaning	From PTE Calculations	4.63E-03	
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for	
Landing	Tarable sight Arrange I 111 C C	Toluene	
Release Height (ft)	Tank height. Approx. height of roof vents	24	
Diameter (ft)	Tank diameter	100	
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3	
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16	

	ee Separate Table for Vapor Space Purge Duri	ing Cleanings
Tank 119 (Blendstock) (UPPER Volume Soul	rce, 80% of emissions)	
Emission Rate (lb/hr) Not During Landing or Cleaning	From PTE Calculations	1.88E-02
Emission Rate (lb/hr) During Refill After		calculations in Variable Emissions Rate Spreadsheet for
Landing	Calculated based on 1300 bpi Tellii Tate and	Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 119 (Blendstock) (LOWER Volume Sou	,	22.33
Emission Rate (lb/hr) Not During Landing or	Tee, 20% of enhissions;	
Cleaning	From PTE Calculations	4.71E-03
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for
Landing		Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 121 (Blendstock) (UPPER Volume Sour		
Emission Rate (lb/hr) Not During Landing or	<u>, </u>	
Cleaning	From PTE Calculations	2.47E-02
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for
Landing		Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 121 (Blendstock) (LOWER Volume Sou	rce, 20% of emissions)	
Emission Rate (lb/hr) Not During Landing or		
Cleaning	From PTE Calculations	6.19E-03
Emission Rate (lb/hr) During Refill After	Calculated based on 1500 bph refill rate and	calculations in Variable Emissions Rate Spreadsheet for
Landing		Toluene
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 130 (Product/ Water Mixture) (UPPER		
Emission Rate (lb/hr)	From PTE Calculations	3.39E-03
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	75
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 130 (Product/ Water Mixture) (LOWE	R Volume Source, 20% of emissions)	
Emission Rate (lb/hr)	From PTE Calculations	8.47E-04
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	75
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
	The same height divided by 2.13	11.10

Parameter Value Projection UTM Datum NAD83 UTM Zone 18 Hemisphere Northern AERMET 2016-2020 MET Data AERMAP 1-deg DEM Data from webgis.com	- 1		
Projection UTM Datum NAD83 UTM Zone 18 Hemisphere Northern AERMET 2016-2020 MET Data			
Datum NAD83 UTM Zone 18 Hemisphere Northern AERMET 2016-2020 MET Data			
UTM Zone 18 Hemisphere Northern AERMET 2016-2020 MET Data			
Hemisphere Northern 2016-2020 MET Data			
AERMET 2016-2020 MET Data			
AERMAP I1-deg DEM Data from webgis.com			
Sources Assumptions/ Notes Value			
Tank 28 (Distillate) (Point Source)			
See Hourly Assumptions Table			
Tank 29 (Distillate) (Point Source)			
See Hourly Assumptions Table			
Tank 30 (Distillate) (Point Source)			
See Hourly Assumptions Table			
Tank 33 (Distillate) (Point Source)			
See Hourly Assumptions Table			
Tank 64 (Distillate) (Point Source)			
See Hourly Assumptions Table			
Tank 31 (Gasoline) (During Cleaning - Volume Source at Manway Height)			
Model Assumptions Not During Cleaning See Hourly Model Assumptions Table			
Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Toluene Table			
Release Height (ft) Actual Height of Manway above ground 2.5			
Diameter (ft) Tank diameter 125			
Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1			
Initial Vertical Dimension (ft) Release height divided by 2.15 1.16			
Tank 31 (Gasoline) (During Controlled Cleaning - Horizontal Point Source)			
Model Assumptions Not During Cleaning See Hourly Model Assumptions Table			
Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for toluene Table			
Release Height (ft) Stack Height above ground 13	2.5		
Diameter (ft) Inside diameter of stack 2.5			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 32 (Gasoline) (During Cleaning - Volume Source at Manway Height)			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 32 (Gasoline) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 32 (Gasoline) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Toluene Table			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 32 (Gasoline) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for Toluene Table Release Height (ft) Actual Height of Manway above ground 2.75			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 32 (Gasoline) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for Toluene Table Release Height (ft) Actual Height of Manway above ground 2.75 Diameter (ft) Tank diameter 125			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 32 (Gasoline) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for Toluene Table Release Height (ft) Actual Height of Manway above ground 2.75 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 32 (Gasoline) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for Toluene Table Release Height (ft) Actual Height of Manway above ground 2.75 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1 Initial Vertical Dimension (ft) Release height divided by 2.15 1.30			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 32 (Gasoline) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for Toluene Table Release Height (ft) Actual Height of Manway above ground 2.75 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 32 (Gasoline) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for Toluene Table Release Height (ft) Actual Height of Manway above ground 2.75 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1 Initial Vertical Dimension (ft) Release height divided by 2.15 1.30			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 32 (Gasoline) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for Toluene Table Release Height (ft) Actual Height of Manway above ground 2.75 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1 Initial Vertical Dimension (ft) Release height divided by 2.15 1.30 Tank 32 (Gasoline) (During Controlled Cleaning - Horizontal Point Source)			
Diameter (ft) Inside diameter of stack Exit Velocity (ft/s) Calculated from contractor data Gas Exit Temperature (degrees F) From cleaning contractor Tank 32 (Gasoline) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Toluene Table Release Height (ft) Actual Height of Manway above ground 2.75 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1 Initial Vertical Dimension (ft) Release height divided by 2.15 Tank 32 (Gasoline) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Variable Emission Rate for toluene Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for toluene Table			
Diameter (ft)			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 32 (Gasoline) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for Toluene Table Release Height (ft) Actual Height of Manway above ground 2.75 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1 Initial Vertical Dimension (ft) Release height divided by 2.15 1.30 Tank 32 (Gasoline) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (lb/hr) During Cleaning See Variable Emission Rate for toluene Table Release Height (ft) Stack Height above ground 13 Diameter (ft) Inside diameter of stack 2.5			
Diameter (ft) Inside diameter of stack 2.5 Exit Velocity (ft/s) Calculated from contractor data 5.1 Gas Exit Temperature (degrees F) From cleaning contractor 1400 Tank 32 (Gasoline) (During Cleaning - Volume Source at Manway Height) Model Assumptions Not During Cleaning See Hourly Model Assumptions Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for Toluene Table Release Height (ft) Actual Height of Manway above ground 2.75 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1 Initial Vertical Dimension (ft) Release height divided by 2.15 1.30 Tank 32 (Gasoline) (During Controlled Cleaning - Horizontal Point Source) Model Assumptions Not During Cleaning See Variable Emission Rate for toluene Table Emission Rate (Ib/hr) During Cleaning See Variable Emission Rate for toluene Table Release Height (ft) Stack Height above ground 13			

Tank 39 (Gasoline) (During Cleaning - Vol	ume Source at Manway Height)				
Model Assumptions Not During Cleaning	See Hou	urly Model Assumptions Table			
Emission Rate (lb/hr) During Cleaning	See Variable Emission Rate for Toluene Table				
Release Height (ft)	Actual Height of Manway above ground	2.54			
Diameter (ft)	Tank diameter	125			
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1			
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.18			
Tank 39 (Gasoline) (During Controlled Cle					
Model Assumptions Not During Cleaning	See Hou	orly Model Assumptions Table			
Emission Rate (lb/hr) During Cleaning	See Variable	e Emission Rate for toluene Table			
Release Height (ft)	Stack Height above ground	13			
Diameter (ft)	Inside diameter of stack	2.5			
Exit Velocity (ft/s)	Calculated from contractor data	5.1			
Gas Exit Temperature (degrees F)	From cleaning contractor	1400			
Tank 120 (Gasoline) (During Cleaning - Vo	olume Source at Manway Height)				
Madel Assumptions Not During Cleaning	Con Hou	ulu Mandal Assurantiana Talala			
Model Assumptions Not During Cleaning	See Hou	rly Model Assumptions Table			
Emission Rate (lb/hr) During Cleaning		Emission Rate for Toluene Table			
Release Height (ft)	Actual Height of Manway above ground	2.58			
Diameter (ft)	Tank diameter	80			
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6			
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.20			
Tank 120 (Gasoline) (During Controlled C	leaning - Horizontal Point Source)				
Model Assumptions Not During Cleaning	See Hou	rly Model Assumptions Table			
Emission Rate (lb/hr) During Cleaning	See Variable	e Emission Rate for toluene Table			
Release Height (ft)	Stack Height above ground	13			
Diameter (ft)	Inside diameter of stack	2.5			
Exit Velocity (ft/s)	Calculated from contractor data	5.1			
Gas Exit Temperature (degrees F)	From cleaning contractor	1400			
Tank 114 (Blendstock) (During Cleaning -	Volume Source at Manway Height)				
Madal Assumations Nat During Classing	Con Hou	who be delike a constitute a Table			
Model Assumptions Not During Cleaning	See Hou	ırly Model Assumptions Table			
Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for Toluene Table			
Release Height (ft)	Actual Height of Manway above ground	2.71			
Diameter (ft)	Tank diameter	120			
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9			
Initial Vertical Dimension (ft)	Release height divided by 2.15 1.26				
Tank 114 (Blendstock) (During Controlled	Cleaning - Horizontal Point Source)				
Model Assumptions Not During Cleaning	g See Hourly Model Assumptions Table				
Emission Rate (lb/hr) During Cleaning	See Variable Emission Rate for toluene Table				
Release Height (ft)	Stack Height above ground	13			
Diameter (ft)	Inside diameter of stack	2.5			
Exit Velocity (ft/s)	Calculated from contractor data	5.1			
Exit velocity (14/3)		J.1			
Gas Exit Temperature (degrees F)	From cleaning contractor	1400			

Tank 115 (Blendstock) (During Cleaning -	Volume Source at Manway Height)					
Model Assumptions Not During Cleaning	See Hou	rly Model Assumptions Table				
Emission Rate (lb/hr) During Cleaning	See Variable Emission Rate for Toluene Table					
Release Height (ft)	Actual Height of Manway above ground	2.33				
Diameter (ft)	Tank diameter	150				
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9				
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.10				
Tank 115 (Blendstock) (During Controlled		1.10				
Turk 113 (Bierrastock) (Burris controlled						
Model Assumptions Not During Cleaning	See Hou	rly Model Assumptions Table				
Emission Rate (lb/hr) During Cleaning	See Variable	e Emission Rate for toluene Table				
Release Height (ft)	Stack Height above ground	13				
Diameter (ft)	Inside diameter of stack	2.5				
Exit Velocity (ft/s)	Calculated from contractor data	5.1				
Gas Exit Temperature (degrees F)	From cleaning contractor	1400				
Tank 117 (Blendstock) (During Cleaning -	Volume Source at Manway Height)					
Model Assumptions Not During Cleaning	See Hou	rly Model Assumptions Table				
Emission Rate (lb/hr) During Cleaning	See Variable	e Emission Rate for Toluene Table				
Release Height (ft)	Actual Height of Manway above ground	2.5				
Diameter (ft)	Tank diameter	110				
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6				
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.20				
Tank 117 (Blendstock) (During Controlled	Cleaning - Horizontal Point Source)					
Model Assumptions Not During Cleaning	See Hou	rly Model Assumptions Table				
Emission Rate (lb/hr) During Cleaning	See Variable	e Emission Rate for toluene Table				
Release Height (ft)	Stack Height above ground	13				
Diameter (ft)	Inside diameter of stack	2.5				
Exit Velocity (ft/s)	Calculated from contractor data	5.1				
Gas Exit Temperature (degrees F)	From cleaning contractor	1400				
Tank 118 (Blendstock) (During Cleaning -	Volume Source at Manway Height)					
Model Assumptions Not During Cleaning	See Hou	rly Model Assumptions Table				
Emission Rate (lb/hr) During Cleaning		Emission Rate for Toluene Table				
Release Height (ft)	Actual Height of Manway above ground	2.42				
Diameter (ft)	Tank diameter	100				
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3				
The state of the s		23.3				
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.12				
Tank 118 (Blendstock) (During Controlled	Cleaning - Horizontal Point Source)					
Model Assumptions Not During Cleaning						
Emission Rate (lb/hr) During Cleaning	See Variable	e Emission Rate for toluene Table				
Release Height (ft)	Stack Height above ground	13				
Diameter (ft)	Inside diameter of stack	2.5				
Exit Velocity (ft/s)	Calculated from contractor data	5.1				
Gas Exit Temperature (degrees F)	From cleaning contractor	1400				
- (0 /	<u> </u>	·				

- 140/01 1: 11/0 : 01 :						
Tank 119 (Blendstock) (During Cleaning -	Volume Source at Manway Height)					
Model Assumptions Not During Cleaning	See Hourly Model Assumptions Table					
Emission Rate (lb/hr) During Cleaning	See Variable Emission Rate for Toluene Table					
Release Height (ft)	Actual Height of Manway above ground	2.38				
Diameter (ft)	Tank diameter	80				
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6				
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.10				
Tank 119 (Blendstock) (During Controlled	Cleaning - Horizontal Point Source)					
Model Assumptions Not During Cleaning	See Hou	rly Model Assumptions Table				
Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for toluene Table				
Release Height (ft)	Stack Height above ground	13				
Diameter (ft)	Inside diameter of stack	2.5				
Exit Velocity (ft/s)	Calculated from contractor data	5.1				
Gas Exit Temperature (degrees F)	From cleaning contractor	1400				
Tank 121 (Blendstock) (During Cleaning -	Volume Source at Manway Height)					
Model Assumptions Not During Cleaning	See Hourly Model Assumptions Table					
Emission Rate (lb/hr) During Cleaning	See Variable	Emission Rate for Toluene Table				
Release Height (ft)	Actual Height of Manway above ground	2.5				
Diameter (ft)	Tank diameter	150				
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9				
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.16				
Tank 121 (Blendstock) (During Controlled	Cleaning - Horizontal Point Source)					
Model Assumptions Not During Cleaning	See Hou	rly Model Assumptions Table				
Emission Rate (lb/hr) During Cleaning	See Variable Emission Rate for toluene Table					
Release Height (ft)	Stack Height above ground 13					
Diameter (ft)	Inside diameter of stack	2.5				
Exit Velocity (ft/s)	Calculated from contractor data 5.1					
Gas Exit Temperature (degrees F)	From cleaning contractor	1400				
Tank 130 (Product/ Water Mixture) (UPP	ER Volume Source, 80% of emissions)					
	See Hourly Assumptions T	able				
Tank 130 (Product/ Water Mixture) (LOW	• • •					
	See Hourly Assumptions T	able				

Variable Emission Rate Calculations for Toluene Modeling

			Ratios Used for Variable Emission Rates ¹							Ju	ly Toluene Emissio	n Rates ²				
Tank	Product Assumed	January	February	March	April	May	June	July	August	September	October	November	December	Refill after landing (lb/hr)	Uncontrolled Vapor Space Purge (lb/hr)	Controlled Vapor Space Purge (lb/hr)
31	Gasoline - PTE RVP schedule	0.234	0.256	0.332	0.498	0.682	0.897	1.000	0.967	0.770	0.534	0.408	0.284	1.54	18.8	0.376
32	Gasoline - PTE RVP schedule	0.234	0.256	0.332	0.498	0.682	0.897	1.000	0.967	0.770	0.534	0.408	0.284	1.54	18.8	0.376
39	Gasoline - PTE RVP schedule	0.234	0.256	0.332	0.498	0.682	0.897	1.000	0.967	0.770	0.534	0.408	0.284	1.54	18.8	0.376
120	Gasoline - PTE RVP schedule	0.234	0.256	0.332	0.498	0.682	0.897	1.000	0.967	0.770	0.534	0.408	0.284	1.54	7.69	0.1538
114	Blendstock RVP 15	0.224	0.245	0.332	0.498	0.682	0.897	1.000	0.967	0.770	0.534	0.391	0.272	1.74	19.35	0.387
115	Blendstock RVP 15	0.224	0.245	0.332	0.498	0.682	0.897	1.000	0.967	0.770	0.534	0.391	0.272	1.72	30.2	0.604
117	Component RVP 14.33	0.224	0.245	0.332	0.498	0.682	0.897	1.000	0.967	0.770	0.534	0.391	0.272	1.65	15.58	0.3116
118	Component RVP 14.33	0.224	0.245	0.332	0.498	0.682	0.897	1.000	0.967	0.770	0.534	0.391	0.272	1.65	12.9	0.258
119	Component RVP 14.33	0.224	0.245	0.332	0.498	0.682	0.897	1.000	0.967	0.770	0.534	0.391	0.272	1.65	8.24	0.1648
121	Blendstock RVP 15	0.224	0.245	0.332	0.498	0.682	0.897	1.000	0.967	0.770	0.534	0.391	0.272	1.72	30.2	0.604

Notes

1. The ratio was calculated and used as follows:

Landing or cleaning total VOC emissions were calculated for each month.

The toluene emissions for each month were calculated based on the speciation for that month for the given product.

The ratio used for variable emission rate factors in AERMOD was calculated by dividing the toluene emission rate for a given month by the July toluene emission rate.

The July toluene emission rate was then entered as the emission rate for the source in the Source inputs screen in AERMOD View.

2. Emission rates represent the total toluene emissions for the tank. For landings, 80% of that value was at a release height at the top of the tank. The remaining 20% was at half of the tank height. For vapor space purge, all of the emissions were placed at the height of the manway.

General Parameters				
Parameter		Value		
Projection		UTM		
Datum		NAD83		
UTM Zone		18		
Hemisphere		Northern		
AERMET		2016-2020 MET Data		
AERMAP		1-deg DEM Data from webgis.com		
Sources	Assumptions/ Notes	Value		
Tank 28 (Distillate) (Point Source)				
Emission Rate (lb/hr)	From PTE Calculations	9.95E-04		
Emission Rate (lb/yr)	From PTE Calculations	8.72		
Release Height (ft)	Tank height. Approx. height of roof vents	45		
Stack Inside Diameter (ft)	Assumed	0.00328		
Gas Exit Velocity (ft/s)	Assumed	0.00328		
Gas Exit Temperature	Assumed	Ambient		
Tank 29 (Distillate) (Point Source)				
Emission Rate (lb/hr)	From PTE Calculations	9.95E-04		
Emission Rate (lb/yr)	From PTE Calculations	8.72		
Release Height (ft)	Tank height. Approx. height of roof vents	45		
Stack Inside Diameter (ft)	Assumed	0.00328		
Gas Exit Velocity (ft/s)	Assumed	0.00328		
Gas Exit Temperature	Assumed	Ambient		
Tank 30 (Distillate) (Point Source)	·			
Emission Rate (lb/hr)	From PTE Calculations	9.95E-04		
Emission Rate (lb/yr)	From PTE Calculations	8.72		
Release Height (ft)	Tank height. Approx. height of roof vents	45		
Stack Inside Diameter (ft)	Assumed	0.00328		
Gas Exit Velocity (ft/s)	Assumed	0.00328		
Gas Exit Temperature	Assumed	Ambient		
Tank 33 (Distillate) (Point Source)				
Emission Rate (lb/hr)	From PTE Calculations	9.91E-04		
Emission Rate (lb/yr)	From PTE Calculations	8.68		
Release Height (ft)	Tank height. Approx. height of roof vents	45		
Stack Inside Diameter (ft)	Assumed	0.00328		
Gas Exit Velocity (ft/s)	Assumed	0.00328		
Gas Exit Temperature	Assumed	Ambient		
Tank 64 (Distillate) (Point Source)				
Emission Rate (lb/hr)	From PTE Calculations	7.95E-04		
Emission Rate (lb/yr)	From PTE Calculations	6.96		
Release Height (ft)	Tank height. Approx. height of roof vents	45		
Stack Inside Diameter (ft)	Assumed	0.00328		
Gas Exit Velocity (ft/s)	Assumed	0.00328		
Gas Exit Temperature	Assumed	Ambient		

Tank 31 (Gasoline) (UPPER Volume Source, 8	ibany Annual Ethylbenzene Wodel Assumptic	713
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	2.15E-03
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	2.132 03
and 9 (lb/hr)	TPY per tank	18.83
	From PTE Calculations, no landings at this	25/65
Emission Rate for Annual Run 8 (lb/hr)	tank	9.12E-04
	From PTE Calculations, no landings at this	0.220
Emission Rate for Annual Run 8 (lb/yr)	tank	7.99
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 31 (Gasoline) (LOWER Volume Source,	· · · · · · · · · · · · · · · · · · ·	20.33
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	5.37E-04
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	3.372 01
and 9 (lb/hr)	TPY per tank	4.71
() /	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/hr)	tank	2.28E-04
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/yr)	tank	2.00
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47
Tank 32 (Gasoline) (UPPER Volume Source, 8	30% of emissions)	
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	2.15E-03
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	18.84
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/hr)	tank	9.13E-04
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/yr)	tank	8.00
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 32 (Gasoline) (LOWER Volume Source,	20% of emissions)	
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	5.38E-04
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	4.71
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/hr)	tank	2.28E-04
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/yr)	tank	2.00
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47

Tank 39 (Gasoline) (UPPER Volume Source, 8	ibany Annual Ethylbenzene Wodel Assumptio	
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	1.94E-03
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	2.5 .2 65
and 9 (lb/hr)	TPY per tank	16.98
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/hr)	tank	7.00E-04
, , ,	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/yr)	tank	6.14
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 39 (Gasoline) (LOWER Volume Source,	,	20.33
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	4.85E-04
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	4.24
() /	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/hr)	tank	1.75E-04
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/yr)	tank	1.53
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47
Tank 120 (Gasoline) (UPPER Volume Source,	80% of emissions)	
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	1.74E-03
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	15.23
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/hr)	tank	5.00E-04
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/yr)	tank	4.38
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 120 (Gasoline) (LOWER Volume Source	, 20% of emissions)	
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	4.35E-04
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	3.81
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/hr)	tank	1.25E-04
	From PTE Calculations, no landings at this	
Emission Rate for Annual Run 8 (lb/yr)	tank	1.10
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

Tank 114 (Blendstock) (UPPER Volume Sou	rce 80% of emissions)	
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	2.41E-03
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	21.15
, ,	From PTE Calculations, 3.7 TPY landings	-
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	3.24E-03
, ,	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	28.37
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 114 (Blendstock) (LOWER Volume Sou	· · · · · · · · · · · · · · · · · · ·	22.55
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	6.03E-04
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	0.032 01
and 9 (lb/hr)	TPY per tank	5.29
, , ,	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	8.10E-04
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	7.09
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 115 (Blendstock) (UPPER Volume Sou	•	22.20
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	2.62E-03
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	22.97
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	3.45E-03
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	30.20
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 115 (Blendstock) (LOWER Volume Sou		
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	6.56E-04
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	5.74
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	8.62E-04
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	7.55
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

	lbany Annual Ethylbenzene Model Assumption	ID - IMINIO
Tank 117 (Blendstock) (UPPER Volume Sour Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	2.02E-03
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	2.02E-03
and 9 (lb/hr)	TPY per tank	17.71
and 5 (lb/m)	From PTE Calculations, 3.7 TPY landings	17.71
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	2.85E-03
	From PTE Calculations, 3.7 TPY landings	2.032 03
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	24.94
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 117 (Blendstock) (LOWER Volume Sour	1	22.55
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	5.06E-04
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	3.002 04
and 9 (lb/hr)	TPY per tank	4.43
	From PTE Calculations, 3.7 TPY landings	7.70
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	7.12E-04
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	6.24
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 118 (Blendstock) (UPPER Volume Sour	,	11.10
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	2.17E-03
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	19.03
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	3.00E-03
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	26.25
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	100
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 118 (Blendstock) (LOWER Volume Sour		
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	5.43E-04
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	4.76
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	7.49E-04
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	6.56
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	100
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

	Ibany Annual Ethylbenzene Model Assumption	15 - TAINKS
Tank 119 (Blendstock) (UPPER Volume Source Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
	·	2.175.02
and 9 (lb/hr) Emission Rate for Annual Runs 1 through 7	TPY per tank From PTE Calculations, with landings at 2.2	2.17E-03
and 9 (lb/hr)	TPY per tank	19.03
and 3 (lb/m)	From PTE Calculations, 3.7 TPY landings	13.03
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	3.00E-03
Zimosion nate ion miniaar nan e (io, in)	From PTE Calculations, 3.7 TPY landings	3.502 03
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	26.25
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 119 (Blendstock) (LOWER Volume Sou	1	22.55
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	5.43E-04
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	3.43E 04
and 9 (lb/hr)	TPY per tank	4.76
	From PTE Calculations, 3.7 TPY landings	4.70
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	7.49E-04
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	6.56
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 121 (Blendstock) (UPPER Volume Sour	,	22.20
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	3.04E-03
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	300.2.00
and 9 (lb/hr)	TPY per tank	26.63
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	3.87E-03
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	33.86
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 121 (Blendstock) (LOWER Volume Sou		
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	7.60E-04
Emission Rate for Annual Runs 1 through 7	From PTE Calculations, with landings at 2.2	
and 9 (lb/hr)	TPY per tank	6.66
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/hr)	per blendstock tank	9.66E-04
	From PTE Calculations, 3.7 TPY landings	
Emission Rate for Annual Run 8 (lb/yr)	per blendstock tank	8.47
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

Global Albany Annual Ethylbenzene Model Assumptions - TANKS

Tank 130 (Product/ Water Mixture) (UPPER Volume Source, 80% of emissions) Emission Rate (lb/hr) From PTE Calculations 2.18E-04 Emission Rate (lb/yr) From PTE Calculations 1.91 Release Height (ft) Tank height. Approx. height of roof vents 48 Diameter (ft) Tank diameter 75 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 17.4 Initial Vertical Dimension (ft) Tank height divided by 2.15 22.33 Tank 130 (Product/ Water Mixture) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/hr) From PTE Calculations 5.46E-05											
Emission Rate (lb/hr)	From PTE Calculations	2.18E-04									
Emission Rate (lb/yr)	From PTE Calculations	1.91									
Release Height (ft)	Tank height. Approx. height of roof vents	48									
Diameter (ft)	Tank diameter	75									
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4									
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33									
Tank 130 (Product/ Water Mixture) (LC	OWER Volume Source, 20% of emissions)										
Emission Rate (lb/hr)	From PTE Calculations	5.46E-05									
Emission Rate (lb/yr)	From PTE Calculations	0.48									
Release Height (ft)	Tank height. Approx. height of roof vents	24									
Diameter (ft)	Tank diameter	75									
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	17.4									
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16									

Attachment 2 Modeling Parameters for Loading

Global Albany Loading Model Parameters

General Parameters		
Parameter		Value
Projection		UTM
Datum		NAD83
UTM Zone		18
Hemisphere		Northern
AERMET		2016-2020 MET Data
AERMAP		1-deg DEM Data from webgis.com
Sources	Assumptions/ Notes	Value
Truck Rack VRU (VRUT	K) (Point Source)	
Emission Rate (lb/hr)	See Loa	ding Assumptions Spreadsheet for Each Pollutant
Stack Height (ft)	Actual Stack Height	22.4
Stack Temperature	Release Temperature	Ambient
Stack Velocity (m/s)	Calculated	3.46
Stack Diameter (ft)	Actual Stack Diameter	1
Emissions Limit (mg/L)		2
Rail VCU (VCURR) (Poi	nt Source)	
Emission Rate (lb/hr)	See Loa	ding Assumptions Spreadsheet for Each Pollutant
Stack Height (ft)	Actual Stack Height	35
Stack Temperature	Release Temperature	1350
Stack Velocity (ft/s)	Assumed	50
Stack Diameter (ft)	Actual Stack Diameter	8
Emissions Limit (mg/L)		2
Marine VCU (VCUM1)	(Point Source) Refined or B	llendstock OS#3
Emission Rate (lb/hr)	See Loa	ding Assumptions Spreadsheet for Each Pollutant
Stack Height (ft)	Actual Stack Height	35
Stack Temperature	Release Temperature	1500
Stack Velocity (ft/s)	Assumed	50
Stack Diameter (ft)	Actual Stack Diameter	6
Emissions Limit (mg/L)		10
Marine VCU (VCUM1)	(Point Source) Crude OS#3	
Emission Rate (lb/hr)	See Loa	ding Assumptions Spreadsheet for Each Pollutant
Stack Height (ft)	Actual Stack Height	35
Stack Temperature	Release Temperature	1500
Stack Velocity (ft/s)	Assumed	50
Stack Diameter (ft)	Actual Stack Diameter	6
Emissions Limit (mg/L)		10

Emission Rate (lb/hr)	See Loadi	ng Assumptions Spreadsheet for Each Pollutant
Stack Height (ft)	Actual Stack Height	60
Stack Temperature	Release Temperature	1500
Stack Velocity (ft/s)	Assumed	50
Stack Diameter (ft)	Actual Stack Diameter	10
Emissions Limit (mg/L)		2
Marine VCU (VCUM2) (Point Source), Crude OS#1 o	r Crude OS#2
Emission Rate (lb/hr)	See Loadi	ng Assumptions Spreadsheet for Each Pollutant
Stack Height (ft)	Actual Stack Height	60
Stack Temperature	Release Temperature	1500
Stack Velocity (ft/s)	Assumed	50
Stack Diameter (ft)	Actual Stack Diameter	10
Emissions Limit (mg/L)		2
Truck Fugitives (Volum	e Source) OS#4 Only	
Emission Rate (lb/hr)		ng Assumptions Spreadsheet for Each Pollutant
Release Height (ft)	Center of Plume	10
Initial Horizontal	Length of Side divided by	
Dimension (ft)	4.3	31.4
Initial Vertical	Center of Plume height	
Dimension (ft)	divided by 2.15	4.65
Barge Fugitives (Area S	ource) OS#2 Only	
Emission Rate (lb/hr)	See Loadi	ng Assumptions Spreadsheet for Each Pollutant
Release Height (ft)	Barge Height	20
Initial Vertical	Barge height divided by	
Dimension (ft)	2.15	9.3
Area (ft2)	Barge Area	9178.8
Barge Fugitives (Area S	ource) Crude OS#2 Only	
Emission Rate (lb/hr)	See Loadi	ng Assumptions Spreadsheet for Each Pollutant
Release Height (ft)	Barge Height	20
Initial Vertical	Barge height divided by	
Dimension (ft)	2.15	9.3
Area (ft2)	Barge Area	9178.8
Rail Fugitives (Volume	Source) OS#5 Only	
Emission Rate (lb/hr)	See Loadi	ng Assumptions Spreadsheet for Each Pollutant
Release Height (ft)	Release Height	17
Initial Horizontal	Length of Side divided by	
Dimension (ft)	4.3	54.88
Initial Vertical	Center of Plume height	

MODEL RUN ASSUMPTION DETAILS - Benzene

	1	I	1	Marine Lo		SSUMPTION DET		ick loading		I	Rail Loading		Tank Comments
File Name	Annual or Hourly	Overall Comments	Description	VCUM1	VCUM2	Barge Fugitives	Description	VRUTK	Fugitives	Description	VCURR	Fugitives	(see separate tables for emission rates)
Global Alb Annual All Run 1	Annual	max loading for truck and rail under OS #1	OS#1 369 MM gallons refined as gas at 2 mg/l with vac assist, 380 MM blendstock at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.0088 lb/hr 77 lb/yr	0	OS#1 879.3 MM gallons refined as gas at 2 mg/l with vac assist	0.0077 lb/hr 67.5 lb/yr	0	OS#1 300 MM gallons gas at 2 mg/l with vac assist	0.0026 lb/hr 23 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 2	Annual	max fugitives at marine, some fugitives at rail	OS#2 900 MM gallons refined loading of inerted vessels at 2 mg/l (99.9%), OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.00969 lb/hr 84.9 lb/yr	3.69E-8 lb/hr/ft2 17.9 lb/yr	No loading	0	0	OS#5 163.437 MM as gas at 2 mg/l and 8 mg/l fugitives	0.0014 lb/hr 12.5 lb/yr	0.0057 lb/hr 50.2 lb/yr	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 3	Annual	max fugitives at marine, some fugitives at truck	OS#2 900 MM gallons refined loading of inerted vessels at 2 mg/l (99.9%), OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.00969 lb/hr 84.9 lb/yr	3.69E-8 lb/hr/ft2 17.9 lb/yr	OS#4 163.437 MM as gas at 2 mg/l and 8 mg/l fugitives	0.0014 lb/hr 12.5 lb/yr	0.0057 lb/hr 50.2 lb/yr	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 4	Annual	max loading for marine under OS#1, max loading at rail under OS#1, remaining loading at truck under OS#1	OS#1 900 MM gallons refined as gas at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.01 lb/hr 88.6 lb/yr	0	OS#1 728.3 MM as gas at 2 mg/l with vac assist	0.0064 lb/hr 55.9 lb/yr	0	OS#1 300 MM gallons gas at 2 mg/l with vac assist	0.0026 lb/hr 23 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 5	Annual	max loading for marine under OS#1, max loading at truck under OS#1, remaining loading at rail under OS#1	OS#1 900 MM gallons refined as gas at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.01 lb/hr 88.6 lb/yr	0	OS#1 879.3 MM gallons refined as gas at 2 mg/l with vac assist	0.0077 lb/hr 67.5 lb/yr	0	OS#1 149 MM gallons gas at 2 mg/l with vac assist	0.0013 lb/hr 11.4 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 6	Annual	max fugitives at truck, max crude fugitives at marine	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.0018 lb/hr 15.8 lb/yr	3.52E-9 lb/hr/ft2 1.7 lb/yr	OS#4 385.66 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.0034 lb/hr 29.6 lb/yr	0.014 lb/hr 118.4 lb/yr	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 7	Annual	max fugitives at rail to subcap with some truck fugitives, max crude fugitives at marine	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.0018 lb/hr 15.8 lb/yr	3.52E-9 lb/hr/ft2 1.7 lb/yr	OS#4 85.66 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	7.5E-4 lb/hr 6.6 lb/yr	0.003 lb/hr 26.3 lb/yr	OS#5 300 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.0026 lb/hr 23 lb/yr	0.01 lb/hr 92.1 lb/yr	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 8	Annual	worst case annual assumptions from previous runs (Run 6) with landings distributed only between blendstock tanks	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.0018 lb/hr 15.8 lb/yr	3.52E-9 lb/hr/ft2 1.7 lb/yr	OS#4 385.66 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.0034 lb/hr 29.6 lb/yr	0.014 lb/hr 118.4 lb/yr	No loading	0	0	landings evenly distributed between blendstock tanks
Global Alb Annual All Run 9	Annual	emissions at VCUM1 instead of VCUM2	380 MM gallons blendstock and 5.66 MM gallons refined under OS#3, 90 MM gallons crude under OS#CRD3	0.019 lb/hr 167.6 lb/yr	0	0	No loading	0	0	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Hourly All Run 0	Hourly	hourly loading with fugitives, no cleanings or landings	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	No cleanings or landings, annual emissions at all tanks
Global Alb Hourly All Run 1	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 31 landing, annual emissions at other tanks
Global Alb Hourly All Run 2	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 32 landing, annual emissions at other tanks
Global Alb Hourly All Run 3	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 39 landing, annual emissions at other tanks
Global Alb Hourly All Run 4	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 114 landing, annual emissions at other tanks
Global Alb Hourly All Run 5	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 115 landing, annual emissions at other tanks
Global Alb Hourly All Run 6	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 117 landing, annual emissions at other tanks
Global Alb Hourly All Run 7	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 118 landing, annual emissions at other tanks
Global Alb Hourly All Run 8	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 119 landing, annual emissions at other tanks
Global Alb Hourly All Run 9	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 121 landing, annual emissions at other tanks
Global Alb Hourly All Run 10	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 120 landing, annual emissions at other tanks

MODEL RUN ASSUMPTION DETAILS - Benzene

				Marine Lo		330MPHON DE		ıck loading			Rail Loading		Tank Comments
File Name	Annual or Hourly	Overall Comments	Description	VCUM1	VCUM2	Barge Fugitives	Description	VRUTK	Fugitives	Description	VCURR	Fugitives	(see separate tables for emission rates)
Global Alb Hourly All Run 11	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 31 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 12	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 32 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 13	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 39 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 14	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 114 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 15	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 115 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 16	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 117 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 17	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 118 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 18	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 119 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 19	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 121 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 20	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	Tank 120 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Controlled Cleaning Runs	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.081 lb/hr	3.41E-7 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.018 lb/hr	0.074 lb/hr	4500 gpm loading rate as gas with fugitives	0.021 lb/hr	0.083 lb/hr	

MODEL RUN ASSUMPTION DETAILS - HEXANE

	Annual or	ı		Tarine Loadin		1011 0217112	3 - HEAAINE	ck loading		l p	ail Loading		Tank Comments
File Name	Hourly	Overall Comments	Description	VCUM1	VCUM2	Barge Fugitives	Description	VRUTK	Fugitives	Description	VCURR	Fugitives	(see separate tables for
Global Alb Annual All Run 1	Annual	max loading for truck and rail under OS #1	OS#1369 MM gallons refined as gas at 2 mg/l with vac assist, 380 MM blendstock at 2 mg/l with vac assist, OS#CRD1450 MM gallons crude at 2 mg/l with vac assist	0	0.038 lb/hr 328.5 lb/yr	0	OS#1 879.3 MM gallons refined as gas at 2 mg/l with vac assist	0.007 lb/hr 61.6 lb/yr	0	OS#1 300 MM gallons gas at 2 mg/l with vac assist	0.0024 lb/hr 21 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 2	Annual	max fugitives at marine, some fugitives at rail	OS#2 900 MM gallons refined loading of inerted vessels at 2 mg/l (99.9%), OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.039 lb/hr 338.6 lb/yr	1.66E-7 lb/hr/ft2 10.4 lb/yr	No loading	0	0	OS#5 163.437 MM as gas at 2 mg/l and 8 mg/l fugitives	0.0013 lb/hr 11.46 lb/yr	0.0052 lb/hr 45.8 lb/yr	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 3	Annual	max fugitives at marine, some fugitives at truck	OS#2 900 MM gallons refined loading of inerted vessels at 2 mg/l (99.9%), OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.039 lb/hr 338.6 lb/yr	1.66E-7 lb/hr/ft2 10.4 lb/yr	OS#4 163.437 MM as gas at 2 mg/l and 8 mg/l fugitives	0.0013 lb/hr 11.46 lb/yr	0.0052 lb/hr 45.8 lb/yr	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 4	Annual	max loading for marine under OS#1, max loading at rail under OS#1, remaining loading at truck under OS#1	OS#1 900 MM gallons refined as gas at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.039 lb/hr 338.6 lb/yr	0	OS#1 728.3 MM as gas at 2 mg/l with vac assist	0.0058 lb/hr 51.1 lb/yr	0	OS#1 300 MM gallons gas at 2 mg/l with vac assist	0.0024 lb/hr 21 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 5	Annual	max loading for marine under OS#1, max loading at truck under OS#1, remaining loading at rail under OS#1	OS#1 900 MM gallons refined as gas at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.039 lb/hr 338.6 lb/yr	0	OS#1 879.3 MM gallons refined as gas at 2 mg/l with vac assist	0.007 lb/hr 61.6 lb/yr	0	OS#1 149 MM gallons gas at 2 mg/l with vac assist	0.0012 lb/hr 10.4 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 6	Annual	max fugitives at truck, max crude fugitives at marine	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.0019 lb/hr 17 lb/yr	3.79E-9 lb/hr/ft2 1.8 lb/yr	OS#4 385.66 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.0031 lb/hr 27 lb/yr	0.012 lb/hr 108.1 lb/yr	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 7	Annual	max fugitives at rail to subcap with some truck fugitives, max crude fugitives at marine	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.0019 lb/hr 17 lb/yr	3.79E-9 lb/hr/ft2 1.8 lb/yr	OS#4 85.66 MM gallons as gas at 2 mg/I with 8 mg/I fugitives	6.9E-4 lb/hr 6 lb/yr	0.0027 lb/hr 24 lb/yr	OS#5 300 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.0024 lb/hr 21 lb/yr	0.0096 lb/hr 84.1 lb/yr	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 8	Annual	worst case annual assumptions from previous runs (Run 6) with landings distributed only between blendstock tanks	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.0019 lb/hr 17 lb/yr	3.79E-9 lb/hr/ft2 1.8 lb/yr	OS#4 385.66 MM gallons as gas at 2 mg/I with 8 mg/I fugitives	0.0031 lb/hr 27 lb/yr	0.012 lb/hr 108.1 lb/yr	No loading	0	0	landings evenly distributed between blendstock tanks
Global Alb Annual All Run 9	Annual	emissions at VCUM1 instead of VCUM2	380 MM gallons blendstock and 5.66 MM gallons refined under OS#3, 90 MM gallons crude under OS#CRD3	0.17 lb/hr 1523 lb/yr	0	0	No loading	0	0	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank

MODEL RUN ASSUMPTION DETAILS - 2.2.4-TMP

			IVIOL			ON DETAILS							
File Name	Annual or	Overall Comments		Marine Loadin		1		ick loading			ail Loading		Tank Comments
	Hourly		Description	VCUM1	VCUM2	Barge Fugitives	Description	VRUTK	Fugitives	Description	VCURR	Fugitives	(see separate tables for
Global Alb Annual All Run 1	Annual	max loading for truck and rail under OS #1	OS#1 369 MM gallons refined as gas at 2 mg/l with vac assist, 380 MM blendstock at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.0076 lb/hr 66.5 lb/yr	0	OS#1 879.3 MM gallons refined as gas at 2 mg/l with vac assist	0.0087 lb/hr 76.3 lb/yr	0	OS#1 300 MM gallons gas at 2 mg/l with vac assist	0.003 lb/hr 26 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 2	Annual	max fugitives at marine, some fugitives at rail	OS#2 900 MM gallons refined loading of inerted vessels at 2 mg/l (99.9%), OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.0091 lb/hr 79.3 lb/yr	3.79E-8 lb/hr/ft2 18.4 lb/yr	No loading	0	0	OS#5 163.437 MM as gas at 2 mg/l and 8 mg/l fugitives	0.0016 lb/hr 14.2 lb/yr	0.0065 lb/hr 56.7 lb/yr	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 3	Annual	max fugitives at marine, some fugitives at truck	OS#2 900 MM gallons refined loading of inerted vessels at 2 mg/l (99.9%), OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.0091 lb/hr 79.3 lb/yr	3.79E-8 lb/hr/ft2 18.4 lb/yr	OS#4 163.437 MM as gas at 2 mg/l and 8 mg/l fugitives	0.0016 lb/hr 14.2 lb/yr	0.0065 lb/hr 56.7 lb/yr	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 4	Annual	max loading for marine under OS#1, max loading at rail under OS#1, remaining loading at truck under OS#1	OS#1 900 MM gallons refined as gas at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.0091 lb/hr 79.6 lb/yr	0	OS#1 728.3 MM as gas at 2 mg/l with vac assist	0.0072 lb/hr 63.2 lb/yr	0	OS#1 300 MM gallons gas at 2 mg/l with vac assist	0.003 lb/hr 26 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 5	Annual	max loading for marine under OS#1, max loading at truck under OS#1, remaining loading at rail under OS#1	OS#1 900 MM gallons refined as gas at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.0091 lb/hr 79.6 lb/yr	0	OS#1 879.3 MM gallons refined as gas at 2 mg/l with vac assist	0.0087 lb/hr 76.3 lb/yr	0	OS#1 149 MM gallons gas at 2 mg/l with vac assist	0.0015 lb/hr 12.9 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 6	Annual	max fugitives at truck, max crude fugitives at marine	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	1.4E-4 lb/hr 1.2 lb/yr	2.71E-10 lb/hr/ft2 0.13 lb/yr	OS#4 385.66 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.0038 lb/hr 33.5 lb/yr	0.015 lb/hr 133.9 lb/yr	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 7	Annual	max fugitives at rail to subcap with some truck fugitives, max crude fugitives at marine	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	1.4E-4 lb/hr 1.2 lb/yr	2.71E-10 lb/hr/ft2 0.13 lb/yr	OS#4 85.66 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	8.5E-4 lb/hr 7.4 lb/yr	0.0034 lb/hr 29.7 lb/yr	OS#5 300 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.003 lb/hr 26 lb/yr	0.012 lb/hr 104.2 lb/hr	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 8	Annual	worst case annual assumptions from previous runs (Run 6) with landings distributed only between blendstock tanks	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	1.4E-4 lb/hr 1.2 lb/yr	2.71E-10 lb/hr/ft2 0.13 lb/yr	OS#4 385.66 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.0038 lb/hr 33.5 lb/yr	0.015 lb/hr 133.9 lb/yr	No loading	0	0	landings evenly distributed between blendstock tanks
Global Alb Annual All Run 9	Annual	emissions at VCUM1 instead of VCUM2	380 MM gallons blendstock and 5.66 MM gallons refined under OS#3, 90 MM gallons crude under OS#CRD3	0.0024 lb/hr 168.9 lb/yr	0	0	No loading	0	0	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank

MODEL RUN ASSUMPTION DETAILS - Xylenes

				1arine Loadin		TION DETAI		ck loading		Ra	ail Loading		Tank Comments
File Name	Annual or Hourly	Overall Comments	Description	VCUM1	VCUM2	Barge Fugitives	Description	VRUTK	Fugitives	Description	VCURR	Fugitives	(see separate tables for emission rates)
Global Alb Annual All Run 1	Annual	max loading for truck and rail under OS #1	OS#1 369 MM gallons refined as gas at 2 mg/l with vac assist, 380 MM blendstock at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.081 lb/hr 713 lb/yr	0	OS#1 879.3 MM gallons refined as gas at 2 mg/l with vac assist	0.095 lb/hr 833.6 lb/yr	0	OS#1 300 MM gallons gas at 2 mg/l with vac assist	0.032 lb/hr 284.4 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 2	Annual	max fugitives at marine, some fugitives at rail	OS#2 900 MM gallons refined loading of inerted vessels at 2 mg/l (99.9%), OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.098 lb/hr 855.7 lb/yr	4.12E-7 lb/hr/ft2 199.6 lb/yr	No loading	0	0	OS#5 163.437 MM as gas at 2 mg/l and 8 mg/l fugitives	0.018 lb/hr 154.9 lb/yr	0.071 lb/hr 619.8 lb/yr	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 3	Annual	max fugitives at marine, some fugitives at truck	OS#2 900 MM gallons refined loading of inerted vessels at 2 mg/l (99.9%), OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.098 lb/hr 855.7 lb/yr	4.12E-7 lb/hr/ft2 199.6 lb/yr	OS#4 163.437 MM as gas at 2 mg/l and 8 mg/l fugitives	0.018 lb/hr 154.9 lb/yr	0.071 lb/hr 619.8 lb/yr	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 4	Annual	max loading for marine under OS#1, max loading at rail under OS#1, remaining loading at truck under OS#1	OS#1 900 MM gallons refined as gas at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.098 lb/hr 856 lb/yr	0	OS#1 728.3 MM as gas at 2 mg/l with vac assist	0.079 lb/hr 690.5 lb/yr	0	OS#1 300 MM gallons gas at 2 mg/l with vac assist	0.032 lb/hr 284.4 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 5	Annual	max loading for marine under OS#1, max loading at truck under OS#1, remaining loading at rail under OS#1	OS#1 900 MM gallons refined as gas at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.098 lb/hr 856 lb/yr	0	OS#1 879.3 MM gallons refined as gas at 2 mg/l with vac assist	0.095 lb/hr 833.6 lb/yr	0	OS#1 149 MM gallons gas at 2 mg/l with vac assist	0.016 lb/hr 141.3 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 6	Annual	max fugitives at truck, max crude fugitives at marine	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	2.78E-4 lb/hr 2.4 lb/yr	5.4E-10 lb/hr/ft2 0.26 lb/yr	OS#4 385.66 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.042 lb/hr 365.6 lb/yr	0.17 lb/hr 1462.5 lb/yr	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 7	Annual	max fugitives at rail to subcap with some truck fugitives, max crude fugitives at marine	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	2.78E-4 lb/hr 2.4 lb/yr	5.4E-10 lb/hr/ft2 0.26 lb/yr	OS#4 85.66 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.0093 lb/hr 81.2 lb/yr	0.037 lb/hr 324.8 lb/yr	OS#5 300 MM gallons as gas at 2 mg/I with 8 mg/I fugitives	0.032 lb/hr 284.4 lb/yr	0.13 lb/hr 1137.6 lb/yr	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 8	Annual	worst case annual assumptions from previous runs (Run 6) with landings distributed only between blendstock tanks	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	2.78E-4 lb/hr 2.4 lb/yr	5.4E-10 lb/hr/ft2 0.26 lb/yr	OS#4 385.66 MM gallons as gas at 2 mg/I with 8 mg/I fugitives	0.042 lb/hr 365.6 lb/yr	0.17 lb/hr 1462.5 lb/yr	No loading	0	0	landings evenly distributed between blendstock tanks
Global Alb Annual All Run 9	Annual	emissions at VCUM1 instead of VCUM2	380 MM gallons blendstock and 5.66 MM gallons refined under OS#3, 90 MM gallons crude under OS#CRD3	0.21 lb/hr 1831 lb/yr	0	0	No loading	0	0	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Hourly All Run 10X	Hourly	hourly loading with fugitives, no cleanings or landings	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	No cleanings or landings, annual emissions at all tanks
Global Alb Hourly All Run 1 X	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 31 landing, annual emissions at other tanks
Global Alb Hourly All Run 2 X	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 32 landing, annual emissions at other tanks
Global Alb Hourly All Run 3 X	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 39 landing, annual emissions at other tanks
Global Alb Hourly All Run 4 X	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives 4000 gpm loading	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives 4500 gpm loading	0.26 lb/hr	1.02 lb/hr	Tank 114 landing, annual emissions at other tanks
Global Alb Hourly All Run 5 X	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	rate as gas with fugitives 4000 gpm loading	0.23 lb/hr	0.91 lb/hr	rate as gas with fugitives 4500 gpm loading	0.26 lb/hr	1.02 lb/hr	Tank 115 landing, annual emissions at other tanks
Global Alb Hourly All Run 6 X	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	rate as gas with fugitives 4000 gpm loading	0.23 lb/hr	0.91 lb/hr	rate as gas with fugitives 4500 gpm loading	0.26 lb/hr	1.02 lb/hr	Tank 117 landing, annual emissions at other tanks
Global Alb Hourly All Run 7 X	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 118 landing, annual emissions at other tanks

MODEL RUN ASSUMPTION DETAILS - Xylenes

				/arine Loadir		TION DETAI		ck loading		Ra	ail Loading		Tank Comments
File Name	Annual or Hourly	Overall Comments	Description	VCUM1	VCUM2	Barge Fugitives	Description	VRUTK	Fugitives	Description	VCURR	Fugitives	(see separate tables for emission rates)
Global Alb Hourly All Run 8 X	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 119 landing, annual emissions at other tanks
Global Alb Hourly All Run 9 X	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 121 landing, annual emissions at other tanks
Global Alb Hourly All Run 10 X	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 120 landing, annual emissions at other tanks
Global Alb Hourly All Run 11 X	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 31 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 12 X	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 32 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 13 X	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 39 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 14 X	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 114 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 15 X	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 115 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 16 X	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 117 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 17 X	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 118 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 18 X	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 119 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 19 X	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 121 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 20 X	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	Tank 120 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Controlled Cleaning Runs	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.995 lb/hr	4.21E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.23 lb/hr	0.91 lb/hr	4500 gpm loading rate as gas with fugitives	0.26 lb/hr	1.02 lb/hr	

MODEL RUN ASSUMPTION DETAILS - Toluene

File Name	Annual or	Overall Comments		Marine Loadin		TION DETAIL		ck loading		R	ail Loading		Tank Comments
File Name	Hourly	Overall Comments	Description	VCUM1	VCUM2	Barge Fugitives	Description	VRUTK	Fugitives	Description	VCURR	Fugitives	(see separate tables for
Global Alb Annual All Run 1	Annual	max loading for truck and rail under OS #1	OS#1 369 MM gallons refined as gas at 2 mg/l with vac assist, 380 MM blendstock at 2 mg/l with vac assist, O5#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.035 lb/hr 309 lb/yr	0	OS#1 879.3 MM gallons refined as gas at 2 mg/l with vac assist	0.04 lb/hr 352.2 lb/yr	0	OS#1 300 MM gallons gas at 2 mg/l with vac assist	0.014 lb/hr 120.2 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 2	Annual	max fugitives at marine, some fugitives at rail	OS#2 900 MM gallons refined loading of inerted vessels at 2 mg/l (99.9%), OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.042 lb/hr 367.8 lb/yr	1.76 lb/hr/ft2 85 lb/yr	No loading	0	0	OS#5 163.437 MM as gas at 2 mg/l and 8 mg/l fugitives	0.0075 lb/hr 65.5 lb/yr	0.03 lb/hr 261.9 lb/yr	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 3	Annual	max fugitives at marine, some fugitives at truck	OS#2 900 MM gallons refined loading of inerted vessels at 2 mg/l (99.9%), OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.042 lb/hr 367.8 lb/yr	1.76 lb/hr/ft2 85 lb/yr	OS#4 163.437 MM as gas at 2 mg/l and 8 mg/l fugitives	0.0075 lb/hr 65.5 lb/yr	0.03 lb/hr 261.9 lb/yr	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 4	Annual	max loading for marine under OS#1, max loading at rail under OS#1, remaining loading at truck under OS#1	OS#1 900 MM gallons refined as gas at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.042 lb/hr 369.5 lb/yr	0	OS#1 728.3 MM as gas at 2 mg/l with vac assist	0.033 lb/hr 291.7 lb/yr	0	OS#1 300 MM gallons gas at 2 mg/l with vac assist	0.014 lb/hr 120.2 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 5	Annual	max loading for marine under OS#1, max loading at truck under OS#1, remaining loading at rail under OS#1	OS#1 900 MM gallons refined as gas at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.042 lb/hr 369.5 lb/yr	0	OS#1 879.3 MM gallons refined as gas at 2 mg/l with vac assist	0.04 lb/hr 352.2 lb/yr	0	OS#1 149 MM gallons gas at 2 mg/l with vac assist	0.0068 lb/hr 59.7 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 6	Annual	max fugitives at truck, max crude fugitives at marine	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	8.3E-4 lb/hr 7.3 lb/yr	1.63E-9 lb/hr/ft2 0.79 lb/yr	OS#4 385.66 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.018 lb/hr 154.5 lb/yr	0.071 lb/hr 617.9 lb/yr	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 7	Annual	max fugitives at rail to subcap with some truck fugitives, max crude fugitives at marine	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	8.3E-4 lb/hr 7.3 lb/yr	1.63E-9 lb/hr/ft2 0.79 lb/yr	OS#4 85.66 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.0039 lb/hr 34.3 lb/yr	0.016 lb/hr 137.3 lb/yr	OS#5 300 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.014 lb/hr 120.2 lb/yr	0.055 lb/hr 480.7 lb/yr	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 8	Annual	worst case annual assumptions from previous runs (Run 6) with landings distributed only between blendstock tanks	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	8.3E-4 lb/hr 7.3 lb/yr	1.63E-9 lb/hr/ft2 0.79 lb/yr	OS#4 385.66 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.018 lb/hr 154.5 lb/yr	0.071 lb/hr 617.9 lb/yr	No loading	0	0	landings evenly distributed between blendstock tanks
Global Alb Annual All Run 9	Annual	emissions at VCUM1 instead of VCUM2	380 MM gallons blendstock and 5.66 MM gallons refined under OS#3, 90 MM gallons crude under OS#CRD3	0.089 lb/hr 781.5 lb/yr	0	0	No loading	0	0	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Hourly All Run 0 T	Hourly	hourly loading with fugitives, no cleanings or landings	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	No cleanings or landings, annual emissions at all tanks
Global Alb Hourly All Run 1 T	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 31 landing, annual emissions at other tanks
Global Alb Hourly All Run 2 T	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 32 landing, annual emissions at other tanks
Global Alb Hourly All Run 3 T	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 39 landing, annual emissions at other tanks
Global Alb Hourly All Run 4 T	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 114 landing, annual emissions at other tanks
Global Alb Hourly All Run 5 T	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 115 landing, annual emissions at other tanks
Global Alb Hourly All Run 6 T	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 117 landing, annual emissions at other tanks
Global Alb Hourly All Run 7 T	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 118 landing, annual emissions at other tanks
Global Alb Hourly All Run 8 T	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 119 landing, annual emissions at other tanks

MODEL RUN ASSUMPTION DETAILS - Toluene

File News	Annual or	0		/arine Loadin		TION DETAIL		ick loading		R	ail Loading		Tank Comments
File Name	Hourly	Overall Comments	Description	VCUM1	VCUM2	Barge Fugitives	Description	VRUTK	Fugitives	Description	VCURR	Fugitives	(see separate tables for
Global Alb Hourly All Run 9 T	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 121 landing, annua emissions at other tanks
Global Alb Hourly All Run 10 T	Hourly	hourly loading with fugitives and tank landing	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 120 landing, annua emissions at other tanks
Global Alb Hourly All Run 11 T	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 31 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 12 T	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 32 cleaning, annual emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 13 T	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 39 cleaning, annua emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 14 T	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 114 cleaning, annua emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 15 T	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 115 cleaning, annua emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 16 T	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 117 cleaning, annua emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 17 T	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 118 cleaning, annua emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 18 T	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 119 cleaning, annua emissions at other tanks uncontrolled vapor space purge
Global Alb Hourly All Run 19 T	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 121 cleaning, annua emissions at other tanks, uncontrolled vapor space purge
Global Alb Hourly All Run 20 T	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	Tank 120 cleaning, annua emissions at other tanks uncontrolled vapor space purge
Controlled Cleaning Runs	Hourly	hourly loading with fugitives and tank cleaning	25000 bph loading rate at VCUM2 as gas with fugitives	0	0.42 lb/hr	1.78E-6 lb/hr/ft2	4000 gpm loading rate as gas with fugitives	0.096 lb/hr	0.38 lb/hr	4500 gpm loading rate as gas with fugitives	0.11 lb/hr	0.43 lb/hr	

MODEL RUN ASSUMPTION DETAILS - Ethylbenzene

						IN DETAILS	Ethylbenzene						
File Name	Annual or	Overall Comments		Marine Loadin				ick loading			ail Loading		Tank Comments
	Hourly		Description	VCUM1	VCUM2	Barge Fugitives	Description	VRUTK	Fugitives	Description	VCURR	Fugitives	(see separate tables fo
Global Alb Annual All Run 1	Annual	max loading for truck and rail under OS #1	OS#1 369 MM gallons refined as gas at 2 mg/l with vac assist, 380 MM blendstock at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.0042 lb/hr 37 lb/yr	0	OS#1 879.3 MM gallons refined as gas at 2 mg/l with vac assist	0.0049 lb/hr 42.6 lb/yr	0	OS#1 300 MM gallons gas at 2 mg/l with vac assist	0.0017 lb/hr 14.5 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 2	Annual	max fugitives at marine, some fugitives at rail	OS#2 900 MM gallons refined loading of inerted vessels at 2 mg/l (99.9%), OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.005 lb/hr 44.2 lb/yr	2.11E-8 lb/hr/ft2 10.2 lb/yr	No loading	0	0	OS#5 163.437 MM as gas at 2 mg/l and 8 mg/l fugitives	9E-4 lb/hr 7.9 lb/yr	0.0036 lb/hr 31.6 lb/yr	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 3	Annual	max fugitives at marine, some fugitives at truck	OS#2 900 MM gallons refined loading of inerted vessels at 2 mg/l (99.9%), OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	0.005 lb/hr 44.2 lb/yr	2.11E-8 lb/hr/ft2 10.2 lb/yr	OS#4 163.437 MM as gas at 2 mg/l and 8 mg/l fugitives	9E-4 lb/hr 7.9 lb/yr	0.0036 lb/hr 31.6 lb/yr	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 4	Annual	max loading for marine under OS#1, max loading at rail under OS#1, remaining loading at truck under OS#1	OS#1 900 MM gallons refined as gas at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.005 lb/hr 44.3 lb/yr	0	OS#1 728.3 MM as gas at 2 mg/l with vac assist	0.004 lb/hr 32.3 lb/yr	0	OS#1 300 MM gallons gas at 2 mg/l with vac assist	0.0017 lb/hr 14.5 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 5	Annual	max loading for marine under OS#1, max loading at truck under OS#1, remaining loading at rail under OS#1	OS#1 900 MM gallons refined as gas at 2 mg/l with vac assist, OS#CRD1 450 MM gallons crude at 2 mg/l with vac assist	0	0.005 lb/hr 44.3 lb/yr	0	OS#1 879.3 MM gallons refined as gas at 2 mg/l with vac assist	0.0049 lb/hr 42.6 lb/yr	0	OS#1 149 MM gallons gas at 2 mg/l with vac assist	8.2E-4 lb/hr 7.2 lb/yr	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 6	Annual	max fugitives at truck, max crude fugitives at marine	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	6.94E-5 lb/hr 0.6 lb/yr	1.35E-10 lb/hr/ft2 0.066 lb/yr	OS#4 385.66 MM gallons as gas at 2 mg/I with 8 mg/I fugitives	0.0021 lb/hr 18.7 lb/yr	0.0085 74.7 lb/yr	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 7	Annual	max fugitives at rail to subcap with some truck fugitives, max crude fugitives at marine	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	6.94E-5 lb/hr 0.6 lb/yr	1.35E-10 lb/hr/ft2 0.066 lb/yr	OS#4 85.66 MM gallons as gas at 2 mg/I with 8 mg/I fugitives	4.7E-4 lb/hr 4.1 lb/yr	0.0019 lb/hr 16.6 lb/yr	OS#5 300 MM gallons as gas at 2 mg/l with 8 mg/l fugitives	0.0017 lb/hr 14.5 lb/yr	0.0066 lb/hr 58.1 lb/yr	Landings evenly distributed at 2.2 tpy per tank
Global Alb Annual All Run 8	Annual	worst case annual assumptions from previous runs (Run 6) with landings distributed only between blendstock tanks	OS#CRD2 364.5 MM gallons crude loading of inerted vessels at 2 mg/l (99.9%)	0	6.94E-5 lb/hr 0.6 lb/yr	1.35E-10 lb/hr/ft2 0.066 lb/yr	OS#4 385.66 MM gallons as gas at 2 mg/I with 8 mg/I fugitives	0.0021 lb/hr 18.7 lb/yr	0.0085 74.7 lb/yr	No loading	0	0	landings evenly distributed between blendstock tanks
Global Alb Annual All Run 9	Annual	emissions at VCUM1 instead of VCUM2	380 MM gallons blendstock and 5.66 MM gallons refined under OS#3, 90 MM gallons crude under OS#CRD3	0.011 lb/hr 94.1 lb/yr	0	0	No loading	0	0	No loading	0	0	Landings evenly distributed at 2.2 tpy per tank

Attachment 3 H₂S Model Parameters

Parameter Value	General Parameters		
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Assemble			
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Source Assumptions Notes Value Source			
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Immission Barte (Inly/n) Sec Calculations Attachment 8 1500 15			0.125.04
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Actual Stack Diameter (ft) Actual Stack Diameter 10	<u> </u>	·	
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Stack Diameter (ft)	Stack Temperature	<u>'</u>	
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nitial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1 20.93 Tank 31 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/hr) See Calculations Attachment Release Height (ft) Tank height. Approx. height of roof vents 22.5 Diameter (ft) Tank Diameter divided by 4.3 29.1 Tank 32 (Crude) (LOWER Volume Source, 80% of emissions) Emission Rate (lb/hr) See Calculations Attachment Release Height (ft) Tank diameter Tank Diameter divided by 4.3 29.1 Tank Again the Release Height (ft) Tank Diameter divided by 2.15 Tank 32 (Crude) (LOWER Volume Source, 80% of emissions) Emission Rate (lb/hr) See Calculations Attachment Tank Diameter (ft) Tank height. Approx. height of roof vents 1.20E-03 Tank 32 (Crude) (Lower Source, 80% of emissions) Emission Rate (lb/hr) See Calculations Attachment 1.20E-03 Tank Diameter (ft) Tank height. Approx. height of roof vents 45 Diameter (ft) Tank Diameter divided by 4.3 29.1 Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20% of emissions) Tank 4 (Lower Volume Source, 20% of emissions) Tank 4 (Lower Volume Source, 20% of emissions) Tank 32 (Crude) (Lower Volume Source, 20%	Release Height (ft)	Tank height. Approx. height of roof vents	45
Initial Vertical Dimension (ft) Tank height divided by 2.15 Zo.93 Tank 31 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/hr) See Calculations Attachment Emission Rate (lb/yr) See Calculations Attachment Zo.64 Release Height (ft) Tank height. Approx. height of roof vents Zo.5 Diameter (ft) Tank Diameter divided by 4.3 Zo.1 Tank Diameter divided by 4.3 Zo.1 Tank 32 (Crude) (UPPER Volume Source, 80% of emissions) Emission Rate (lb/yr) See Calculations Attachment Release Height (ft) Tank beight. Approx. height of roof vents Tank 32 (Crude) (UPPER Volume Source, 80% of emissions) Emission Rate (lb/hr) See Calculations Attachment Release Height (ft) Tank height. Approx. height of roof vents Tank diameter Tank diameter Tank diameter Tank diameter Tank diameter Tank Diameter divided by 4.3 Zo.93 Tank 32 (Crude) (UDWER Volume Source, 20% of emissions) Emission Rate (lb/hr) Tank height divided by 2.15 Tank height divided by 2.15 Tank Diameter divided by 2.15 Tank Diameter divided by 2.15 Tank Diameter divided by 2.15 Tank Release Height (ft) Tank height divided by 2.15 Tank Release Height (ft) Tank height divided by 2.15 Tank Release Height (ft) Tank height divided by 2.15 Tank Release Height (ft) Tank height divided by 2.15 Tank Release Height (ft) Tank height Approx. height of roof vents Tan	Diameter (ft)	Tank diameter	125
Fank 31 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/hr) See Calculations Attachment 3.00E-04 Emission Rate (lb/hr) See Calculations Attachment 2.64 Release Height (ft) Tank height. Approx. height of roof vents 2.5 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Release height divided by 4.3 29.1 Initial Vertical Dimension (ft) Release height divided by 2.15 10.47 Fank 32 (Crude) (UPPER Volume Source, 80% of emissions) Emission Rate (lb/hr) See Calculations Attachment 10.58 Release Height (ft) Tank height. Approx. height of roof vents 45 Diameter (ft) Tank Diameter divided by 4.3 29.1 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1 Initial Horizontal Dimension (ft) Tank height divided by 2.15 20.93 Fank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/hr) See Calculations Attachment 3.00E-04 Emission Rate (lb/hr) Tank height divided by 2.15 20.93 Fank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/hr) See Calculations Attachment 3.00E-04 Emission Rate (lb/yr) See Calculations Attachment 2.65 Release Height (ft) Tank height. Approx. height of roof vents 22.5 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Tank height. Approx. height of roof vents 22.5 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Tank height. Approx. height of roof vents 22.5 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Tank height. Approx. height of roof vents 22.5 Diameter (ft) Tank diameter 125	Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Emission Rate (lb/hr) See Calculations Attachment 3.00E-04 Emission Rate (lb/yr) See Calculations Attachment 2.64 Release Height (ft) Tank height. Approx. height of roof vents 22.5 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Release height divided by 4.3 10.47 Fank 32 (Crude) (UPPER Volume Source, 80% of emissions) Emission Rate (lb/hr) See Calculations Attachment 1.20E-03 Emission Rate (lb/yr) See Calculations Attachment 1.058 Release Height (ft) Tank height. Approx. height of roof vents Diameter (ft) Tank diameter 1.25 Initial Horizontal Dimension (ft) Tank height divided by 4.3 1.21 Initial Vertical Dimension (ft) Tank height divided by 2.15 20.93 Fank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/hr) See Calculations Attachment 2.65 Release Height (ft) Tank height divided by 2.15 2.55 Release Height (ft) Tank height divided by 2.15 2.55 Release Height (ft) Tank height divided by 2.15 2.55 Release Height (ft) Tank height. Approx. height of roof vents 2.25 Release Height (ft) Tank height. Approx. height of roof vents 2.25 Release Height (ft) Tank height. Approx. height of roof vents 2.25 Release Height (ft) Tank height. Approx. height of roof vents 2.25 Diameter (ft) Tank height. Approx. height of roof vents 2.25 Diameter (ft) Tank diameter Tank Diameter divided by 4.3 29.1	Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
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nitial Horizontal Dimension (ft) Release height divided by 2.15 Fank 32 (Crude) (UPPER Volume Source, 80% of emissions) Emission Rate (lb/hr) See Calculations Attachment Emission Rate (lb/yr) See Calculations Attachment Selease Height (ft) Tank height. Approx. height of roof vents Diameter (ft) Tank Diameter divided by 2.15 Tank Diameter divided by 4.3 Tank Diameter divided by 2.15 Tank Agint Dimension (ft) Tank height divided by 2.15 Tank Agint Dimension (ft) Tank height divided by 2.15 Tank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/hr) See Calculations Attachment See Calculations Attachment See Calculations Attachment Tank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/yr) See Calculations Attachment Tank height Approx. height of roof vents Tank diameter Tank diameter Tank diameter Tank diameter Tank diameter Tank Diameter (ft) Tank diameter Tank Diameter divided by 4.3 Tank Diameter divided by 4.3	Release Height (ft)		
Initial Vertical Dimension (ft) Release height divided by 2.15 Fank 32 (Crude) (UPPER Volume Source, 80% of emissions) Emission Rate (Ib/yr) See Calculations Attachment 1.20E-03 Emission Rate (Ib/yr) See Calculations Attachment 10.58 Release Height (ft) Tank height. Approx. height of roof vents 125 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1 Initial Vertical Dimension (ft) Tank height divided by 2.15 Tank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (Ib/yr) See Calculations Attachment See Calculations Attachment 2.65 Release Height (ft) Tank height. Approx. height of roof vents 22.5 Diameter (ft) Tank diameter 125 Tank diameter 125 Tank diameter 126 Tank Diameter divided by 4.3 29.1	Diameter (ft)		125
Fank 32 (Crude) (UPPER Volume Source, 80% of emissions) Emission Rate (lb/hr) See Calculations Attachment 1.20E-03 Emission Rate (lb/yr) See Calculations Attachment 10.58 Release Height (ft) Tank height. Approx. height of roof vents 45 Diameter (ft) Tank Diameter divided by 4.3 29.1 Initial Horizontal Dimension (ft) Tank height divided by 2.15 20.93 Fank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/hr) See Calculations Attachment 3.00E-04 Emission Rate (lb/yr) See Calculations Attachment 2.65 Release Height (ft) Tank height. Approx. height of roof vents 22.5 Diameter (ft) Tank diameter 125 Initial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1	Initial Horizontal Dimension (ft)	·	29.1
Emission Rate (lb/hr) See Calculations Attachment 1.20E-03 Emission Rate (lb/yr) See Calculations Attachment 10.58 Release Height (ft) Tank height. Approx. height of roof vents Diameter (ft) Tink Diameter (mitial Horizontal Dimension (ft) Tank Diameter divided by 4.3 Tank Diameter divided by 2.15 Tank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/hr) See Calculations Attachment Emission Rate (lb/yr) See Calculations Attachment See Calculations Attachment Calculations Attachment Tank height. Approx. height of roof vents Diameter (ft) Tank diameter Tank diameter Tank diameter Tank diameter Tank diameter Tank diameter Tank Diameter divided by 4.3 Tank Diameter divided by 4.3	Initial Vertical Dimension (ft)		10.47
Emission Rate (lb/yr) See Calculations Attachment 10.58 Release Height (ft) Tank height. Approx. height of roof vents Diameter (ft) Tank diameter Tank Diameter divided by 4.3 29.1 nitial Horizontal Dimension (ft) Tank height divided by 2.15 Tank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/hr) See Calculations Attachment Emission Rate (lb/yr) See Calculations Attachment See Calculations Attachment Release Height (ft) Tank height. Approx. height of roof vents Diameter (ft) Tank diameter Tank diameter Tank diameter Tank diameter Tank Diameter divided by 4.3 29.1			
Release Height (ft) Tank height. Approx. height of roof vents Diameter (ft) Tank diameter Tank diameter Tank Diameter divided by 4.3 Tank Diameter divided by 4.3 Tank Diameter divided by 2.15 Tank Jeff divided by 2.15 Tank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/hr) See Calculations Attachment See Calculations Attachment Tank height. Approx. height of roof vents Diameter (ft) Tank diameter Tank diameter Tank diameter Tank diameter Tank Diameter divided by 4.3 Tank Diameter divided by 4.3	Emission Rate (lb/hr)		
Diameter (ft) Tank diameter 125 nitial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1 nitial Vertical Dimension (ft) Tank height divided by 2.15 20.93 Tank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (Ib/hr) See Calculations Attachment 3.00E-04 Emission Rate (Ib/yr) See Calculations Attachment 2.65 Release Height (ft) Tank height. Approx. height of roof vents 22.5 Diameter (ft) Tank diameter 125 nitial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1	Emission Rate (lb/yr)		10.58
nitial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1 nitial Vertical Dimension (ft) Tank height divided by 2.15 20.93 Tank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (Ib/hr) See Calculations Attachment Emission Rate (Ib/yr) See Calculations Attachment 2.65 Release Height (ft) Tank height. Approx. height of roof vents Diameter (ft) Tank diameter 125 nitial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1	Release Height (ft)	Tank height. Approx. height of roof vents	45
nitial Vertical Dimension (ft) Tank height divided by 2.15 20.93 Tank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (Ib/hr) See Calculations Attachment See Calculations Attachment 2.65 Release Height (ft) Tank height. Approx. height of roof vents Diameter (ft) Tank diameter Tank Diameter divided by 4.3 29.1	Diameter (ft)		
Fank 32 (Crude) (LOWER Volume Source, 20% of emissions) Emission Rate (lb/hr) See Calculations Attachment 3.00E-04 Emission Rate (lb/yr) See Calculations Attachment 2.65 Release Height (ft) Tank height. Approx. height of roof vents 22.5 Diameter (ft) Tank diameter 125 nitial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1	Initial Horizontal Dimension (ft)		29.1
Emission Rate (lb/hr) See Calculations Attachment 3.00E-04 Emission Rate (lb/yr) See Calculations Attachment 2.65 Release Height (ft) Tank height. Approx. height of roof vents 22.5 Diameter (ft) Tank diameter 125 nitial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1	Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Emission Rate (lb/yr) See Calculations Attachment 2.65 Release Height (ft) Tank height. Approx. height of roof vents 22.5 Diameter (ft) Tank diameter 125 nitial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1			
Release Height (ft) Tank height. Approx. height of roof vents 22.5 Diameter (ft) Tank diameter 125 nitial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1	Emission Rate (lb/hr)		3.00E-04
Diameter (ft) Tank diameter 125 nitial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1	Emission Rate (lb/yr)		2.65
nitial Horizontal Dimension (ft) Tank Diameter divided by 4.3 29.1	Release Height (ft)	Tank height. Approx. height of roof vents	22.5
	Diameter (ft)		125
nitial Vertical Dimension (ft) Release height divided by 2.15 10.47	Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
	Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47

	Global Albany Annual H ₂ S Wodel Assumption	UIIS
Tank 39 (Crude) (UPPER Volume Source, 80% of		
Emission Rate (lb/hr)	See Calculations Attachment	1.10E-03
Emission Rate (lb/yr)	See Calculations Attachment	9.30
Release Height (ft)	Tank height. Approx. height of roof vents	45
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93
Tank 39 (Crude) (LOWER Volume Source, 20% of	emissions)	
Emission Rate (lb/hr)	See Calculations Attachment	2.70E-04
Emission Rate (lb/yr)	See Calculations Attachment	2.33
Release Height (ft)	Tank height. Approx. height of roof vents	22.5
Diameter (ft)	Tank diameter	125
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1
Initial Vertical Dimension (ft)	·	
()	Release height divided by 2.15	10.47
Tank 120 (Crude) (UPPER Volume Source, 80% of		
Emission Rate (lb/hr)	See Calculations Attachment	6.10E-04
Emission Rate (lb/yr)	See Calculations Attachment	5.33
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 120 (Crude) (LOWER Volume Source, 20% o	f emissions)	
Emission Rate (lb/hr)	See Calculations Attachment	1.50E-04
Emission Rate (lb/yr)	See Calculations Attachment	1.33
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	80
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 114 (Crude) (UPPER Volume Source, 80% of		11.10
. , , , ,		0.035.04
Emission Rate (lb/hr)	See Calculations Attachment	8.83E-04
Emission Rate (lb/yr)	See Calculations Attachment	7.74
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 114 (Crude) (LOWER Volume Source, 20% o	f emissions)	
Emission Rate (lb/hr)	See Calculations Attachment	2.20E-04
Emission Rate (lb/yr)	See Calculations Attachment	1.93
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	120
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 115 (Crude) (UPPER Volume Source, 80% of	emissions)	
Emission Rate (lb/hr)	See Calculations Attachment	1.30E-03
Emission Rate (lb/yr)	See Calculations Attachment	11.70
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	
· /	,	22.33
Tank 115 (Crude) (LOWER Volume Source, 20% o		2 225 24
Emission Rate (lb/hr)	See Calculations Attachment	3.30E-04
Emission Rate (lb/yr)	See Calculations Attachment	2.93
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16
Tank 117 (Crude) (UPPER Volume Source, 80% of	emissions)	
Emission Rate (lb/hr)	See Calculations Attachment	6.65E-04
Emission Rate (lb/yr)	See Calculations Attachment	5.82
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	110
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6
Initial Vertical Dimension (ft)	Tank height divided by 4.5	
ןייינימי אבי נוכמי ביווובוואטוו (וג)	Trank height divided by 2.13	22.33

Tank 117 (Crude) (LOWER Volume Source	Global Albany Annual H ₂ S Wodel Assumptions							
Emission Rate (lb/hr)	See Calculations Attachment	1.70E-04						
Emission Rate (Ib/yr)	See Calculations Attachment	1.46						
Release Height (ft)	Tank height. Approx. height of roof vents	24						
Diameter (ft)	Tank diameter	110						
. ,	Tank Diameter divided by 4.3	·						
Initial Horizontal Dimension (ft) Initial Vertical Dimension (ft)	· · · · · · · · · · · · · · · · · · ·	25.6						
. ,	Release height divided by 2.15	11.16						
Tank 118 (Crude) (UPPER Volume Source, Emission Rate (lb/hr)	See Calculations Attachment	0.055.04						
Emission Rate (Ib/yr)		8.85E-04						
, , , ,	See Calculations Attachment	7.75						
Release Height (ft)								
Diameter (ft)		100						
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3						
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33						
Tank 118 (Crude) (LOWER Volume Source	· · · ·	2 205 24						
Emission Rate (lb/hr)	See Calculations Attachment	2.20E-04						
Emission Rate (lb/yr)	See Calculations Attachment	1.94						
Release Height (ft)	Tank height. Approx. height of roof vents	24						
Diameter (ft)	Tank diameter	100						
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3						
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16						
Tank 119 (Crude) (UPPER Volume Source,	, 80% of emissions) See Calculations Attachment							
Emission Rate (lb/hr)	8.40E-04							
Emission Rate (lb/yr)	See Calculations Attachment	7.36						
Release Height (ft)	Tank height. Approx. height of roof vents	48						
Diameter (ft)	Tank diameter Tank Diameter divided by 4.3	80						
Initial Horizontal Dimension (ft)	18.6							
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33						
Tank 119 (Crude) (LOWER Volume Source	e, 20% of emissions)							
Emission Rate (lb/hr)	See Calculations Attachment	2.10E-04						
Emission Rate (lb/yr)	See Calculations Attachment	1.84						
Release Height (ft)	Tank height. Approx. height of roof vents	24						
Diameter (ft)	Tank diameter	80						
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6						
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16						
Tank 121 (Crude) (UPPER Volume Source,	, 80% of emissions)							
Emission Rate (lb/hr)	See Calculations Attachment	1.70E-03						
Emission Rate (lb/yr)	See Calculations Attachment	15.23						
Release Height (ft)	Tank height. Approx. height of roof vents	48						
Diameter (ft)	Tank diameter	150						
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9						
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33						
Tank 121 (Crude) (LOWER Volume Source	e, 20% of emissions)							
Emission Rate (lb/hr)	See Calculations Attachment	4.30E-04						
Emission Rate (lb/yr)	See Calculations Attachment	3.81						
Release Height (ft)	Tank height. Approx. height of roof vents	24						
Diameter (ft)	Tank diameter	150						
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9						
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16						

See Separate Table for Vapor Space Purge During Cleanings

General Parameters						
Parameter		Value				
Projection		UTM				
Datum		NAD83				
UTM Zone		18				
Hemisphere		Northern				
AERMET		2016-2020 MET Data				
AERMAP		1-deg DEM Data from webgis.com				
Sources	Assumptions/ Notes	Value				
Marine VCU (VCUM2) (Point Source)						
Emission Rate (lb/hr)	See Calculations Attachment	2.10E-02				
Stack Height (ft)	Actual Stack Height	60				
Stack Temperature	Release Temperature	1500				
Stack Velocity (ft/s)	Assumed	50				
Stack Diameter (ft)	Actual Stack Diameter	10				
Emissions Limit (mg/L)		2				
Barge Fugitives (Area Source) Crude OS#2 (Only					
Emission Rate (lb/hr/ft2)	See Calculations Attachment	4.03E-08				
Release Height (ft)	Barge Height	20				
Initial Vertical Dimension (ft)	Barge height divided by 2.15	9.3				
Area (ft2)	Barge Area	55294.2				
Tank 31 (Crude) (UPPER Volume Source, 80	% of emissions)					
Emission Rate Not During Landing (lb/hr)	See Calculations Attachment	1.20E-03				
Release Height (ft)	Tank height. Approx. height of roof vents	45				
Diameter (ft)	Tank diameter	125				
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1				
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93				
Tank 31 (Crude) (LOWER Volume Source, 2	0% of emissions)					
Emission Rate Not During Landing (lb/hr)	See Calculations Attachment	3.00E-04				
Release Height (ft)	Tank height. Approx. height of roof vents	22.5				
Diameter (ft)	Tank diameter	125				
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1				
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47				
Tank 32 (Crude) (UPPER Volume Source, 80						
	·					
Emission Rate (lb/hr)	See Calculations Attachment	1.20E-03				
	•	te and calculations in Variable Emissions Rate				
Emission Rate (lb/hr) During Landing	·	dsheet for H2S				
Release Height (ft)	Tank height. Approx. height of roof vents	45				
Diameter (ft)	Tank diameter	125				
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1				
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93				

Tank 32 (Crude) (LOWER Volume Source,	20% of emissions)							
Emission Rate (lb/hr)	See Calculations Attachment	3.00E-04						
	Calculated based on 1500 bph refill rate and cal	culations in Variable Emissions Rate						
Emission Rate (lb/hr) During Landing	Spreadsheet for							
Release Height (ft)	Tank height. Approx. height of roof vents	22.5						
Diameter (ft)	Tank diameter	125						
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3 29.1							
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47						
Tank 39 (Crude) (UPPER Volume Source,	80% of emissions)							
Emission Rate (lb/hr)	See Calculations Attachment	1.10E-03						
Release Height (ft)	Tank height. Approx. height of roof vents	45						
Diameter (ft)	Tank diameter	125						
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1						
Initial Vertical Dimension (ft)	Tank height divided by 2.15	20.93						
Tank 39 (Crude) (LOWER Volume Source,	20% of emissions)							
Emission Rate (lb/hr)	See Calculations Attachment	2.70E-04						
Release Height (ft)	Tank height. Approx. height of roof vents	22.5						
Diameter (ft)	Tank diameter	125						
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1						
Initial Vertical Dimension (ft)	Release height divided by 2.15	10.47						
Tank 120 (Crude) (UPPER Volume Source	, 80% of emissions)							
Emission Rate (lb/hr)	See Calculations Attachment	6.10E-04						
Release Height (ft)	Tank height. Approx. height of roof vents	48						
Diameter (ft)	Tank diameter	80						
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6						
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33						
Tank 120 (Crude) (LOWER Volume Source	e, 20% of emissions)							
Emission Data (lh/hr)	See Calculations Attachment	4.505.04						
Emission Rate (lb/hr)	See Calculations Attachment	1.50E-04						
Release Height (ft)	Tank height. Approx. height of roof vents	24						
Diameter (ft)	Tank diameter	80						
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6						
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16						

Tank 114 (Crude) (UPPER Volume Source, 8	0% of emissions)					
Emission Rate (lb/hr)	See Calculations Attachment	8.83E-04				
Release Height (ft)	Tank height. Approx. height of roof vents	48				
Diameter (ft)	Tank diameter	120				
nitial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9				
nitial Vertical Dimension (ft)	Tank height divided by 2.15	22.33				
Tank 114 (Crude) (LOWER Volume Source,	20% of emissions)					
mission Rate (lb/hr)	See Calculations Attachment	2.20E-04				
Release Height (ft)	Tank height. Approx. height of roof vents	24				
Diameter (ft)	Tank diameter	120				
nitial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	27.9				
nitial Vertical Dimension (ft)	Release height divided by 2.15	11.16				
Tank 115 (Crude) (UPPER Volume Source, 8	0% of emissions)					
Emission Rate (lb/hr)	See Calculations Attachment	1.30E-03				
Release Height (ft)	Tank height. Approx. height of roof vents	48				
Diameter (ft)	Tank diameter	150				
nitial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9				
nitial Vertical Dimension (ft)	Tank height divided by 2.15	22.33				
Tank 115 (Crude) (LOWER Volume Source,	20% of emissions)					
Emission Rate (lb/hr)	See Calculations Attachment	3.30E-04				
Release Height (ft)	Tank height. Approx. height of roof vents	24				
Diameter (ft)	Tank diameter	150				
nitial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9				
nitial Vertical Dimension (ft)	Release height divided by 2.15	11.16				
ank 117 (Crude) (UPPER Volume Source, 8	0% of emissions)					
Emission Rate Not During Landing (lb/hr)	See Calculations Attachment	6.65E-04				
	Calculated based on 1500 bph refill rate ar					
mission Rate (lb/hr) During Landing	Spreadshe					
Release Height (ft)	Tank height. Approx. height of roof vents	48				
Diameter (ft)	Tank diameter	110				
nitial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6				
nitial Vertical Dimension (ft)	Tank height divided by 2.15	22.33				

Tank 117 (Crude) (LOWER Volume Source, 20% of emissions)									
Friedrice Rote Mat D. See Lee Bree III. II. A	See Selective Association								
Emission Rate Not During Landing (lb/hr)	See Calculations Attachment	1.70E-04							
	Calculated based on 1500 bph refill rate and c								
Emission Rate (lb/hr) During Landing	Spreadsheet f	or H2S							
Release Height (ft)	Tank height. Approx. height of roof vents	24							
Diameter (ft)	Tank diameter	110							
nitial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	25.6							
nitial Vertical Dimension (ft)	Release height divided by 2.15	11.16							
Tank 118 (Crude) (UPPER Volume Source, 8	0% of emissions)								
Emission Rate (lb/hr)	See Calculations Attachment	8.85E-04							
Release Height (ft)	Tank height. Approx. height of roof vents	8.85E-04 48 100 23.3 22.33							
Diameter (ft)	Tank diameter	100							
nitial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3							
nitial Vertical Dimension (ft)	Tank height divided by 2.15	22.33							
Tank 118 (Crude) (LOWER Volume Source, 2	20% of emissions)								
Emission Rate (lb/hr)	See Calculations Attachment	2.20E-04							
Release Height (ft)	Tank height. Approx. height of roof vents	24							
Diameter (ft)	Tank diameter	100							
nitial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	23.3							
nitial Vertical Dimension (ft)	Release height divided by 2.15	11.16							
Tank 119 (Crude) (UPPER Volume Source, 8	0% of emissions)								
Emission Rate (lb/hr)	See Calculations Attachment	8.40E-04							
Release Height (ft)	Tank height. Approx. height of roof vents	48							
Diameter (ft)	Tank diameter	80							
nitial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6							
nitial Vertical Dimension (ft)	Tank height divided by 2.15	22.33							
Fank 119 (Crude) (LOWER Volume Source, 2	20% of emissions)								
Emission Rate (lb/hr)	See Calculations Attachment	2.10E-04							
Release Height (ft)	Tank height. Approx. height of roof vents	24							
Diameter (ft)	Tank diameter	80							
nitial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	18.6							
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16							

Tank 121 (Crude) (UPPER Volume Sou	rce, 80% of emissions)	
Emission Rate (lb/hr)	See Calculations Attachment	1.70E-03
Release Height (ft)	Tank height. Approx. height of roof vents	48
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Tank height divided by 2.15	22.33
Tank 121 (Crude) (LOWER Volume Sou	rrce, 20% of emissions)	
Emission Rate (lb/hr)	See Calculations Attachment	4.30E-04
Release Height (ft)	Tank height. Approx. height of roof vents	24
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	11.16

Global Albany Hourly Toluene Model Assumptions - Vapor Space Purge During Tank Cleaning

General Parameters				
Parameter		Value		
Projection		итм		
Datum		NAD83		
UTM Zone		18		
Hemisphere		Northern		
AERMET		2016-2020 MET Data		
AERMAP		1-deg DEM Data from webgis.com		
Sources	Assumptions/ Notes	Value		
Tank 28 (Distillate) (Point Source	e)			
	See Hourly Assumpti	ons Table		
Гапк 29 (Distillate) (Point Source	e)			
	See Hourly Assumpti	ions Table		
Tank 30 (Distillate) (Point Source				
	See Hourly Assumpti	ions Table		
Tank 33 (Distillate) (Point Source				
	See Hourly Assumpt	ions Table		
Tank 64 (Distillate) (Point Source	e)			
	See Hourly Assumpt	ions Table		
Tank 31 (Gasoline) (During Clear	ning - Volume Source at Manway Height)			
	See Hourly Assumpti	ons Table		
Tank 32 (Gasoline) (During Clear	ning - Volume Source at Manway Height)			
Model Assumptions Not During				
Cleaning	See Ho	urly Model Assumptions Table		
Emission Rate (lb/hr) During				
Cleaning		ble Emission Rate for H2S Table		
Release Height (ft)	Actual Height of Manway above ground	2.75		
Diameter (ft)	Tank diameter	125		
regerting a context of 1995	Total Biographic divide the A.S.			
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	29.1		
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.30		
Tank 39 (Gasoline) (During Clear	ning - Volume Source at Manway Height)			
, ,,	See Hourly Assumpti	ions Table		
Tank 120 (Gasoline) (During Clea	aning - Volume Source at Manway Height)			
(See Hourly Assumpti	ions Table		
Tank 114 (Blendstock) (During C	leaning - Volume Source at Manway Height			
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	See Hourly Assumpti			
Tank 115 (Blendstock) (During C	leaning - Volume Source at Manway Height			
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	See Hourly Assumpti			
Tank 117 (Blendstock) (During C	leaning - Volume Source at Manway Height			
, , , , , ,	See Hourly Assumpti	•		

Global Albany Hourly Toluene Model Assumptions - Vapor Space Purge During Tank Cleaning

Tank 118 (Blendstock) (During C	leaning - Volume Source at Manway Height)	-
	See Hourly Assumption	ons Table
Tank 119 (Blendstock) (During C	leaning - Volume Source at Manway Height)	
	See Hourly Assumption	ons Table
Tank 121 (Blendstock) (During C	leaning - Volume Source at Manway Height)	
Model Assumptions Not During Cleaning	See Hou	rly Model Assumptions Table
Emission Rate (lb/hr) During Cleaning	See Varial	ole Emission Rate for H2S Table
Release Height (ft)	Actual Height of Manway above ground	2.5
Diameter (ft)	Tank diameter	150
Initial Horizontal Dimension (ft)	Tank Diameter divided by 4.3	34.9
Initial Vertical Dimension (ft)	Release height divided by 2.15	1.16
Tank 130 (Product/ Water Mixtu	ire) (UPPER Volume Source, 80% of emission	ns)
	See Hourly Assumption	ons Table
Tank 130 (Product/ Water Mixtu	ire) (LOWER Volume Source, 20% of emissio	ns)
	See Hourly Assumption	ons Table

Variable Emission Rate Calculations for H2S Modeling

			Ratios Used for Variable Emission Rates ¹								July H2S I	Emission Rates ²			
														Refill after	Uncontrolled
Tank	Product Assumed	January	February	March	April	May	June	July	August	September	October	November	December	landing	Vapor Space
														(lb/hr)	Purge (lb/hr)
32	Crude RVP 12.5	0.502	0.522	0.600	0.722	0.836	0.950	1.000	0.985	0.884	0.746	0.646	0.548	0.36	4.4
117	Crude RVP 12.5	0.502	0.522	0.600	0.722	0.836	0.950	1.000	0.985	0.884	0.746	0.646	0.548	0.36	N/A
121	Crude RVP 12.5	0.502	0.522	0.600	0.722	0.836	0.950	1.000	0.985	0.884	0.746	0.646	0.548	N/A	6.35

Notes

1. The ratio was calculated and used as follows:

Landing or cleaning total VOC emissions were calculated for each month.

The H2S emissions for each month were calculated based on the speciation for that month for crude oil.

The ratio used for variable emission rate factors in AERMOD was calculated by dividing the H2S emission rate for a given month by the July H2S emission rate.

The July H2S emission rate was then entered as the emission rate for the source in the Source inputs screen in AERMOD View.

2. Emission rates represent the total H2S emissions for the tank. For landings, 80% of that value was at a release height at the top of the tank. The remaining 20% was at half of the tank height. For vapor space purge, all of the emissions were placed at the height of the manway.

Attachment 4 Emissions Calculations

Model Calculations

Summary tables of the parameters to use in the modeling are attached to the modeling report. The following sections detail the calculations used to determine emission rates for the modeling. Calculations for non-HTACs were completed using the same methods as benzene.

<u>Annual Modeling Benzene – Tank Sources</u>

Each IFR tank is modeled as two volume sources, as described in the report, with the worst-case emissions, as outlined below. Each VFR is modeled as a point source.

Vertical Fixed Roof Tanks

Tanks 28, 29, 30, 33, and 64 were modeled based on PTE emissions assuming distillate fuel oil 2, with both standing and working losses included.

IFR Tanks without Blendstock Storage

Tanks 31, 32, 39, and 120 were modeled based on the worst-case standing and working losses and landings as follows:

- Standing Losses worst case of standing losses (gasoline)
- Working Losses worst case benzene emissions from working losses (gasoline) plus crude working losses
- Example calculation for Tank 31 (total emissions, upper volume source is 80% of emissions and lower volume source is 20% of emissions):
 - Benzene emissions (lb/yr) = Benzene standing losses for gasoline (lb/yr) + Benzene working losses for gasoline (lb/yr) + Benzene working losses for crude (lb/yr) + Benzene losses due to landings (lb/yr) = 43.94 lb/yr + 6.56 lb/yr + 2.82 lb/yr + 30.36 lb/yr = 83.7 lb/yr

IFR Tanks with Blendstock Storage

IFR Tanks 114, 115, 117, 118, 119, and 121 – Modeled based on the worst-case standing and working losses and landings as follows:

- Standing Losses worst case of standing losses (blendstock)
- Working Losses worst case benzene emissions from working losses of gasoline and distillate (gasoline) plus blendstock working losses plus crude working losses
- Example calculation for Tank 117 (total emissions, upper volume source is 80% of emissions and lower volume source is 20% of emissions):
 - Benzene emissions (lb/yr) = Benzene standing losses for blendstock (lb/yr) + Benzene working losses for gasoline (lb/yr) + Benzene working losses for blendstock (lb/yr) + Benzene working losses for crude (lb/yr) + Benzene losses due to landings (lb/yr) = 20.99 lb/yr + 4.94 lb/yr + 1.45 lb/yr + 2.14 lb/yr + 30.36 lb/yr = 59.9 lb/yr

Tank Landings in Annual Model

The initial model iterations were completed assuming that the 22 tons per year of emissions from landings was evenly distributed between the tanks (2.2 tons per year per tank) and the worst-case speciation for July (0.69% benzene). Based on these initial runs, one additional run (annual run 8) was completed that distributed the landings only between the blendstock tanks because the maximum annual concentration was observed to be near this area of the facility.

Tank 130 – Product Water Tank

IFR tank 130 was modeled with standing and working losses as calculated in the PTE. It was also modeled as two volume sources, with 80% of emissions at a release height at the height of the tank and 20% of emissions at a release height of ½ the height of the tank.

Hourly Modeling Benzene - Tank Sources - Refill after a Landing

Each IFR tank is modeled as two volume sources, as described in the report, with the worst-case emissions, as outlined below. Each VFR is modeled as a point source. Vertical fixed roof tanks are modeled with the same emission rates as the annual model. IFRs are modeled assuming one tank is landing, with annual emission rates at the other IFR tanks. The worst-case hour of landing is used for the hourly model, with filling losses assumed as the worst-case. Landings for Tanks 31 and 32, though modeled in the PTE as ethanol, were recalculated for the purposes of the modeling with the worst-case product (gasoline) assumed.

The time to fill the tank is calculated based on a filling rate of 1500 bph provided by the terminal as a worst-case (rates range from 1000 to 1500 bph). Variable emission rates were used in the model. The landing emissions were calculated for each month for each tank depending on the worst-case product (gasoline or blendstock, depending on the tank).

The emission rate for July was entered into the Source Inputs screen for the tank being landed, and the ratios for the other months were calculated by dividing the benzene emissions for that month by the benzene emissions in the month of July. The calculations used for the landings in the month of July are provided at the end of this Attachment, and the ratios used for the variable emission rate entries in the model are provided with the modeling parameter attachment to the report.

<u>Hourly Modeling Benzene – Tank Sources – Vapor Space Purge</u>

Hourly cleaning calculations were also completed as part of the modeling to determine the worst-case hour. Variable emission rates were also used for the vapor space purge, with a similar method to that described for a refill after a landing. Emissions were modeled assuming a release height at the manway, which was measured in the field at the terminal. These heights are provided in the model parameters attachment to the model report.

Controlled cleaning results were calculated by taking 2% of the result from the uncontrolled model. An example run was completed for benzene to confirm that this technique was accurate.

<u>Annual Modeling Benzene – Loading Calculations</u>

For the annual model, iterative modeling was completed to determine worst-case loading scenarios based on the Operating Scenarios proposed for the facility. Detailed emission rates are provided in the attachments to the model report. An example calculation is provided below to demonstrate the method for calculating emission rates.

Example calculations for loading for Annual Run 1 is provided below. Example fugitive calculations are also provided. Calculations for other scenarios were completed using the same methods, with throughputs and emission limits adjusted as necessary depending on the assumptions for the specific model run. As described in the Permit Application submitted December 16, 2020, compliance with the emissions limits for refined product loading is determined based on the following equation:

Total Throughput of Refined Product (kgal) = (kgal loaded from OS #1) + (kgal loaded from OS#2/ 0.81) + (kgal loaded from OS#3/ 0.2) + (kgal loaded from OS#3/ 0.2)

The upper limit for the total throughput of refined product is 1,928,300 kgal. The Operating Scenarios are defined as follows:

#1: Loading at truck, rail and/or marine at 2 mg/L with vac assist

#2: Marine loading of inerted vessels at 2 mg/L (99.9%)

#3: Marine loading with VCUM1 (10 mg/L) with vac assist

#4: Truck loading with no vac assist (2 mg/L and 8 mg/L fugitives)

#5: Rail loading with no vac assist (2 mg/L and 8 mg/L fugitives)

Annual Run 1 Calculations

For the example calculations in this section, the following throughputs were assumed:

- 369,000,000 gallons of refined product and 380,000,000 gallons of blendstock at marine under Operating Scenario 1
- 879,300,000 gallons of refined product at truck under Operating Scenario 1
- 300,000,000 gallons of refined product at rail under Operating Scenario 1
- 450,000,000 gallons of crude at marine under OS#CRD1

The total throughput used for the compliance equation would be calculated as follows for refined products:

Total Throughput of Refined Product (kgal) = 1,928,300 kgal loaded from OS#1 + 0 kgal loaded from OS#2/ 0.81 + 0 kgal from OS#3/ 0.2 + 0 kgal from OS#4/ 0.2 + 0 kgal from OS#5/ 0.2

Total Throughput of Refined Product (kgal) = 1,928,300 kgal + 0 kgal = 1,928,300 kgal

The total throughput for the crude compliance equation would be calculated as follows (limited to 450,000 kgal):

Total Throughput of crude oil (kgal) = (kgal loaded from OS#1) + (kgal loaded from OS#2/0.81) + (kgal loaded from OS#3/2) = 450,000 kgal loaded from OS#1 + 0 kgal loaded from OS#2/0.81 + 0 kgal loaded from OS#3/ 0.2 = 450,000 kgal

Truck Loading

Truck VRU calculation:

The following assumes that 879,300,000 gallons of refined product are loaded at the truck rack under Operating Scenario #1:

Emissions (lbs), Total VOCs = Refined Product Throughput at Truck Rack (gallons) * 3.785 liters/gallon * Overall Emission Rate (mg/liter) * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg

Emissions (lbs), Total VOCs = 879,300,000 gallons * 3.785 liters/gallon * 2 mg/l * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg = 14,674.5 lb/yr

Benzene emissions, lbs = Total VOCs * Benzene fraction in refined product (gasoline) = 14,674.5 lb/yr * 0.0046 = 67.5 lb/yr

Benzene emissions, lb/hr = 67.5 lb/yr * 1 yr/ 8760 hrs = 0.0077 lb/hr

Rail Loading

Rail VCU calculation:

The following assumes that 300,000,000 gallons of refined product are loaded at rail under Operating Scenario #1:

Emissions (lbs), Total VOCs = Refined Product Throughput at Rail (gallons) * 3.785 liters/gallon * Overall Emission Rate (mg/liter) * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg

Emissions (lbs), Total VOCs = 300,000,000 gallons * 3.785 liters/gallon * 2 mg/l * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg = 5006 lb/yr

Benzene emissions, lbs = Total VOCs * Benzene fraction in refined product (gasoline) = 5006 lb/yr * 0.0046 = 23 lb/yr

Benzene emissions, lb/hr = 23 lb/yr * 1 yr/ 8760 hrs = 0.0026 lb/hr

Marine Loading

VCUM1 calculation

The following assumes that 369,000,000 gallons of refined product and 380,000,000 gallons of blendstock are loaded at VCUM2 under Operating Scenario #1:

Emissions (lbs), Total VOCs = Refined Product Throughput at Marine (gallons) * 3.785 liters/gallon * Overall Emission Rate (mg/liter) * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg + Blendstock Throughput at Marine (gallons) * 3.785 liters/gallon * Overall Emission Rate (mg/liter) * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg

Emissions (lbs), Total VOCs = 369,000,000 gallons * 3.785 liters/gallon * 2 mg/l * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg + 380,000,000 gallons * 3.785 liters/gallon * 2 mg/l * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg = 12,499.2 lb/yr

Benzene emissions, lbs = Total VOCs * Benzene fraction in refined product (gasoline) = 12,499.9 lb/yr * 0.0046 = 57.5 lb/yr from refined product

The following assumes that 450,000,000 gallons crude are loaded at VCUM2 under Operating Scenario #CRD1:

Emissions (lbs), Total VOCs = Crude Throughput at Marine (gallons) * 3.785 liters/gallon * Overall Emission Rate (mg/liter) * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg

Emissions (lbs), Total VOCs = 450,000,000 gallons * 3.785 liters/gallon * 2 mg/l * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg = 7510 lb/yr

Benzene emissions, lbs = Total VOCs * Benzene fraction in crude = 7510 lb/yr * 0.0026 = 19.5 lb/yr from crude

Benzene emissions from refined product and crude, lb/hr = (57.5 lb/yr + 19.5 lb/yr) * 1 yr/ 8760 hrs = 0.0088 lb/hr

Example of Truck Fugitives calculation:

The following assumes that 163,437,000 gallons of refined product are loaded at the truck rack under Operating Scenario #4 as an example calculation (used for Annual Run 3):

Emissions (lbs), Total VOCs = Refined Product Throughput at Truck Rack (gallons) * 3.785 liters/gallon * Overall Emission Rate (mg/liter) * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg

Emissions (lbs), Total VOCs = 163,437,000 gallons * 3.785 liters/gallon * 8 mg/l * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg = 10,910 lb/yr

Benzene emissions, lbs = Total VOCs * Benzene fraction in refined product (gasoline) = 10,910 lb/yr * 0.0046 = 50.2 lb/yr

Benzene emissions, lb/hr = 50.2 lb/yr * 1 yr/ 8760 hrs = 0.0057 lb/hr

Example of Rail Fugitives calculation:

The following assumes that 163,437,000 gallons of refined product are loaded at rail under Operating Scenario #5 as an example calculation (used for Annual Run 2):

Emissions (lbs), Total VOCs = Refined Product Throughput at Rail (gallons) * 3.785 liters/gallon * Overall Emission Rate (mg/liter) * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg

Emissions (lbs), Total VOCs = 163,437,000 gallons * 3.785 liters/gallon * 8 mg/l * 2.2046 lbs/Kg * 1 Kg / 1,000,000 mg = 10,910 lb/yr

Benzene emissions, lbs = Total VOCs * Benzene fraction in refined product (gasoline) = 10,910 lb/yr * 0.0046 = 50.2 lb/yr

Benzene emissions, lb/hr = 50.2 lb/yr * 1 yr/ 8760 hrs = 0.0057 lb/hr

Example of Marine Fugitives calculation

Refined product

The following calculation assumes a throughput of 900,000,000 gallons under OS#2 (used for Annual Run 2):

Emissions, lbs (Total VOCs) = Emission Factor (lb/1000 gallons) * Throughput in MM gallons * 1000 * % of Fugitive Emissions = 3.9 lb/1000 gallons * 900 MM gallons * <math>1000 * 0.1 % fugitives = 3.510 lbs

Benzene Emissions, lb/yr = Total VOCs * Benzene fraction in refined product (gasoline) = 3,510 lbs/yr * 0.0046 = 16.1 lb/yr

Benzene emissions, lb/hr = 16.1 lb/yr * 1 yr/ 8760 hrs = 0.0018 lb/hr

Benzene emissions, lb/hr/ft2 = 0.0018 lb/hr/55,294.2 ft2 (surface area as measured in aerial image) = 3.33E-8 lb/hr/ft2

Crude

The following calculation assumes a throughput of 364,500,000 gallons of crude under OS#CRD2 (used for Annual Run 2):

Emissions, lbs (Total VOCs) = Emission Factor (lb/1000 gallons) * Throughput in MM gallons * 1000 * % of Fugitive Emissions = 1.7996 lb/1000 gallons * 364.5 MM gallons * 1000 * 0.1 % fugitives = 656 lbs

Benzene Emissions, lb/yr = Total VOCs * Benzene fraction in refined product (gasoline) = 656 lbs/yr * 0.0026 = 1.71 lb/yr

Benzene emissions, lb/hr = 1.71 lb/yr * 1 yr/ 8760 hrs = 0.00019 lb/hr

Benzene emissions, $lb/hr/ft^2 = 0.00019 lb/hr/55,294.2 ft^2 = 3.52E-9 lb/hr/ft^2$

Hourly Modeling Benzene - Loading Calculations

Hourly emission rates for loading are provided in the report. Details on how these emission rates were calculated and how they were utilized in the model are provided below.

Truck Rack VRU Hourly Modeling

The hourly emission rate at the truck rack VRU is based on a maximum loading rate of 4000 gpm and an emissions limit of 2 mg/l to calculate the total VOC emissions. Benzene emissions are then calculated based on the average speciation for the year for gasoline (0.46%) as a worst-case average speciation. The calculation is as follows:

Maximum Short Term Loading Rate (liters/hr) = 4000 gallons/minute * 3.785 liters/gallon * 60 minutes/hr = 908,498.8 liters/hr

Total VOCs (g/hr) = 2 mg/l * 908,498.8 liters/hr * 1 g/ 1000 mg = 1,816.998 g/hr

Total VOCs (lb/hr) = 1,816.998 g/hr * 0.00220462 lb/g = 4.006 lb/hr

Benzene (lb/hr) = Total VOCs * 0.0046 = 4.006 lb/hr * 0.0046 = 0.0184 lb/hr

Truck Fugitives Hourly Modeling

Truck fugitives, which are only part of Operating Scenario #4, were calculated based on an emission limit of 8 mg/l and a maximum short-term loading rate of 4000 gpm. The emissions calculation was completed using the same method as the truck rack VRU, with 8 mg/l used instead of 2 mg/l. Benzene emissions are calculated based on the average speciation for the year for gasoline (0.46%).

Rail VCU Hourly Modeling

The hourly emission rate at the truck rack VRU is based on a maximum loading rate of 4500 gpm and an emissions limit of 2 mg/l to calculate the total VOC emissions. Benzene emissions are then calculated based on the average speciation for the year for gasoline (0.46%). The emissions calculation was completed using the same method as the truck rack VRU, with 4500 gpm used as the maximum loading rate.

Rail Fugitives Hourly Modeling

Rail fugitives, which are only part of Operating Scenario #5, are calculated based on an emission limit of 8 mg/l and a maximum short-term loading rate of 4500 gpm. The emissions calculation was completed using the same method as the truck rack VRU, with 8 mg/l used instead of 2 mg/l. Benzene emissions are calculated based on the average speciation for the year for gasoline (0.46%).

Marine VCU (VCUM2) Hourly Modeling

VCUM2 was used in the hourly modeling given that the emissions are higher based on the higher loading rate compared to VCUM1. Benzene emissions are calculated based on the average speciation for the year for blendstock (0.46%) or crude (0.26%), depending on the assumptions in the model iteration. The maximum loading rate for VCUM2 used for the modeling was 25,000 barrels/hr (1,050,000 gallons/hr) with an emission rate of 2 mg/l. The example calculation for blendstock is provided below:

Maximum Short Term Loading Rate (liters/hr) = 1,050,000 gallons/hr * 3.785 liters/gallon = 3,794,250 l/hr

Total VOCs (g/hr) = 2 mg/l * 3,794,250 liters/hr * 1 g/ 1000 mg = 7,948.5 g/hr

Total VOCs (lb/hr) = 7,948.5 g/hr * 0.00220462 lb/g = 17.5 lb/hr

Benzene (lb/hr) = Total VOCs * 0.0046 = 17.5 lb/hr * 0.0046 = 0.081 lb/hr

If one of the model iterations were to include only crude at VCUM2, the same calculation would be completed with 0.26% benzene used for the speciation for crude loading.

Marine Fugitives Hourly Modeling

Marine fugitives, which are part of Refined Operating Scenario #2 and Crude Operating Scenario #2 (CRD2), are calculated based on an emission factor of 3.9 lb/1000 gallons for an uncleaned barge for refined product and 25,000 barrels per hour as a worst-case short term loading rate. It is assumed that 99.9% of emissions go to the VCU with 0.1% emitted as fugitives. Benzene emissions are calculated based on the average speciation for the year for blendstock (0.46%) or crude (0.26%), depending on the assumptions in the model iteration. The example calculation for blendstock is provided below:

Total VOCs emitted as Fugitives (lb/hr) = Emission Factor * Volume Loaded kgal/hr * fraction emitted as fugitives = 3.9 lb/1000 gallons * 1,050 kgal/hr * 0.001 = 4.1 lb/hr

Benzene emitted as fugitives (lb/hr) = 4.1 lb/hr * 0.0046 = 0.0188 lb/hr

Benzene emitted as fugitives (lb/hr/ft²) = 0.0188 lb/hr/55,294.2 ft² = 3.4E-7 lb/hr/ft²

Annual Modeling Hydrogen Sulfide

A table of annual model inputs is provided with the modeling report. Tanks are modeled using the same parameters as for the benzene model, with only the IFRs included. Only marine loading is included for crude.

Tank Sources

For each of the IFR tanks, H_2S emissions were calculated by multiplying the total standing and working losses during crude storage by the vapor fraction of 0.00118 for H_2S . One crude landing per tank is assumed for the purposes of this modeling only.

Example calculation for tank 117:

 H_2S emissions (lb/yr) = (Total standing losses during crude storage (lb/yr) + working losses during crude storage (lb/yr) + Total Landing Losses (lb/yr)) * vapor fraction of H_2S

 H_2S emissions (lb/yr) = (2410.11 lb/yr + 357.34 lb/yr + 3402 lb/yr) * 0.00118 = 7.28 lb/yr (total emissions, upper volume source is 80% of this total and lower volume source is 20% of this total)

Loading calculations

Example calculation with vac assist only

The calculations provided in the PTE for VCUM2 will be used to derive the H₂S emissions for this point source for one of the model iterations, as follows:

VCUM2 H_2S Emissions (lb/yr) = Emissions in tons/yr * 2000 lbs/ton = 0.004 tons/yr * 2000 lbs/ton = 8 lb/yr

Example calculation for Crude Operating Scenario #2 with fugitives

A model iteration was completed assuming the maximum loading of crude under Operating Scenario 2 (CRD2) to calculate the emissions including barge fugitives. This calculation assumed that no crude loading occurs under the other 2 model scenarios as a worst-case for fugitive emissions.

Control device emission rate (lb/1000 gallons) = Emission rate in mg/l * 0.00834540445 (conversion factor) = 2 mg/l * 0.00834540445 = 0.0167 lb/1000 gallons

Emission factor (in lb/1000 gallons) = 1.7975 (see Marine Loading – Crude Oil in PTE)

VCUM2 Total VOC Emissions (lb/yr) = Control device emission rate (lb/1000 gallons) * Throughput in kgal = 0.0167 lb/1000 gallons * 364,500 kgal = 6,087 lb/yr

VCUM2 H_2S Emissions (lb/yr) = Total VOC Emissions in lb/yr * vapor fraction of H_2S = 6,087 lb/yr * 0.00118 = 7.18 lb/yr

Barge Fugitive Total VOC Emissions (lb/yr) = Emission factor (lb/1000 gallons) * Throughput in kgal * Fraction of emissions as fugitives = 1.7975 lb/1000 gallons * 364,500 kgal * 0.001 = 655.2 lb/yr

Barge Fugitive H_2S Emissions (lb/yr) = Total VOC Emissions in lb/yr * vapor fraction of H_2S = 655.2 lb/yr * 0.00118 = 0.773 lb/yr

Barge Fugitive H_2S Emissions (lb/hr) = H_2S Emissions in lb/yr * 1 yr/ 8760 hrs = 0.773 lb/yr * 1/8760 = 8.83E-5 lb/hr

Barge Fugitive H_2S Emissions (lb/hr/ft²) = H_2S Emissions in lb/hr/ Surface Area of Barge in ft² = 8.83E-5 lb/hr/ 55,294.2 ft² = 1.6E-9 lb/hr/ft²

Hourly Modeling Hydrogen Sulfide

Tank Sources

IFRs were modeled assuming one tank was landing, with annual emission rates at the other IFR tanks. As described in the report, tanks 32 and 117 landings were modeled since they were the worst case gasoline and blendstock tanks from the benzene hourly modeling, respectively. The worst-case hour of landing is used for the hourly model, with filling losses assumed as the worst-case. The time for filling was calculated based on a filling rate of 1500 bph. Variable emission rates were used for the H₂S model, with a similar approach to the calculation for benzene. The specific ratios used for each month are provided in the model parameters attachment to the report.

Tank landing emissions were calculated for crude tanks only for the purposes of the hourly H_2S modeling and are provided at the end of this attachment. Crude landings were not included for the benzene modeling because gasoline speciation results in a higher benzene content so that would be considered the worst-case.

For each tank that is landed, the emissions were calculated as follows:

H₂S Emissions During Landing (lb/hr) = Filling losses for one landing * H₂S vapor fraction/ hours for filling

Example calculation for Tank 117 (Assuming 1500 bph filling rate):

H₂S Emissions During Landing (lb/hr) = 1385 lb/landing * 0.00118 / 4.51 hours = 0.36 lb/hr

Loading Sources

Total VOC emissions were calculated in the same way for the hourly H_2S modeling as for the hourly benzene model, with the vapor fraction of H_2S of 0.00118 applied.

July Total VOC Landing and Cleaning Calculations for IFRs

Used in Benzene and non-HTAC Modeling

LANDING PTE CALCUL			
Т	Symbol		Units
Total Landing Losses (Eq.3-1 L _{TL} = L _{SL} +L _{FL})	L _{TL}	1,806.62	lb/event
			ton/event
Product in tank duri	* * 		
Month the landing Number of days the tank stays idle	g occurred:	July 3	days
Height of floating roof deck, h _d (ft) (assume 3 ft if unknown)	h _d	3.00	ft
Height of the stock liquid	h _l	0.250	ft
Full heel, Partial heel or Drain Dry?	·	Partial Heel	
Flat or Cone Bottom Tank?		Flat	
			•
Standing Idle Losses Eq. 3-7 $L_{SL} = n_d *KE*((P_{VA}*V_V)/R*Tv))*M_V*K_s$	L _{SL}	678.94	lb
Number of days the tank stays idle Vapor space expansion factor, per day	n _d K _E	0.1848	
True vapor pressure of stock liquid (avg. ambient temp. of month landing occ	P _{VA}	5.774	nsia
Volume of the vapor space	V _V	33747.58	'
Ideal gas constant	R	10.731	(psia-ft3)/(lb-mole de
Average vapor temperature (assumed to be equal to ground temperature - a	$T_V(T_{AA})$	531.35	°R
Stock vapor molecular weight	M_V	66	lb/lb-mol
Saturation factor	Ks	0.54	
Filling Loopes Eq. 2.49 L. = /D. M./DT.M./C. C.	_,	4 40= 4-	116
Filling Losses Eq. 3-18 L _{FL} = (P _{VA} V _V /RT _V)M _V (C _{st} S) True vapor pressure of stock liquid (avg. ambient temp. of month landing occ	L _{FL}	1,127.68 5.774	
Volume of the vapor space	V _V	33747.58	<u> </u>
Ideal gas constant	R	10.731	
Average vapor temperature (average ambient temp of the month)	T _V (T _{AA})	531.35	U -7.1
Stock vapor molecular weight	M_V	66	lb/lb-mole
Filling saturation correction factor for wind (1.0 for IFT and DEFT)	$C_{\rm sf}$	1	
Filling Saturation Factor (0.60 for full heel, 0.50 for partial heel, 0.15 for drain	S	0.5	
			_
Average Ambient Temperature during Month TAA = (TAX+TAN) /2	TAA	531.35	
Average daily monthly maximum ambient temperature, Table 7.1-2 Average daily montlhy minimum ambient temperature, Table 7.1-2	TAX TAN	541 521.7	
Average daily monthly minimum ambient temperature, Table 7.1-2	IAN	321.7	K
Product Vapor Pressure			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	5.774	psia
Vapor Pressure Equation Constant A (Table 7.1-2)	Α	11.756	
Vapor Pressure Equation Constant B (Table 7.1-2)	В	5,315.1	°R
Average ambien temperature during month	TAA	531.4	°R
Manage Control	1/5	0.4040	
Vapor Space Expansion Factor (Eq. 1-5: (ΔΤν/TLA)+[(ΔΡν-ΔΡΒ)/(PA-Ρν. Average Daily Vapor Temperature Range	ΚΕ ΔΤν	22.87	per day °R
Average Daily Vapor Pressure Range	ΔΡν	1.2440	
Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	<u> </u>
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	5.7736	psia
Average Daily Liquid Surface Temperature (TLA=TAA)	TAA	531.35	°R
Atmospheric Pressure	P_A	14.55	psia
r			
Average Daily Vapor Temperature Range (ΔTv)	A.T.	20.07	0=
Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΛΤΔ=ΤΔΧ-ΤΔΝ)	ΔΤν	19.3	°R ∘⊳
Average daily ambient temperature range - Equation 1-11 (ΔΤΑ=ΤΑΧ-ΤΑΝ) Average tank surface solar absorptance, dimensionless, Table 7.1-6	α	0.25	ri.
Daily total solar insolation on a horizontal surface	ı		Btu/ft ² -day
Average daily maximum ambient temperature for the month	TAX	541.00	°R
Average daily minimum ambient temperature for the month	TAN	521.70	°R
Average Daily Vapor Pressure Range (ΔPv)			
Equation 1-9: ΔPV = PVX - PVN	ΔΡν	1.244	psia
Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	6.42	psia
	D//Ai	E 40	noio
Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV	PVN TLX	5.18 537.07	°R
_ · · · · · · · · · · · · · · · · · · ·	TLN	525.63	°R
_ · · · · · · · · · · · · · · · · · · ·		11.756	
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV √apor Pressure Equation Constant A	Α	5,315	
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B	В		ı
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	B TAA	531.35	
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	В		
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range	B TAA ΔTv	531.35 22.87	6 3
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4)	Β ΤΑΑ ΔΤν V _V	531.35 22.87 33,747.58	
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((P)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _t)	Β ΤΑΑ ΔΤν V _v h _v	531.35 22.87 33,747.58 2.75	ft
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _ν =h _ν ((PI)D²/4) Height of vapor space under landed deck (h _ν =h _d -h _t) Deck height	B TAA ΔTv V _v h _v	531.35 22.87 33,747.58 2.75 3.00	ft ft
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _ν =h _ν ((PI)D²/4) Height of vapor space under landed deck (h _ν =h _d -h _t) Deck height	Β ΤΑΑ ΔΤν V _v h _v	531.35 22.87 33,747.58 2.75	ft ft
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((P)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _i) Deck height Liquid height Vented Vapor Saturation Factor (Eq. 1-21: Ks = 1/(1+0.053*P _{Va} *Hvo))	B TAA ΔTv V _v h _v	531.35 22.87 33,747.58 2.75 3.00	ft ft
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _l) Deck height Liquid height	B TAA ΔTv V _v h _v hd hl	531.35 22.87 33,747.58 2.75 3.00 0.25	ft ft ft

Includes Landing (standing and filling losses) and Additonal Pu	ges associated		CLEANING PTE CALCULATIONS									
	Symbol	Units		Symbol		Units						
Total Cleaning Losses LFV = LP+LCV+ LF+LS	LFV	10,628.61 lb/event 5.3143 ton/event										
Product in tank	prior to cleaning	g Gasoline - RVP 9										
Month the cle	aning occurred:	July					Additional Purge Emissions					
Calibration Gas		Propane (C3)	Standing Idle Losses Eq. 3-7 $L_{SL} = n_d^*KE^*((P_{VA}^*))$	L _{SL}	947.34	lb		Day 2	Day 3			
Duration of the continued forced ventilation	n _{CV}	3 days	Number of days the tank stays idle	n _d	3	3	Lp	1180.562	1181.720			
Height of deck during cleaning (assume 6 ft if unknown)	h _d	6 ft	Vapor space expansion factor, per day	K _E	0.1848		S*	0.25		*S is based on fix	ed roof Eq. 4-6 < 1day	
Number of days standing idle before cleaning	n _d	3 days	True vapor pressure of stock liquid (avg. ambient	P_{VA}	5.774		H _I	0.242	0.24			
Height of the stock liquid	hı	0.250 ft	Volume of the vapor space	V _V	70563.12	11	V _v	70,660.38	70,729.65			
Average ventilation rate during continued forced ventilation	Q _V	10000 ft ³ /min	Ideal gas constant	R	+	(psia-ft3)/(lb-mole degR)	h _v	5.76	5.76			
Hours per day of force ventilation	t _v	10 hrs/day	Average vapor temperature (average ambient ten	T _V (T _{AA})	531.35		h _{d2}	6.00	6.00			
Average LEL Reading	LEL	10 %	Stock vapor molecular weight	M _V		b lb/lb-mol				J		
LEL of Calibration Gas		2.1 %	Standing idle saturation factor	K _S	0.36							
Average vapor concentration by volume during continued forced ven	C _V	0.0021					Height of Vapor Space Calc			2,[9 9 4 10	
Calibration Gas Molecular Weight	M _{CG}	44.1 lb/lb-mole	Filling Losses Eq. 3-18 L _{FL} = (P _{VA} V _V /RT _V)M _V (C _{st}	L _{FL}	707.36		Height of vapor space under I	anded deck, (h _d	+ sD/6)- [(volume of	` '' `	6.31 ft	
l		 	True vapor pressure of stock liquid (avg. ambient	P _{VA}	5.774 70563.12	<u> </u>	Tank cone bottom slope			s	0.02 ft/ft	
Vapor Space Purge Losses Eq. 4-2 LP=(PVA*VV/R*TV)*MV*S		2357.875	Volume of the vapor space Ideal gas constant	V _v		ft° (psia-ft3)/(lb-mole degR)	Diameter Dank las haisht			D	125 ft 6 ft	
Saturation Factor (0.5 for IFR with a partial liquid heel)	L _p	0.5	Average vapor temperature (average ambient ter	T _V (T _{AA})	531.4	11 /1 0 /	Deck leg height Volume of heel, (πD²/12)*((sE	/a = \ ³ \\/=D/a\ ²		h _d	1578 ft3	
Ideal gas constant	R	10.731 (psia-ft3)/(lb-mole degR)	Stock vapor molecular weight	M _V		B lb/lb-mole	Vertical distance from bottom			h _D	0.4 ft	
Average temperature of the vapor space = average ambient tempera	T _V (T _{AA})	531.35 °R	Filling saturation correction factor for wind (1.0 for	C _{sf}	1	i ib/ib-iiiole	Effective height of cone-down			''p	0.4 ft	
True vapor pressure of the exposed volatile material in the tank	P _{VA}	5.774	Filling Saturation Factor (0.15 for drain dry)	S	0.15		Height of liquid in bottom of co		igure 7.1-23)		0.4 It	
Volume of vapor space	V _V	70,563.12	I ming catalation ractor (0.10 for drain dry)		0.10	1	ricignt or liquid in bottom or o	, ic			o it	
Stock vapor molecular weight	M _V	66 lb/lb-mol	— Vapor Space Expansion Factor (Eq. 1-5: (ΔΤν/	KE	0 1848	per day	╡					
			Average Daily Vapor Temperature Range	ΔΤν	22.87		┪					
Continued Forced Ventiliation Emissions			Average Daily Vapor Pressure Range	ΔΡν	1,2440	**	1					
$L_{CV} = 60 ^{\circ}\text{Qv} ^{\circ}\text{n}_{CV} ^{\circ}\text{tv} ^{\circ}\text{C}_{V} ^{\circ}\text$	L _{cv}	4,253.76	Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	psi	1					
Average ventilation rate during continued forced ventilation	Q _V	10000 ft ³ /min	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	5.7736	psia	1					
Duration of continued forced ventilation, days	n _{CV}	3 days	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35	°R	1					
Daily period of forced ventilation	t _V	10 hrs/day	Atmospheric Pressure	PA	14.55	psia	1					
Average vapor concentration by volume during continued forced ven	C _V	0.0021					1					
Atmospheric pressure at the tank location	Pa	14.55	Average Daily Vapor Temperature Range (ΔΤν)			1					
Calibration gas molecular weight	M _{CG}	44.1	Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	22.87	°R	1					
Average temperature of vapor below the floating roof = average amb	T _V (T _{AA})	531.35	Average daily ambient temperature range - Equat	ΔTA	19.3	°R						
			Average tank surface solar absorptance, dimension	α	0.25							
Prior Stock Remains = LCV max			Daily total solar insolation on a horizontal surface	I	1872	Btu/ft ² -day						
L_{CV} max = 5.9*D ² *(hI)*WI		129062.5	Average daily maximum ambient temperature for	TAX	541.00		_					
Cvmax = P _{VA} /Pa		0.396813954	Average daily minimum ambient temperature for t	TAN	521.70	°R	-					
Average Ambient Temp during Month TAA = (TAX+TAN) /2	TAA	531.35 °R	Average Daily Vapor Pressure Range (ΔPv)				1					
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541 °R	Equation 1-9: ΔPV = PVX - PVN	ΔΡν	1.244	psia	1					
Average daily montlhy minimum ambient temperature, Table 7.1-2	TAN	521.7 °R	Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX		psia	1					
		•	Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	5.18	psia	1					
Product Vapor Pressure			Average daily max liquid surface temp TLX = TAA	TLX	537.07	°R	1					
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	5.774 psia	Average daily min liquid surface temp TLN = TAA	TLN	525.63	°R	1					
Vapor Pressure Equation Constant A (Table 7.1-2)	Α	11.756	Vapor Pressure Equation Constant A	А	11.756							
Vapor Pressure Equation Constant B (Table 7.1-2)	В	5,315.1 °R	Vapor Pressure Equation Constant B	В	5,315							
Average ambient temperature during month	TAA	531.4 °R	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35]					
[. <u>.</u>			Average Daily Vapor Temperature Range	ΔΤν	22.87		_					
Vapor Space Volume V _V =h _v ((PI)D ² /4)	V _V	70,563.12 ft ³	⊣									
Height of vapor space under landed deck (h _{v=} h _d -h _I)	h _v	5.75 ft	⊣									
Deck height	hd	6.00 ft	┥									
Liquid height	hl	0.25 ft	_									

	ATIONS		
	Symbol		Units
Total Landing Losses (Eq.3-1 L _{TL} = L _{SL} +L _{FL})	LTL	1,806.62	lb/event
19 tal 2 and 19 2 2 2 2 2 1 2 1 2 1 2 1 2 1 2 1 2 1	-11.		ton/event
Product in tank duri	ng landing:	Gasoline - RVP 9	
Month the landing		July	
Number of days the tank stays idle	n _d	3 2 00	days ft
Height of floating roof deck, h_d (ft) (assume 3 ft if unknown) Height of the stock liquid	h _d	3.00 0.250	ft
Full heel, Partial heel or Drain Dry?		Partial Heel	
Flat or Cone Bottom Tank?		Flat	
_			
Standing Idle Losses Eq. 3-7 L _{SL} = n _d *KE*((P _{VA} *V _V)/R*Tv))*M _V *K _s	L _{SL}	678.94	lb
Number of days the tank stays idle Vapor space expansion factor, per day	n _d K _E	0.1848	
True vapor pressure of stock liquid (avg. ambient temp. of month landing occ	P _{VA}	5.774	psia
Volume of the vapor space	V _V	33747.58	<u> </u>
Ideal gas constant	R	10.731	(psia-ft3)/(lb-mole de
Average vapor temperature (assumed to be equal to ground temperature - a	$T_V(T_{AA})$	531.35	°R
Stock vapor molecular weight	M_V		lb/lb-mol
Saturation factor	Ks	0.54	
Filling Losses Eq. 3-18 $L_{FL} = (P_{VA}V_V/RT_V)M_V(C_{si}S)$	L _{FL}	1,127.68	lh
Filling Losses Eq. 3-16 L _{FL} = (F _{VA} V _V /R1 _V)M _V (C _{sf} 3) True vapor pressure of stock liquid (avg. ambient temp. of month landing occ	P _{VA}	1,127.68 5.774	
Volume of the vapor space	V _V	33747.58	<u>'</u>
deal gas constant	R	10.731	(psia-ft3)/(lb-mole de
Average vapor temperature (average ambient temp of the month)	T _V (T _{AA})	531.35	
Stock vapor molecular weight	M _V	66	lb/lb-mole
Filling saturation correction factor for wind (1.0 for IFT and DEFT)	C _{sf}	1	
Filling Saturation Factor (0.60 for full heel, 0.50 for partial heel, 0.15 for drain	S	0.5	
Average Ambient Temperature during Month TAA = (TAX+TAN) /2	TAA	531.35	°R
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541	
Average daily montlhy minimum ambient temperature, Table 7.1-2	TAN	521.7	
Product Vapor Pressure			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	5.774	psia
Vapor Pressure Equation Constant A (Table 7.1-2) Vapor Pressure Equation Constant B (Table 7.1-2)	A B	11.756 5,315.1	0D
Average ambien temperature during month	TAA	531.4	°R °R
Tronge ambien temperature daming mentil	.,,,,		IX.
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-Pv	KE	0.1848	per day
Average Daily Vapor Temperature Range	ΔΤν	22.87	°R
Average Daily Vapor Pressure Range	ΔΡν	1.2440	i
Breather Vent Pressure Setting Range (ΔPB = 0) Vapor Pressure at Avg Daily Liq Surface Temp	ΔPB PvA	0.0000 5.7736	psi psia
Average Daily Liquid Surface Temperature (TLA=TAA)	TAA		°R
Atmospheric Pressure	PA	14.55	
Average Daily Vapor Temperature Range (ΔTv)			
Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	22.87	°R
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔΤΑ	19.3	°R
Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface	α I	0.25	D. 102
		541.00	Btu/ft²-day °R
=	TAX I		
Average daily maximum ambient temperature for the month	TAX TAN		
=		521.70	K
Average daily maximum ambient temperature for the month			
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month			
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔΡν)	TAN	521.70	psia
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	TAN ΔPv PVX	521.70 1.244 6.42	psia psia
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	TAN ΔPv PVX PVN	521.70 1.244 6.42 5.18	psia psia psia
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV	ΔPv PVX PVN TLX	521.70 1.244 6.42 5.18 537.07	psia psia psia °R
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV	TAN ΔPv PVX PVN	521.70 1.244 6.42 5.18	psia psia psia
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN //apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] //apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV //apor Pressure Equation Constant A	ΔPV PVX PVN TLX TLN A	521.70 1.244 6.42 5.18 537.07 525.63 11.756	psia psia psia °R
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A	ΔPV PVX PVN TLX TLN A B	521.70 1.244 6.42 5.18 537.07 525.63 11.756 5,315	psia psia psia °R
Average daily maximum ambient temperature for the month Average daily wainimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A /apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	PVV PVX PVN TLX TLN A B TAA	521.70 1.244 6.42 5.18 537.07 525.63 11.756 5,315 531.35	psia psia psia °R
Average daily maximum ambient temperature for the month Average daily wainimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A /apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	ΔPV PVX PVN TLX TLN A B	521.70 1.244 6.42 5.18 537.07 525.63 11.756 5,315	psia psia psia °R
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (\(\Delta \text{PV} \) Equation 1-9: \(\Delta \text{PV} = \text{PVX} - \text{PVN} \) Vapor pressure Eq. 1-25; \(\text{PVX} = \text{exp[A-(B/TLN)]} \) Average daily max liquid surface temp TLX = TAA + 0.25\(\Delta \text{TV} \) Average daily min liquid surface temp TLN = TAA - 0.25\(\Delta \text{TV} \) Average daily min liquid surface temp TLN = TAA - 0.25\(\Delta \text{TV} \) Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range	PVX PVN TLX TLN A B TAA ATV	521.70 1.244 6.42 5.18 537.07 526.63 11.756 5.3115 531.35 22.87	psia psia psia °R °R
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (\(\Delta \text{PV} \) Equation 1-9: \(\Delta \text{PV} = \text{PVX} - \text{PVN} \) Vapor pressure Eq. 1-25; \(\text{PVX} = \text{exp[A-(B/TLX)]} \) Average daily max liquid surface temp TLX = TAA + 0.25\(\Delta \text{TV} \) Average daily min liquid surface temp TLN = TAA - 0.25\(\Delta \text{TV} \) Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _V =h _v ((P)D ² /4)	PVV PVX PVN TLX TLN A B TAA	521.70 1.244 6.42 5.18 537.07 525.63 11.756 5,315 531.35 22.87	psia psia psia °R °R ft³
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN //apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] //apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV //apor Pressure Equation Constant A //apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range //apor Space Volume V _v =h _v ((P)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _h)	TAN ΔPv PVX PVN TLX TLN A B TAA ΔTv V _v	521.70 1.244 6.42 5.18 537.07 526.63 11.756 5.3115 531.35 22.87	psia psia psia °R °R ft³
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN //apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] //apor pressure Eq. 1-25; PVN = exp[A-(B/TLX)] //apor pressure Eq. 1-25; PVN = Exp[A-(B/TLX)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV //apor Pressure Equation Constant A //apor Pressure Equation Constant B Everage Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range //apor Space Volume V _v =h _v ((P))D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _h) Deck height	TAN APV PVX PVN TLX TLN A B TAA ΔTV V _V h _V	521.70 1.244 6.42 5.18 537.07 525.63 11.756 5,315 531.35 22.87 33,747.58 2.75	psia psia psia °R °R ft³ ft
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN //apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] //apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV //apor Pressure Equation Constant A //apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range //apor Space Volume V,=h,((Pi)D²/4) leight of vapor space under landed deck (h,-h,-h,) Deck height Liquid height	TAN APV PVX PVN TLX TLN A B TAA ATV V _V h _V hd	521.70 1.244 6.42 5.18 537.07 525.63 11.756 5,315 531.35 22.87 33,747.58 2.75 3.00	psia psia psia °R °R ft³ ft
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	TAN APV PVX PVN TLX TLN A B TAA ATV V _V h _V hd	521.70 1.244 6.42 5.18 537.07 525.63 11.756 5,315 531.35 22.87 33,747.58 2.75 3.00	psia psia psia °R °R tria tria tria tria

				CLEANING PTE CALCULATIONS							
Includes Landing (standing and filling losses) and Additonal Pu	rges associated	with this clea	ning event	CLL, MINOT IL GALOGLATIONO							
	Symbol		Units		Symbol		Units				
L											
Total Cleaning Losses LFV = LP+LCV+ LF+LS	LFV	10,628.61									
Product in tank	c prior to cleaning		ton/event			1 1		1		I	
	eaning occurred:		TVF 3	- 				Additional Purge Emission	s		
Calibration Gas		Propane (C3	3)	Standing Idle Losses Eq. 3-7 $L_{SL} = n_d^*KE^*((P_{VA}^*))$	L _{SL}	947.34	lb	/ tautional range Emission	Day 2 Day 3		
Duration of the continued forced ventilation	n _{CV}	3	days	Number of days the tank stays idle	n _d	3		Lp	1180.562 1181.720		
Height of deck during cleaning (assume 6 ft if unknown)	h _d	6	ft	Vapor space expansion factor, per day	K _E	0.1848		S*	0.25 0.25	*S is based on fix	xed roof Eq. 4-6 < 1day
Number of days standing idle before cleaning	n _d	3	days	True vapor pressure of stock liquid (avg. ambient	P_{VA}	5.774	psia	H _I	0.242 0.24		
Height of the stock liquid	h _l	0.250	ft	Volume of the vapor space	V_{V}	70563.12	ft ³	V _v	70,660.38 70,729.65		
Average ventilation rate during continued forced ventilation	Q _V	10000	ft ³ /min	Ideal gas constant	R		(psia-ft3)/(lb-mole degR)	h _v	5.76 5.76		
Hours per day of force ventilation	t _V	10	hrs/day	Average vapor temperature (average ambient tem	$T_V (T_{AA})$	531.35	R	h _{d2}	6.00 6.00		
Average LEL Reading	LEL	10	%	Stock vapor molecular weight	M_V		b/lb-mol			J	
LEL of Calibration Gas		2.1	%	Standing idle saturation factor	K_S	0.36					
Average vapor concentration by volume during continued forced ven	C _V	0.0021		 				Height of Vapor Space Cald			
Calibration Gas Molecular Weight	M _{CG}	44.1	lb/lb-mole	Filling Losses Eq. 3-18 L _{FL} = (P _{VA} V _V /RT _V)M _V (C _{st}	L _{FL}	707.36	lb	- 1	landed deck, (h _d + sD/6)- [(volume of	heel/(πD²/4))+(0.0	
				True vapor pressure of stock liquid (avg. ambient	P _{VA}	5.774	psia	Tank cone bottom slope		s	0.02 ft/ft
Vapor Space Purge Losses	<u> </u>	0057.075		Volume of the vapor space	V _v	70563.12	15	Diameter		D	125 ft
Eq. 4-2 LP=(PVA*VV/R*TV)*MV*S Saturation Factor (0.5 for IFR with a partial liquid heel)	L _P	2357.875 0.5		Ideal gas constant	T _V (T _{AA})	10.731 531.4	(psia-ft3)/(lb-mole degR)	Deck leg height	2/0 - \3\\/- \2/0\2\	h _d	6 ft 1578 ft3
Ideal gas constant	R		(psia-ft3)/(lb-mole degR)	Average vapor temperature (average ambient ter Stock vapor molecular weight	M _V		b/lb-mole	Volume of heel, (πD²/12)*((st	בועב-ח _p)"))/(אטוב)) n shell to the liquid surface in cone bot	h _n	0.4 ft
Average temperature of the vapor space = average ambient tempera	T _V (T _{AA})	531.35	11 /1 0 /	Filling saturation correction factor for wind (1.0 for	C _{sf}	1	D/ID-ITIOIE	-	n bottom, sD/6 (Figure 7.1-23)	''p	0.4 ft
True vapor pressure of the exposed volatile material in the tank	P _{VA}	5.774		Filling Saturation Factor (0.15 for drain dry)	S	0.15		Height of liquid in bottom of o			0.4 It
Volume of vapor space	V _V	70,563.12		- I ming catalation ractor (0.10 for drain dry)		0.10		rieignt or liquid in bottom or c	Sono		- Olic
Stock vapor molecular weight	M _V		ib/lb-mol	Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/	KE	0.1848	per day	┨			
				Average Daily Vapor Temperature Range	ΔΤν	22.87	<u> </u>	1			
Continued Forced Ventiliation Emissions				Average Daily Vapor Pressure Range	ΔΡν	1.2440	• • • • • • • • • • • • • • • • • • • •	1			
$L_{CV} = 60^{\circ}Qv^{*}n_{CV}^{*}tv^{*}C_{V}^{*}(P_{a}^{*}M_{CG})/(R^{*}T_{V})$	Lcv	4,253.76		Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	psi	7			
Average ventilation rate during continued forced ventilation	Q _V	10000	ft ³ /min	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	5.7736	psia	7			
Duration of continued forced ventilation, days	n _{CV}	3	days	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35	R .				
Daily period of forced ventilation	t _V	10	hrs/day	Atmospheric Pressure	P_A	14.55	psia				
Average vapor concentration by volume during continued forced ven	C _V	0.0021		_							
Atmospheric pressure at the tank location	Pa	14.55		Average Daily Vapor Temperature Range (ΔTv)							
Calibration gas molecular weight	M _{CG}	44.1		Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	22.87	°R	_			
Average temperature of vapor below the floating roof = average amb	T _V (T _{AA})	531.35	5	Average daily ambient temperature range - Equat	ΔΤΑ	19.3	R	4			
L				Average tank surface solar absorptance, dimension	α	0.25		-			
Prior Stock Remains = LCV max		400000		Daily total solar insolation on a horizontal surface	- I		Btu/ft ² -day	-			
L_{CV} max = 5.9*D ² *(hI)*WI		129062.5	-	Average daily maximum ambient temperature for	TAX TAN	541.00 521.70	R	-			
Cvmax = P _{VA} /Pa	<u> </u>	0.39681395	2	Average daily minimum ambient temperature for t	IAN	521.70	К	-			
Average Ambient Temp during Month TAA = (TAX+TAN) /2	TAA	531.35	 	— Average Daily Vapor Pressure Range (ΔPv)				\dashv			
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	531.33		Equation 1-9: ΔPV = PVX - PVN	ΔΡν	1.244	nsia	\dashv			
Average daily monthly minimum ambient temperature, Table 7.1-2	TAN	521.7		Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	6.42		┨			
and the second s	· · · · · · · · · · · · · · · · · · ·	1 021.7	1	Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	5.18		┪			
Product Vapor Pressure				Average daily max liquid surface temp TLX = TAA	TLX	537.07		┨			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	5.774	psia	Average daily min liquid surface temp TLN = TAA	TLN	525.63	°R	7			
Vapor Pressure Equation Constant A (Table 7.1-2)	A	11.756	ľ	Vapor Pressure Equation Constant A	Α	11.756		┪			
Vapor Pressure Equation Constant B (Table 7.1-2)	В	5,315.1	°R	Vapor Pressure Equation Constant B	В	5,315		7			
Average ambient temperature during month	TAA	531.4	°R	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35		7			
				Average Daily Vapor Temperature Range	ΔΤν	22.87					
Vapor Space Volume V _v =h _v ((PI)D ² /4)	V _v	70,563.12	10.0					_			
Height of vapor space under landed deck (h _{v=} h _d -h _i)	h _v	5.75	ft								
N=											
Deck height Liquid height	hd hl	6.00 0.25									

LANDING PTE CALCUL	AHONO		
	Symbol		Units
Total Landing Losses (Eq.3-1 L _{TL} = L _{SL} +L _{FL})	L _{TL}	2,174.38	lb/event
Total Earland 200000 (Eq. 0-1 E _{TL} = E _{SL} · E _{FL})	-π		ton/event
Product in tank duri	ng landing:	Gasoline - RVP 9	
Month the landing	occurred:	July	
Number of days the tank stays idle	n _d	3	days ft
Height of floating roof deck, h_σ (ft) (assume 3 ft if unknown) Height of the stock liquid	h _d	3.00 0.250	ft
Full heel, Partial heel or Drain Dry?		Partial Heel	
Flat or Cone Bottom Tank?		Flat	
-			
Standing Idle Losses Eq. 3-7 L _{SL} = n _d *KE*((P _{VA} *V _V)/R*Tv))*M _V *K _s	L _{SL}	1046.70	lb
Number of days the tank stays idle Vapor space expansion factor, per day	n _d K _E	0.2849	
True vapor pressure of stock liquid (avg. ambient temp. of month landing oc	P _{VA}	5.774	psia
Volume of the vapor space	V _V	33747.58	<u> </u>
deal gas constant	R	10.731	(psia-ft3)/(lb-mole de
Average vapor temperature (assumed to be equal to ground temperature - a	$T_V(T_{AA})$	531.35	°R
Stock vapor molecular weight	M _V		lb/lb-mol
Saturation factor	Ks	0.54	
Filling Losses Eq. 3-18 $L_{FL} = (P_{VA}V_V/RT_V)M_V(C_{sf}S)$	L _{FL}	1,127.68	l lib
Frue vapor pressure of stock liquid (avg. ambient temp. of month landing occ	P _{VA}	5.774	
Volume of the vapor space	V _V	33747.58	<u>'</u>
deal gas constant	R	10.731	(psia-ft3)/(lb-mole de
Average vapor temperature (average ambient temp of the month)	T _V (T _{AA})	531.35	
Stock vapor molecular weight	M _V	66	lb/lb-mole
Filling saturation correction factor for wind (1.0 for IFT and DEFT)	C _{sf}	0.5	
Filling Saturation Factor (0.60 for full heel, 0.50 for partial heel, 0.15 for drain	- 3	0.5	
Average Ambient Temperature during Month TAA = (TAX+TAN) /2	TAA	531.35	°R
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541	
Average daily montlhy minimum ambient temperature, Table 7.1-2	TAN	521.7	°R
Product Vapor Pressure	_		
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA) Vapor Pressure Equation Constant A (Table 7.1-2)	P _{VA}	5.774 11.756	psia
Vapor Pressure Equation Constant A (Table 7.1-2)	В	5,315.1	°R
Average ambien temperature during month	TAA	531.4	°R
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-Pv	KE		per day
Average Daily Vapor Temperature Range	ΔΤν ΔΡν	35.23 1.9184	
Average Daily Vapor Pressure Range Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΥ		psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA		psia
Average Daily Liquid Surface Temperature (TLA=TAA)	TAA	531.35	°R
Atmospheric Pressure	P _A	14.55	psia
г			
Average Daily Vapor Temperature Range (ΔTv)			0-
Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	35.23	
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6	α	0.58	K
Daily total solar insolation on a horizontal surface	ı		Btu/ft ² -day
Average daily maximum ambient temperature for the month	TAX	541.00	
Average daily minimum ambient temperature for the month	TAN	521.70	°R
Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN	AD.	4.040	
Equation 1-9: $\Delta PV = PVX - PVN$	ΔΡν	1.918	psia
Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	6.80	psia
Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	4.88	psia
Average daily max liquid surface temp TLX = TAA + 0.25ΔTV	TLX	540.16	
Accessed delicación liquidacente es tenen TINI, TAA, O.O.F.ATV	TLN	522.54	°R
Average daily min liquid surface temb TLN = TAA - 0.25/11V			ļ.,
	A B	11.756 5,315	
/apor Pressure Equation Constant A	D	5,315	
/apor Pressure Equation Constant A /apor Pressure Equation Constant B	TAA		
/apor Pressure Equation Constant A /apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	TAA ΔTv	35.23	
/apor Pressure Equation Constant A /apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)		35.23	
/apor Pressure Equation Constant A //apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range //apor Space Volume V _v =h _v ((PI)D ² /4)		33,747.58	ft ³
/apor Pressure Equation Constant A //apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range //apor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _i)	ΔΤν V _V h _v	33,747.58 2.75	
Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D²/4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	ΔTv V _v h _v hd	33,747.58 2.75 3.00	ft ft
Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D²/4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	ΔΤν V _V h _v	33,747.58 2.75	ft ft
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((P)ID²/4) Height of vapor space under landed deck (h _v =h _d -h _i) Deck height Liquid height	V _V h _v hd hl	33,747.58 2.75 3.00 0.25	ft ft
Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D²/4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	ΔTv V _v h _v hd	33,747.58 2.75 3.00	ft ft ft

				LEANING PTE CALCULATIONS								
ncludes Landing (standing and filling losses) and Additonal Pu	rges associated Symbol	with this clea	ning event Units		Symbol		Units					
	•				•							
otal Cleaning Losses LFV = LP+LCV+ LF+LS	LFV	11,141.97	lb/event ton/event									
Product in tank	prior to cleaning							I		1		
Month the cle	aning occurred:	July						Additional Purge Emissions	;			
Calibration Gas		Propane (C3	3)	Standing Idle Losses Eq. 3-7 $L_{SL} = n_d * KE * ((P_{VA})^*)$	L _{SL}	1460.49	lb		Day 2	Day 3		
Duration of the continued forced ventilation	n _{CV}	3	days	Number of days the tank stays idle	n_d	3		L _P	1180.630	1181.856		
leight of deck during cleaning (assume 6 ft if unknown)	h _d	6	ft	Vapor space expansion factor, per day	K_E	0.2849		S *	0.25		*S is based on fixed ro	of Eq. 4-6 < 1day
Number of days standing idle before cleaning	n _d	3	days	True vapor pressure of stock liquid (avg. ambient	P_{VA}	5.774		H _I	0.242	0.24		
leight of the stock liquid	h _l	0.250	ft	Volume of the vapor space	$V_{\rm V}$	70563.12	11	V _v	70,664.44	70,737.79		
verage ventilation rate during continued forced ventilation	Q_V	10000	ft ³ /min	Ideal gas constant	R	10.731	(psia-ft3)/(lb-mole degR)	h _v	5.76	5.76		
lours per day of force ventilation	t _v	10	hrs/day	Average vapor temperature (average ambient ten	$T_V (T_{AA})$	531.35	°R	h _{d2}	6.00	6.00		
verage LEL Reading	LEL	10	%	Stock vapor molecular weight	M_V	66	lb/lb-mol					
EL of Calibration Gas		2.1	%	Standing idle saturation factor	K _S	0.36						
verage vapor concentration by volume during continued forced ven	C _V	0.0021		1				Height of Vapor Space Cald	ulation for Con	e Bottom		
Calibration Gas Molecular Weight	M _{CG}	44.1	lb/lb-mole	Filling Losses Eq. 3-18 $L_{FL} = (P_{VA}V_{V}/RT_{V})M_{V}(C_{s})$	L _{FL}	707.36	lb	Height of vapor space under	anded deck, (h _d	+ sD/6)- [(volume of I	heel/(πD²/4))+(0.0	6.31 ft
				True vapor pressure of stock liquid (avg. ambient	P _{VA}	5.774	psia	Tank cone bottom slope			s	0.02 ft/ft
apor Space Purge Losses				Volume of the vapor space	V _V	70563.12	ft ³	Diameter			D	125 ft
q. 4-2 LP=(PVA*VV/R*TV)*MV*S	L _P	2357.875		Ideal gas constant	R	10.731	(psia-ft3)/(lb-mole degR)	Deck leg height			h _d	6 ft
Saturation Factor (0.5 for IFR with a partial liquid heel)	S	0.5		Average vapor temperature (average ambient ter	T _V (T _{AA})	531.4	°R	Volume of heel, (πD ² /12)*((sE	//2-h _n) ³))/(sD/2) ²)		1578 ft3
deal gas constant	R	10.731	(psia-ft3)/(lb-mole degR)	Stock vapor molecular weight	M _V	66	lb/lb-mole	Vertical distance from bottom			h _p	0.4 ft
Average temperature of the vapor space = average ambient tempera	T _V (T _{AA})	531.35	i°R	Filling saturation correction factor for wind (1.0 for	C _{sf}	1		Effective height of cone-dowr			r l	0.4 ft
rue vapor pressure of the exposed volatile material in the tank	P _{VA}	5.774		Filling Saturation Factor (0.15 for drain dry)	S	0.15		Height of liquid in bottom of c		3 ,		0 ft
/olume of vapor space	V _V	70,563.12		1								-
Stock vapor molecular weight	M _V		lb/lb-mol	Vapor Space Expansion Factor (Eq. 1-5: (ΔΤν/	KE	0.2849	per day	-				
		1		Average Daily Vapor Temperature Range	ΔΤν	35.23						
Continued Forced Ventiliation Emissions		 		Average Daily Vapor Pressure Range	ΔΡν	1.9184	**					
$_{\text{CV}} = 60^{\circ}\text{Qv}^{\circ}\text{n}_{\text{CV}}^{\circ}\text{tv}^{\circ}\text{C}_{\text{V}}^{\circ}(\text{P}_{\text{a}}^{\circ}\text{M}_{\text{CG}})/(\text{R}^{\circ}\text{T}_{\text{V}})$	L _{cv}	4,253.76		Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	<u> </u>					
Average ventilation rate during continued forced ventilation	Q _V		ft ³ /min	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	5.7736		1				
Duration of continued forced ventilation, days	n _{CV}	10000	days	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35	•	-				
Daily period of forced ventilation	t _v	10	hrs/dav	Atmospheric Pressure	P ₄	14.55	**	-				
Average vapor concentration by volume during continued forced ven	C _V	0.0021	insiday	- runospineno i ressure	' A	14.00	pola	-				
Atmospheric pressure at the tank location	Pa	14.55		L Average Daily Vapor Temperature Range (ΔΤν)		<u> </u>		-				
Calibration gas molecular weight	M _{CG}	44.1		Equation 1-7 ($\Delta TV = 0.7 \Delta TA + 0.02 \alpha I$)	ΔΤν	35.23	o _D	-				
Average temperature of vapor below the floating roof = average amb	T _V (T _{AA})	531.35		Average daily ambient temperature range - Equat	ΔΤΑ	19.3		1				
tronago temperature or vapor below the hoating roof - average affili	'V ('AA)	301.30		Average tank surface solar absorptance, dimension	α	0.58	I.V.	1				
Prior Stock Remains = LCV max		+	 	Daily total solar insolation on a horizontal surface	ı		Btu/ft ² -day	1				
L _{CV} max = 5.9*D ² *(hl)*Wl		129062.5		Average daily maximum ambient temperature for	TAX	541.00		-				
$C_{\text{CV IIIAX}} = 5.9^{\circ}D^{-2}(\text{ni})^{\circ}WI$ $C_{\text{Vmax}} = P_{\text{Va}}/Pa$		0.39681395		Average daily minimum ambient temperature for t	TAN	521.70	**	-				
Gvillax - I VA/I a		0.39001393		Twerage daily minimum ambient temperature for t	IAN	321.70	I.V.	-				
Average Ambient Temp during Month TAA = (TAX+TAN) /2	TAA	531.35	1ºn	Average Daily Vapor Process Bongs (A.D.)		-		-				
,	TAX			Average Daily Vapor Pressure Range (ΔPv)	ΔΡν	4 040	noio	-				
Average daily monthly maximum ambient temperature, Table 7.1-2		541		Equation 1-9: ΔPV = PVX - PVN	PVX	1.918		-				
Average daily montlhy minimum ambient temperature, Table 7.1-2	TAN	521.7	[⁻ K	Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]		6.80		-				
handa A Varian Barrana		_	1	Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	4.88		-				
Product Vapor Pressure		<u> </u>	ļ	Average daily max liquid surface temp TLX = TAA	TLX	540.16	**	4				
VA = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	5.774	psia	Average daily min liquid surface temp TLN = TAA	TLN	522.54	°R					
/apor Pressure Equation Constant A (Table 7.1-2)	A	11.756		Vapor Pressure Equation Constant A	Α	11.756		4				
apor Pressure Equation Constant B (Table 7.1-2)	В	5,315.1	"R	Vapor Pressure Equation Constant B	В	5,315		4				
Average ambient temperature during month	TAA	531.4	°R	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35		_				
_				Average Daily Vapor Temperature Range	ΔΤν	35.23						
Vapor Space Volume V _V =h _v ((PI)D ² /4)	V _v	70,563.12	,,									
Height of vapor space under landed deck (h _{v=} h _d -h _i)	h_v	5.75		_								
Deck height	hd	6.00		_								
iquid height	hl	0.25	ft									

LANDING PTE CALCUL	ATIONS		
	Symbol		Units
Total Landing Losses (Eq.3-1 L _{TL} = L _{SL} +L _{FL})	L _{TL}	5,124.27	lh/event
Total Editaring 200000 (Eq.0-1 E _{TL} = E _{SL} · E _{FL})	-11		ton/event
Product in tank duri	ing landing:	Gasoline - RVP 1	5
Month the landin	g occurred:	July	
Number of days the tank stays idle	n _d	3	days
Height of floating roof deck, h _d (ft) (assume 3 ft if unknown)	h _d	3.00	ft
Height of the stock liquid Full heel, Partial heel or Drain Dry?	h _i	0.250 Partial Heel	ft
Flat or Cone Bottom Tank?		Flat	
Standing Idle Losses Eq. 3-7 $L_{SL} = n_d^*KE^*((P_{VA}^*V_V)/R^*TV))^*M_V^*K_s$	L _{SL}	3316.82	lb
Number of days the tank stays idle	n _d	3	
Vapor space expansion factor, per day	K _E	0.7535	
True vapor pressure of stock liquid (avg. ambient temp. of month landing oc	P _{VA}	10.041	'
Volume of the vapor space	V _V	31101.77	
ldeal gas constant Average vapor temperature (assumed to be equal to ground temperature - a	R T _V (T _{AA})	531.35	(psia-ft3)/(lb-mole degR oR
Stock vapor molecular weight	M _V		lb/lb-mol
Saturation factor	Ks	0.41	ID/ID THE
Filling Losses Eq. 3-18 $L_{FL} = (P_{VA}V_V/RT_V)M_V(C_{sf}S)$	L _{FL}	1,807.44	
True vapor pressure of stock liquid (avg. ambient temp. of month landing occ	P _{VA}	10.041	'
Volume of the vapor space	V _V	31101.77	
Ideal gas constant	R T (T)		(psia-ft3)/(lb-mole degR
Average vapor temperature (average ambient temp of the month)	T _V (T _{AA})	531.35	***
Stock vapor molecular weight Filling saturation correction factor for wind (1.0 for IFT and DEFT)	M _V C _{sf}	1	lb/lb-mole
Filling Saturation Factor (0.60 for full heel, 0.50 for partial heel, 0.15 for drain	S	0.5	
((((
Average Ambient Temperature during Month TAA = (TAX+TAN) /2	TAA	531.35	°R
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541	°R
Average daily montlhy minimum ambient temperature, Table 7.1-2	TAN	521.7	°R
Product Vapor Pressure	-	40.044	naia.
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA) Vapor Pressure Equation Constant A (Table 7.1-2)	P _{VA}	10.041 11.600	psia
Vapor Pressure Equation Constant B (Table 7.1-2)	В	4,937.9	°R
Average ambien temperature during month	TAA	531.4	°R
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-Pv/	KE	0.7535	per day
Average Daily Vapor Temperature Range	ΔΤν	35.23	°R
Average Daily Vapor Pressure Range	ΔΡν ΔΡΒ	3.0983 0.0000	<u>'</u>
Breather Vent Pressure Setting Range (ΔPB = 0) Vapor Pressure at Avg Daily Liq Surface Temp	PvA	10.0412	psi psia
Average Daily Liquid Surface Temperature (TLA=TAA)	TAA	531.35	°R
Atmospheric Pressure	PA	14.55	psia
·			
Average Daily Vapor Temperature Range (ΔTv)			
Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	35.23	°R
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔΤΑ	19.3	°R
Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface	α	0.58	Btu/ft ² -day
Average daily maximum ambient temperature for the month	TAX	541.00	°R
Average daily minimum ambient temperature for the month	TAN	521.70	°R
·			
Average Daily Vapor Pressure Range (ΔPv)			
Equation 1-9: ΔPV = PVX - PVN	ΔΡν	3.098	psia
Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	11.68	psia
	D/AI		
Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25∆TV	PVN TLX	8.59 540.16	psia o _D
			PR L
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV	TLN	522.54	°R
Vapor Pressure Equation Constant A	Α	11.600	
Vapor Pressure Equation Constant B	В	4,938	
Average Daily Liquid Surface Temperature (TLA=TAA for landings)	TAA	531.35	
Average Daily Vapor Temperature Range	ΔΤν	35.23	
Vanor Space Valuma V =h //BI\D²/4\	V _v	24 404 77	6 3
	h _v	31,101.77 2.75	
Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h,h,-h,)		3.00	ft
Height of vapor space under landed deck (h _{v=} h _d -h _i)	na i	0.00	4
	hd hl	0.25	π
Height of vapor space under landed deck (h _{v=} h _d -h _i) Deck height		0.25	π
Height of vapor space under landed deck (h _{v=} h _d -h _i) Deck height		0.25	π
Height of vapor space under landed deck (h _{ve} h _d -h _i) Deck height Liquid height	hl		psia

Includes Landing (standing and filling losses) and Additonal Pur	nes associated w	rith this cleanir		LEANING PTE CALCULATIONS								
	Symbol	und Gealli	Units		Symbol		Units					
Total Cleaning Losses LFV = LP+LCV+ LF+LS	LFV	17.166.32	lh/ovent									
Total Gleaning Losses Li V - LF (LOV) Li (Lo	LIV	,	ton/event									
Product in tank	prior to cleaning	Gasoline - RVI	P 15									
Month the clea	ning occurred:	July						Additional Purge Emissions				
Calibration Gas		Propane (C3)		Standing Idle Losses Eq. 3-7 $L_{SL} = n_d^* KE^* ((P_{VA}^*))$	L _{SL}	4208.03	lb		Day 2	Day 3		
Duration of the continued forced ventilation	n _{CV}	3	days	Number of days the tank stays idle	n _d	0.7505		L _P S*	1894.159	1897.415	t0 :- bd	d == 4.0 + 4.0
Height of deck during cleaning (assume 6 ft if unknown)	h _d	6	III.	Vapor space expansion factor, per day	K _E P _{VA}	0.7535 10.041	1-	S" H _I	0.25 0.236	0.25	"S is based on fixe	d roof Eq. 4-6 < 1day
Number of days standing idle before cleaning Height of the stock liquid	n _d	0.250	days	True vapor pressure of stock liquid (avg. ambient Volume of the vapor space	V _V	65030.97		V _V	65.187.85	65.299.93		
Average ventilation rate during continued forced ventilation	Q _V	10000	ft ³ /min	Ideal gas constant	R		π (psia-ft3)/(lb-mole degR)	h _v	5.76	5.77		
Hours per day of force ventilation	t _v	10	π /min hrs/day	Average vapor temperature (average ambient tem	T _V (T _{AA})	531.35	· · · · · · · · · · · · · · · · · · ·	h _{d2}	6.00	6.00		
Average LEL Reading	LEL	10	%	Stock vapor molecular weight	M _V		lb/lb-mol	11d2	0.00	0.00		
LEL of Calibration Gas	LLL	2.1	%	Standing idle saturation factor	K _S	0.25	ID/ID-ITIOI				J	
Average vapor concentration by volume during continued forced ven	Cv	0.0021	, v	Otanding fale Saturation factor	145	0.20		Height of Vapor Space Calcu	ulation for Con	a Rottom		
Calibration Gas Molecular Weight	M _{CG}		lb/lb-mole	Filling Losses Eq. 3-18 $L_{FL} = (P_{VA}V_V/RT_V)M_V(C_{st})$	L _{FL}	1,133.76	lb	Height of vapor space under la			heel/(#D²/4))+(n d	6.29 ft
		74.1		True vapor pressure of stock liquid (avg. ambient	P _{VA}	10.041		Tank cone bottom slope	aou ucon, (IId	. SD/O/- [(VOIGING OI	s	0.02 ft/ft
Vapor Space Purge Losses				Volume of the vapor space	V _V	65030.97	ff ³	Diameter			D	120 ft
Eq. 4-2 LP=(PVA*VV/R*TV)*MV*S	Lp	3779.201		Ideal gas constant	R		(psia-ft3)/(lb-mole degR)	Deck leg height			h _d	6 ft
Saturation Factor (0.5 for IFR with a partial liquid heel)	S	0.5		Average vapor temperature (average ambient ter	T _V (T _{AA})	531.4	°R	Volume of heel, (πD ² /12)*((sD ₂	/2-h _a) ³))/(sD/2) ²)	u u	1396 ft3
Ideal gas constant	R		(psia-ft3)/(lb-mole degR)	Stock vapor molecular weight	M _V		lb/lb-mole	Vertical distance from bottom	p		h _n	0.4 ft
Average temperature of the vapor space = average ambient tempera	T _V (T _{AA})	531.35	°R	Filling saturation correction factor for wind (1.0 for	C _{sf}	1		Effective height of cone-down	bottom, sD/6 (F	igure 7.1-23)	r l	0.4 ft
True vapor pressure of the exposed volatile material in the tank	P _{VA}	10.041		Filling Saturation Factor (0.15 for drain dry)	S	0.15		Height of liquid in bottom of co		,		0 ft
Volume of vapor space	V _V	65,030.97										•
Stock vapor molecular weight	M_V	66	lb/lb-mol	Vapor Space Expansion Factor (Eq. 1-5: (ΔΤν/	KE	0.7535	per day					
				Average Daily Vapor Temperature Range	ΔΤν	35.23	°R					
Continued Forced Ventiliation Emissions				Average Daily Vapor Pressure Range	ΔΡν	3.0983	psi					
$L_{CV} = 60^{*}Qv^{*}n_{CV}^{*}tv^{*}C_{V}^{*}(P_{a}^{*}M_{CG})/(R^{*}T_{V})$	L _{cv}	4,253.76		Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	psi					
Average ventilation rate during continued forced ventilation	Q _V	10000	ft ³ /min	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	10.0412	psia					
Duration of continued forced ventilation, days	n _{CV}	3	days	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35	°R					
Daily period of forced ventilation	t _V	10	hrs/day	Atmospheric Pressure	P _A	14.55	psia					
Average vapor concentration by volume during continued forced ven	C _V	0.0021										
Atmospheric pressure at the tank location	Pa	14.55		Average Daily Vapor Temperature Range (ΔTv)							
Calibration gas molecular weight	M _{CG}	44.1		Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔTv	35.23						
Average temperature of vapor below the floating roof = average amb	T _V (T _{AA})	531.35		Average daily ambient temperature range - Equat	ΔΤΑ	19.3	°R					
				Average tank surface solar absorptance, dimension	α	0.58						
Prior Stock Remains = LCV max				Daily total solar insolation on a horizontal surface	I		Btu/ft ² -day					
L_{CV} max = $5.9*D^2*(hl)*Wl$		118944		Average daily maximum ambient temperature for	TAX	541.00	°R					
Cvmax = P _{VA} /Pa		0.690118501		Average daily minimum ambient temperature for t	TAN	521.70	°R					
Average Ambient Temp during Month TAA = (TAX+TAN) /2	TAA	531.35	o _B	Average Daily Vapor Pressure Range (ΔΡν)								
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541	••	Equation 1-9: $\Delta PV = PVX - PVN$	ΔΡν	3.098	nsia					
Average daily montlhy minimum ambient temperature, Table 7.1-2	TAN	521.7		Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	11.68						
			111	Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	8.59						
Product Vapor Pressure				Average daily max liquid surface temp TLX = TAA	TLX	540.16	°R					
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	10.041	psia	Average daily min liquid surface temp TLN = TAA	TLN	522.54	°R					
Vapor Pressure Equation Constant A (Table 7.1-2)	A	11.600		Vapor Pressure Equation Constant A	Α	11.600		1				
Vapor Pressure Equation Constant B (Table 7.1-2)	В	4,937.9	°R	Vapor Pressure Equation Constant B	В	4,938		1				
Average ambient temperature during month	TAA	531.4	°R	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35		1				
Ţ				Average Daily Vapor Temperature Range	ΔΤν	35.23						
Vapor Space Volume V _V =h _v ((PI)D ² /4)	V _v	65,030.97	ft ³					_				
Height of vapor space under landed deck (h _{v=} h _d -h _l)	h _v	5.75	ft									
Deck height	hd	6.00	ft									
Liquid height	hl	0.25	ft	7								

LANDING PTE CALCUL	AHONS		
	Symbol		Units
Total Landing Losses (Eq.3-1 L _{TL} = L _{SL} +L _{FL})	L _{TL}	8,006.67	lb/event
Total Earland 200000 (Eq. 0-1 E _{TL} = E _{SL} · E _{FL})	<u>-11.</u>		ton/event
Product in tank duri	ng landing:	Gasoline - RVP 1	5
Month the landing	g occurred:	July	
Number of days the tank stays idle	n _d	3	days
Height of floating roof deck, h _d (ft) (assume 3 ft if unknown)	h _d	3.00	ft
Height of the stock liquid Full heel, Partial heel or Drain Dry?	h _i	0.250 Partial Heel	ft
Flat or Cone Bottom Tank?		Flat	
Standing Idle Losses Eq. 3-7 $L_{SL} = n_d^* KE^*((P_{VA}^* V_V)/R^* Tv))^* M_V^* K_s$	L _{SL}	5182.54	lb
Number of days the tank stays idle	n _d	3	
Vapor space expansion factor, per day	K _E	0.7535	
True vapor pressure of stock liquid (avg. ambient temp. of month landing oc	P _{VA}	10.041	<u> </u>
Volume of the vapor space	V _V	48596.51	**
deal gas constant Average vapor temperature (assumed to be equal to ground temperature - a	R T _V (T _{AA})	531.35	(psia-ft3)/(lb-mole de
Stock vapor molecular weight	M _V		lb/lb-mol
Saturation factor	Ks	0.41	
Filling Losses Eq. 3-18 $L_{FL} = (P_{VA}V_{V}/RT_{V})M_{V}(C_{sf}S)$	L _{FL}	2,824.13	
True vapor pressure of stock liquid (avg. ambient temp. of month landing oc	P _{VA}	10.041	<u>'</u>
Volume of the vapor space	V _V	48596.51	
deal gas constant Average vapor temperature (average ambient temp of the month)	R T _V (T _{AA})	531.35	(psia-ft3)/(lb-mole do
Stock vapor molecular weight	M _V		lb/lb-mole
Filling saturation correction factor for wind (1.0 for IFT and DEFT)	C _{sf}	1	
Filling Saturation Factor (0.60 for full heel, 0.50 for partial heel, 0.15 for drain	S	0.5	
Average Ambient Temperature during Month TAA = (TAX+TAN) /2	TAA	531.35	
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541	
Average daily montlhy minimum ambient temperature, Table 7.1-2	TAN	521.7	°R
Product Vapor Pressure			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	10.041	psia
Vapor Pressure Equation Constant A (Table 7.1-2)	Α	11.600	
√apor Pressure Equation Constant B (Table 7.1-2)	В	4,937.9	°R
Average ambien temperature during month	TAA	531.4	°R
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-Pv.	KE	0.7525	nor dov
vapor Space Expansion Factor (Eq. 1-3: (كانا الماجر(كات عام المادة) (المادة المادة) (المادة المادة	ΔΤν	35.23	per day □D
Average Daily Vapor Pressure Range	ΔΡν	3.0983	
Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	10.0412	psia
Average Daily Liquid Surface Temperature (TLA=TAA)	TAA	531.35	
Atmospheric Pressure	P _A	14.55	psia
Average Deily Vener Terroresture Bonne (ATv)			1
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	35.23	о _р
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔΤΑ	19.3	
Average tank surface solar absorptance, dimensionless, Table 7.1-6	α	0.58	
Daily total solar insolation on a horizontal surface	I	1872	Btu/ft ² -day
	TAX	541.00	
= -		521.70	°R
= -	TAN		
Average daily minimum ambient temperature for the month	IAN		l
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv)		3 008	neia
Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN	ΔΡν	3.098	psia
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔΡν) Equation 1-9: ΔΡV = PVX - PVN			psia psia
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv)	ΔΡν	11.68	
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	ΔPv PVX	11.68	psia
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV	ΔPv PVX PVN	11.68 8.59	psia
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN //apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] //apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV	ΔPv PVX PVN TLX TLN	11.68 8.59 540.16 522.54	psia psia °R
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A	ΔPv PVX PVN TLX TLN A	11.68 8.59 540.16 522.54 11.600	psia psia °R
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A	ΔPV PVX PVN TLX TLN A B	11.68 8.59 540.16 522.54 11.600 4,938	psia psia °R
Average Daily Wapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN //apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Average Daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLX = TAA - 0.25ΔTV //apor Pressure Equation Constant A //apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	ΔPv PVX PVN TLX TLN A	11.68 8.59 540.16 522.54 11.600	psia psia °R
Average Daily Wapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN //apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Average Daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLX = TAA - 0.25ΔTV //apor Pressure Equation Constant A //apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	PVX PVN TLX TLN A B TAA	11.68 8.59 540.16 522.54 11.600 4,938 531.35	psia psia °R
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A /apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range	PVX PVN TLX TLN A B TAA	11.68 8.59 540.16 522.54 11.600 4,938 531.35	psia psia °R °R
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A /apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range /apor Space Volume V _v =h _v ((P)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _h)	ΔPV PVX PVN TLX TLN A B TAA ΔTV	11.68 8.59 540.16 522.54 11.600 4.938 531.35 35.23	psia psia °R °R ft³
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A /apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range //apor Space Volume V _v =h _v ((P))D²/4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	PVX PVX PVN TLX TLN A B TAA ΔTV V _V h _V	11.68 8.59 540.16 522.54 11.600 4,938 531.35 35.23 48,596.51 2.75 3.00	psia psia °R °R tt³ tt
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A /apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range //apor Space Volume V _v =h _v ((P))D²/4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	ΔPV PVX PVN TLX TLN A B TAA ΔTV V _V	11.68 8.59 540.16 522.54 11.600 4.938 531.35 35.23 48,596.51 2.75	psia psia °R °R tt³ tt
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _t) Deck height Liquid height	PVX PVN TLX TLN A B TAA ΔTV V h h h h l	11.68 8.59 540.16 522.54 11.600 4,938 531.35 35.23 48,596.51 2.75 3.00	psia psia °R °R tt³ tt
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔΡν) Equation 1-9: ΔΡV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX PVX PVN TLX TLN A B TAA ΔTV V _V h _V	11.68 8.59 540.16 522.54 11.600 4,938 531.35 35.23 48,596.51 2.75 3.00	psia psia °R °R ft³ ft ft

			C	LEANING PTE CALCULATIONS						
ncludes Landing (standing and filling losses) and Additonal Pu	_	with this cleanir	ng event	LEANING FIE CALCULATIONS						
	Symbol		Units		Symbol	Units				
otal Cleaning Losses LFV = LP+LCV+ LF+LS	LFV	24,427.99	lb/event ton/event							
Product in tank	prior to cleaning									
Month the cle	aning occurred:	July		1			Additional Purge Emission	3		
Calibration Gas		Propane (C3)		Standing Idle Losses Eq. 3-7 $L_{SL} = n_d^* KE^* ((P_{VA}^*))^{-1}$	L _{SL}	6575.05 lb		Day 2	Day 3	
Duration of the continued forced ventilation	n _{CV}	3	days	Number of days the tank stays idle	n_d	3	L _P	2959.072		
Height of deck during cleaning (assume 6 ft if unknown)	h _d	6	ft	Vapor space expansion factor, per day	K_E	0.7535	S*	0.25	0.25	*S is based on fixed roof Eq. 4-6 < 1day
Number of days standing idle before cleaning	n _d	3	days	True vapor pressure of stock liquid (avg. ambient	P_{VA}	10.041 psia	H _I	0.237	0.23	
Height of the stock liquid	h _I	0.250	ft	Volume of the vapor space	V_{V}	101610.89 ft ³	V _v	101,837.06	101,993.21	
Average ventilation rate during continued forced ventilation	Q _V	10000	ft ³ /min	Ideal gas constant	R	10.731 (psia-ft3)/(lb-mole degR)	h _v	5.76	5.77	
Hours per day of force ventilation	t _V	10	hrs/day	Average vapor temperature (average ambient tem	$T_V(T_{AA})$	531.35 °R	h _{d2}	6.00	6.00	
Average LEL Reading	LEL	10	%	Stock vapor molecular weight	M_V	66 lb/lb-mol				
LEL of Calibration Gas		2.1	%	Standing idle saturation factor	K _S	0.25				
Average vapor concentration by volume during continued forced ven	C _V	0.0021		」			Height of Vapor Space Cald			
Calibration Gas Molecular Weight	M _{CG}	44.1	lb/lb-mole	Filling Losses Eq. 3-18 L _{FL} = (P _{VA} V _V /RT _V)M _V (C _s	L _{FL}	1,771.50 lb	Height of vapor space under	landed deck, (h	d + sD/6)- [(volume of	
				True vapor pressure of stock liquid (avg. ambient	P _{VA}	10.041 psia	Tank cone bottom slope			s 0.02 ft/ft
Vapor Space Purge Losses				Volume of the vapor space	V _V	101610.89 ft ³	Diameter			D 150 ft
Eq. 4-2 LP=(PVA*VV/R*TV)*MV*S	L _P	5905.001		Ideal gas constant	R	10.731 (psia-ft3)/(lb-mole degR)	Deck leg height			h _d 6 ft
Saturation Factor (0.5 for IFR with a partial liquid heel)	S	0.5		Average vapor temperature (average ambient ter	T _V (T _{AA})	531.4 °R	Volume of heel, (πD ² /12)*((st			2727 ft3
Ideal gas constant	R		(psia-ft3)/(lb-mole degR)	Stock vapor molecular weight	M _V	66 lb/lb-mole	Vertical distance from bottom	shell to the liqu	iid surface in cone bo	
Average temperature of the vapor space = average ambient temperature	T _V (T _{AA})	531.35	°R	Filling saturation correction factor for wind (1.0 for	$C_{\rm sf}$	1	Effective height of cone-down		Figure 7.1-23)	0.5 ft
True vapor pressure of the exposed volatile material in the tank	P _{VA}	10.041		Filling Saturation Factor (0.15 for drain dry)	S	0.15	Height of liquid in bottom of o	one		0 ft
Volume of vapor space	V _V	101,610.89		<u> </u>						
Stock vapor molecular weight	M_V	66	lb/lb-mol	Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/	KE	0.7535 per day	_			
				Average Daily Vapor Temperature Range	ΔΤν	35.23 °R	_			
Continued Forced Ventiliation Emissions				Average Daily Vapor Pressure Range	ΔΡν	3.0983 psi	_			
$L_{CV} = 60*Qv*n_{CV}*tv*C_{V}*(P_a*M_{CG})/(R*T_V)$	L _{cv}	4,253.76		Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000 psi				
Average ventilation rate during continued forced ventilation	Q_V		ft ³ /min	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	10.0412 psia				
Duration of continued forced ventilation, days	n _{CV}	3	days	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35 °R	_			
Daily period of forced ventilation	t _V		hrs/day	Atmospheric Pressure	P _A	14.55 psia	_			
Average vapor concentration by volume during continued forced ven	C _V	0.0021		<u>]</u>			_			
Atmospheric pressure at the tank location	Pa	14.55		Average Daily Vapor Temperature Range (ΔTv)			_			
Calibration gas molecular weight	M _{CG}	44.1		Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	35.23 °R				
Average temperature of vapor below the floating roof = average amb	T _V (T _{AA})	531.35		Average daily ambient temperature range - Equat	ΔΤΑ	19.3 °R	_			
				Average tank surface solar absorptance, dimensi	α	0.58	_			
Prior Stock Remains = LCV max				Daily total solar insolation on a horizontal surface	I	1872 Btu/ft²-day	_			
$L_{CV} \max = 5.9 * D^2 * (hI) * WI$		185850		Average daily maximum ambient temperature for	TAX	541.00 °R				
Cvmax = P _{VA} /Pa		0.690118501		Average daily minimum ambient temperature for t	TAN	521.70 °R	4			
Average Ambient Temp during Month TAA = (TAX+TAN) /2	TAA	531.35	°R	Average Daily Vapor Pressure Range (ΔΡν)			1			
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541	**	Equation 1-9: ΔPV = PVX - PVN	ΔΡν	3.098 psia	1			
Average daily monthly minimum ambient temperature, Table 7.1-2	TAN	521.7		Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	11.68 psia	1			
, , ,				Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	8.59 psia	1			
Product Vapor Pressure				Average daily max liquid surface temp TLX = TAA	TLX	540.16 °R	1			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	10.041	psia	Average daily min liquid surface temp TLN = TAA	TLN	522.54 °R	1			
Vapor Pressure Equation Constant A (Table 7.1-2)	A	11.600	-	Vapor Pressure Equation Constant A	A	11.600	1			
Vapor Pressure Equation Constant B (Table 7.1-2)	В	4,937.9	°R	Vapor Pressure Equation Constant B	В	4,938	1			
Average ambient temperature during month	TAA	531.4	**	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35	1			
•				Average Daily Vapor Temperature Range	ΔΤν	35.23	1			
Vapor Space Volume V _V =h _v ((PI)D ² /4)	V _v	101,610.89	ft ³				_			
Height of vapor space under landed deck (h _{v=} h _d -h _i)	h _v	5.75	ft	1						
Deck height	hd	6.00		1						
Liquid height	hl	0.25		1						

LANDING PTE CALCUL			
	Symbol		Units
Total Landing Losses (Eq.3-1 L _{TL} = L _{SL} +L _{FL})	L _{TL}	2,749.89	lb/event
	-12		ton/event
Product in tank duri	ng landing:	Component (Ave	rage RVP 14.33)
Month the landing	g occurred:	July	
Number of days the tank stays idle	n _d	3	days
Height of floating roof deck, h _d (ft) (assume 3 ft if unknown)	h _d	3.00	ft
Height of the stock liquid	h _I	0.250	ft
Full heel, Partial heel or Drain Dry?		Partial Heel	
Flat or Cone Bottom Tank?		Flat	
Standing Idle Losses Eq. 3-7 $L_{SL} = n_d^* KE^* ((P_{VA}^* V_V)/R^* Tv))^* M_V^* K_s$	L _{SL}	1419.15	lıb
Number of days the tank stays idle	n _d	3	
Vapor space expansion factor, per day	K _E	0.4243	
True vapor pressure of stock liquid (avg. ambient temp. of month landing oc	P _{VA}	9.519	psia
Volume of the vapor space	V_{V}	26134.12	ft ³
deal gas constant	R	10.731	(psia-ft3)/(lb-mole de
Average vapor temperature (assumed to be equal to ground temperature - a	T _V (T _{AA})	531.35	°R
Stock vapor molecular weight	M_V	61	lb/lb-mol
Saturation factor	Ks	0.42	
Filling Losses Eq. 3-18 $L_{FL} = (P_{VA}V_{V}/RT_{V})M_{V}(C_{sf}S)$	L _{FL}	1,330.74	
True vapor pressure of stock liquid (avg. ambient temp. of month landing oc	P _{VA}	9.519	<u>'</u>
Volume of the vapor space	V _V	26134.12	
deal gas constant	R		(psia-ft3)/(lb-mole de
Average vapor temperature (average ambient temp of the month)	T _V (T _{AA})	531.35	
Stock vapor molecular weight Filling saturation correction factor for wind (1.0 for IFT and DEFT)	M _V C _{sf}	61	lb/lb-mole
Filling Saturation Correction factor for wind (1.0 for F1 and IDEF1) Filling Saturation Factor (0.60 for full heel, 0.50 for partial heel, 0.15 for drain	S S	0.5	
Filling Saturation Factor (0.00 for full fleet, 0.50 for partial fleet, 0.15 for drain	- 3	0.5	
Average Ambient Temperature during Month TAA = (TAX+TAN) /2	TAA	531.35	°p
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541	
Average daily monthly minimum ambient temperature, Table 7.1-2	TAN	521.7	
			IX.
Product Vapor Pressure			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	9.519	psia
Vapor Pressure Equation Constant A (Table 7.1-2)	Α	11.610	
Vapor Pressure Equation Constant B (Table 7.1-2)	В	4,971.7	°R
Average ambien temperature during month	TAA	531.4	°R
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-Pv	KE		per day
Average Daily Vapor Temperature Range	ΔΤν		°R
Average Daily Vapor Pressure Range	ΔΡν	1.9182	<u> </u>
Breather Vent Pressure Setting Range (ΔPB = 0)	ΔPB	0.0000	'
Vapor Pressure at Avg Daily Liq Surface Temp Average Daily Liquid Surface Temperature (TLA=TAA)	PvA TAA	9.5193 531.35	psia
Atmospheric Pressure	P _A	14.55	°R
Authospheric Pressure	FA	14.55	psia
Average Daily Vapor Temperature Range (ΔTv)			ı
Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	22.87	°R
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔΤΑ	19.3	0-
Average tank surface solar absorptance, dimensionless, Table 7.1-6	α	0.25	l .
Daily total solar insolation on a horizontal surface	ı.		Btu/ft ² -day
Average daily maximum ambient temperature for the month	TAX	541.00	
Average daily minimum ambient temperature for the month	TAN	521.70	°R
Average Daily Vapor Pressure Range (ΔPv)	T		
Equation 1-9: ΔPV = PVX - PVN	ΔΡν	1.918	psia
Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	10.52	psia
Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	8.60	psia
Average daily max liquid surface temp TLX = TAA + 0.25ΔTV	TLX	537.07	°R
 	-		
	TLN	525.63	°R
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV	Α	11.610	
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A		4,972	
Vapor Pressure Equation Constant A	ВІ	531.35	
Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B	B TAA		
Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	B TAA ΔTv	22.87	i .
Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	TAA		
Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range	TAA	22.87	ft ³
Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4)	TAA ΔTv		
Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((P)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _t)	ΤΑΑ ΔΤν V _V	22.87 26,134.12	ft
Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	ΤΑΑ ΔΤν V _V h _v	22.87 26,134.12 2.75	ft ft
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((P)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height Liquid height	TAA ΔTv V _V h _v	22.87 26,134.12 2.75 3.00	ft ft
Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	TAA ΔTv V _V h _v	22.87 26,134.12 2.75 3.00	ft ft
Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _I) Deck height Liquid height	TAA ΔTV V _V h _v hd hl	22.87 26,134.12 2.75 3.00 0.25	ft ft ft

			C	LEANING PTE CALCULATIONS								
Includes Landing (standing and filling losses) and Additonal Pur	-	this cleaning eve										
	Symbol		Units		Symbol		Units					
Total Cleaning Losses LFV = LP+LCV+ LF+LS	LFV	12,477.30	lb/event ' ton/event									
Product in	tank prior to cleaning			1		1		1				
	e cleaning occurred:	July	Terage KVF 14.55)	- 				Additional Purge Emissions			1	
Calibration Gas	cicanning occurred.	Propane (C3)		Standing Idle Losses Eq. 3-7 $L_{SL} = n_d * KE*((P_{VA})^*)$	L _{SL}	1816.02	lb	Additional Funge Emissions	Day 2	Day 3	1	
Duration of the continued forced ventilation	n _{CV}	3	days	Number of days the tank stays idle	n _d	3	-	L _p	1394.136	1396.204	1	
Height of deck during cleaning (assume 6 ft if unknown)	h _d	6	ft	Vapor space expansion factor, per day	K _E	0.4243		S*	0.25		4	ed roof Eq. 4-6 < 1day
Number of days standing idle before cleaning	n _d	3	days	True vapor pressure of stock liquid (avg. ambient	P_{VA}	9.519	psia	H _i	0.238	0.23	1	
Height of the stock liquid	h _i	0.250	ft	Volume of the vapor space	V_{V}	54644.08	ft ³	V _V	54,758.31	54,839.55	1	
Average ventilation rate during continued forced ventilation	Q _V	10000	ft ³ /min	Ideal gas constant	R	10.731	(psia-ft3)/(lb-mole degR)	h _v	5.76	5.77	i	
Hours per day of force ventilation	t _V	10	hrs/day	Average vapor temperature (average ambient ten	T _V (T _{AA})	531.35	°R	h _{d2}	6.00	6.00	1	
Average LEL Reading	LEL	10	%	Stock vapor molecular weight	M_V	61	lb/lb-mol				j	
LEL of Calibration Gas		2.1		Standing idle saturation factor	K _S	0.26					<u> </u>	
Average vapor concentration by volume during continued forced ven	C _V	0.0021						Height of Vapor Space Calc				
Calibration Gas Molecular Weight	M _{CG}	44.1	lb/lb-mole	Filling Losses Eq. 3-18 L _{FL} = (P _{VA} V _V /RT _V)M _V (C _{st}	L _{FL}	834.74		Height of vapor space under I	anded deck, (h _d + sD/6)- [(volume of hee	$al/(\pi D^2/4))+(0.01 ir$	6.27 ft
				True vapor pressure of stock liquid (avg. ambient	P _{VA}	9.519	psia	Tank cone bottom slope			s	0.02 ft/ft
Vapor Space Purge Losses				Volume of the vapor space	V _V	54644.08	ft ³	Diameter			D	110 ft
Eq. 4-2 LP=(PVA*VV/R*TV)*MV*S	L _p	2782.454		Ideal gas constant	R		(psia-ft3)/(lb-mole degR)	Deck leg height	2 2		h _d	6 ft
Saturation Factor (0.5 for IFR with a partial liquid heel)	S	0.5		Average vapor temperature (average ambient ter	T _V (T _{AA})	531.4	°R	Volume of heel, (πD²/12)*((sD			<u> </u>	1075 ft3
Ideal gas constant	R		(psia-ft3)/(lb-mole degR)	Stock vapor molecular weight	M _V	61	lb/lb-mole	Vertical distance from bottom			h _p	0.4 ft
Average temperature of the vapor space = average ambient tempera	T _V (T _{AA})	531.35	°R	Filling saturation correction factor for wind (1.0 for	C _{sf}	1		Effective height of cone-down		7.1-23)	\vdash	0.4 ft
True vapor pressure of the exposed volatile material in the tank	P _{VA}	9.519 54.644.08		Filling Saturation Factor (0.15 for drain dry)	S	0.15		Height of liquid in bottom of co	one			0 ft
Volume of vapor space	V _V M _V	- /		- ·	I/F	0.4040	d	4				
Stock vapor molecular weight	MV	01	lb/lb-mol	Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/ Average Daily Vapor Temperature Range	ΚΕ ΔΤν	22.87	per day	4				
Continued Forced Ventiliation Emissions		1		Average Daily Vapor Pressure Range	ΔΙν	1.9182	-R	4				
L _{CV} =60*Qv*n _{CV} *tv*C _V *(P _a *M _{CG})/(R*T _V)	L _{cv}	4.253.76		Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	psi	┨				
Average ventilation rate during continued forced ventilation	Q _V	,	ft ³ /min	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	9.5193	r = :	-				
Duration of continued forced ventilation, days	n _{CV}		days	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35		-				
Daily period of forced ventilation	t _v		hrs/day	Atmospheric Pressure	P _A	14.55	**	1				
Average vapor concentration by volume during continued forced ven	C _V	0.0021			· A	11.00	pola	1				
Atmospheric pressure at the tank location	Pa	14.55)			1				
Calibration gas molecular weight	M _{CG}	44.1		Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	22.87	°R	1				
Average temperature of vapor below the floating roof = average amb	T _V (T _{AA})	531.35		Average daily ambient temperature range - Equat	ΔΤΑ	19.3	°R	1				
				Average tank surface solar absorptance, dimension	α	0.25		1				
Prior Stock Remains = LCV max		İ		Daily total solar insolation on a horizontal surface	I	1872	Btu/ft ² -day	1				
$L_{CV} \text{ max} = 5.9 \cdot D^2 \cdot (\text{hl}) \cdot \text{WI}$		99946	6	Average daily maximum ambient temperature for	TAX	541.00	°R	1				
Cvmax = P _{VA} /Pa		0.654248923	3	Average daily minimum ambient temperature for t	TAN	521.70	°R	1				
Average Ambient Temp during Month TAA = (TAX+TAN) /2	TAA	531.35		Average Daily Vapor Pressure Range (ΔPv)								
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541		Equation 1-9: ΔPV = PVX - PVN	ΔΡν	1.918	•	_				
Average daily monthly minimum ambient temperature, Table 7.1-2	TAN	521.7	′ °R	Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	10.52	<u>'</u>	_				
			,	Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	8.60		_				
Product Vapor Pressure		ļ		Average daily max liquid surface temp TLX = TAA	TLX	537.07		4				
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	9.519	psia	Average daily min liquid surface temp TLN = TAA	TLN	525.63	°R	4				
Vapor Pressure Equation Constant A (Table 7.1-2)	A	11.610		Vapor Pressure Equation Constant A	A	11.610		4				
Vapor Pressure Equation Constant B (Table 7.1-2)	B	4,971.7	***	Vapor Pressure Equation Constant B	В	4,972		-1				
Average ambient temperature during month	TAA	531.4	TR	Average Daily Liquid Surface Temperature (TLA= Average Daily Vapor Temperature Range	TAA ΔTv	531.35 22.87		1				
Vapor Space Volume V _v =h _v ((PI)D ² /4)	V _v	54,644.08	ft ³	, ,,				≝				
Height of vapor space under landed deck (h _{v=} h _d -h _i)	h _v	5.75	I''	1								
Deck height	hd	6.00		1								
Liquid height	hl	0.25	ft	1								
		•	•	=								

LANDING PTE CALCUL	CHOIL		
	Symbol		Units
Total Landing Losses (Eq.3-1 $L_{TL} = L_{SL} + L_{FL}$)	L _{TL}	2.272.64	lh/event
10th 24th 1 21 25t 25t	-11		ton/event
Product in tank duri	ng landing:	Component (Ave	rage RVP 14.33)
Month the landing	g occurred:	July	
Number of days the tank stays idle	n _d	3	days
Height of floating roof deck, h _d (ft) (assume 3 ft if unknown)	h _d	3.00 0.250	ft ft
Height of the stock liquid Full heel, Partial heel or Drain Dry?	n _l	Partial Heel	π
Flat or Cone Bottom Tank?		Flat	
			l .
Standing Idle Losses Eq. 3-7 $L_{SL} = n_d * KE * ((P_{VA} * V_V)/R * Tv)) * M_V * K_s$	L _{SL}	1172.85	lb
Number of days the tank stays idle	n _d	3	
Vapor space expansion factor, per day	K _E	0.4243	
True vapor pressure of stock liquid (avg. ambient temp. of month landing oc	P _{VA}	9.519	<u> </u>
Volume of the vapor space	V _V	21598.45	(psia-ft3)/(lb-mole de
deal gas constant Average vapor temperature (assumed to be equal to ground temperature - a	R T _V (T _{AA})	531.35	(psia-π3)/(ib-moie α
Stock vapor molecular weight	M _V		lb/lb-mol
Saturation factor	Ks	0.42	ID/ID THO
Filling Losses Eq. 3-18 $L_{FL} = (P_{VA}V_V/RT_V)M_V(C_{sf}S)$	L _{FL}	1,099.78	lb
Frue vapor pressure of stock liquid (avg. ambient temp. of month landing oc	P_{VA}	9.519	'
Volume of the vapor space	V _v	21598.45	
deal gas constant	R		(psia-ft3)/(lb-mole de
Average vapor temperature (average ambient temp of the month)	T _V (T _{AA})	531.35	
Stock vapor molecular weight Filling saturation correction factor for wind (1.0 for IFT and DEFT)	M _V C _{sf}	61	lb/lb-mole
Filling Saturation Factor (0.60 for full heel, 0.50 for partial heel, 0.15 for drain	S	0.5	
r ming dataration r actor (0.00 for fair fieci, 0.00 for partial fieci, 0.10 for arain		0.0	
Average Ambient Temperature during Month TAA = (TAX+TAN) /2	TAA	531.35	°R
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541	°R
Average daily montlhy minimum ambient temperature, Table 7.1-2	TAN	521.7	°R
Product Vapor Pressure			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	9.519	psia
Vapor Pressure Equation Constant A (Table 7.1-2)	A	11.610	
Vapor Pressure Equation Constant B (Table 7.1-2)	TAA	4,971.7	°R
Average ambien temperature during month	TAA	531.4	K
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-Pv	KE	0.4243	per day
Average Daily Vapor Temperature Range	ΔΤν	22.87	°R
Average Daily Vapor Pressure Range	ΔΡν	1.9182	psi
Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	9.5193	psia
Average Daily Liquid Surface Temperature (TLA=TAA)	TAA		°R
Atmospheric Pressure	P _A	14.55	psia
Avenue Deile Veneu Tenneveture Benne (ATv)			1
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	22.87	°R
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔΤΑ	19.3	
Average tank surface solar absorptance, dimensionless, Table 7.1-6	α	0.25	IX.
Daily total solar insolation on a horizontal surface	1		Btu/ft ² -day
Average daily maximum ambient temperature for the month	TAX	541.00	
Average daily minimum ambient temperature for the month	TAN	521.70	°R
Average Daily Vapor Pressure Range (ΔPv)			<u> </u>
Equation 1-9: ΔPV = PVX - PVN	ΔΡν	1.918	psia
Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	10.52	psia
√apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	8.60	psia
Vapor pressure Eq. 1-25, PVN = exp[A-(δ/1LN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV	TLX	537.07	°R
· · · · · · · · · · · · · · · · · · ·			
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV	TLN	525.63	°R
I I	Α	11.610	
	В	4,972	
/apor Pressure Equation Constant B		531.35	
Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	TAA		
/apor Pressure Equation Constant A /apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range	TAA ΔTv	22.87	i .
/apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range	ΔΤν		n3
/apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range //apor Space Volume V _v =h _v ((PI)D ² /4)	ΔTv V _v	21,598.45	
/apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range /apor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _i)	ΔΤν V _V h _v	21,598.45 2.75	
Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D²/4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	ΔTv V _v h _v hd	21,598.45 2.75 3.00	ft ft
/apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range /apor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _i)	ΔΤν V _V h _v	21,598.45 2.75	ft ft
/apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range /apor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _l) Deck height Liquid height	ΔTv V _v h _v hd	21,598.45 2.75 3.00	ft ft
Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D²/4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	V _V h _v hd hl	21,598.45 2.75 3.00 0.25	ft ft

				CLEANING PTE CALCULATIONS							
Includes Landing (standing and filling losses) and Additonal Pu	rges associated Symbol	with this cleani	ng event Units		Symbol		Units				
Total Cleaning Losses LFV = LP+LCV+ LF+LS	LFV	11,050.52 5.5253	lb/event ton/event								
Product in tank	prior to cleaning		Average RVP 14.33)								
	aning occurred:							Additional Purge Emissions			
Calibration Gas		Propane (C3)		Standing Idle Losses Eq. 3-7 $L_{SL} = n_d*KE*((P_{VA})^2)$	L _{SL}	1500.84	lb		Day 2 Day 3		
Duration of the continued forced ventilation	n _{CV}	3	days	Number of days the tank stays idle	n _d	3		L _p	1152.327 1154.185		
Height of deck during cleaning (assume 6 ft if unknown)	h _d	6	ft	Vapor space expansion factor, per day	K _E	0.4243		S *		*S is based on fix	ed roof Eq. 4-6 < 1day
Number of days standing idle before cleaning	n _d	3	days	True vapor pressure of stock liquid (avg. ambient	P _{VA}	9.519	psia	H _I	0.237 0.23		
Height of the stock liquid	hı	0.250	ft	Volume of the vapor space	V _V	45160.39	ft ³	V _V	45,260.66 45,333.64		
Average ventilation rate during continued forced ventilation	Q _V	10000	ft ³ /min	Ideal gas constant	R		(psia-ft3)/(lb-mole degR)	h _v	5.76 5.77		
Hours per day of force ventilation	t _V	10	hrs/day	Average vapor temperature (average ambient ten	T _V (T _{AA})	531.35	°R	h _{d2}	6.00 6.00		
Average LEL Reading	LEL	10	%	Stock vapor molecular weight	M_V		lb/lb-mol			J	
LEL of Calibration Gas		2.1	%	Standing idle saturation factor	K _S	0.26					
Average vapor concentration by volume during continued forced ven	C _V	0.0021						Height of Vapor Space Calc			
Calibration Gas Molecular Weight	M _{CG}	44.1	lb/lb-mole	Filling Losses Eq. 3-18 L _{FL} = (P _{VA} V _V /RT _V)M _V (C _s	L _{FL}	689.86		Height of vapor space under	anded deck, (h _d + sD/6)- [(volume of	heel/(πD ² /4))+(0.0	6.25 ft
				True vapor pressure of stock liquid (avg. ambient	P _{VA}	9.519		Tank cone bottom slope		s	0.02 ft/ft
Vapor Space Purge Losses				Volume of the vapor space	V _V	45160.39		Diameter		D	100 ft
Eq. 4-2 LP=(PVA*VV/R*TV)*MV*S	L _P	2299.549		Ideal gas constant	R		(psia-ft3)/(lb-mole degR)	Deck leg height		h _d	6 ft
Saturation Factor (0.5 for IFR with a partial liquid heel)	S	0.5		Average vapor temperature (average ambient ter		531.4		Volume of heel, (πD ² /12)*((sE			808 ft3
Ideal gas constant	R	10.731	11 /1 0 /	Stock vapor molecular weight	M _V	61	lb/lb-mole	Vertical distance from bottom	shell to the liquid surface in cone bo	h _p	0.3 ft
Average temperature of the vapor space = average ambient tempera	T _V (T _{AA})	531.35	°R	Filling saturation correction factor for wind (1.0 for	C _{sf}	1		_	bottom, sD/6 (Figure 7.1-23)		0.3 ft
True vapor pressure of the exposed volatile material in the tank	P_{VA}	9.519		Filling Saturation Factor (0.15 for drain dry)	S	0.15		Height of liquid in bottom of c	one		0 ft
Volume of vapor space	V_V	45,160.39									
Stock vapor molecular weight	M_V	61	lb/lb-mol	Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/	KE	0.4243	per day				
				Average Daily Vapor Temperature Range	ΔΤν	22.87	°R				
Continued Forced Ventiliation Emissions				Average Daily Vapor Pressure Range	ΔΡν	1.9182	psi				
$L_{CV} = 60 \cdot \text{Qv*n}_{CV} \cdot \text{tv*C}_{V} \cdot (P_a \cdot M_{CG}) / (R \cdot T_V)$	L _{cv}	4,253.76		Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	psi				
Average ventilation rate during continued forced ventilation	Q _V	10000	ft ³ /min	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	9.5193	psia				
Duration of continued forced ventilation, days	n _{CV}	3	days	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35	°R				
Daily period of forced ventilation	t _V	10	hrs/day	Atmospheric Pressure	P _A	14.55	psia				
Average vapor concentration by volume during continued forced ven	C _v	0.0021									
Atmospheric pressure at the tank location	Pa	14.55		Average Daily Vapor Temperature Range (ΔTv)						
Calibration gas molecular weight	M _{CG}	44.1		Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	22.87	°R				
Average temperature of vapor below the floating roof = average amb	T _V (T _{AA})	531.35		Average daily ambient temperature range - Equat	ΔΤΑ	19.3	°R				
				Average tank surface solar absorptance, dimensi	α	0.25					
Prior Stock Remains = LCV max				Daily total solar insolation on a horizontal surface	I	1872	Btu/ft2-day				
$L_{CV} \max = 5.9 \cdot D^{2*} (hI) \cdot WI$		82600		Average daily maximum ambient temperature for	TAX	541.00					
Cvmax = P _{va} /Pa		0.654248923		Average daily minimum ambient temperature for t	TAN	521.70	°R]			
Average Ambient Temp during Month TAA = (TAX+TAN) /2	TAA	531.35	 	Average Daily Vapor Pressure Range (ΔΡν)				-			
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541	**	Equation 1-9: ΔPV = PVX - PVN	ΔΡν	1.918	nsia	1			
Average daily montlhy minimum ambient temperature, Table 7.1-2	TAN	521.7		Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	10.52		1			
,				Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	8.60		1			
Product Vapor Pressure		1		Average daily max liquid surface temp TLX = TAA		537.07		1			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	9.519	nsia	Average daily min liquid surface temp TLN = TAA		525.63		1			
Vapor Pressure Equation Constant A (Table 7.1-2)	A	11.610	•	Vapor Pressure Equation Constant A	A	11.610	• • • • • • • • • • • • • • • • • • • •	1			
Vapor Pressure Equation Constant X (Table 7.1-2)	В	4,971.7		Vapor Pressure Equation Constant B	В	4,972		1			
Average ambient temperature during month	TAA	531.4		Average Daily Liquid Surface Temperature (TLA=	TAA	531.35		1			
g tomporatato asing month		551.4	· · ·	Average Daily Vapor Temperature Range	ΔΤν	22.87		1			
Vapor Space Volume V _V =h _v ((PI)D ² /4)	V _v	45,160.39	ft ³		•	•		=			
Height of vapor space under landed deck (h _{v=} h _d -h _l)	h _v	5.75	P								
Deck height	hd	6.00									
Liquid height	hl	0.25	ft								
1 V	• • • •	3.20	<u> </u>								

LANDING PTE CALCUL	CNOTTA		
	Symbol		Units
Total Landing Losses (Eq.3-1 L _{TL} = L _{SL} +L _{FL})	L _{TL}	1,454.49	lh/ayant
Total Editality 200000 (Eq.0-1 E _{TL} = E _{SL} · E _{FL})	-т		ton/event
Product in tank duri	ng landing:	Component (Ave	rage RVP 14.33)
Month the landing	g occurred:	July	
Number of days the tank stays idle	n _d	3	days
Height of floating roof deck, h _d (ft) (assume 3 ft if unknown)	h _d	3.00	ft
Height of the stock liquid Full heel, Partial heel or Drain Dry?	h _I	0.250 Partial Heel	ft
Flat or Cone Bottom Tank?		Flat	
Standing Idle Losses Eq. 3-7 $L_{SL} = n_d * KE * ((P_{VA} * V_V)/R * Tv)) * M_V * K_s$	L _{SL}	750.63	lb
Number of days the tank stays idle	n _d	3	
Vapor space expansion factor, per day	K _E	0.4243	
True vapor pressure of stock liquid (avg. ambient temp. of month landing occ Volume of the vapor space	P _{VA} V _V	9.519	<u> </u>
deal gas constant	R		(psia-ft3)/(lb-mole de
Average vapor temperature (assumed to be equal to ground temperature - a	T _V (T _{AA})	531.35	°R
Stock vapor molecular weight	M _V	61	lb/lb-mol
Saturation factor	Ks	0.42	
Filling Losses Eq. 3-18 L _{FL} = (P _{VA} V _V /RT _V)M _V (C _{sf} S)	L _{FL}	703.86	
Frue vapor pressure of stock liquid (avg. ambient temp. of month landing occ /olume of the vapor space	P _{VA} V _V	9.519	'
deal gas constant	R		(psia-ft3)/(lb-mole de
Average vapor temperature (average ambient temp of the month)	T _V (T _{AA})	531.35	
Stock vapor molecular weight	M _V		lb/lb-mole
Filling saturation correction factor for wind (1.0 for IFT and DEFT)	C _{sf}	1	
Filling Saturation Factor (0.60 for full heel, 0.50 for partial heel, 0.15 for drain	S	0.5	
Average Ambient Temperature during Month TAA = (TAX+TAN) /2	TAA	531.35	
Average daily monthly maximum ambient temperature, Table 7.1-2 Average daily monthly minimum ambient temperature, Table 7.1-2	TAX TAN	541 521.7	
wordge daily monthly minimum ambient temperature, Tuble 7.1-2	17.03	021.7	N.
Product Vapor Pressure			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	9.519	psia
Vapor Pressure Equation Constant A (Table 7.1-2)	Α	11.610	
Vapor Pressure Equation Constant B (Table 7.1-2)	В	4,971.7	°R
Average ambien temperature during month	TAA	531.4	°R
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-Pv.	KE	0 4243	per day
Average Daily Vapor Temperature Range	ΔΤν	22.87	°R
Average Daily Vapor Pressure Range	ΔΡν	1.9182	psi
Breather Vent Pressure Setting Range (ΔPB = 0)	ΔPB	0.0000	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	9.5193	psia
Average Daily Liquid Surface Temperature (TLA=TAA)	TAA		°R
Atmospheric Pressure	P _A	14.55	psia
Average Daily Vapor Temperature Range (ΔTv)			I
Equation 1-7 ($\Delta TV = 0.7 \Delta TA + 0.02 \alpha I$)	ΔΤν	22.87	°R
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔΤΑ	19.3	
Average tank surface solar absorptance, dimensionless, Table 7.1-6	α	0.25	
Daily total solar insolation on a horizontal surface	1		Btu/ft ² -day
Average daily maximum ambient temperature for the month	TAX	541.00	
Average daily minimum ambient temperature for the month	TAN	521.70	°R
Average Daily Vapor Pressure Range (ΔPv)			
Equation 1-9: ΔPV = PVX - PVN	ΔΡν	1.918	psia
·			
Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	10.52	psia
Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN		psia
Average daily max liquid surface temp TLX = TAA + 0.25ΔTV	TLX	537.07	°R
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV	TLN	525.63	°R
/apor Pressure Equation Constant A	A	11.610	
/apor Pressure Equation Constant B	В	4,972	
Average Daily Liquid Surface Temperature (TLA=TAA for landings)	TAA	531.35	
(Verage Bally Elquia Gunade Temperature (TEX-170 (Tot landings)	ΔΤν	22.87	
- · · · · · · · · · · · · · · · · · · ·			
Average Daily Vapor Temperature Range		13,823.01	
Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4)	V _v		ft
Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _l)	h _v	2.75	
Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _I) Deck height	h _v	3.00	ft
Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _i) Deck height	h _v		ft ft
Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _i) Deck height Liquid height	h _v hd hl	3.00 0.25	ft ft
Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _i)	h _v	3.00	

and the state of t				LEANING PTE CALCULATIONS								
ncludes Landing (standing and filling losses) and Additonal Pur	ges associated w Symbol	ith this cleaning	g event Units		Symbol		Units					
otal Cleaning Losses LFV = LP+LCV+ LF+LS	LFV	8,604.61	b/event		•							
Product in tank	prior to cleaning		rerage RVP 14.33)									
Month the clea	ning occurred:	July						Additional Purge Emissions	3		i	
alibration Gas		Propane (C3)		Standing Idle Losses Eq. 3-7 $L_{SL} = n_d^* KE^* ((P_{VA}^*))^*$	L _{SL}	960.54 lb			Day 2	Day 3	i	
uration of the continued forced ventilation	n _{CV}		days	Number of days the tank stays idle	n_d	3		L _P	737.798	739.297	i	
leight of deck during cleaning (assume 6 ft if unknown)	h _d	6	ft	Vapor space expansion factor, per day	K _E	0.4243		S *	0.25		*S is based on fixed	I roof Eq. 4-6 < 1day
lumber of days standing idle before cleaning	n _d		days	True vapor pressure of stock liquid (avg. ambient	P_{VA}	9.519 psia		H _I	0.235	0.22	l	
eight of the stock liquid	h _l	0.250	ft	Volume of the vapor space	V _V	28902.65 ft ³		V _V	28,978.95	29,037.81	i	
verage ventilation rate during continued forced ventilation	Q_V		ft ³ /min	Ideal gas constant	R	10.731 (psia-ft3)	/(lb-mole degR)	h _v	5.77	5.78	i	
ours per day of force ventilation	t _V	10	hrs/day	Average vapor temperature (average ambient ten	T _V (T _{AA})	531.35 °R		h _{d2}	6.00	6.00	i	
verage LEL Reading	LEL	10	%	Stock vapor molecular weight	M_V	61 lb/lb-mol					J	
EL of Calibration Gas		2.1	%	Standing idle saturation factor	K _S	0.26						
Average vapor concentration by volume during continued forced ven	C _V	0.0021		- ₋ -				Height of Vapor Space Calc			2	I-:
Calibration Gas Molecular Weight	M _{CG}	44.1	b/lb-mole	Filling Losses Eq. 3-18 L _{FL} = (P _{VA} V _V /RT _V)M _V (C _{st}	L _{FL}	441.51 lb		Height of vapor space under I	anded deck, (h _d	+ sD/6)- [(volume of		6.20 ft
				True vapor pressure of stock liquid (avg. ambient	P _{VA}	9.519 psia		Tank cone bottom slope			s	0.02 ft/ft
apor Space Purge Losses				Volume of the vapor space	V _V	28902.65 ft ³		Diameter			D	80 ft
q. 4-2 LP=(PVA*VV/R*TV)*MV*S	L _P	1471.711		Ideal gas constant	R	10.731 (psia-ft3)	/(lb-mole degR)	Deck leg height			h _d	6 ft
aturation Factor (0.5 for IFR with a partial liquid heel)	S	0.5		Average vapor temperature (average ambient ter	T _V (T _{AA})	531.4 °R		Volume of heel, (πD²/12)*((sD				414 ft3
eal gas constant	R		(psia-ft3)/(lb-mole degR)	Stock vapor molecular weight	M _V	61 lb/lb-mol	e	Vertical distance from bottom			h _p	0.3 ft
verage temperature of the vapor space = average ambient tempera	T _V (T _{AA})	531.35	R	Filling saturation correction factor for wind (1.0 for	C _{sf}	1		Effective height of cone-down		gure 7.1-23)		0.3 ft
rue vapor pressure of the exposed volatile material in the tank	P _{VA}	9.519		Filling Saturation Factor (0.15 for drain dry)	S	0.15		Height of liquid in bottom of co	one			0 ft
olume of vapor space	V _V	28,902.65		- -								
tock vapor molecular weight	M_V	61	b/lb-mol	Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/	KE	0.4243 per day		.]				
				Average Daily Vapor Temperature Range	ΔΤν	22.87 °R						
ontinued Forced Ventiliation Emissions				Average Daily Vapor Pressure Range	ΔΡν	1.9182 psi						
$_{CV} = 60 ^{*}\text{Qv*n}_{CV} ^{*}\text{tv*C}_{V} ^{*}\text{(P}_{a} ^{*}\text{M}_{CG})/\text{(R*T}_{V})$	L _{CV}	4,253.76		Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000 psi]				
verage ventilation rate during continued forced ventilation	Q_V	10000		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	9.5193 psia						
ouration of continued forced ventilation, days	n _{CV}		days	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35 °R]				
Daily period of forced ventilation	t _V		hrs/day	Atmospheric Pressure	P _A	14.55 psia						
Average vapor concentration by volume during continued forced ven	C _V	0.0021		_ _								
Atmospheric pressure at the tank location	Pa	14.55		Average Daily Vapor Temperature Range (ΔTv)_]				
Calibration gas molecular weight	M _{CG}	44.1		Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	22.87 °R						
verage temperature of vapor below the floating roof = average amb	T _V (T _{AA})	531.35		Average daily ambient temperature range - Equat	ΔΤΑ	19.3 °R						
				Average tank surface solar absorptance, dimension	α	0.25]				
rior Stock Remains = LCV max				Daily total solar insolation on a horizontal surface	I	1872 Btu/ft²-da	ay					
$L_{CV} \max = 5.9*D^{2*}(hl)*Wl$		52864		Average daily maximum ambient temperature for	TAX	541.00 °R]				
Cvmax = P _{VA} /Pa		0.654248923		Average daily minimum ambient temperature for t	TAN	521.70 °R						
verage Ambient Temp during Month TAA = (TAX+TAN) /2	TAA	531.35	°R	Average Daily Vapor Pressure Range (ΔΡν)				•				
verage daily monthly maximum ambient temperature, Table 7.1-2	TAX	541	°R	Equation 1-9: ΔPV = PVX - PVN	ΔΡν	1.918 psia		1				
verage daily montlhy minimum ambient temperature, Table 7.1-2	TAN	521.7	°R	Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	10.52 psia		1				
				Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	8.60 psia		1				
roduct Vapor Pressure				Average daily max liquid surface temp TLX = TAA	TLX	537.07 °R		1				
VA = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	9.519	psia	Average daily min liquid surface temp TLN = TAA	TLN	525.63 °R		1				
apor Pressure Equation Constant A (Table 7.1-2)	A	11.610		Vapor Pressure Equation Constant A	A	11.610		1				
apor Pressure Equation Constant B (Table 7.1-2)	В	4,971.7	°R	Vapor Pressure Equation Constant B	В	4,972		1				
verage ambient temperature during month	TAA	531.4	°R	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35		1				
, , , , , , , , , , , , , , , , , , ,				Average Daily Vapor Temperature Range	ΔΤν	22.87		1				
/apor Space Volume V _V =h _v ((PI)D ² /4)	V _v	28,902.65	ft ³			<u> </u>		4				
Height of vapor space under landed deck (h _{v=} h _d -h _l)	h _v	5.75	ft	┨								
Deck height	hd	6.00	ft	╣								
iquid height	hl	0.25	ft .	┨								

LANDING PTE CALCUL	AHUNS		
	Symbol		Units
Total Landing Losses (Eq.3-1 L _{TL} = L _{SL} +L _{FL})	L _{TL}	1,759.55	lh/event
Total Earland 200000 (Eq. 0-1 E _{TL} = E _{SL} · E _{FL})	<u>-11.</u>		ton/event
Product in tank duri	ng landing:	Gasoline - RVP 1	5
Month the landing		July	
Number of days the tank stays idle Height of floating roof deck, h_d (ft) (assume 3 ft if unknown)	n _d	3.00	days ft
Height of the stock liquid	h _i	0.250	ft
Full heel, Partial heel or Drain Dry?		Partial Heel	
Flat or Cone Bottom Tank?		Flat	
Standing Idle Losses Eq. 3-7 $L_{SL} = n_d * KE * ((P_{VA} * V_V)/R * Tv)) * M_V * K_s$	L _{SL}	956.25	l _{ib}
Number of days the tank stays idle	n _d	350.25	ID
Vapor space expansion factor, per day	K _E	0.4888	
True vapor pressure of stock liquid (avg. ambient temp. of month landing oc	P_{VA}	10.041	psia
Volume of the vapor space	V_V	13823.01	**
ldeal gas constant Average vapor temperature (assumed to be equal to ground temperature - a	R T _V (T _{AA})	10.731 531.35	(psia-ft3)/(lb-mole de
Average vapor temperature (assumed to be equal to ground temperature - a Stock vapor molecular weight	M _V		lb/lb-mol
Saturation factor	K _S	0.41	ID/ID-ITIOI
Filling Losses Eq. 3-18 $L_{FL} = (P_{VA}V_{V}/RT_{V})M_{V}(C_{sf}S)$	L _{FL}	803.31	
Frue vapor pressure of stock liquid (avg. ambient temp. of month landing oc	P _{VA}	10.041	<u>'</u>
Volume of the vapor space Ideal gas constant	V _V	13823.01	(psia-ft3)/(lb-mole de
Average vapor temperature (average ambient temp of the month)	T _V (T _{AA})	531.35	
Stock vapor molecular weight	M _V		lb/lb-mole
Filling saturation correction factor for wind (1.0 for IFT and DEFT)	C _{sf}	1	
Filling Saturation Factor (0.60 for full heel, 0.50 for partial heel, 0.15 for drain	S	0.5	
Average Ambient Temperature during Month TAA = (TAX+TAN) /2 Average daily monthly maximum ambient temperature, Table 7.1-2	TAA TAX	531.35 541	
Average daily monthly minimum ambient temperature, Table 7.1-2 Average daily monthly minimum ambient temperature, Table 7.1-2	TAN	521.7	
			TX.
Product Vapor Pressure			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	10.041	psia
Vapor Pressure Equation Constant A (Table 7.1-2)	Α	11.600	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	4,937.9	°R
Average ambien temperature during month	TAA	531.4	°R
	KE	0.4888	per day
Average Daily Vapor Temperature Range	ΔΤν	22.87	°R
Average Daily Vapor Pressure Range	ΔΡν	2.0096	psi
Breather Vent Pressure Setting Range (ΔPB = 0)	ΔPB		psi
Vapor Pressure at Avg Daily Liq Surface Temp Average Daily Liquid Surface Temperature (TLA=TAA)	PvA TAA	10.0412 531.35	psia on
Atmospheric Pressure	P _A	14.55	°R nsia
unospiteno i ressure	• А	14.00	pola
Average Daily Vapor Temperature Range (ΔTv)			
Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	22.87	°R
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔΤΑ	19.3	°R
Average tank surface solar absorptance, dimensionless, Table 7.1-6	α	0.25	
Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month	TAX	541.00	Btu/ft²-day °R
	TAN	521.70	
= :			
= -			
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv)	.,		
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv)	ΔΡν	2.010	psia
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔΡν) Equation 1-9: ΔΡV = PVX - PVN			psia psia
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔΡν) Equation 1-9: ΔΡV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	Δ Pv PVX	11.09	psia
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	ΔΡν	11.09	psia psia
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV	ΔPv PVX PVN TLX	9.08 537.07	psia psia °R
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN //apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] //apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV	ΔPv PVX PVN TLX TLN	11.09 9.08 537.07 525.63	psia psia
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A	ΔPv PVX PVN TLX TLN A	9.08 537.07 525.63 11.600	psia psia °R
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A	ΔPV PVX PVN TLX TLN A B	11.09 9.08 537.07 525.63 11.600 4,938	psia psia °R
Average Daily Wapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN //apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Average Daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLX = TAA - 0.25ΔTV //apor Pressure Equation Constant A //apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	PVX PVN TLX TLN A B TAA	11.09 9.08 537.07 525.63 11.600 4,938 531.35	psia psia °R
Average Daily Wapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN //apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Average Daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLX = TAA - 0.25ΔTV //apor Pressure Equation Constant A //apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	ΔPV PVX PVN TLX TLN A B	11.09 9.08 537.07 525.63 11.600 4,938	psia psia °R
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A /apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range	PVX PVN TLX TLN A B TAA	11.09 9.08 537.07 525.63 11.600 4,938 531.35	psia psia °R °R
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN //apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] //apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV //apor Pressure Equation Constant A //apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range	ΔPV PVX PVN TLX TLN A B TAA ΔTV	11.09 9.08 537.07 525.63 11.600 4.938 531.35 22.87	psia psia °R °R ft³
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A /apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range //apor Space Volume V _v =h _v ((P))D²/4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	PVX PVX PVN TLX TLN A B TAA ΔTV V _V h _V	11.09 9.08 537.07 525.63 11.600 4,938 531.35 22.87 13,823.01 2.75 3.00	psia psia °R °R ft³ ft ft
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN /apor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] /apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A /apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range //apor Space Volume V _v =h _v ((P))D²/4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	ΔPV PVX PVN TLX TLN A B TAA ΔTV V _V	11.09 9.08 537.07 525.63 11.600 4.938 531.35 22.87 13,823.01 2.75	psia psia °R °R ft³ ft ft
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _t) Deck height Liquid height	PVX PVN TLX TLN A B TAA ΔTV V h h h h l	11.09 9.08 537.07 525.63 11.600 4.938 531.35 22.87 13,823.01 2.75 3.00 0.25	psia psia °R °R ft³ ft ft
Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height Liquid height Vented Vapor Saturation Factor (Eq. 1-21: Ks = 1/(1+0.053*P _{VA} *Hvo)) Vapor Pressure at TAA for month	PVX PVX PVN TLX TLN A B TAA ΔTV V _V h _V	11.09 9.08 537.07 525.63 11.600 4,938 531.35 22.87 13,823.01 2.75 3.00	psia psia °R °R ft³ ft ft

lands de la codica del la codica del			CLEANING PTE CALCULATIONS								
ncludes Landing (standing and filling losses) and Additonal Pur	ges associated w Symbol	vith this cleaning event Units		Symbol		Units					
otal Cleaning Losses LFV = LP+LCV+ LF+LS	LFV	9,336.80 lb/event 4.6684 ton/event									
Product in tank	prior to cleaning				l		1			1	
	aning occurred:	July	- 				Additional Purge Emissions	6			
Calibration Gas	9	Propane (C3)	Standing Idle Losses Eq. 3-7 $L_{SL} = n_d^* KE^* ((P_{VA}^*))^{-1}$	L _{SL}	1213.18	lb		Day 2	Day 3		
Ouration of the continued forced ventilation	n _{CV}	3 days	Number of days the tank stays idle	n _d	3		L _P	842.241	844.082	2	
leight of deck during cleaning (assume 6 ft if unknown)	h _d	6 ft	Vapor space expansion factor, per day	K _E	0.4888		S*	0.25	0.25	*S is based on fixed	l roof Eq. 4-6 < 1day
Number of days standing idle before cleaning	n _d	3 days	True vapor pressure of stock liquid (avg. ambient	P_{VA}	10.041	l'	H _I	0.233	0.22	-1	
Height of the stock liquid	h _i	0.250 ft	Volume of the vapor space	V _V	28902.65	1.5	V _ν	28,985.90	29,049.24	-1	
Average ventilation rate during continued forced ventilation	Q _V	10000 ft ³ /min	Ideal gas constant	R		(psia-ft3)/(lb-mole degR)	h _v	5.77	5.78	-1	
lours per day of force ventilation	t _V	10 hrs/day	Average vapor temperature (average ambient ten	$T_V(T_{AA})$	531.35		h _{d2}	6.00	6.00	4	
verage LEL Reading	LEL	10 %	Stock vapor molecular weight	M _V		lb/lb-mol				J	
EL of Calibration Gas		2.1 %	Standing idle saturation factor	K _S	0.25						
Average vapor concentration by volume during continued forced ven	C _V	0.0021	Filling Loopes Eq. 2.481 - /D. V /DT 184 /O		F00.00	114	Height of Vapor Space Calc				6 20 12
Calibration Gas Molecular Weight	M _{CG}	44.1 lb/lb-mole	Filling Losses Eq. 3-18 L _{FL} = (P _{VA} V _V /RT _V)M _V (C _{st}	L _{FL}	503.89 10.041		Height of vapor space under I	landed deck, (h _d	+ sD/6)- [(volume of	neei/(πD ⁻ /4))+(0.0	6.20 ft 0.02 ft/ft
former Street Divers I access			True vapor pressure of stock liquid (avg. ambient Volume of the vapor space	V _V	28902.65		Tank cone bottom slope Diameter			D D	80 ft
/apor Space Purge Losses Eq. 4-2 LP=(PVA*VV/R*TV)*MV*S	Lp	1679.645	Ideal gas constant	R		(psia-ft3)/(lb-mole degR)	Deck leg height			h _d	6 ft
Saturation Factor (0.5 for IFR with a partial liquid heel)	S	0.5	Average vapor temperature (average ambient ter	T _V (T _{AA})	531.4	" ''	Volume of heel, (πD²/12)*((sD	1/2 h \ ³ \\/(eD/2\ ²	`	l'id	414 ft3
deal gas constant	R	10.731 (psia-ft3)/(lb-mole degR)	Stock vapor molecular weight	M _V		lb/lb-mole	Vertical distance from bottom	p, ,, ,	•	t h _p	0.3 ft
Average temperature of the vapor space = average ambient tempera	T _V (T _{AA})	531.35 °R	Filling saturation correction factor for wind (1.0 for	C _{sf}	1	ID/ID-ITIOIC	Effective height of cone-down			p	0.3 ft
rue vapor pressure of the exposed volatile material in the tank	P _{VA}	10.041	Filling Saturation Factor (0.15 for drain dry)	S	0.15		Height of liquid in bottom of co		.ga.o 7.1 20)		0.0 ft
/olume of vapor space	V _V	28,902.65	d a (
Stock vapor molecular weight	M _V	66 lb/lb-mol	Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/	KE	0.4888	per day	1				
·			Average Daily Vapor Temperature Range	ΔΤν	22.87	· ,	1				
Continued Forced Ventiliation Emissions			Average Daily Vapor Pressure Range	ΔΡν	2.0096	psi	1				
$_{\text{CV}} = 60^{\circ} \text{Qv*n}_{\text{CV}} \text{tv*C}_{\text{V}} \text{(P}_{\text{a}} \text{M}_{\text{CG}}) \text{/(R*T}_{\text{V}})$	L _{cv}	4,253.76	Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	psi	1				
Average ventilation rate during continued forced ventilation	Q _V	10000 ft ³ /min	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	10.0412	psia	1				
Duration of continued forced ventilation, days	n _{CV}	3 days	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35	°R	1				
Daily period of forced ventilation	t _V	10 hrs/day	Atmospheric Pressure	P_A	14.55	psia]				
Average vapor concentration by volume during continued forced ven	C _v	0.0021					_				
Atmospheric pressure at the tank location	Pa	14.55	Average Daily Vapor Temperature Range (ΔTv)				_				
Calibration gas molecular weight	M _{CG}	44.1	Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α l)	ΔΤν	22.87		_				
Average temperature of vapor below the floating roof = average amb	T _V (T _{AA})	531.35	Average daily ambient temperature range - Equat	ΔΤΑ	19.3		_				
			Average tank surface solar absorptance, dimension	α	0.25		4				
Prior Stock Remains = LCV max			Daily total solar insolation on a horizontal surface			Btu/ft²-day	4				
$L_{CV} max = 5.9*D^{2*}(hl)*Wl$		52864	Average daily maximum ambient temperature for	TAX	541.00	1	4				
Cvmax = P _{VA} /Pa		0.6901185	Average daily minimum ambient temperature for t	TAN	521.70	°R	-1				
Average Ambient Temp during Month TAA = (TAX+TAN) /2	TAA	531.35 °R					-				
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541 °R	Equation 1-9: ΔPV = PVX - PVN	ΔΡν	2.010	neia	┨				
Average daily monthly minimum ambient temperature, Table 7.1-2	TAN	521.7 °R	Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	11.09		1				
Wordge daily monthly minimum ambient temperature, ruble 7:1-2	1744	021.7 K	Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN		psia	1				
Product Vapor Pressure			Average daily max liquid surface temp TLX = TAA	TLX	537.07	°R	1				
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	10.041 psia	Average daily min liquid surface temp TLN = TAA	TLN	525.63	°R	1				
/apor Pressure Equation Constant A (Table 7.1-2)	A	11.600	Vapor Pressure Equation Constant A	A	11.600		1				
/apor Pressure Equation Constant B (Table 7.1-2)	В	4,937.9 °R	Vapor Pressure Equation Constant B	В	4,938	1	1				
Average ambient temperature during month	TAA	531.4 °R	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35		1				
<u>-</u>			Average Daily Vapor Temperature Range	ΔΤν	22.87		1				
/apor Space Volume V _V =h _v ((PI)D ² /4)	V_{v}	28,902.65 ft ³					_				
Height of vapor space under landed deck (h _{v=} h _d -h _l)	h _v	5.75 ft									
Deck height	hd	6.00 ft									
iquid height	hl	0.25 ft									

LANDING PTE CALCUL	AHONS		
	Symbol		Units
Total Landing Losses (Eq.3-1 L _{TL} = L _{SL} +L _{FL})	L _{TL}	6.185.93	lh/event
Total Earland 200000 (Eq. 0-1 E _{TL} = E _{SL} · E _{FL})		-,	ton/event
Product in tank duri	ng landing:	Gasoline - RVP 1	5
Month the landin	g occurred:	July	
Number of days the tank stays idle	n _d	3	days
Height of floating roof deck, h _d (ft) (assume 3 ft if unknown)	h _d	3.00 0.250	ft ft
Height of the stock liquid Full heel, Partial heel or Drain Dry?	"	Partial Heel	II.
Flat or Cone Bottom Tank?		Flat	
			I.
Standing Idle Losses Eq. 3-7 $L_{SL} = n_d * KE * ((P_{VA} * V_V)/R * Tv)) * M_V * K_s$	L _{SL}	3361.80	lb
Number of days the tank stays idle	n _d	3	
Vapor space expansion factor, per day	K _E	0.4888	
True vapor pressure of stock liquid (avg. ambient temp. of month landing oct Volume of the vapor space	P _{VA} V _V	10.041 48596.51	<u> </u>
deal gas constant	R		(psia-ft3)/(lb-mole de
Average vapor temperature (assumed to be equal to ground temperature - a	T _V (T _{AA})	531.35	°R
Stock vapor molecular weight	M _V	66	lb/lb-mol
Saturation factor	Ks	0.41	
Filling Losses Eq. 3-18 L _{FL} = (P _{VA} V _V /RT _V)M _V (C _{sf} S)	L _{FL}	2,824.13	
Frue vapor pressure of stock liquid (avg. ambient temp. of month landing occ /olume of the vapor space	P _{VA}	10.041 48596.51	<u>'</u>
deal gas constant	R		(psia-ft3)/(lb-mole de
Average vapor temperature (average ambient temp of the month)	T _V (T _{AA})	531.35	
Stock vapor molecular weight	M _V		lb/lb-mole
Filling saturation correction factor for wind (1.0 for IFT and DEFT)	$C_{\rm sf}$	1	
Filling Saturation Factor (0.60 for full heel, 0.50 for partial heel, 0.15 for drain	S	0.5	
Average Ambient Temperature during Month TAA = (TAX+TAN) /2	TAA	531.35	
Average daily monthly maximum ambient temperature, Table 7.1-2 Average daily montlhy minimum ambient temperature, Table 7.1-2	TAX TAN	541 521.7	
riverage daily monany minimum ambient temperature, rable 7.1-2	1741	021.7	N.
Product Vapor Pressure			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	10.041	psia
Vapor Pressure Equation Constant A (Table 7.1-2)	Α	11.600	
Vapor Pressure Equation Constant B (Table 7.1-2)	В	4,937.9	°R
Average ambien temperature during month	TAA	531.4	°R
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-Pv.	KE	0.4888	per day
Average Daily Vapor Temperature Range	ΔΤν	22.87	°R
Average Daily Vapor Pressure Range	ΔΡν	2.0096	psi
Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	10.0412	psia
Average Daily Liquid Surface Temperature (TLA=TAA)	TAA		°R
Atmospheric Pressure	P _A	14.55	psia
Average Daily Vapor Temperature Range (ΔTv)	1		I
Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	22.87	°R
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔΤΑ	19.3	
Average tank surface solar absorptance, dimensionless, Table 7.1-6	α	0.25	
Daily total solar insolation on a horizontal surface	- 1		Btu/ft ² -day
Average daily maximum ambient temperature for the month	TAX	541.00	
Average daily minimum ambient temperature for the month	TAN	521.70	řR
Average Daily Vapor Pressure Range (ΔPv)			
Equation 1-9: ΔPV = PVX - PVN	ΔΡν	2.010	psia
· · · · · · · · · · · · · · · · · · ·			
Venezania Fr. 4 35, DVV	PVX	11.09	psia
Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]		9.08	psia
Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN		°R
Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN TLX	537.07	
√apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV		537.07	°R
/apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV	TLX TLN	525.63	°R
/apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A	TLX	525.63 11.600	°R
/apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV /apor Pressure Equation Constant A /apor Pressure Equation Constant B	TLX TLN A	525.63	°R
/apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV //apor Pressure Equation Constant A //apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	TLX TLN A B	525.63 11.600 4,938	°R
/apor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV //apor Pressure Equation Constant A //apor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	TLX TLN A B TAA	525.63 11.600 4,938 531.35	°R
Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range	TLX TLN A B TAA ΔTv	525.63 11.600 4,938 531.35 22.87 48,596.51	ft ³
Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((P)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _t)	TLX TLN A B TAA ΔTv V _V h _v	525.63 11.600 4,938 531.35 22.87 48,596.51 2.75	ft ³
Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _V =h _V ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _t) Deck height	TLX TLN A B TAA ΔTv V _V h _V	525.63 11.600 4,938 531.35 22.87 48,596.51 2.75 3.00	ft ³
Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((P))D ² /4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	TLX TLN A B TAA ΔTv V _V h _v	525.63 11.600 4,938 531.35 22.87 48,596.51 2.75	ft ³
Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _V =h _V ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _t) Deck height Liquid height	TLX TLN A B TAA ΔTv V _v h _v hd hl	525.63 11.600 4,938 531.35 22.87 48,596.51 2.75 3.00	ft ³
Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((P)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _t)	TLX TLN A B TAA ΔTv V _V h _V	525.63 11.600 4,938 531.35 22.87 48,596.51 2.75 3.00	ft ³ ft

			רו	EANING PTE CALCULATIONS						
Includes Landing (standing and filling losses) and Additonal Pur	_	with this cleanir	ng event	LANING FIE CALCULATIONS						
	Symbol		Units		Symbol	Units				
Total Cleaning Losses LFV = LP+LCV+ LF+LS	LFV	22,116.43	lb/event							
Product in tank p	nrior to cleaning			1			1			
Month the clea		July		1			Additional Purge Emissions	.		
Calibration Gas	J	Propane (C3)		Standing Idle Losses Eq. 3-7 $L_{SL} = n_d * KE * ((P_{VA})^*)$	L _{SL}	4265.09 lb	J	Day 2	Day 3	
Duration of the continued forced ventilation	n _{CV}	3	days	Number of days the tank stays idle	n _d	3	Lp	2958.540	2962.545	
Height of deck during cleaning (assume 6 ft if unknown)	h _d	6	ft	Vapor space expansion factor, per day	K_E	0.4888	S*	0.25	0.25	*S is based on fixed roof Eq. 4-6 < 1day
Number of days standing idle before cleaning	n _d	3	days	True vapor pressure of stock liquid (avg. ambient	P_{VA}	10.041 psia	H _I	0.238	0.23	
Height of the stock liquid	hı	0.250	ft	Volume of the vapor space	V _V	101610.89 ft ³	V _V	101,818.76	101,956.59	
Average ventilation rate during continued forced ventilation	Q_V	10000	ft ³ /min	Ideal gas constant	R	10.731 (psia-ft3)/(lb-mole degR)	h _v	5.76	5.77	
Hours per day of force ventilation	t _V	10	hrs/day	Average vapor temperature (average ambient ten	$T_V(T_{AA})$	531.35 °R	h _{d2}	6.00	6.00	
Average LEL Reading	LEL	10	%	Stock vapor molecular weight	M_V	66 lb/lb-mol				
LEL of Calibration Gas		2.1	%	Standing idle saturation factor	K _S	0.25				
Average vapor concentration by volume during continued forced ven	Cv	0.0021]			Height of Vapor Space Calc			-
Calibration Gas Molecular Weight	M _{CG}	44.1	lb/lb-mole	Filling Losses Eq. 3-18 $L_{FL} = (P_{VA}V_V/RT_V)M_V(C_s)$	L _{FL}	1,771.50 lb	Height of vapor space under	anded deck, (h _d +	sD/6)- [(volume of	
				True vapor pressure of stock liquid (avg. ambient	P _{VA}	10.041 psia	Tank cone bottom slope			s 0.02 ft/ft
Vapor Space Purge Losses				Volume of the vapor space	V _v	101610.89 ft ³	Diameter			D 150 ft
Eq. 4-2 LP=(PVA*VV/R*TV)*MV*S	L _P	5905.001		Ideal gas constant	R	10.731 (psia-ft3)/(lb-mole degR)	Deck leg height	2 2		h _d 6 ft
Saturation Factor (0.5 for IFR with a partial liquid heel)	S	0.5		Average vapor temperature (average ambient ter	T _V (T _{AA})	531.4 °R	Volume of heel, (πD²/12)*((sE			2727 ft3
Ideal gas constant	R	10.731		Stock vapor molecular weight	M _V	66 lb/lb-mole	Vertical distance from bottom			h _p 0.5 ft
Average temperature of the vapor space = average ambient tempera	T _V (T _{AA})	531.35	°R	Filling saturation correction factor for wind (1.0 for	C _{sf}	1	Effective height of cone-down		ure 7.1-23)	0.5 ft
True vapor pressure of the exposed volatile material in the tank	P _{VA}	10.041		Filling Saturation Factor (0.15 for drain dry)	S	0.15	Height of liquid in bottom of c	one		0 ft
Volume of vapor space	V _V	101,610.89		 			4			
Stock vapor molecular weight	M_V	66	lb/lb-mol	Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/	KE	0.4888 per day	4			
L				Average Daily Vapor Temperature Range	ΔΤν	22.87 °R	4			
Continued Forced Ventiliation Emissions		4.050.70		Average Daily Vapor Pressure Range	ΔΡν	2.0096 psi	4			
$L_{CV} = 60^{\circ} Qv^{\circ} n_{CV}^{\circ} tv^{\circ} C_{V}^{\circ} (P_{a}^{\circ} M_{CG}) / (R^{\circ} T_{V})$	L _{cv}	4,253.76	-3	Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000 psi	4			
Average ventilation rate during continued forced ventilation	Q _V		ft ³ /min	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	10.0412 psia	4			
Duration of continued forced ventilation, days	n _{CV}		days hrs/day	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35 °R 14.55 psia	4			
Daily period of forced ventilation	C _V	0.0021	nis/day	Atmospheric Pressure	P _A	14.55 psia	4			
Average vapor concentration by volume during continued forced ven Atmospheric pressure at the tank location	Pa	14.55		Average Beille Vener Terronerture Benne (ATv)			4			
Calibration gas molecular weight	M _{CG}	44.1		Average Daily Vapor Temperature Range (ΔΤν) Equation 1-7 (ΔΤV = 0.7 ΔΤΑ + 0.02 α I)	ΔΤν	22.87 °R	-			
Average temperature of vapor below the floating roof = average amb	T _V (T _{AA})	531.35		Average daily ambient temperature range - Equat	ΔΤΑ	19.3 °R	-			
Average temperature of vapor below the hoating roof – average and	TV (TAA)	331.33		Average tank surface solar absorptance, dimension	α	0.25	-			
Prior Stock Remains = LCV max				Daily total solar insolation on a horizontal surface	u	1872 Btu/ft²-day	-			
L _{CV} max = 5.9*D ² *(hl)*WI		185850		Average daily maximum ambient temperature for	TAX	541.00 °R	-			
Cvmax = P _{VA} /Pa		0.690118501		Average daily minimum ambient temperature for t	TAN	521.70 °R	┪			
S max		0.000110001		Transings daily minimum ambient temperature for T	1744	525 IX	┪			
Average Ambient Temp during Month TAA = (TAX+TAN) /2	TAA	531.35	°P	Average Daily Vapor Pressure Range (ΔΡν)			┪			
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541		Equation 1-9: ΔPV = PVX - PVN	ΔΡν	2.010 psia	┨			
Average daily monthly minimum ambient temperature, Table 7.1-2 Average daily monthly minimum ambient temperature, Table 7.1-2	TAN	521.7		Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	11.09 psia	1			
			T.	Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	9.08 psia	1			
Product Vapor Pressure				Average daily max liquid surface temp TLX = TAA	TLX	537.07 °R	1			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	10.041	psia	Average daily min liquid surface temp TLN = TAA	TLN	525.63 °R	1			
Vapor Pressure Equation Constant A (Table 7.1-2)	A	11.600		Vapor Pressure Equation Constant A	A	11.600	1			
Vapor Pressure Equation Constant B (Table 7.1-2)	В	4,937.9	°R	Vapor Pressure Equation Constant B	В	4,938	1			
Average ambient temperature during month	TAA	531.4	°R	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35	1			
		1		Average Daily Vapor Temperature Range	ΔΤν	22.87	1			
Vapor Space Volume V _V =h _v ((PI)D ² /4)	V _v	101,610.89	ft ³	,			⊒			
Height of vapor space under landed deck (h _{v=} h _d -h _i)	h _v	5.75	ft	1						
Deck height			4	1						
Deak neight	hd	6.00	III.							

Speciation for Landing and Cleaning Calculations
Used in Benzene and non-HTAC Modeling

Landing and Cleaning Speciation - Blendstock RVP 15

Nearest US Location

	MONTH Janu					MONTH Feb	<u>bruary</u>				MONTH Ma	<u>rch</u>		
			Symbol		Units			Symbol		Units		Symbol		Units
Product Type				Gasoline -	RVP 15	Product Type			Gasoline - I	RVP 15	Product Type		Gasoline -	RVP 15
/apor Molecular weight			M _v	66.00		Vapor Molecular weight		M _v	66.00		Vapor Molecular weight	M _v	66.00	
/apor Pressure Equation Constant A			A	11.60		Vapor Pressure Equation Cor	nstant /	A	11.60		Vapor Pressure Equation Const	ant A	11.60	
/apor Pressure Equation Constant B			В	4937.93	°R	Vapor Pressure Equation Cor		В	4937.93	°R	Vapor Pressure Equation Const		4937.93	°R
Daily total solar insolation on a horizontal surface			1		Btu/ft ² -day	Daily total solar insolation on				Btu/ft ² -day	Daily total solar insolation on a h			Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			•	002.0	Dia/it -day	Average Daily Ambient Tem		Fa 1-30	7 00.0	Dia/it -day	Average Daily Ambient Tempe			Dia/it -day
Average Daily Ambient Temperature Eq. 1-30	TAA = ((TAX+TAN)/	2)	T _{AA}	483.25	°D	TAA = ((TAX+TAI		T _{AA}	485.80	°R	TAA = ((TAX+TAN)		494.80	°R
	,,,		T _{AX}	_			<i>' '</i>		493.80	°R		, ,,,,	503.50	
	Average daily maxim				°R	Average daily ma		T _{AX}			Average daily maxir			
	Average daily minim	um ambient	T _{AN}	475.80	°R	Average daily min		T _{AN}	477.80	°R	Average daily minim	um T _{AN}	486.10	°R
rue Vapor Pressure Eq. 1-25:						True Vapor Pressure Eq. 1-2					True Vapor Pressure Eq. 1-25:		.	
	PvA = exp(A-(B/TLA))	a))	P_{vA}	3.982	psia	PvA = exp(A-(B/T	TLA))	P_{vA}	4.201	psia	PvA = exp(A-(B/TLA)) P _{vA}	5.054	psia
IAPS Speciation						HAPS Speciation					HAPS Speciation			
	Product - sele	ect from list		blendstock		Product - select fro			blendstock		Product - select from	list	blendstock	
apor Weight Concentrations Eq. 40-6		$Z_{Vi} = y_i M_i / N_i$	Λ _V			Vapor Weight Concent Z _{Vi} = :	y_iM_i/M_V				Vapor Weight Concen Z _{Vi} = y _i N	I _i / M _V		
		Mi	M _V	Z _{Vi}			Mi	M_{V}	Z_{Vi}			M_i M_V	Z _{Vi}	
	hexane	86.18	66	0.03374		hexane	86.18	66	0.03459		hexane 86	.18 66	0.03766	
	benzene	78.11	66	0.00283		benzene	78.11	66	0.00292		benzene 78		0.00324	
	2,2,4 TMP	114.23	66	0.00276			114.23	66	0.00286		2,2,4 TMP 11 ²		0.00321	
	toluene	92.14	66	0.00263			92.14	66	0.00274			.14 66	0.00315	
	ethylbenzene	106.17	66	0.00019			106.17	66	0.00020		ethylbenzene 106		0.00024	
	xylenes	106.17	66	0.00057		<u> </u>	106.17	66	0.00060		xylenes 106		0.00072	
	cumene	120.19	66	0.00002			120.19	66	0.00002		cumene 120		0.00003	
	naphthalene	128.17	66	5.90E-07			128.17	66	6.42E-07		naphthalene 128		8.57E-07	
/apor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$						Vapor Mole Fraction Eq. 40-					Vapor Mole Fraction Eq. 40-5			
		$P_i = P_{VAI}(x_i)$	P _{VA}	y i			$P_{VAI}(x_i)$	P_{VA}	y i		$P_i = P_{VA}$,	y i	
	hexane		3.982	0.0258383			11301	4.201	0.02649		hexane 0.145		0.02884	
	benzene	0.009537	3.982	0.00240			10373	4.201	0.00247		benzene 0.013		0.00274	
	2,2,4 TMP	0.006360	3.982	0.00160			006940	4.201	0.00165		2,2,4 TMP 0.009		0.00185	
	toluene	0.007515	3.982	0.00189			008255	4.201	0.00197		toluene 0.011		0.00225	
	ethylbenzene	0.000465	3.982	0.00012			000518	4.201	0.00012		ethylbenzene 0.000		0.00015	
	xylenes	0.001405	3.982	0.00035			001564	4.201	0.00037		xylenes 0.002		0.00045	
	cumene naphthalene	4.25E-05	3.982 3.982	0.00001 0.00000			77E-05 39E-06	4.201 4.201	0.00001 0.00000		cumene 7.07E naphthalene 2.23E		0.00001	
iquid Mole Fraction Eq. 40-4 x _i = (Z _{1 i} M ₁)/M _i	парпилалене	1.21E-06	3.962	0.00000		<u> </u>			0.00000		Liquid Mole Fraction Eq. 40-4		0.00000	
iquid Mole Fraction Eq. 40-4 X; - (ZLiML)/M;					V	Liquid Mole Fraction Eq. 40				V	Liquid Mole Fraction Eq. 40-4			v
	h	Z Li	ML	M _i	X _i 0.15150	T 5	Z Li	ML	M _i 86.18	X _i 0.15150	h	Z _{Li} M _L	M _i 86.18	X _i 0.15150
	hexane	0.136 0.02	96 96	86.18 78.11	0.15150	hexane	0.136	96 96	78.11	0.15150		136 96 .02 96	78.11	0.15150
	benzene 2.2.4 TMP	0.02	96	114.23		benzene 2.2.4 TMP	0.02	96	114.23			.04 96	114.23	0.02456
	toluene	0.04	96	92.14	0.03362 0.07814	toluene	0.04	96	92.14	0.03362 0.07814		075 96	92.14	0.03362
	ethylbenzene	0.073	96	106.17	0.07814	ethylbenzene	0.073	96	106.17	0.07814		0.02 96	106.17	0.07814
	xylenes	0.02	96	106.17	0.01808	xylenes	0.02	96	106.17	0.06329	,	0.07 96	106.17	0.06329
	cumene	0.005	96	120.19	0.00329		0.005	96	120.19	0.00329		005 96	120.19	0.00329
	naphthalene	0.00415	96	128.17	0.00333		.00415	96	128.17	0.00331	naphthalene 0.00		128.17	0.00311
component Vapor pressure P _{VAi} =(0.019337)10				T		Component Vapor pressure					Component Vapor pressure F			
· · · · · · · · · · · · · · · · · · ·	, , , , · · · · · · · · · · · · · · · ·	Δ	В	С	P _{VAi}	pro apar prosoure	Δ	В	C (2.7.1.2.	P _{VAi}	p	A B	T c	P _{VAi}
	hexane	6.878	1171.5	224.37	0.68	hexane	6.878	1171.5	224.37	0.73	hexane 6.	378 1171.5	224.37	0.96
	benzene	6.906	1211	220.79	0.39		6.906	1211	220.79	0.42		906 1211	220.79	0.56
	2,2,4 TMP	6.812	1257.8	220.74	0.19			1257.8	220.74	0.21	2,2,4 TMP 6.		220.74	0.28
,	toluene	7.017	1377.6	222.64	0.10	toluene	7.017	1377.6	222.64	0.11		017 1377.6	222.64	0.15
	ethylbenzene	6.95	1419.3	212.61	0.03	ethylbenzene		1419.3	212.61	0.03	·	.95 1419.3	212.61	0.04
	xylenes	7.009	1462.3	215.11	0.02		7.009	1462.3	215.11	0.02	,	009 1462.3	215.11	0.04
	cumene	6.929	1455.8	207.2	0.01		6.929	1455.8	207.2	0.01	1	929 1455.8	207.2	0.02
	naphthalene	7.146	1831.6	211.82	0.00	naphthalene	7.146	1831.6	211.82	0.00	naphthalene 7.	146 1831.6	211.82	0.00

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MONTH	April				MONTH	May				MONTH	June			
		Symbol		Units			Symbol		Units			Symbol		Units
Product Type			Gasoline -	RVP 15	Product Type			Gasoline -	RVP 15	Product Type			Gasoline -	RVP 15
Vapor Molecular weight		M_{v}	66.00		Vapor Molecular weight		M_{v}	66.00		Vapor Molecular weight		M_{v}	66.00	
Vapor Pressure Equation	n Constant /	Α	11.60		Vapor Pressure Equatio	n Constant	А	11.60		Vapor Pressure Equation	n Constant	Α	11.60	
Vapor Pressure Equation	n Constant I	В	4937.93	°R	Vapor Pressure Equatio	n Constant I	В	4937.93	°R	Vapor Pressure Equation	n Constant l	В	4937.93	°R
Daily total solar insolation	n on a horiz	1	1496.0	Btu/ft ² -day	Daily total solar insolation	n on a horiz	ı	1739.0	Btu/ft ² -day	Daily total solar insolatio	n on a horiz		1853.0	Btu/ft ² -day
Average Daily Ambient		re Ea. 1-30		Dia, it day	Average Daily Ambient		re Ea. 1-30		Dianit day	Average Daily Ambient	t Temperaty	re Ea. 1-30		Diame day
TAA = ((TAX		T _{AA}	507.45	°R	TAA = ((TA)		T _{AA}	517.90	°R	TAA = ((TAX		TAA	527.45	°R
Average dail		T _{AX}	517.50	°R	Average dai	, ,	T _{AX}	528.40	°R	Average dai		T _{AX}	537.30	°R
Average dail	_	T _{AN}	497.40	°R	Average dai	_	T _{AN}	507.40	°R	Average dai	-	T _{AN}		°R
True Vapor Pressure E	_	¹ AN	497.40	K	True Vapor Pressure E		¹ AN	307.40	K	True Vapor Pressure E	_	¹ AN	317.00	R
		- В	6.482	naia	PvA = exp(A		В	7.888	psia	 		В	9.374	nois
PvA = exp(A	4-(B/TLA))	P _{vA}	0.462	psia		4-(B/TLA))	P _{vA}	7.000	psia	PvA = exp(A	1-(B/TLA))	P _{vA}	9.374	psia
HAPS Speciation	16 11 1				HAPS Speciation					HAPS Speciation	1.5			
Product - selec			blendstock		Product - sele			blendstock		Product - sele			blendstock	
Vapor Weight Concent	$Z_{Vi} = y_i M_i / M_i$				Vapor Weight Concent					Vapor Weight Concent				
	Mi	M _V	Z _{Vi}	ļ	<u> </u>	Mi	Μ _V	Z _{Vi}		 	Mi	M _V	Z _{Vi}	ļ
hexane	86.18	66	0.04207		hexane	86.18	66	0.04580		hexane	86.18	66	0.04924	
benzene	78.11	66	0.00371		benzene	78.11	66	0.00411		benzene	78.11	66	0.00449	
2,2,4 TMP	114.23 92.14	66	0.00372		2,2,4 TMP	114.23	66	0.00418		2,2,4 TMP	114.23 92.14	66	0.00461	
toluene ethylbenzene	92.14 106.17	66 66	0.00377 0.00030		toluene ethylbenzene	92.14 106.17	66 66	0.00433 0.00036		toluene	92.14 106.17	66 66	0.00488	
xylenes	106.17	66	0.00030		xylenes	106.17	66	0.00036		ethylbenzene xylenes	106.17	66	0.00042	
cumene	120.19	66	0.00091		cumene	120.19	66	0.000110		cumene	120.19	66	0.00128	
naphthalene	128.17	66	1.25E-06		naphthalene	128.17	66	1.68E-06		naphthalene	128.17	66	2.17E-06	
/apor Mole Fraction Ed			1.20L-00		Vapor Mole Fraction E			1.00L-00		Vapor Mole Fraction E			2.17 L-00	
<u> </u>	$P_i = P_{VAI}(x_i)$	P _{VA}	y _i			$P_i = P_{VAI}(x_i)$	P _{VA}	y _i			$P_i = P_{VAI}(x_i)$	P _{VA}	y _i	
hexane	0.208854	6.482	0.03222		hexane	0.276652	7.888	0.03507		hexane		9.374	0.03771	
benzene	0.020305	6.482	0.003222		benzene	0.027398	7.888	0.00347		benzene	0.035575	9.374	0.00377	
2,2,4 TMP	0.013947	6.482	0.00215		2,2,4 TMP	0.019042	7.888	0.00241		2,2,4 TMP	0.024978	9.374	0.00266	
toluene	0.017503	6.482	0.00270		toluene	0.024480	7.888	0.00310		toluene	0.032799	9.374	0.00350	
ethylbenzene	0.001209	6.482	0.00019		ethylbenzene	0.001763	7.888	0.00022		ethylbenzene	0.002448	9.374	0.00026	
xylenes	0.003673	6.482	0.00057		xylenes	0.005372	7.888	0.00068		xylenes	0.007480	9.374	0.00080	
cumene	1.19E-04	6.482	0.00002		cumene	1.79E-04	7.888	0.00002		cumene	2.55E-04	9.374	0.00003	
naphthalene	4.18E-06	6.482	0.00000		naphthalene	6.83E-06	7.888	0.00000		naphthalene	1.05E-05	9.374	0.00000	
iquid Mole Fraction E	q. 40-4 x _i = ($Z_{Li}M_L)/M_i$			Liquid Mole Fraction E	q. 40-4 x _i =	$(Z_{Li}M_L)/M_i$			Liquid Mole Fraction E	q. 40-4 x _i =	$(Z_{Li}M_L)/M_i$		
	Z_{Li}	ML	Mi	Xi		Z_{Li}	ML	Mi	Xi		Z_{Li}	ML	Mi	Xi
hexane	0.136	96	86.18	0.15150	hexane	0.136	96	86.18	0.15150	hexane	0.136	96	86.18	0.151
benzene	0.02	96	78.11	0.02458	benzene	0.02	96	78.11	0.02458	benzene	0.02	96	78.11	0.024
2,2,4 TMP	0.04	96	114.23	0.03362	2,2,4 TMP	0.04	96	114.23	0.03362	2,2,4 TMP	0.04	96	114.23	0.033
toluene	0.075	96	92.14	0.07814	toluene	0.075	96	92.14	0.07814	toluene	0.075	96	92.14	0.078
ethylbenzene	0.02	96	106.17	0.01808	ethylbenzene	0.02	96	106.17	0.01808	ethylbenzene	0.02	96	106.17	0.018
xylenes	0.07	96	106.17	0.06329	xylenes	0.07	96	106.17	0.06329	xylenes	0.07	96	106.17	0.063
cumene	0.005	96	120.19		cumene	0.005	96	120.19	0.00399	cumene	0.005	96	120.19	0.003
naphthalene	0.00415	96	128.17		naphthalene	0.00415	96	128.17	0.00311	naphthalene	0.00415	96	128.17	0.00311
Component Vapor pres					Component Vapor pres					Component Vapor pres				
	A	B	C	P _{VAi}	 	A	B	C	P _{VAi}	 	A	B	C	P _{VAi}
hexane	6.878	1171.5	224.37	1.38	hexane	6.878	1171.5	224.37	1.83	hexane	6.878	1171.5	224.37	2.33
benzene	6.906	1211	220.79		benzene	6.906	1211	220.79	1.11	benzene	6.906	1211	220.79	1.45
2,2,4 TMP toluene	6.812	1257.8 1377.6	220.74 222.64	0.41 0.22	2,2,4 TMP	6.812	1257.8 1377.6	220.74 222.64	0.57 0.31	2,2,4 TMP	6.812 7.017	1257.8	220.74 222.64	0.74 0.42
toluene	7.017		212.61	0.22	toluene ethylbenzene	7.017 6.95	1419.3	212.61	0.31	toluene ethylbenzene	6.95	1377.6 1419.3	212.61	0.42
														. U 14
ethylbenzene	6.95 7.000	1419.3												
	7.009 6.929	1462.3 1455.8	215.11 207.2	0.06 0.03	xylenes	7.009 6.929	1462.3 1455.8	215.11	0.08 0.04	xylenes cumene	7.009 6.929	1462.3 1455.8	215.11 207.2	0.12 0.06

MONTH July				MONTH	August				MONTH	September			
	Symbol		Units			Symbol		Units			Symbol		Units
Product Type		Gasoline -	RVP 15	Product Type			Gasoline -	RVP 15	Product Type			Gasoline - I	RVP 15
Vapor Molecular weight	M _v	66.00		Vapor Molecular weight		M_{v}	66.00		Vapor Molecular weight		M _v	66.00	
Vapor Pressure Equation Constant	Α	11.60		Vapor Pressure Equation	n Constant	А	11.60		Vapor Pressure Equation	n Constant	Α	11.60	
Vapor Pressure Equation Constant	В	4937.93	°R	Vapor Pressure Equation	n Constant	В	4937.93	°R	Vapor Pressure Equation	n Constant I	В	4937.93	°R
Daily total solar insolation on a horiz	1	1872.0	Btu/ft ² -day	Daily total solar insolation	on on a horiz		1640.0	Btu/ft ² -day	Daily total solar insolation	on on a horiz		1300.0	Btu/ft ² -day
Average Daily Ambient Temperati	re Ea. 1-30		Dianit day	Average Daily Ambien	t Temperati	re Ea. 1-30		Dianit day	Average Daily Ambien		ıre Ea. 1-30		Diani day
TAA = ((TAX+TAN)/2)	T _{AA}	531.35	°R	TAA = ((TA		T _{AA}	530.15	°R	TAA = ((TA		T _{AA}	522.05	°R
Average daily maximum	T _{AX}	541.00	°R	Average da		T _{AX}	539.70	°R	Average da		T _{AX}		°R
Average daily minimum	T _{AN}	521.70		Average da		T _{AN}	520.60		Average da	,	T _{AN}	512.40	
True Vapor Pressure Eq. 1-25:	' AN	321.70	I N	True Vapor Pressure E		' AN	320.00	K	True Vapor Pressure B		' AN	312.40	K
PvA = exp(A-(B/TLA))	P _{vA}	10.041	noio	PvA = exp(/		P _{vA}	9.832	noio	PvA = exp(/		P _{vA}	8.509	noio
	Γ _V A	10.041	рыа		4-(B/TLA))	F _{VA}	9.032	рыа		4-(b/TLA))	FVA	6.509	рыа
HAPS Speciation		 - -4 -		HAPS Speciation	at forms lint		h.l		HAPS Speciation	-4 f l'-4		h - 4 -	
Product - select from list		blendstock		Product - sele			blendstock		Product - sele			blendstock	
Vapor Weight ConcentZ _{Vi} = y _i M _i / I				Vapor Weight Concen	$Z_{Vi} = y_i W_i / V_i$				Vapor Weight Concen	$Z_{Vi} = y_i W_i / N$			
M _i	M _V	Z _{Vi}		<u> </u>	M _i	M _V	Z _{Vi}			M _i	M _V	Z _{Vi}	
hexane 86.18	66	0.05066		hexane	86.18	66	0.05023		hexane	86.18	66	0.04729 0.00427	
benzene 78.11 2,2,4 TMP 114.23	66 66	0.00465 0.00479		benzene 2,2,4 TMP	78.11 114.23	66 66	0.00460 0.00474		benzene 2,2,4 TMP	78.11 114.23	66 66	0.00427	
toluene 92.14	66	0.00479	 	z,z,4 TMP toluene	92.14	66	0.00474		z,z,4 TMP toluene	92.14	66	0.00436	
ethylbenzene 106.17	66	0.00045		ethylbenzene	106.17	66	0.00303		ethylbenzene	106.17	66	0.00039	
xylenes 106.17	66	0.00137		xylenes	106.17	66	0.00044		xylenes	106.17	66	0.00003	
cumene 120.19	66	0.00005		cumene	120.19	66	0.00005		cumene	120.19	66	0.00004	
naphthalene 128.17	66	2.40E-06		naphthalene	128.17	66	2.32E-06		naphthalene	128.17	66	1.88E-06	
Vapor Mole Fraction Eq. 40-5 yi	= P _i / P _{VA}			Vapor Mole Fraction E	g. 40-5 Vi				Vapor Mole Fraction E	g. 40-5 v			
$P_i = P_{VAI}(x_i)$	P _{VA}	y _i			$P_i = P_{VAI}(x_i)$	P _{VA}	y i			$P_i = P_{VAI}(x_i)$	P _{VA}	y i	
hexane 0.389589	10.041	0.03880		hexane		9.832	0.03846		hexane	0.308169	8.509	0.03622	
benzene 0.039450	10.041	0.00393		benzene	0.038222	9.832	0.00389		benzene	0.030735	8.509	0.00361	
2,2,4 TMP 0.027811	10.041	0.00277		2,2,4 TMP	0.026912	9.832	0.00274		2,2,4 TMP	0.021457	8.509	0.00252	
toluene 0.036827	10.041	0.00367		toluene	0.035545	9.832	0.00362		toluene	0.027843	8.509	0.00327	
ethylbenzene 0.002788	10.041	0.00028		ethylbenzene	0.002679	9.832	0.00027		ethylbenzene	0.002037	8.509	0.00024	
xylenes 0.008526	10.041	0.00085		xylenes	0.008191	9.832	0.00083		xylenes	0.006215	8.509	0.00073	
cumene 2.93E-04	10.041	0.00003		cumene	2.80E-04	9.832	0.00003		cumene	2.09E-04	8.509	0.00002	
naphthalene 1.24E-05	10.041	0.00000		naphthalene	1.18E-05	9.832	0.00000		naphthalene	8.24E-06	8.509	0.00000	
Liquid Mole Fraction Eq. 40-4 x _i =				Liquid Mole Fraction E					Liquid Mole Fraction E				
Z _{Li}	M _L	Mi	Xi		Z _{Li}	ML	Mi	X _i		Z_{Li}	M _L	Mi	Xi
hexane 0.136	96	86.18	0.15150	hexane	0.136	96	86.18	0.15150	hexane	0.136	96	86.18	0.1515
benzene 0.02	96	78.11	0.02458	benzene	0.02	96	78.11	0.02458	benzene	0.02	96	78.11	0.0245
2,2,4 TMP 0.04 toluene 0.075	96	114.23	0.03362	2,2,4 TMP	0.04 0.075	96	114.23	0.03362	2,2,4 TMP	0.04 0.075	96 96	114.23	0.0336
toluene 0.075 ethylbenzene 0.02	96 96	92.14 106.17	0.07814 0.01808	toluene ethylbenzene	0.075	96 96	92.14 106.17	0.07814 0.01808	toluene ethylbenzene	0.075	96	92.14 106.17	0.0781 0.0180
xylenes 0.07	96	106.17	0.01808	xylenes	0.02	96	106.17	0.01808	xylenes	0.02	96	106.17	0.0180
cumene 0.005	96	120.17	0.00329	cumene	0.005	96	120.19	0.00329	cumene	0.07	96	120.19	0.0032
naphthalene 0.00415	96	128.17	0.00399	naphthalene	0.00415	96	128.17	0.00399	naphthalene	0.00415	96	128.17	0.0033
Component Vapor pressure P _{VAi} =				Component Vapor pre					Component Vapor pre				
A	В	C	P _{VAi}	<u> </u>	A	В	C	P _{VAi}		A	В	C	P _{VAi}
hexane 6.878	1171.5	224.37	2.57	hexane	6.878	1171.5	224.37	2.50	hexane	6.878	1171.5	224.37	2.03
benzene 6.906	1211	220.79	1.60	benzene	6.906	1211	220.79	1.55	benzene	6.906	1211	220.79	1.25
2,2,4 TMP 6.812	1257.8	220.74	0.83	2,2,4 TMP	6.812	1257.8	220.74	0.80	2,2,4 TMP	6.812	1257.8	220.74	0.64
toluene 7.017	1377.6	222.64	0.47	toluene	7.017	1377.6	222.64	0.45	toluene	7.017	1377.6	222.64	0.36
ethylbenzene 6.95	1419.3	212.61	0.15	ethylbenzene	6.95	1419.3	212.61	0.15	ethylbenzene	6.95	1419.3	212.61	0.11
xylenes 7.009	1462.3	215.11	0.13	xylenes	7.009	1462.3	215.11	0.13	xylenes	7.009	1462.3	215.11	0.10
cumene 6.929	1455.8	207.2	0.07	cumene	6.929	1455.8	207.2	0.07	cumene	6.929	1455.8	207.2	0.05
naphthalene 7.146	1831.6	211.82	0.00	naphthalene	7.146	1831.6	211.82	0.00	naphthalene	7.146	1831.6	211.82	0.00

MONTH Oc	tober				MONTH	November				MONTH	December			
		Symbol		Units			Symbol		Units			Symbol		Units
Product Type			Gasoline -	RVP 15	Product Type			Gasoline -	RVP 15	Product Type			Gasoline -	RVP 15
Vapor Molecular weight		M _v	66.00		Vapor Molecular weight		M _v	66.00		Vapor Molecular weight		M _v	66.00	
Vapor Pressure Equation Con	stant /	Ā	11.60		Vapor Pressure Equation		Ā	11.60		Vapor Pressure Equation		A	11.60	
Vapor Pressure Equation Con		В	4937.93	°R	Vapor Pressure Equation			4937.93		Vapor Pressure Equation		В	4937.93	°R
Daily total solar insolation on a	-	ī		Btu/ft ² -day	Daily total solar insolation				Btu/ft ² -day	Daily total solar insolation				Btu/ft ² -day
Average Daily Ambient Tem		o Fa 1-30	002.0	Blu/II -uay	Average Daily Ambien				Diu/ii -uay	Average Daily Ambien			422.0	Blu/II -uay
TAA = ((TAX+TAN		T _{AA}	509.75	°р	TAA = ((TA		T _{AA}	499.80	°D	TAA = ((TA		T _{AA}	488.85	°D
Average daily max	, ,		519.00				_	•		Average da			495.60	
,		T _{AX}			Average da		T _{AX}		°R			T _{AX}		
Average daily mini		T _{AN}	500.50	°R	Average da	-	T _{AN}	492.20	°R	Average da		T _{AN}	482.10	°R
True Vapor Pressure Eq. 1-2					True Vapor Pressure E	_	<u> </u>			True Vapor Pressure E	•			<u> </u>
PvA = exp(A-(B/Tl	_A))	P_{vA}	6.773	psia	PvA = exp(/	A-(B/TLA))	P_{vA}	5.585	psia	PvA = exp(/	4-(B/TLA))	P _{vA}	4.476	psia
HAPS Speciation					HAPS Speciation					HAPS Speciation				
Product - select from	m list		blendstock		Product - sele	ct from list		blendstock		Product - sele	ct from list		blendstock	
Vapor Weight ConcentZ _{Vi} = y	$_{i}$ M $_{i}$ / M $_{v}$	1			Vapor Weight Concen	$Z_{Vi} = y_i M_i / I$	Μ _V			Vapor Weight Concent	$Z_{Vi} = y_i M_i / N$			
	Mi	M_{V}	Z_{Vi}			M _i	M_{V}	Z_{Vi}			Mi	M _∨	Z_{Vi}	
	86.18	66	0.04289		hexane	86.18	66	0.03939		hexane	86.18	66	0.03562	
	78.11	66	0.00379		benzene	78.11	66	0.00342		benzene	78.11	66	0.00303	
	14.23	66	0.00382		2,2,4 TMP	114.23	66	0.00341		2,2,4 TMP	114.23	66	0.00297	
	92.14	66	0.00389		toluene	92.14	66	0.00339		toluene	92.14	66	0.00288	
	06.17	66	0.00031		ethylbenzene	106.17	66	0.00026		ethylbenzene	106.17	66	0.00021	
	06.17	66	0.00095		xylenes	106.17	66	0.00079		xylenes	106.17	66	0.00064	
	20.19	66	0.00004		cumene	120.19		0.00003		cumene	120.19	66	0.00002	
	28.17	66	1.34E-06		naphthalene	128.17		9.99E-07		naphthalene	128.17	66	7.09E-07	
Vapor Mole Fraction Eq. 40-					Vapor Mole Fraction E					Vapor Mole Fraction E				
$P_i = P_i$		P _{VA}	y _i			$P_i = P_{VAI}(x_i)$	P _{VA}	y i			$P_i = P_{VAI}(x_i)$	P _{VA}	y i	
	2451	6.773	0.03284		hexane	0.168476		0.03017		hexane	0.122122	4.476	0.02728	
	1717	6.773	0.00321		benzene 2,2,4 TMP	0.016147	5.585	0.00289		benzene	0.011453	4.476	0.00256	
	4957 8872	6.773 6.773	0.00221 0.00279		toluene	0.010992 0.013544	5.585 5.585	0.00197 0.00243		2,2,4 TMP toluene	0.007693 0.009223	4.476 4.476	0.00172 0.00206	
	1316	6.773	0.00279		ethylbenzene	0.000906	5.585	0.00243		ethylbenzene	0.009223	4.476	0.00200	
	4000	6.773	0.00019		xylenes	0.000300	5.585	0.00049		xylenes	0.000307	4.476	0.00040	
)E-04	6.773	0.00003		cumene	8.72E-05	5.585	0.000043		cumene	5.46E-05	4.476	0.00001	
	7E-06	6.773	0.00002		naphthalene		5.585	0.00002		naphthalene		4.476	0.00000	
Liquid Mole Fraction Eq. 40-			0.0000		Liquid Mole Fraction E			0.0000		Liquid Mole Fraction E			0.0000	
	ZLi	ML	Mi	X _i		Z Li	ML	Mi	X _i		Z _{Li}	ML	Mi	X _i
hexane	0.136	96	86.18	0.15150	hexane	0.136	96	86.18		hexane	0.136	96	86.18	0.1515
benzene	0.02	96	78.11	0.02458	benzene	0.02	96	78.11		benzene	0.02	96	78.11	0.0245
2,2,4 TMP	0.04	96	114.23	0.03362	2,2,4 TMP	0.04	96	114.23	0.03362	2,2,4 TMP	0.04	96	114.23	0.0336
	0.075	96	92.14	0.07814	toluene	0.075	96	92.14	0.07814	toluene	0.075	96	92.14	0.0781
ethylbenzene	0.02	96	106.17	0.01808	ethylbenzene	0.02	96	106.17	0.01808	ethylbenzene	0.02	96	106.17	0.0180
xylenes	0.07	96	106.17	0.06329	xylenes	0.07	96	106.17	0.06329	xylenes	0.07	96	106.17	0.0632
	0.005	96	120.19	0.00399	cumene	0.005	96	120.19		cumene	0.005	96	120.19	0.0039
	00415	96	128.17	0.00311	naphthalene		96	128.17		naphthalene		96	128.17	0.00311
Component Vapor pressure	P _{VAi} =(0	0.019337)1	0^(A-(B/(TL	A+C)))	Component Vapor pre	ssure P _{VAi} =	(0.019337)1	10^(A-(B/(TL	A+C)))	Component Vapor pre	ssure P _{VAi} =	(0.019337)1	#N/A	
	Α	В	С	P _{VAi}		Α	В	С	P _{VAi}		Α	В	С	P_{VAi}
hexane	6.878	1171.5	224.37	1.47	hexane	6.878	1171.5	224.37		hexane	6.878	1171.5	224.37	0.81
benzene	6.906	1211	220.79	0.88	benzene	6.906	1211	220.79	0.66	benzene	6.906	1211	220.79	0.47
2,2,4 TMP	6.812	1257.8	220.74	0.44	2,2,4 TMP	6.812		220.74		2,2,4 TMP	6.812	1257.8	220.74	0.23
	7.017	1377.6	222.64	0.24	toluene	7.017	1377.6	222.64		toluene	7.017	1377.6	222.64	
ethylbenzene	6.95	1419.3	212.61	0.07	ethylbenzene	6.95	1419.3	212.61	0.05	ethylbenzene	6.95	1419.3	212.61	0.03
	7.009	1462.3	215.11	0.06	xylenes	7.009	1462.3	215.11		xylenes	7.009	1462.3	215.11	0.03
	6.929	1455.8	207.2	0.03	cumene	6.929	1455.8	207.2		cumene	6.929	1455.8	207.2	0.01
naphthalene	7.146	1831.6	211.82	0.00	naphthalene	7.146	1831.6	211.82	0.00	naphthalene	7.146	1831.6	211.82	0.00

Landing and Cleaning Speciation - Component RVP 14.33

Nearest US Location Albany, NY

	MONTH	January				MONTH February	,			MONTH March			
			Symbol		Units		Symbol		Units		Symbol		Units
Product Type				Componen	t (Average R\	Product Type		Componen	nt (Average RVP 14.3	Product Type		Component	t (Average RVP 14.3
Vapor Molecular weight			M _v	61.00		Vapor Molecular weight	M _v	61.00		Vapor Molecular weight	M_{v}	61.00	
Vapor Pressure Equation Constant A			А	11.61		Vapor Pressure Equation Constant	A	11.61		Vapor Pressure Equation Constant .	Α	11.61	
Vapor Pressure Equation Constant B			В	4971.67	°R	Vapor Pressure Equation Constant	В	4971.67	°R	Vapor Pressure Equation Constant	В	4971.67	°R
Daily total solar insolation on a horizontal surface			1	532.0	Btu/ft ² -day	Daily total solar insolation on a hori	1	789.0	Btu/ft ² -day	Daily total solar insolation on a horiz	1	1096.0	Btu/ft ² -day
Average Daily Ambient Temperature Eq. 1-30					Diani uay	Average Daily Ambient Temperat			Dianit day	Average Daily Ambient Temperatu			Diant day
TAA = ((T)	AX+TAN)/	(2)	TAA	483.25	°R	TAA = ((TAX+TAN)/2)	T _{AA}	485.80	°R	TAA = ((TAX + TAN)/2)	T _{AA}	1 1	°R
		num ambient	T _{AX}	490.70		Average daily maximum	T _{AX}	493.80		Average daily maximum	T _{AX}	503.50	°R
		num ambient	T _{AN}	475.80		Average daily minimum	T _{AN}	477.80	+	Average daily minimum	T _{AN}	486.10	
Frue Vapor Pressure Eq. 1-25:	ally IIIIIIII	ium ambiem	¹ AN	473.00	K	True Vapor Pressure Eq. 1-25:	'AN	477.00	K	True Vapor Pressure Eq. 1-25:	AN	400.10	K
PvA = exp	/Λ /R/TI Λ	())	P _{vA}	3.751	neia	PvA = exp(A-(B/TLA))	P _{νΔ}	3.959	neia	PvA = exp(A-(B/TLA))	P _v	4.769	neia
	(A-(B/TLA	())	Γ _V A	3.731	рыа		FVA	3.939	рыа		FVA	4.709	psia
HAPS Speciation	luot oole	ant from lint		hlandataak		HAPS Speciation	1	blendstock		HAPS Speciation		blendstock	
	iuct - seie	ect from list		blendstock		Product - select from list	•	biendstock		Product - select from list		biendstock	ı
Vapor Weight Concentrations Eq. 40-6		$Z_{Vi} = y_i M_i / N$	_			Vapor Weight Concent Z _{Vi} = y _i M _i /		 		Vapor Weight Concent Z _{Vi} = y _i M _i / N		 	
	hexane	M ₁ 86.18	M _V	Z _{Vi} 0.03713		hexane 86.18	M _V	Z _{Vi} 0.03806	_	hexane 86.18	M _V	Z _{Vi} 0.04138	
	benzene	78.11	61	0.03713		benzene 78.11	61	0.03806	 	benzene 78.11	61	0.04138	·
	2.2.4 TMP	114.23	61	0.00312	-	2,2,4 TMP 114.23	61	0.00322	 	2,2,4 TMP 114,23	61	0.00356	
	toluene	92.14	61	0.00304		toluene 92.14	61	0.00313	 	toluene 92.14	61	0.00332	
ethy	/lbenzene	106.17	61	0.00023		ethylbenzene 106.17	61	0.00002	 	ethylbenzene 106.17	61	0.00046	
	xylenes	106.17	61	0.00062		xylenes 106.17	61	0.00066		xylenes 106.17	61	0.00079	
	cumene	120.19	61	0.00002		cumene 120.19	61	0.00002		cumene 120.19	61	0.00003	
na	phthalene	128.17	61	6.49E-07		naphthalene 128.17	61	7.07E-07		naphthalene 128.17	61	9.42E-07	
Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$						Vapor Mole Fraction Eq. 40-5 y	= P _i / P _{VA}			Vapor Mole Fraction Eq. 40-5 y _i	= P _i / P _{VA}		
		$P_i = P_{VAI}(x_i)$	P _{VA}	y _i		$P_i = P_{VAI}(x_i)$	P _{VA}	y _i		$P_i = P_{VAI}(x_i)$	P _{VA}	y _i	
	hexane	0.098594	3.751	0.0262849		hexane 0.106663	3.959	0.02694		hexane 0.139694	4.769	0.02929	
	benzene	0.009140	3.751	0.00244		benzene 0.009941	3.959	0.00251		benzene 0.013259	4.769	0.00278	1
	2,2,4 TMP	0.006095	3.751	0.00162		2,2,4 TMP 0.006651	3.959	0.00168		2,2,4 TMP 0.008972	4.769	0.00188	i
	toluene		3.751	0.00192		toluene 0.007911	3.959	0.00200		toluene 0.010919	4.769	0.00229	
ethy	/lbenzene	0.000446	3.751	0.00012		ethylbenzene 0.000496	3.959	0.00013		ethylbenzene 0.000714	4.769	0.00015	
	xylenes		3.751	0.00036		xylenes 0.001499	3.959	0.00038		xylenes 0.002162	4.769	0.00045	
	cumene		3.751	0.00001		cumene 4.57E-05	3.959	0.00001		cumene 6.77E-05	4.769	0.00001	
	phthalene	1.16E-06	3.751	0.00000		naphthalene 1.33E-06	3.959	0.00000		naphthalene 2.14E-06	4.769	0.00000	
Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$					V	Liquid Mole Fraction Eq. 40-4 x _i =			V	Liquid Mole Fraction Eq. 40-4 x _i =		 	· · ·
	h	Z _{Li} 0.136	ML	M _i	X _i	Z _L	M _L	M _i	X _i	Z _{Li}	ML	M _i	X _i
	hexane benzene	0.136	92 92	86.18 78.11	0.14518 0.02356	hexane 0.136 benzene 0.02	92	86.18 78.11	0.14518 0.02356	hexane 0.136 benzene 0.02	92 92	86.18 78.11	0.14518 0.02356
	2.2.4 TMP	0.02	92	114.23	0.02330	2,2,4 TMP 0.04	92	114.23	0.03222	2.2.4 TMP 0.04		114.23	0.02330
	toluene	0.075	92	92.14	0.03222	toluene 0.075	92	92.14	0.07489	toluene 0.075	92	92.14	0.07489
ethy	/lbenzene	0.02	92	106.17	0.01733	ethylbenzene 0.02	92	106.17	0.01733	ethylbenzene 0.02	92	106.17	0.01733
	xylenes	0.07	92	106.17	0.06066	xylenes 0.07	92	106.17		xylenes 0.07	92	106.17	0.06066
	cumene	0.005	92	120.19	0.00383	cumene 0.005	92	120.19	0.00383	cumene 0.005	92	120.19	0.00383
na	phthalene	0.00415	92	128.17	0.00298	naphthalene 0.00415	92	128.17	0.00298	naphthalene 0.00415	92	128.17	0.00298
Component Vapor pressure P _{VAI} =(0.019337)10^(A-(B/(TLA	\+C)))					Component Vapor pressure P _{VAi}	=(0.019337)1	10^(A-(B/(TL	_A+C)))	Component Vapor pressure P _{VAi} =	(0.019337)1	0^(A-(B/(TL	A+C)))
		Α	В	С	P _{VAi}	A	В	С	P _{VAi}	A	В	С	P _{VAi}
	hexane	6.878	1171.5	224.37	0.68	hexane 6.878	1171.5	224.37	0.73	hexane 6.878	1171.5	224.37	0.96
	benzene	6.906	1211	220.79	0.39	benzene 6.906	1211	220.79	0.42	benzene 6.906	1211	220.79	0.56
	2,2,4 TMP	6.812	1257.8	220.74	0.19	2,2,4 TMP 6.812	1257.8	220.74		2,2,4 TMP 6.812	1257.8	220.74	0.28
	toluene	7.017	1377.6	222.64	0.10	toluene 7.017	1377.6	222.64		toluene 7.017	1377.6	222.64	0.15
ethy	/lbenzene	6.95	1419.3	212.61	0.03	ethylbenzene 6.95	1419.3	212.61	0.03	ethylbenzene 6.95	1419.3	212.61	0.04
	xylenes	7.009	1462.3	215.11	0.02	xylenes 7.009	1462.3	215.11	0.02	xylenes 7.009	1462.3	215.11	0.04
	cumene	6.929	1455.8	207.2	0.01	cumene 6.929	1455.8	207.2	0.01	cumene 6.929	1455.8	207.2	0.02
na	phthalene	7.146	1831.6	211.82	0.00	naphthalene 7.146	1831.6	211.82	0.00	naphthalene 7.146	1831.6	211.82	0.00

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MONTH	April				MONTH	May				MONTH	June			
		Symbol		Units			Symbol		Units			Symbol		Units
Product Type			Componen	t (Average RVP	Product Type			Componen	it (Average RVP 1	Product Type			Componen	t (Average RVP 14
Vapor Molecular weight		M _v	61.00		Vapor Molecular weight		Μ _ν	61.00		Vapor Molecular weight		M _v	61.00	
Vapor Pressure Equatio	on Constant	Α	11.61		Vapor Pressure Equatio	n Constant	Α	11.61		Vapor Pressure Equation	n Constant .	Α	11.61	
Vapor Pressure Equatio		В		°R	Vapor Pressure Equatio		В	4971.67	°R	Vapor Pressure Equation		В		°R
Daily total solar insolation		ı		Btu/ft ² -day	Daily total solar insolation		ı		Btu/ft ² -day	Daily total solar insolation				Btu/ft ² -day
Average Daily Ambient		re Ea. 1-30		Dia/it -day	Average Daily Ambien		re Ea. 1-30	11 00.0	Dia/it -day	Average Daily Ambien		re Ea. 1-30		Dia/it -day
TAA = ((TA)		T _{AA}		°R	TAA = ((TA)		TAA	517.90	°R	TAA = ((TA)		TAA	•	°R
Average dai		T _{AX}	517.50		Average dai	, ,	T _{AX}		°R	Average da		T _{AX}	537.30	
											_			
Average dai		T _{AN}	497.40	⁻ R	Average dai		T _{AN}	507.40	°R	Average da	,	T _{AN}	517.60	⁻ R
True Vapor Pressure E			0.407		True Vapor Pressure E			7.400		True Vapor Pressure E		_	0.000	
PvA = exp(A	A-(B/TLA))	P _{vA}	6.127	psia	PvA = exp(A	\-(B/TLA))	P _{vA}	7.466	psia	PvA = exp(A	A-(B/TLA))	P _{vA}	8.883	psia
HAPS Speciation					HAPS Speciation					HAPS Speciation				
Product - sele			blendstock		Product - sele			blendstock		Product - sele			blendstock	
Vapor Weight Concent	$Z_{Vi} = y_i M_i / M_i$				Vapor Weight Concent	$Z_{Vi} = y_i M_i / N_i$	l _ν			Vapor Weight Concent	$Z_{Vi} = y_i M_i / N$			
	M_i	M_{V}	Z_{Vi}			Mi	M_{V}	Z _{vi}			Mi	M_V	Z _{vi}	
hexane	86.18	61	0.04615		hexane	86.18	61	0.05017		hexane	86.18	61	0.05388	
benzene	78.11	61	0.00407		benzene	78.11	61	0.00450		benzene	78.11	61	0.00491	
2,2,4 TMP	114.23	61	0.00409		2,2,4 TMP	114.23	61	0.00458		2,2,4 TMP	114.23	61	0.00505	
toluene	92.14	61	0.00414		toluene	92.14	61	0.00475		toluene	92.14	61	0.00534	
ethylbenzene	106.17	61	0.00033		ethylbenzene	106.17	61	0.00039		ethylbenzene	106.17	61	0.00046	
xylenes	106.17	61	0.00100		xylenes	106.17	61	0.00120		xylenes	106.17	61	0.00140	
cumene	120.19	61	0.00004		cumene	120.19	61	0.00005		cumene	120.19	61	0.00005	
naphthalene	128.17	61	1.38E-06		naphthalene	128.17	61	1.84E-06		naphthalene	128.17	61	2.37E-06	
Vapor Mole Fraction E					Vapor Mole Fraction E					Vapor Mole Fraction E				
	$P_i = P_{VAI}(x_i)$	P _{VA}	y _i			$P_i = P_{VAI}(x_i)$	P _{VA}	y _i			$P_i = P_{VAI}(x_i)$	P _{VA}	y _i	
hexane	0.200152	6.127	0.03267		hexane	0.265125	7.466	0.03551		hexane	0.338806	8.883	0.03814	
benzene 2,2,4 TMP	0.019459	6.127	0.00318		benzene 2,2,4 TMP	0.026257	7.466	0.00352		benzene 2,2,4 TMP	0.034093	8.883	0.00384	
toluene	0.013366 0.016774	6.127 6.127	0.00218 0.00274			0.018248 0.023460	7.466 7.466	0.00244 0.00314		toluene	0.023938 0.031433	8.883 8.883	0.00269 0.00354	
ethylbenzene	0.010774	6.127	0.00274		toluene ethylbenzene	0.023400	7.466	0.000314		ethylbenzene	0.002346	8.883	0.00334	
xylenes	0.001139	6.127	0.00019		xylenes	0.001090	7.466	0.00023		xylenes	0.002340	8.883	0.00020	
cumene	1.14E-04	6.127	0.000037		cumene	1.71E-04	7.466	0.00003		cumene	2.44E-04	8.883	0.00003	
naphthalene	4.01E-06	6.127	0.00000		naphthalene	6.55E-06	7.466	0.00000		naphthalene		8.883	0.00000	
Liquid Mole Fraction E			0.00000		Liquid Mole Fraction E			0.00000		Liquid Mole Fraction E			0.00000	
	Z _{Li}	M _L	M,	X _i		Z _{Li}	M ₁	M _i	X _i		Z _{Li}	M _L	M;	X _i
hexane	0.136	92	86.18	0.14518	hexane	0.136	92	86.18	0.14518	hexane	0.136	92	86.18	0.1451
benzene	0.02	92	78.11	0.02356	benzene	0.02	92	78.11	0.02356	benzene	0.02	92	78.11	0.0235
2,2,4 TMP	0.04	92	114.23	0.03222	2,2,4 TMP	0.04	92	114.23	0.03222	2,2,4 TMP	0.04	92	114.23	0.0322
toluene	0.075	92	92.14	0.07489	toluene	0.075	92	92.14	0.07489	toluene	0.075	92	92.14	0.0748
ethylbenzene	0.02	92	106.17	0.01733	ethylbenzene	0.02	92	106.17	0.01733	ethylbenzene	0.02	92	106.17	0.0173
xylenes	0.07	92	106.17	0.06066	xylenes	0.07	92	106.17	0.06066	xylenes	0.07	92	106.17	0.0606
cumene	0.005	92	120.19	0.00383	cumene	0.005	92	120.19	0.00383	cumene	0.005	92	120.19	0.0038
naphthalene	0.00415	92	128.17	0.00298	naphthalene	0.00415	92	128.17	0.00298	naphthalene	0.00415	92	128.17	0.00298
Component Vapor pre	ssure P _{VAi} =	(0.019337)1	0^(A-(B/(TL	A+C)))	Component Vapor pres	ssure P _{VAi} =	(0.019337)1	0^(A-(B/(TL	.A+C)))	Component Vapor pre	ssure P _{VAi} =	(0.019337)1	10^(A-(B/(TL	A+C)))
	Α	В	С	P _{VAi}		Α	В	С	P _{VAi}		Α	В	С	P _{VAi}
hexane	6.878	1171.5	224.37	1.38	hexane	6.878	1171.5	224.37	1.83	hexane	6.878	1171.5	224.37	2.33
benzene	6.906	1211	220.79	0.83	benzene	6.906	1211	220.79	1.11	benzene	6.906	1211	220.79	1.45
2,2,4 TMP	6.812	1257.8	220.74	0.41	2,2,4 TMP	6.812	1257.8	220.74	0.57	2,2,4 TMP	6.812	1257.8	220.74	0.74
toluene	7.017	1377.6	222.64	0.22	toluene	7.017	1377.6	222.64	0.31	toluene	7.017	1377.6	222.64	0.42
ethylbenzene	6.95	1419.3	212.61	0.07	ethylbenzene	6.95	1419.3	212.61	0.10	ethylbenzene	6.95	1419.3	212.61	0.14
xylenes	7.009	1462.3	215.11	0.06	xylenes	7.009	1462.3	215.11	0.08	xylenes	7.009	1462.3	215.11	0.12
cumene	6.929	1455.8	207.2	0.03	cumene	6.929	1455.8	207.2	0.04	cumene	6.929	1455.8	207.2	0.06
naphthalene	7.146	1831.6	211.82	0.00	naphthalene	7.146	1831.6	211.82	0.00	naphthalene	7.146	1831.6	211.82	0.00

MONTH	July				MONTH	August				MONTH	September			
		Symbol		Units			Symbol		Units			Symbol		Units
Product Type			Componen	t (Average RVP 1	Product Type			Componen	t (Average RVP 1	Product Type			Componen	t (Average RV
Vapor Molecular weight		M_{v}	61.00		Vapor Molecular weight		M_v	61.00		Vapor Molecular weight		M_{v}	61.00	
Vapor Pressure Equation Cor	nstant /	Α	11.61		Vapor Pressure Equation	n Constant	Α	11.61		Vapor Pressure Equatio	n Constant A	Α	11.61	
Vapor Pressure Equation Cor	nstant I	В	4971.67	°R	Vapor Pressure Equation	n Constant	В	4971.67	°R	Vapor Pressure Equatio	n Constant l	В	4971.67	°R
Daily total solar insolation on	a horiz		1872.0	Btu/ft ² -day	Daily total solar insolation	on on a horiz	ı	1640.0	Btu/ft ² -day	Daily total solar insolation	n on a horiz	ı	1300.0	Btu/ft ² -day
Average Daily Ambient Tem	peratur	e Eq. 1-30		,	Average Daily Ambien	t Temperati	re Eg. 1-30		,	Average Daily Ambient	Temperatu	re Eq. 1-30		
TAA = ((TAX+TA		TAA	531.35	°R	TAA = ((TA		T _{AA}	530.15	°R	TAA = ((TA)		T _{AA}	522.05	°R
Average daily ma	' '	T _{AX}		°R	Average da		T _{AX}	539.70		Average dai		T _{AX}	531.70	
Average daily mir		T _{AN}	521.70			ily minimum	T _{AN}	520.60		Average dai		T _{AN}	512.40	
		' AN	321.70	K		,	¹ AN	320.00	K		•	' AN	312.40	K
True Vapor Pressure Eq. 1-2		- В	9.519	naia	True Vapor Pressure E PvA = exp(/		ь	9.320	noio	True Vapor Pressure E PvA = exp(A		P _{vA}	8.058	naia
PvA = exp(A-(B/T	LA))	P _{vA}	9.519	psia		4-(D/TLA))	P _{vA}	9.320	psia		A-(D/TLA))	F _{VA}	6.036	psia
HAPS Speciation			la la cardada a la		HAPS Speciation	of Control Park		la la sa ala 4 a ala		HAPS Speciation			 	
Product - select fro			blendstock		Product - sele			blendstock		Product - sele			blendstock	
Vapor Weight ConcentZ _{vi} =					Vapor Weight Concen			<u> </u>		Vapor Weight Concent			<u> </u>	ļ
ļ	Mi	M _V	Z _{Vi}		ļ	M _i	M _V	Z _{Vi}		ļ	M _i	M _V	Z _{Vi}	
hexane	86.18	61	0.05541		hexane	86.18	61	0.05494		hexane	86.18	61	0.05178	
benzene	78.11	61	0.00509		benzene	78.11	61	0.00503		benzene	78.11	61	0.00468	
	114.23 92.14	61 61	0.00524 0.00560		2,2,4 TMP toluene	114.23 92.14	61 61	0.00518 0.00552		2,2,4 TMP	114.23 92.14	61 61	0.00478 0.00500	
	106.17	61	0.00360		ethylbenzene	106.17	61	0.00032		toluene ethylbenzene	106.17	61	0.00500	
	106.17	61	0.00049		xylenes	106.17	61	0.00048		xylenes	106.17	61	0.00042	
	120.19	61	0.00006		cumene	120.19	61	0.00006		cumene	120.19	61	0.00005	
	128.17	61	2.62E-06		naphthalene	128.17	61	2.54E-06		naphthalene	128.17	61	2.06E-06	-
Vapor Mole Fraction Eq. 40-		-	2.022 00		Vapor Mole Fraction E			2.0.2.00		Vapor Mole Fraction E			2.002 00	
	$P_{VAI}(x_i)$	P _{VA}	y _i			$P_i = P_{VAI}(x_i)$		y _i			$P_i = P_{VAI}(x_i)$	P _{VA}	y _i	-
	73357	9.519	0.03922		hexane		9.320	0.03889		hexane	0.295329	8.058	0.03665	
	37806	9.519	0.00397		benzene		9.320	0.00393		benzene	0.029455	8.058	0.00366	
	26652	9.519	0.00280		2,2,4 TMP		9.320	0.00277		2,2,4 TMP	0.020563	8.058	0.00255	
	35292	9.519	0.00371		toluene		9.320	0.00366		toluene	0.026683	8.058	0.00331	
ethylbenzene 0.0	02671	9.519	0.00028		ethylbenzene		9.320	0.00028		ethylbenzene	0.001952	8.058	0.00024	
xylenes 0.0	08171	9.519	0.00086		xylenes	0.007850	9.320	0.00084		xylenes	0.005956	8.058	0.00074	
cumene 2.8	30E-04	9.519	0.00003		cumene	2.69E-04	9.320	0.00003		cumene	2.00E-04	8.058	0.00002	
naphthalene 1.1	9E-05	9.519	0.00000		naphthalene	1.13E-05	9.320	0.00000		naphthalene	7.90E-06	8.058	0.00000	
Liquid Mole Fraction Eq. 40)-4 x _i = (2	$Z_{Li}M_L)/M_i$			Liquid Mole Fraction E	q. 40-4 x _i =	$(Z_{Li}M_L)/M_i$			Liquid Mole Fraction E	q. 40-4 x _i =	$(Z_{Li}M_L)/M_i$		
	Z_{Li}	ML	Mi	X_{i}		\mathbf{Z}_{Li}	ML	Mi	X_{i}		\mathbf{Z}_{Li}	ML	Mi	X _i
hexane	0.136	92	86.18	0.14518	hexane	0.136	92	86.18	0.14518	hexane	0.136	92	86.18	0.14518
benzene	0.02	92	78.11	0.02356	benzene	0.02		78.11	0.02356	benzene	0.02	92	78.11	0.02356
2,2,4 TMP	0.04	92	114.23	0.03222	2,2,4 TMP	0.04	92	114.23	0.03222	2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.075	92	92.14	0.07489	toluene	0.075	92	92.14	0.07489	toluene	0.075	92	92.14	
ethylbenzene	0.02	92	106.17	0.01733	ethylbenzene	0.02	92	106.17	0.01733	ethylbenzene	0.02	92	106.17	0.01733
xylenes	0.07	92	106.17	0.06066	xylenes	0.07	92	106.17	0.06066	xylenes	0.07	92	106.17	0.06066
cumene	0.005	92	120.19	0.00383	cumene	0.005 0.00415	92	120.19	0.00383	cumene	0.005 0.00415	92	120.19	0.00383
		92	128.17	0.00298	naphthalene Component Vapor pre			128.17	0.00298	naphthalene		92	128.17	0.00298
Component Vapor pressure					Component vapor pre					Component Vapor pre				
LI	6 070	1171 F	C 224.27	P _{VAi}	L	A 6 070		C 224.27	P _{VAi}	L	6 070		C 224.27	P _{VAi}
	6.878	1171.5	224.37	2.57	hexane			224.37	2.50	hexane	6.878	1171.5	224.37	2.03
	6.906 6.812	1211 1257.8	220.79 220.74	1.60 0.83	benzene 2,2,4 TMP	6.906 6.812	1211 1257.8	220.79 220.74	1.55 0.80	benzene 2,2,4 TMP	6.906 6.812	1211 1257.8	220.79 220.74	
	7.017	1377.6	220.74	0.63	toluene	7.017	1377.6	220.74	0.45	toluene	7.017	1377.6	220.74	0.84
ethylbenzene	6.95	1419.3	212.61	0.47	ethylbenzene	6.95	1419.3	212.61	0.45	ethylbenzene	6.95	1419.3	212.61	0.30
xylenes	7.009	1462.3	215.11	0.13	xylenes	7.009	1462.3	215.11	0.13	xylenes	7.009	1462.3	215.11	0.11
·	6.929	1455.8	207.2	0.07	cumene	6.929	1455.8	207.2	0.07	cumene	6.929	1455.8	207.2	0.05
	7.146	1831.6	211.82	0.00	naphthalene			211.82		naphthalene	7.146		211.82	

MONTH	October				MONTH	November				MONTH	December			
		Symbol		Units			Symbol		Units			Symbol		Units
roduct Type			Componen	it (Average RVP 14	Product Type			Componen	t (Average RVP 1	Product Type			Componer	t (Average RVP 1
apor Molecular weight		M _v	61.00		Vapor Molecular weight		M _v	61.00		Vapor Molecular weight		M _v	61.00	
apor Pressure Equatior	Constant	A	11.61		Vapor Pressure Equatio	n Constant	A	11.61		Vapor Pressure Equatio		A	11.61	
apor Pressure Equation		В	4971.67	°R	Vapor Pressure Equatio		В	4971.67	°R	Vapor Pressure Equatio		В	4971.67	°R
ailv total solar insolation		<u> </u>		Btu/ft ² -dav	Daily total solar insolation		ī		Btu/ft ² -day	Daily total solar insolation				Btu/ft ² -day
verage Daily Ambient		re Fr. 1-30	002.0	Did/it -day	Average Daily Ambient		-	001.0	Diu/it -day	Average Daily Ambient				Did/it -day
TAA = ((TAX		T _{AA}	509.75	°D	TAA = ((TA)		T _{AA}	499.80	°D	TAA = ((TA)		T _{AA}	488.85	°D
**					,,,								495.60	
Average dail		T _{AX}	519.00		Average dai		T _{AX}	507.40		Average dai				
Average dail	_	T _{AN}	500.50	°R	Average dai	•	T _{AN}	492.20	°R	Average dai		T _{AN}	482.10	°R
ue Vapor Pressure E					True Vapor Pressure E	•				True Vapor Pressure E				
PvA = exp(A	-(B/TLA))	P_{vA}	6.404	psia	PvA = exp(A	۸-(B/TLA))	P_{vA}	5.273	psia	PvA = exp(A	4-(B/TLA))	P _{vA}	4.220	psia
APS Speciation					HAPS Speciation					HAPS Speciation				
Product - selec			blendstock		Product - sele			blendstock		Product - sele			blendstock	
apor Weight Concent	$Z_{Vi} = y_i M_i / M$	v			Vapor Weight Concent	$Z_{Vi} = y_i M_i / N_i$	۸ _v			Vapor Weight Concent	$Z_{Vi} = y_i M_i / N_i$	VI _V		
	Mi	Μ _V	Z_{Vi}			Mi	M_{V}	Z_{Vi}			Mi	M_V	Z_{Vi}	
hexane	86.18	61	0.04703		hexane	86.18	61	0.04326		hexane	86.18	61	0.03918	
benzene	78.11	61	0.00416		benzene	78.11	61	0.00376		benzene	78.11	61	0.00333	
2,2,4 TMP	114.23	61	0.00419		2,2,4 TMP	114.23	61	0.00374		2,2,4 TMP	114.23	61	0.00327	
toluene	92.14	61	0.00427		toluene	92.14	61	0.00372		toluene	92.14		0.00316	
ethylbenzene	106.17	61	0.00034		ethylbenzene	106.17	61	0.00029		ethylbenzene	106.17	61	0.00023	
xylenes	106.17	61	0.00104		xylenes	106.17	61	0.00087		xylenes	106.17	61	0.00070	
cumene	120.19	61	0.00004		cumene	120.19	61	0.00003		cumene	120.19		0.00002	
naphthalene	128.17	61	1.47E-06		naphthalene	128.17	61	1.10E-06		naphthalene	128.17		7.80E-07	
por Mole Fraction Ed					Vapor Mole Fraction E					Vapor Mole Fraction E				
	$P_i = P_{VAI}(x_i)$	P _{VA}	y i			$P_i = P_{VAI}(x_i)$	P_{VA}	y i			$P_i = P_{VAI}(x_i)$		y _i	
hexane	0.213182	6.404	0.03329		hexane	0.161457	5.273	0.03062		hexane	0.117033		0.02773	
benzene	0.020812	6.404	0.00325		benzene	0.015474	5.273	0.00293		benzene	0.010976		0.00260	
2,2,4 TMP	0.014333	6.404	0.00224		2,2,4 TMP	0.010534	5.273	0.00200		2,2,4 TMP	0.007373		0.00175	
toluene	0.018085	6.404	0.00282		toluene	0.012979	5.273	0.00246		toluene	0.008838		0.00209	
ethylbenzene	0.001261	6.404	0.00020		ethylbenzene	0.000868	5.273	0.00016		ethylbenzene	0.000562		0.00013	
xylenes	0.003834	6.404 6.404	0.00060		xylenes	0.002631	5.273	0.00050 0.00002		xylenes	0.001700		0.00040	
cumene naphthalene	1.25E-04 4.48E-06	6.404	0.00002 0.00000		cumene naphthalene	8.36E-05 2.75E-06	5.273 5.273	0.00002		cumene naphthalene	5.23E-05 1.57E-06		0.00001 0.00000	
quid Mole Fraction E			0.00000		Liquid Mole Fraction E			0.00000		Liquid Mole Fraction E			0.00000	
quid wiole Fraction Et		<u>Z_i V _</u> // V _i M _i	M;	X,	Liquid Wole Fraction E			M _i		Liquid Mole Fraction E		M _I	M,	· ·
havana	Z _{Li}	_			havana	Z _{Li}	ML		X _i	havana	Z _{Li} 0.136			X _i
hexane	0.136 0.02	92 92	86.18 78.11	0.14518 0.02356	hexane benzene	0.136 0.02	92 92	86.18 78.11		hexane benzene	0.136	92 92	86.18 78.11	0.1451 0.0235
benzene 2,2,4 TMP	0.02	92	114.23	0.02356	2,2,4 TMP	0.02	92	114.23		2,2,4 TMP	0.02	92	114.23	0.023
toluene	0.04	92	92.14		toluene	0.04	92	92.14		toluene	0.04	92	92.14	0.0322
ethylbenzene	0.073	92	106.17	0.01733	ethylbenzene	0.073	92	106.17		ethylbenzene	0.073	92	106.17	0.0173
xylenes	0.02	92	106.17	0.06066	xylenes	0.07	92	106.17		xylenes	0.02	92	106.17	0.0606
cumene	0.005	92	120.19		cumene	0.005	92	120.19		cumene	0.005	92	120.19	0.0038
naphthalene	0.00415	92	128.17	0.00298	naphthalene	0.00415	92	128.17		naphthalene	0.00415		128.17	0.00298
omponent Vapor pres					Component Vapor pres					Component Vapor pre			#N/A	
	A	В	C	P _{VAi}		A		C	P _{VAi}		A		С	P_{VAi}
hexane	6.878	1171.5	224.37		hexane	6.878	1171.5	224.37		hexane	6.878		224.37	0.81
benzene	6.906	1211	220.79		benzene	6.906	1211	220.79		benzene	6.906		220.79	
2,2,4 TMP	6.812	1257.8	220.74		2,2,4 TMP	6.812	1257.8	220.74		2,2,4 TMP	6.812		220.74	
toluene	7.017	1377.6	222.64		toluene	7.017	1377.6	222.64		toluene	7.017		222.64	
ethylbenzene	6.95	1419.3	212.61	0.07	ethylbenzene	6.95	1419.3	212.61		ethylbenzene	6.95		212.61	0.03
xylenes	7.009	1462.3	215.11	0.06	xylenes	7.009	1462.3	215.11		xylenes	7.009	1462.3	215.11	0.03
cumene	6.929	1455.8	207.2		cumene	6.929	1455.8	207.2		cumene	6.929		207.2	0.01
naphthalene	7.146	1831.6	211.82		naphthalene	7.146		211.82		naphthalene	7.146		211.82	0.00

Landing and Cleaning Speciation - Gasoline

Nearest US Location Albany, NY

	<u>MON</u> TH	January				MONTH February				MONTH Marc	:h		
·			Symbol		Units		Symbol		Units		Symbol		Units
Product Type				Gasoline -	RVP 15	Product Type		Gasoline -	RVP 15	Product Type		Gasoline -	RVP 13.5
Vapor Molecular weight			M _v	66.00		Vapor Molecular weight	M_{v}	66.00		Vapor Molecular weight	M _v	66.00	
Vapor Pressure Equation Constant A			A	11.60		Vapor Pressure Equation Constant	A	11.60		Vapor Pressure Equation Constar		11.63	
Vapor Pressure Equation Constant B			В	4937.93	°R	Vapor Pressure Equation Constant	В	4937.93	°R	Vapor Pressure Equation Constar		5015.72	°R
Daily total solar insolation on a horizontal surface			ī		Btu/ft ² -day	Daily total solar insolation on a hori	1 -	 	+ · · · · · · · · · · · · · · · · · · ·	Daily total solar insolation on a ho			Btu/ft ² -day
Average Daily Ambient Temperature Eq. 1-30			<u> </u>	332.0	Blu/II -day	Average Daily Ambient Temperat	4 '		Blu/IL -day	Average Daily Ambient Tempera		1090.0	blu/it -day
	TAA = ((TAX+TAN)/	(2)	TAA	483.25	°D	TAA = ((TAX+TAN)/2)		485.80	°R	TAA = ((TAX+TAN)/2)		494.80	°D
	- (()				<u> </u>		TAA		1 1				
	Average daily maxin		T _{AX}	490.70		Average daily maximur	T _{AX}	493.80	<u> </u>	Average daily maximu		503.50	
	Average daily minim	um ambient	T _{AN}	475.80	°R	Average daily minimun	T _{AN}	477.80	°R	Average daily minimu	m T _{AN}	486.10	°R
True Vapor Pressure Eq. 1-25:						True Vapor Pressure Eq. 1-25:				True Vapor Pressure Eq. 1-25:			
	PvA = exp(A-(B/TLA))	v))	P_{vA}	3.982	psia	PvA = exp(A-(B/TLA))	P_{vA}	4.201	psia	PvA = exp(A-(B/TLA))	P _{vA}	4.461	psia
HAPS Speciation						HAPS Speciation				HAPS Speciation			
	Product - sele	ect from list		Gasoline		Product - select from lis		Gasoline		Product - select from li	st	Gasoline	
Vapor Weight Concentrations Eq. 40-6		$Z_{Vi} = y_i M_i / N_i$	N _∨			Vapor Weight Concent Z _{Vi} = y _i M _i /	Μ _V			Vapor Weight Concent Z _{vi} = y _i M _i	/ M _V	1	1
		M _i	M _V	Z _{vi}		M	M _V	Z _{Vi}			M₁ M _V	Z _{Vi}	
	hexane	86.18	66	0.00248		hexane 86.18	66	0.00254		hexane 86.1	8 66	0.00301	
	benzene	78.11	66	0.00255		benzene 78.1	66	0.00263		benzene 78.1	1 66	0.00317	
	2,2,4 TMP	114.23	66	0.00276		2,2,4 TMP 114.23	66	0.00286		2,2,4 TMP 114.2	23 66	0.00348	
	toluene	92.14	66	0.00246		toluene 92.14	66	0.00256		toluene 92.1	4 66	0.00319	
	ethylbenzene	106.17	66	0.00013		ethylbenzene 106.17	66	0.00014		ethylbenzene 106.1	7 66	0.00018	
	xylenes	106.17	66	0.00057		xylenes 106.17	66	0.00060		xylenes 106.1		0.00078	
	cumene	120.19	66	0.00002		cumene 120.19	66	0.00002		cumene 120.1		0.00003	
	naphthalene	128.17	66	5.90E-07		naphthalene 128.17	66	6.42E-07		naphthalene 128.1		9.31E-07	
Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$						Vapor Mole Fraction Eq. 40-5 y	= P _i / P _{VA}			Vapor Mole Fraction Eq. 40-5			
		$P_i = P_{VAI}(x_i)$	P _{VA}	y i		$P_{i} = P_{VAI}(x_{i})$	P _{VA}	y i		$P_i = P_{VAI}(x)$	(i) P _{VA}	y i	1
	hexane	0.007565	3.982	0.0018999		hexane 0.008184	4.201	0.00195		hexane 0.01027	2 4.461	0.00230	
	benzene		3.982	0.00216		benzene 0.009336	4.201	0.00222		benzene 0.01193	4.461	0.00268	l .
	2,2,4 TMP		3.982	0.00160		2,2,4 TMP 0.006940	4.201	0.00165		2,2,4 TMP 0.00897		0.00201	
	toluene		3.982	0.00176		toluene 0.007705	4.201	0.00183		toluene 0.01019		0.00228	
	ethylbenzene		3.982	0.00008		ethylbenzene 0.000362	4.201	0.00009		ethylbenzene 0.00050	_	0.00011	
	xylenes		3.982	0.00035		xylenes 0.001564	4.201	0.00037		xylenes 0.00216		0.00048	1
	cumene		3.982	0.00001		cumene 4.77E-05	4.201	0.00001		cumene 6.77E-0		0.00002	
	naphthalene	1.21E-06	3.982	0.00000		naphthalene 1.39E-06	4.201	0.00000		naphthalene 2.14E-0		0.00000	
Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$						Liquid Mole Fraction Eq. 40-4 x _i :	· ·			Liquid Mole Fraction Eq. 40-4 x _i			
		Z_{Li}	M _L	Mi	X _i	Z _L		Mi	X _i			M _i	X _i
	hexane		96	86.18		hexane 0.0		86.18		hexane 0.0		86.18	0.01068
	benzene	0.018	96	78.11	0.02212	benzene 0.018	96	78.11	0.02212	benzene 0.0°		78.11	0.02120
	2,2,4 TMP	0.04	96	114.23	0.03362	2,2,4 TMP 0.04	96	114.23	0.03362	2,2,4 TMP 0.0		114.23	0.03222
	toluene	0.07	96	92.14	0.07293	toluene 0.0	96	92.14	0.07293	toluene 0.0		92.14	0.06989
	ethylbenzene	0.014	96	106.17	0.01266	ethylbenzene 0.01	96	106.17		ethylbenzene 0.0		106.17	0.01213
	xylenes	0.07	96	106.17	0.06329	xylenes 0.0	96	106.17	0.06329	xylenes 0.0		106.17	0.06066
	cumene	0.005	96	120.19	0.00399	cumene 0.000	96	120.19	0.00399	cumene 0.00		120.19	0.00383
Component Vapor processo B =/0.040337\404	naphthalene	0.00415	96	128.17	0.00311	naphthalene 0.0041	96	128.17		naphthalene 0.004		128.17	0.00298
Component Vapor pressure P _{VAi} =(0.019337)10^((A-(B/(TLA+C)))	<u> </u>				Component Vapor pressure P _{VAI}				Component Vapor pressure P _V			
	h	A 0.070	B	C 204.07	P _{VAi}	havenal 0.070		C 204.07	P _{VAi}		A B	C 204.07	P _{VAi}
	hexane		1171.5	224.37	0.68	hexane 6.878		224.37	0.73	hexane 6.87		224.37	0.96
	benzene	6.906	1211	220.79	0.39	benzene 6.906	1211	220.79	0.42	benzene 6.90		220.79	0.56
	2,2,4 TMP	6.812	1257.8 1377.6	220.74 222.64	0.19	2,2,4 TMP 6.812 toluene 7.017	1257.8 1377.6	220.74 222.64	0.21 0.11	2,2,4 TMP 6.8 ² toluene 7.0 ²		220.74 222.64	0.28 0.15
	toluene			/// 04			0.1161	· /// 04			/ L L3// D		
	toluene	7.017						-					
	ethylbenzene	6.95	1419.3	212.61	0.03	ethylbenzene 6.95	1419.3	212.61	0.03	ethylbenzene 6.9	5 1419.3	212.61	0.04
								-			95 1419.3 99 1462.3		

MONTH	April				MONTH	May				MONTH	June			
		Symbol		Units			Symbol		Units			Symbol		Units
Product Type			Gasoline -	RVP 13	Product Type			Gasoline -	RVP 9	Product Type			Gasoline -	RVP 9
Vapor Molecular weight		M _v	66.00		Vapor Molecular weight		M _v	66.00		Vapor Molecular weight		M _v	66.00	
Vapor Pressure Equation	n Constant	A	11.64		Vapor Pressure Equatio		A	11.76		Vapor Pressure Equatio	n Constant	A	11.76	
Vapor Pressure Equation		В	5043.58	°R	Vapor Pressure Equatio			5315.06	°R	Vapor Pressure Equatio		В	5315.06	
Daily total solar insolation					Daily total solar insolation			1739.0	Btu/ft ² -day	Daily total solar insolation		ī		Btu/ft ² -day
Average Daily Ambient		re Fr. 1-30		Did/it -day	Average Daily Ambient			1700.0	Dia/it -day	Average Daily Ambient		re Fa 1-30		Dia/it -day
TAA = ((TAX		T _{AA}	507.45	°D	TAA = ((TA)		T _{AA}	517.90	°D	TAA = ((TA)		T _{AA}	527.45	°D
Average dail			517.50		Average dai			528.40	°R	Average dai			537.30	
	_	T _{AX}			{ —————		T _{AX}				,	T _{AX}	-	
Average dail		T_{AN}	497.40	°R	Average dai	,	T _{AN}	507.40	°R	Average dai	,	T _{AN}	517.60	°R
True Vapor Pressure E			5 400		True Vapor Pressure E			4.450		True Vapor Pressure E			5.000	 .
PvA = exp(A	-(B/TLA))	P _{vA}	5.499	psia	PvA = exp(A	A-(B/TLA))	P _{vA}	4.453	psia	PvA = exp(A	A-(B/TLA))	P _{vA}	5.362	psia
HAPS Speciation					HAPS Speciation					HAPS Speciation				
Product - selec			Gasoline		Product - sele			Gasoline		Product - sele			Gasoline	
Vapor Weight Concent					Vapor Weight Concent					Vapor Weight Concent				
	Mi	Mν	Z _{vi}			Mi	Μ _V	Z _{vi}			Mi	M _V	\mathbf{Z}_{Vi}	
hexane	86.18	66	0.00349		hexane	86.18	66	0.00572		hexane	86.18	66	0.00607	
benzene	78.11	66	0.00377		benzene	78.11	66	0.00628		benzene	78.11	66	0.00677	
2,2,4 TMP	114.23	66	0.00421		2,2,4 TMP	114.23	66	0.00709		2,2,4 TMP	114.23	66	0.00773	
toluene	92.14	66	0.00397		toluene	92.14	66	0.00687		toluene	92.14	66	0.00764	
ethylbenzene	106.17	66	0.00024		ethylbenzene	106.17	66	0.00043		ethylbenzene	106.17	66	0.00049	
xylenes cumene	106.17 120.19	66 66	0.00103 0.00004		xylenes	106.17 120.19	66 66	0.00186 0.00007		xylenes	106.17 120.19	66 66	0.00215 0.00008	
naphthalene	128.17	66	1.42E-06		cumene naphthalene	120.19	66	2.86E-06		cumene naphthalene	120.19	66	3.63E-06	
Vapor Mole Fraction Ed			1.42L-00		Vapor Mole Fraction E			2.00L-00		Vapor Mole Fraction E			3.03L-00	
	$P_i = P_{VAI}(x_i)$	P _{VA}	y _i			$P_i = P_{VAI}(x_i)$	P _{VA}	y _i			$P_i = P_{VAI}(x_i)$	P _{VA}	y _i	
hexane	0.014717	5.499	0.00268		hexane	0.019494	4.453	0.00438		hexane	0.024912	5.362	0.00465	
benzene	0.017717	5.499	0.00200		benzene	0.023631	4.453	0.00430		benzene	0.030684	5.362	0.00572	
2,2,4 TMP	0.017316	5.499	0.00243		2,2,4 TMP	0.018248	4.453	0.00410		2,2,4 TMP	0.023938	5.362	0.00446	—
toluene	0.015656	5.499	0.00285		toluene	0.021896	4.453	0.00492		toluene	0.029337	5.362	0.00547	
ethylbenzene	0.000811	5.499	0.00015		ethylbenzene	0.001183	4.453	0.00027		ethylbenzene	0.001642	5.362	0.00031	
xylenes	0.003520	5.499	0.00064		xylenes	0.005148	4.453	0.00116		xylenes	0.007168	5.362	0.00134	
cumene	1.14E-04	5.499	0.00002		cumene	1.71E-04	4.453	0.00004		cumene	2.44E-04	5.362	0.00005	
naphthalene	4.01E-06	5.499	0.00000		naphthalene	6.55E-06	4.453	0.00000		naphthalene	1.00E-05	5.362	0.00000	
Liquid Mole Fraction E	q. 40-4 x _i =	$(Z_{Li}M_L)/M_i$			Liquid Mole Fraction E	q. 40-4 x _i =	$(Z_{Li}M_L)/M_i$			Liquid Mole Fraction E	q. 40-4 x _i =	$(Z_{Li}M_L)/M_i$		
	Z_{Li}	ML	Mi	X _i		\mathbf{Z}_{Li}	M _L	Mi	X _i		\mathbf{Z}_{Li}	ML	Mi	X _i
hexane	0.01	92	86.18	0.01068	hexane	0.01	92	86.18	0.01068	hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11		benzene	0.018	92	78.11	0.02120		0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23		2,2,4 TMP	0.04	92	114.23	0.03222	2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14		toluene	0.07	92	92.14	0.06989	toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17		ethylbenzene	0.014	92	106.17	0.01213	ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17		xylenes	0.07	92	106.17	0.06066	xylenes	0.07	92	106.17	0.06066
cumene	0.005 0.00415	92 92	120.19		cumene	0.005 0.00415	92 92	120.19	0.00383	cumene	0.005 0.00415	92 92	120.19	
naphthalene Component Vapor pres			128.17		naphthalene Component Vapor pre			128.17	0.00298	naphthalene Component Vapor pres			128.17	0.00298
Component vapor pres					Component vapor pres					Component vapor pres				
have I	A 6 070	1171 F	C 224.27	P _{VAi}	hay	A 6 070		C 224.27	P _{VAi}	haveral	A 6 070	1171 5	C 224.27	P _{VAi}
hexane	6.878 6.906	1171.5 1211	224.37 220.79		hexane	6.878 6.906	1171.5 1211	224.37 220.79		hexane	6.878 6.906	1171.5 1211	224.37 220.79	2.33 1.45
benzene 2,2,4 TMP	6.812	1257.8	220.79		benzene 2,2,4 TMP	6.812	1257.8	220.79		benzene 2,2,4 TMP	6.812	1257.8	220.79	
toluene	7.017	1377.6	220.74		toluene	7.017	1377.6	220.74		toluene	7.017	1377.6	222.64	
ethylbenzene	6.95	1419.3	212.61		ethylbenzene	6.95		212.61	0.10	ethylbenzene	6.95	1419.3	212.61	0.42
					xylenes	7.009	1462.3	215.11	0.10	xylenes	7.009	1462.3	215.11	0.14
	7 009	1462.3	215 11	U.Un										
xylenes	7.009 6.929	1462.3 1455.8	215.11 207.2	0.06 0.03	cumene	6.929	1455.8	207.2	0.04	cumene	6.929	1455.8	207.2	0.06

MONTH July				MONTH	August				MONTH	September			
	Symbol		Units			Symbol		Units			Symbol		Units
Product Type		Gasoline -	RVP 9	Product Type			Gasoline -	RVP 9	Product Type			Gasoline - I	RVP 13
Vapor Molecular weight	Μ _ν	66.00		Vapor Molecular weight		M _v	66.00		Vapor Molecular weight		M _v	66.00	-
Vapor Pressure Equation Constant	A	11.76		Vapor Pressure Equation	n Constant	A	11.76		Vapor Pressure Equation	n Constant	A	11.64	
Vapor Pressure Equation Constant I	В	5315.06	°R	Vapor Pressure Equation	n Constant	В	5315.06	°R	Vapor Pressure Equation	n Constant	В	5043.58	°R
Daily total solar insolation on a horiz	ı	1872.0	Btu/ft ² -day	Daily total solar insolation		ı	1640.0	Btu/ft ² -day	Daily total solar insolation	on on a horiz	1	1300.0	Btu/ft ² -day
Average Daily Ambient Temperatu	re Ea. 1-30		Dianit day	Average Daily Ambien	t Temperati	re Ea. 1-30		Dia/It day	Average Daily Ambien				Diani day
TAA = ((TAX+TAN)/2)	T _{AA}	531.35	°R	TAA = ((TA		T _{AA}	530.15	°R	TAA = ((TAX	-	T _{AA}		°R
Average daily maximum	T _{AX}	541.00	°R	Average da		T _{AX}	539.70	°R	Average da		T _{AX}		°R
Average daily minimum	T _{AN}						520.60	°R	Average da			512.40	
ů ,	I AN	521.70	K	Average da		T _{AN}	520.00	K	True Vapor Pressure E	,	T _{AN}	312.40	R
True Vapor Pressure Eq. 1-25:	В	E 774	naia	True Vapor Pressure E		ь	E 644	neie			В	7.061	naia
PvA = exp(A-(B/TLA))	P _{vA}	5.774	psia	PvA = exp(/	4-(B/TLA))	P _{vA}	5.644	psia	PvA = exp(A	4-(B/TLA))	P _{vA}	7.261	psia
HAPS Speciation		L 0 1		HAPS Speciation			0 "		HAPS Speciation				
Product - select from list		Gasoline		Product - sele			Gasoline		Product - sele			Gasoline	
Vapor Weight ConcentZ _{vi} = y _i M _i / N				Vapor Weight Concen	$Z_{Vi} = y_i M_i / I$				Vapor Weight Concent			└─	
Mi	M _V	Z _{Vi}			Mi	M _V	Z _{Vi}			Mi	M _V	Z _{Vi}	
hexane 86.18	66	0.00621		hexane	86.18	66	0.00617		hexane	86.18	66	0.00390	
benzene 78.11	66	0.00697		benzene	78.11	66	0.00691		benzene	78.11	66	0.00432	
2,2,4 TMP 114.23 toluene 92.14	66 66	0.00799 0.00796		2,2,4 TMP toluene	114.23 92.14	66 66	0.00791 0.00786		2,2,4 TMP toluene	114.23 92.14	66 66	0.00490 0.00479	
ethylbenzene 106.17	66	0.00796		ethylbenzene	106.17	66	0.00786		ethylbenzene	106.17	66	0.00479	——
xylenes 106.17	66	0.00032		xylenes	106.17	66	0.00031		xylenes	106.17	66	0.00030	
cumene 120.19	66	0.00009		cumene	120.19	66	0.000224		cumene	120.19	66	0.00005	
naphthalene 128.17	66	3.99E-06		naphthalene	128.17	66	3.88E-06		naphthalene	128.17		2.11E-06	
Vapor Mole Fraction Eq. 40-5 y		0.002 00		Vapor Mole Fraction E			0.002 00		Vapor Mole Fraction E		= P _i / P _{VA}		
$P_i = P_{VAI}(x_i)$	P _{VA}	y _i			$P_i = P_{VAI}(x_i)$	P _{VA}	y _i		·	$P_i = P_{VAI}(x_i)$		y _i	
hexane 0.027453	5.774	0.00475		hexane	0.026649	5.644	0.00472		hexane	0.021715	7.261	0.00299	
benzene 0.034026	5.774	0.00589		benzene	0.032967	5.644	0.00584		benzene	0.026509	7.261	0.00365	
2,2,4 TMP 0.026652	5.774	0.00462		2,2,4 TMP	0.025791	5.644	0.00457		2,2,4 TMP	0.020563	7.261	0.00283	
toluene 0.032940	5.774	0.00571		toluene	0.031793	5.644	0.00563		toluene	0.024904	7.261	0.00343	
ethylbenzene 0.001870	5.774	0.00032		ethylbenzene	0.001797	5.644	0.00032		ethylbenzene	0.001367	7.261	0.00019	
xylenes 0.008171	5.774	0.00142		xylenes	0.007850	5.644	0.00139		xylenes	0.005956	7.261	0.00082	
cumene 2.80E-04	5.774	0.00005		cumene	2.69E-04	5.644	0.00005		cumene	2.00E-04	7.261	0.00003	
naphthalene 1.19E-05	5.774	0.00000		naphthalene		5.644	0.00000		naphthalene			0.00000	
Liquid Mole Fraction Eq. 40-4 x _i =	$(Z_{Li}M_L)/M_i$			Liquid Mole Fraction E	Eq. 40-4 x _i =	$(Z_{Li}M_L)/M_i$			Liquid Mole Fraction E	q. 40-4 x _i =			
Z _{Li}	M _L	Mi	X _i		Z_{Li}	M _L	Mi	\mathbf{X}_{i}		Z_{Li}	M∟	Mi	X _i
hexane 0.01	92	86.18	0.01068	hexane	0.01	92	86.18	0.01068	hexane	0.01		86.18	0.0106
benzene 0.018	92	78.11	0.02120	benzene	0.018	92	78.11	0.02120	benzene	0.018	92	78.11	0.0212
2,2,4 TMP 0.04	92	114.23	0.03222	2,2,4 TMP	0.04	92	114.23	0.03222	2,2,4 TMP	0.04		114.23	0.0322
toluene 0.07	92	92.14	0.06989	toluene	0.07	92	92.14	0.06989	toluene	0.07	92	92.14	0.0698
ethylbenzene 0.014 xylenes 0.07	92 92	106.17	0.01213	ethylbenzene	0.014 0.07	92	106.17 106.17	0.01213 0.06066	ethylbenzene	0.014 0.07	92	106.17	0.012 ² 0.0606
xylenes 0.07 cumene 0.005	92 92	106.17 120.19	0.06066 0.00383	xylenes cumene	0.07	92 92	106.17	0.00083	xylenes cumene	0.07	92 92	106.17 120.19	0.0608
naphthalene 0.00415	92	120.19	0.00383	naphthalene	0.003	92	128.17	0.00383	naphthalene	0.00415	92	128.17	
Component Vapor pressure P _{VAi} =				Component Vapor pre					Component Vapor pre				
A	В	C	P _{VAi}	Sampanant vapor pro	Λ	В	C	P _{VAi}	zampononi rapor pro	A		C	P _{VAi}
hexane 6.878	1171.5	224.37	2.57	hexane	6.878		224.37	2.50	hexane	6.878		224.37	2.03
benzene 6.906	1211	220.79	1.60	benzene	6.906	1211	220.79	1.55	benzene	6.906	1211	220.79	1.25
2,2,4 TMP 6.812	1257.8	220.74	0.83	2,2,4 TMP	6.812	1257.8	220.74	0.80	2,2,4 TMP	6.812	1257.8	220.74	0.64
toluene 7.017	1377.6	222.64	0.47	toluene	7.017	1377.6	222.64	0.45	toluene	7.017	1377.6	222.64	0.36
ethylbenzene 6.95	1419.3	212.61	0.15	ethylbenzene	6.95	1419.3	212.61	0.15	ethylbenzene	6.95	1419.3	212.61	0.11
xylenes 7.009	1462.3	215.11	0.13	xylenes	7.009	1462.3	215.11	0.13	xylenes	7.009	1462.3	215.11	0.10
· · · · · · · · · · · · · · · · · · ·	4.455.0	007.0	0.07		6.929	4455.0	207.2	0.07	cumene	6.929	1455.8	207.2	0.05
cumene 6.929	1455.8	207.2	0.07	cumene	0.929	1455.8	207.2	0.07	Cumene	0.929	1400.6	201.2	0.03

MONTH	October				MONTH	November				MONTH	December			
+1		Symbol		Units			Symbol		Units			Symbol		Units
Product Type	Ī		Gasoline -	RVP 13.5	Product Type			Gasoline -	RVP 15	Product Type			Gasoline -	RVP 15
Vapor Molecular weight		M _v	66.00		Vapor Molecular weight		M _v	66.00		Vapor Molecular weight		M _v	66.00	
Vapor Pressure Equation	Constant /	A	11.63		Vapor Pressure Equation		A	11.60		Vapor Pressure Equation		A	11.60	
Vapor Pressure Equation		В	5015.72	°R	Vapor Pressure Equation			4937.93	°R	Vapor Pressure Equation		В	4937.93	
Daily total solar insolation				Btu/ft²-day	Daily total solar insolation				Btu/ft ² -day	Daily total solar insolation				Btu/ft ² -day
Average Daily Ambient		re Ea. 1-30		Blant -day	Average Daily Ambien				Dia/it -day	Average Daily Ambien		re Eg. 1-30		Dta/it -day
TAA = ((TAX+		T _{AA}	509.75	°P	TAA = ((TA		T _{AA}	•	°R	TAA = ((TA		T _{AA}		°R
Average daily		T _{AX}		°R	Average da	, ,	T _{AX}	507.40	°R	Average da		T _{AX}		°R
Average daily		T _{AN}	500.50	°R	Average da	•	T _{AN}	492.20	°R	Average da	,	T _{AN}	482.10	-R
True Vapor Pressure Eq			0.005		True Vapor Pressure I			5.505		True Vapor Pressure E			4.470	
PvA = exp(A-	(B/TLA))	P _{vA}	6.005	psia	PvA = exp(A-(B/TLA))	P _{vA}	5.585	psia	PvA = exp(/	4-(B/TLA))	P _{vA}	4.476	psia
HAPS Speciation			0 "		HAPS Speciation					HAPS Speciation				
Product - select			Gasoline		Product - sele		•	Gasoline		Product - sele			Gasoline	
Vapor Weight Concent Z					Vapor Weight Concen			<u> </u>		Vapor Weight Concent			<u> </u>	
	Mi	M _V	Z _{Vi}		L	M _i	M _V	Z _{Vi}		ļ	Mi	M _V	Z _{Vi}	
hexane	86.18	66	0.00341		hexane	86.18	66	0.00290		hexane	86.18	66	0.00262	
benzene	78.11	66	0.00369		benzene	78.11	66	0.00308		benzene	78.11	66	0.00273	
2,2,4 TMP	114.23 92.14	66 66	0.00413 0.00392		2,2,4 TMP	114.23 92.14	66 66	0.00341		2,2,4 TMP	114.23 92.14	66 66	0.00297 0.00268	
toluene ethylbenzene	106.17	66	0.00392		toluene ethylbenzene	106.17	66	0.00316 0.00018		toluene ethylbenzene	106.17	66	0.00266	
xylenes	106.17	66	0.00024		xylenes	106.17	66	0.00079		xylenes	106.17	66	0.00013	
cumene	120.19	66	0.00103		cumene	120.17	66	0.00079		cumene	120.19	66	0.00004	
naphthalene	128.17	66	1.45E-06		naphthalene	128.17	66	9.99E-07		naphthalene	128.17	66	7.09E-07	
Vapor Mole Fraction Eq.			1.402-00		Vapor Mole Fraction E			3.33L-07		Vapor Mole Fraction E			7.03L-07	
	$P_i = P_{VAI}(x_i)$	P _{VA}	y _i			$P_i = P_{VAI}(x_i)$		Уi			$P_i = P_{VAI}(x_i)$	P _{VA}	y _i	
	0.015675	6.005	0.00261		hexane	0.012388	5.585	0.00222		hexane	0.008980	4.476	0.00201	
	0.018731	6.005	0.00201		benzene	0.014532	5.585	0.00260		benzene	0.010308	4.476	0.00230	
	0.014333	6.005	0.00239		2,2,4 TMP	0.010992	5.585	0.00197		2,2,4 TMP	0.007693	4.476	0.00172	
	0.016880	6.005	0.00281		toluene	0.012641	5.585	0.00226		toluene	0.008608	4.476	0.00192	
ethylbenzene	0.000883	6.005	0.00015		ethylbenzene	0.000634	5.585	0.00011		ethylbenzene	0.000411	4.476	0.00009	
xylenes	0.003834	6.005	0.00064		xylenes	0.002746	5.585	0.00049		xylenes	0.001774	4.476	0.00040	
cumene	1.25E-04	6.005	0.00002		cumene	8.72E-05	5.585	0.00002		cumene	5.46E-05	4.476	0.00001	
naphthalene	4.48E-06	6.005	0.00000		naphthalene	2.87E-06	5.585	0.00000		naphthalene	1.64E-06	4.476	0.00000	
Liquid Mole Fraction Eq	i. 40-4 x _i = ($(Z_{Li}M_L)/M_i$			Liquid Mole Fraction E	Eq. 40-4 x _i =	$(Z_{Li}M_L)/M_i$			Liquid Mole Fraction E	q. 40-4 x _i =	$(Z_{Li}M_L)/M_i$		
	Z _{Li}	ML	Mi	X _i		Z _{Li}	ML	Mi	X _i		Z_{Li}	ML	Mi	X _i
hexane	0.01	92	86.18	0.01068	hexane	0.01	96	86.18	0.01114	hexane	0.01	96	86.18	0.011
benzene	0.018	92	78.11	0.02120	benzene	0.018	96	78.11	0.02212	benzene	0.018	96	78.11	0.022
2,2,4 TMP	0.04	92	114.23	0.03222	2,2,4 TMP	0.04	96	114.23	0.03362	2,2,4 TMP	0.04	96	114.23	
toluene	0.07	92	92.14	0.06989	toluene	0.07	96	92.14	0.07293	toluene	0.07	96	92.14	
ethylbenzene	0.014	92	106.17	0.01213	ethylbenzene	0.014	96	106.17	0.01266	ethylbenzene	0.014	96	106.17	
xylenes	0.07	92	106.17	0.06066	xylenes	0.07	96	106.17	0.06329	xylenes	0.07	96	106.17	0.063
cumene	0.005	92	120.19	0.00383	cumene	0.005	96	120.19	0.00399	cumene	0.005	96	120.19	
naphthalene	0.00415	92	128.17	0.00298	naphthalene		96	128.17	0.00311	naphthalene	0.00415	96	128.17	0.00311
Component Vapor press					Component Vapor pre					Component Vapor pre			#N/A	
<u> </u>	A		C	P _{VAi}	ļ	A		C	P _{VAi}	ļ	A		C	P _{VAi}
hexane	6.878	1171.5	224.37	1.47	hexane			224.37	1.11	hexane	6.878	1171.5	224.37	
benzene 2,2,4 TMP	6.906	1211	220.79	0.88	benzene 2,2,4 TMP		1211	220.79	0.66	benzene 2,2,4 TMP	6.906	1211	220.79	
	6.812 7.017	1257.8	220.74 222.64	0.44			1257.8 1377.6	220.74 222.64	0.33 0.17		6.812	1257.8 1377.6	220.74 222.64	
toluene ethylbenzene	6.95	1377.6 1419.3	212.61	0.24 0.07	toluene ethylbenzene	6.95	1419.3	212.61	0.17	toluene ethylbenzene	7.017 6.95	1419.3	212.61	0.12
	7.009	1462.3	215.11	0.07	xylenes	7.009	1419.3	215.11	0.05	xylenes	7.009	1419.3	215.11	
AMININA			<u> </u>	0.00	N VICTOR	1.008	1702.0	210.11	∪.∪ -	II Aylelles	1.008	1702.0	210.11	0.00
xylenes cumene	6.929	1455.8	207.2	0.03	cumene	6.929	1455.8	207.2	0.02	cumene	6.929	1455.8	207.2	0.01

July Total VOC Landing and Cleaning Calculations for IFRs

Used for H2S Modeling

LANDING PTE CALCUL	ATIONS		
	Symbol		Units
Total Landing Losses (Eq.3-1 L _{TL} = L _{SL} +L _{FL})	L _{TL}		lb/event ton/event
Product in tank duri	ing landing:	Crude RVP 12.5	tornevent
Month the landin		July	
Number of days the tank stays idle	n _d	3	days
Height of floating roof deck, h_d (ft) (assume 3 ft if unknown)	h _d	3.00	ft
Height of the stock liquid	h _l	0.250	ft
Full heel, Partial heel or Drain Dry? Flat or Cone Bottom Tank?		Partial Heel Flat	
riat of Cone Bottom Tank?		riat	
Standing Idle Losses Eq. 3-7 $L_{SL} = n_d*KE*((P_{VA}*V_V)/R*TV))*M_V*K_s$	L _{SL}	3403.22	lb
Number of days the tank stays idle	n _d	3	
Vapor space expansion factor, per day	K _E	0.8759	
True vapor pressure of stock liquid (avg. ambient temp. of month landing oc		12.086	<u> </u>
Volume of the vapor space	V _V	33747.58	-
ldeal gas constant Average vapor temperature (assumed to be equal to ground temperature - a	R T _V (T _{AA})	531.35	(psia-ft3)/(lb-mole degl
Stock vapor molecular weight	M _V		lb/lb-mol
Saturation factor	Ks	0.36	10,10
Filling Losses Eq. 3-18 $L_{FL} = (P_{VA}V_V/RT_V)M_V(C_{sf}S)$	L _{FL}	1,788.37	
True vapor pressure of stock liquid (avg. ambient temp. of month landing occ	P _{VA}	12.086	'
Volume of the vapor space	V _V	33747.58	
Ideal gas constant Average vapor temperature (average ambient temp of the month)	R T _V (T _{AA})	10.731 531.35	(psia-ft3)/(lb-mole degF
Stock vapor molecular weight	M _V		lb/lb-mole
Filling saturation correction factor for wind (1.0 for IFT and DEFT)	C _{sf}	1	
Filling Saturation Factor (0.60 for full heel, 0.50 for partial heel, 0.15 for drain	S	0.5	
Average Ambient Temperature during Month TAA = (TAX+TAN) /2	TAA	531.35	
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX TAN	541	
Average daily montlhy minimum ambient temperature, Table 7.1-2	TAN	521.7	°R
Product Vapor Pressure			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	12.086	psia
Vapor Pressure Equation Constant A (Table 7.1-2)	Α	10.377	
Vapor Pressure Equation Constant B (Table 7.1-2)	В	4,189.7	°R
Average ambien temperature during month	TAA	531.4	°R
Names Chang Evenesian Factor (Fr. 4 S. (ATV/TI A) I/ADV ADD)//DA DV	KE	0.0750	
Vapor Space Expansion Factor (Eq. 1-5: (ΔΤν/TLA)+[(ΔΡν-ΔΡΒ)/(PA-Ρν/ Average Daily Vapor Temperature Range	ΔΤν	22.87	per day °R
Average Daily Vapor Pressure Range	ΔΡν	2.0518	
Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	12.0864	psia
Average Daily Liquid Surface Temperature (TLA=TAA)	TAA	531.35	°R
Atmospheric Pressure	P _A	14.55	psia
Average Daily Vapor Temperature Range (ΔTv)			I
Equation 1-7 (Δ TV = 0.7 Δ TA + 0.02 α I)	ΔΤν	22.87	°R
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔΤΑ	19.3	
Average tank surface solar absorptance, dimensionless, Table 7.1-6	α	0.25	
Daily total solar insolation on a horizontal surface	I		Btu/ft ² -day
Average daily maximum ambient temperature for the month	TAX	541.00	°R
Average daily minimum ambient temperature for the month	TAN	521.70	°R
Average Daily Vapor Pressure Range (ΔΡν)			
Equation 1-9: Δ PV = PVX - PVN	ΔΡν	2.052	psia
Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	13.14	psia
Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	11.09	psia
Average daily max liquid surface temp TLX = TAA + 0.25ΔTV	TLX	537.07	°R
Average daily min liquid surface temp TLN = TAA - 0.25ΔTV	TLN	525.63	°R
Vapor Pressure Equation Constant A	A	10.377	
Vapor Pressure Equation Constant A	В	4,190	
Average Daily Liquid Surface Temperature (TLA=TAA for landings)	TAA	531.35	
(121-170 tion landings)	ΔΤν	22.87	
Average Daily Vapor Temperature Range	V _v	33,747.58	
Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4)	-	2.75	ft
Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _t)	h _v		
Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	h _v	3.00	
Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _t)	h _v	3.00	ft ft
Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _t) Deck height	h _v	3.00	
Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _i) Deck height Liquid height	h _v hd hl	3.00 0.25 0.36	

			CLEANING PTE CALCULATIONS								
Includes Landing (standing and filling losses) and Additonal Pu	irges associated	with this cleaning event	CLAMINO I IL CALCULATIONS								
	Symbol	Units		Symbol		Units					
Tatal Oleveland access EV = LBU OV LEGIO	LFV	17.058.99 lb/event									
Total Cleaning Losses LFV = LP+LCV+ LF+LS	LFV	17,058.99 lb/event 8.5295 ton/event									
Product in tank	k prior to cleaning	g Crude RVP 12.5									
	eaning occurred:	July	-				Additional Purge Emission	ıs			
Calibration Gas	T T	Propane (C3)	Standing Idle Losses Eq. 3-7 $L_{SL} = n_d^*KE^*((P_{VA}^*))$	L _{SL}	4195.95	lb		Day 2	Day 3	1	
Duration of the continued forced ventilation	n _{CV}	3 days	Number of days the tank stays idle	n_d	3		Lp	1872.919	1875.248		
Height of deck during cleaning (assume 6 ft if unknown)	h _d	6 ft	Vapor space expansion factor, per day	K_E	0.8759		S*	0.25	0.25	*S is based on fix	ed roof Eq. 4-6 < 1day
Number of days standing idle before cleaning	n _d	3 days	True vapor pressure of stock liquid (avg. ambient	P_{VA}	12.086	psia	H _I	0.240	0.23		
Height of the stock liquid	h _l	0.250 ft	Volume of the vapor space	V_{V}	70563.12	ft ³	V _v	70,686.03	70,773.96		
Average ventilation rate during continued forced ventilation	Q _V	10000 ft ³ /min	Ideal gas constant	R		(psia-ft3)/(lb-mole degR)	h _v	5.76	5.77		
Hours per day of force ventilation	t _V	10 hrs/day	Average vapor temperature (average ambient ten	T _V (T _{AA})	531.35	°R	h _{d2}	6.00	6.00		
Average LEL Reading	LEL	10 %	Stock vapor molecular weight	M _V		lb/lb-mol				J	
LEL of Calibration Gas		2.1 %	Standing idle saturation factor	K _S	0.21						
Average vapor concentration by volume during continued forced ven		0.0021	——————————————————————————————————————				Height of Vapor Space Cal			2	
Calibration Gas Molecular Weight	M _{CG}	44.1 lb/lb-mole	Filling Losses Eq. 3-18 L _{FL} = (P _{VA} V _V /RT _V)M _V (C _s	L _{FL}	1,121.80		Height of vapor space under	landed deck, (h _d	+ sD/6)- [(volume of		6.31 ft
			True vapor pressure of stock liquid (avg. ambient	P _{VA}	12.086 70563.12		Tank cone bottom slope Diameter			s D	0.02 ft/ft 125 ft
Vapor Space Purge Losses Eq. 4-2 LP=(PVA*VV/R*TV)*MV*S	L _P	3739.324	Volume of the vapor space Ideal gas constant	R R		(psia-ft3)/(lb-mole degR)	Deck leg height			h _d	6 ft
Saturation Factor (0.5 for IFR with a partial liquid heel)	S	0.5	Average vapor temperature (average ambient ter	T _V (T _{AA})	531.4	" ' ' ' ' '	Volume of heel, (πD²/12)*((s	D/2-b)3)\//eD/2) ²)		ı i'd	1578 ft3
Ideal gas constant	R	10.731 (psia-ft3)/(lb-mole degR)	Stock vapor molecular weight	M _V		lb/lb-mole	Vertical distance from bottor			h _o	0.4 ft
Average temperature of the vapor space = average ambient tempera		531.35 °R	Filling saturation correction factor for wind (1.0 for	C _{sf}	1	ib/ib-iiioic	Effective height of cone-dow			1 ·-p	0.4 ft
True vapor pressure of the exposed volatile material in the tank	P _{VA}	12.086	Filling Saturation Factor (0.15 for drain dry)	S	0.15		Height of liquid in bottom of		.ga. 0 7.11 20)		o ft
Volume of vapor space	V _V	70,563.12	─ ┃ ゜								-
Stock vapor molecular weight	M _V	50 lb/lb-mol	Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/	KE	0.8759	per day					
_			Average Daily Vapor Temperature Range	ΔΤν	22.87	°R					
Continued Forced Ventiliation Emissions			Average Daily Vapor Pressure Range	ΔΡν	2.0518	psi					
L_{CV} =60*Qv*n _{CV} *tv*C _V *(P _a *M _{CG})/(R*T _V)	L _{CV}	4,253.76	Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	psi					
Average ventilation rate during continued forced ventilation	Q _V	10000 ft ³ /min	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	12.0864	psia					
Duration of continued forced ventilation, days	n _{CV}	3 days	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35	°R					
Daily period of forced ventilation	t _v	10 hrs/day	Atmospheric Pressure	P_A	14.55	psia					
Average vapor concentration by volume during continued forced ven		0.0021									
Atmospheric pressure at the tank location	Pa	14.55	Average Daily Vapor Temperature Range (ΔTv)								
Calibration gas molecular weight	M _{CG}	44.1	Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	ΔΤν	22.87	°R					
Average temperature of vapor below the floating roof = average amb	T _V (T _{AA})	531.35	Average daily ambient temperature range - Equat	ΔΤΑ	19.3	°R					
			Average tank surface solar absorptance, dimension	α	0.25	2					
Prior Stock Remains = LCV max		100000 010	Daily total solar insolation on a horizontal surface	- 1		Btu/ft ² -day					
$L_{CV} \max = 5.9 \cdot D^{2*} (hl)*Wl$		163632.813 0.83067895	Average daily maximum ambient temperature for	TAX	541.00 521.70	**					
Cvmax = P _{VA} /Pa		0.83067895	Average daily minimum ambient temperature for t	IAN	521.70	°R	-				
Average Ambient Temp during Month TAA = (TAX+TAN) /2	TAA	531.35 °R	Average Daily Vapor Pressure Range (ΔPv)				-				
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541 °R	Equation 1-9: ΔPV = PVX - PVN	ΔΡν	2.052	psia					
Average daily monthly minimum ambient temperature, Table 7.1-2	TAN	521.7 °R	Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	13.14						
		1 111	Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	11.09	psia					
Product Vapor Pressure			Average daily max liquid surface temp TLX = TAA	TLX	537.07	°R					
P _{vA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	12.086 psia	Average daily min liquid surface temp TLN = TAA	TLN	525.63	°R					
Vapor Pressure Equation Constant A (Table 7.1-2)	Α	10.377	Vapor Pressure Equation Constant A	Α	10.377						
Vapor Pressure Equation Constant B (Table 7.1-2)	В	4,189.7 °R	Vapor Pressure Equation Constant B	В	4,190						
Average ambient temperature during month	TAA	531.4 °R	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35						
			Average Daily Vapor Temperature Range	ΔΤν	22.87						
Vapor Space Volume V _v =h _v ((PI)D ² /4)	V _v	70,563.12 ft ³									
Height of vapor space under landed deck (h _{ν=} h _σ -h _I)	h _v	5.75 ft	_								
Deck height	hd	6.00 ft	—								
Liquid height	hl	0.25 ft									

LANDING PTE CALCUL			
	Symbol		Units
Total Landing Losses (Eq.3-1 L _{TL} = L _{SL} +L _{FL})	L _{TL}	4,020.37	lb/event
Total Landing Losses (Eq.5-1 L _{TL} = L _{SL} · L _{FL})	-т.		ton/event
Product in tank duri	ng landing:	Crude RVP 12.5	
Month the landing	occurred:	July	
Number of days the tank stays idle	n _d	3	days
Height of floating roof deck, h_{σ} (ft) (assume 3 ft if unknown) Height of the stock liquid	h _d	0.250	ft
Full heel, Partial heel or Drain Dry?	111	Partial Heel	IL .
Flat or Cone Bottom Tank?		Flat	
_			
Standing Idle Losses Eq. 3-7 $L_{SL} = n_d * KE * ((P_{VA} * V_V)/R * TV)) * M_V * K_s$	L _{SL}	2635.45	lb
Number of days the tank stays idle	n _d	3	
Vapor space expansion factor, per day	K _E	0.8759 12.086	mala
True vapor pressure of stock liquid (avg. ambient temp. of month landing oct Volume of the vapor space	P _{VA} V _V	26134.12	·
Ideal gas constant	R	10.731	
Average vapor temperature (assumed to be equal to ground temperature - a	T _V (T _{AA})	531.35	°R
Stock vapor molecular weight	M_V	50	lb/lb-mol
Saturation factor	Ks	0.36	
			-
Filling Losses Eq. 3-18 L _{FL} = (P _{VA} V _V /RT _V)M _V (C _{st} S) True vapor pressure of stock liquid (avg. ambient temp. of month landing occ	L _{FL}	1,384.92 12.086	
rrue vapor pressure or stock liquid (avg. ambient temp. or month landing oct Volume of the vapor space	V _V	26134.12	'
Ideal gas constant	R		(psia-ft3)/(lb-mole degR)
Average vapor temperature (average ambient temp of the month)	T _V (T _{AA})	531.35	°R
Stock vapor molecular weight	M_V	50	lb/lb-mole
Filling saturation correction factor for wind (1.0 for IFT and DEFT)	C _{sf}	1	
Filling Saturation Factor (0.60 for full heel, 0.50 for partial heel, 0.15 for drain	S	0.5	
Average Ambient Temperature during Month TAA = (TAX+TAN) /2	TAA	531.35	°p.
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541	
Average daily montlhy minimum ambient temperature, Table 7.1-2	TAN	521.7	
Product Vapor Pressure			
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	12.086	psia
Vapor Pressure Equation Constant A (Table 7.1-2) Vapor Pressure Equation Constant B (Table 7.1-2)	A B	10.377 4,189.7	°D
Average ambien temperature during month	TAA	531.4	°R °R
g			
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-Pv	KE	0.8759	per day
Average Daily Vapor Temperature Range	ΔΤν	22.87	°R
Average Daily Vapor Pressure Range	ΔΡν	2.0518	·
Breather Vent Pressure Setting Range (ΔPB = 0) Vapor Pressure at Avg Daily Liq Surface Temp	ΔPB PvA	0.0000 12.0864	psia
Average Daily Liquid Surface Temperature (TLA=TAA)	TAA	531.35	°R
Tronago Bany Equia Canaco Temperataro (TET 1781)		14.55	
Atmospheric Pressure	P _A		
Atmospheric Pressure	P _A	14.55	
_	P _A	14.55	
Average Daily Vapor Temperature Range (ΔTv)	P _A	22.87	°R
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔΤν ΔΤΑ	22.87 19.3	0-
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6	ΔΤν ΔΤΑ α	22.87 19.3 0.25	°R
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α l) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface	ΔΤν ΔΤΑ α	22.87 19.3 0.25 1872	°R Btu/ft²-day
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ATA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month	ΔΤν ΔΤΑ α Ι ΤΑΧ	22.87 19.3 0.25	°R Btu/ft²-day °R
Atmospheric Pressure Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month	ΔΤν ΔΤΑ α	22.87 19.3 0.25 1872 541.00	°R Btu/ft²-day °R
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ATA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month	ΔΤν ΔΤΑ α Ι ΤΑΧ	22.87 19.3 0.25 1872 541.00	°R Btu/ft²-day °R
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv)	ΔΤν ΔΤΑ α Ι ΤΑΧ	22.87 19.3 0.25 1872 541.00	°R Btu/ft²-day °R
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	ΔTν ΔΤΑ α I TAX TAN	22.87 19.3 0.25 1872 541.00 521.70	°R Btu/ft²-day °R °R
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	ΔΤν ΔΤΑ α Ι ΤΑΧ ΤΑΝ	22.87 19.3 0.25 1872 541.00 521.70	°R Btu/ft²-day °R °R psia
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	ΔΤν ΔΤΑ α Ι ΤΑΧ ΤΑΝ ΔΡν ΡΥΧ	22.87 19.3 0.25 1872 541.00 521.70	°R Btu/ft²-day °R °R °R psia
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ATA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV	ΔΤν ΔΤΑ α Ι ΤΑΧ ΤΑΝ ΔΡν ΡVX ΡVN	22.87 19.3 0.25 1872 541.00 521.70 2.052 13.14 11.09	°R Btu/ft²-day °R °R Psia psia psia psia °R
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV	ΔTV ΔTA α I TAX TAN ΔPV PVX PVN TLX	22.87 19.3 0.25 1872 541.00 521.70 2.052 13.14 11.09 537.07	°R Btu/ft²-day °R °R Psia psia psia psia °R
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ATA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A	ΔΤν ΔΤΑ α I ΤΑΧ ΤΑΝ ΔΡν ΡVX PVN TLX	22.87 19.3 0.25 1872 541.00 521.70 2.052 13.14 11.09 537.07	°R Btu/ft²-day °R °R Psia psia psia psia °R
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average daily ambient temperature, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B	ΔTV ΔTA α I TAX TAN ΔPV PVX PVN TLX TLN A	22.87 19.3 0.25 1872 541.00 521.70 2.052 13.14 11.09 537.07	°R Btu/ft²-day °R °R Psia psia psia psia °R
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average daily ambient temperature, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily minimum surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings)	ΔΤν ΔΤΑ α i TAX TAN ΔΡν PVX PVN TLX TLN A B	22.87 19.3 0.25 1872 541.00 521.70 2.052 13.14 11.09 537.07 525.63 10.377 4,190	°R Btu/ft²-day °R °R Psia psia psia psia °R
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range	ΔΤν ΔΤΑ α i ΤΑΧ ΤΑΝ ΔΡν ΡVΧ ΡVΝ ΤLΧ ΤLΝ Α Β ΤΑΑ ΔΤν	22.87 19.3 0.25 1872 541.00 521.70 2.052 13.14 11.09 537.07 525.63 10.377 4,190 531.35	°R Btu/ft²-day °R °R Psia psia psia psia °R
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average daily ambient temperature, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily miniquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((P)D ² /4)	ΔΤν ΔΤΑ α ι ΤΑΧ ΤΑΝ ΔΡν ΡVΧ ΡVΝ ΤLΧ ΤLΝ Α Β ΤΑΑ ΔΤν ΔΥ Vy	22.87 19.3 0.25 1872 541.00 521.70 2.052 13.14 11.09 537.07 525.63 10.377 4,190 531.35 22.87	°R Btu/ft²-day °R °R Psia psia psia psia °R °R R ft³
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average daily ambient temperature, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily miniquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _i)	ΔTV ΔTA α 1 TAX TAN ΔPV PVX PVN TLX TLN A B TAA ΔTV V h _v	22.87 19.3 0.25 1872 541.00 521.70 2.052 13.14 11.09 537.07 525.63 10.377 4.190 531.35 22.87	°R Btu/ft²-day °R °R psia psia psia °R °R ft³ ft³ ft
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _V =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _t) Deck height	ΔTV ΔTA α 1 TAX TAN ΔPV PVX PVN TLX TLN A B TAA ΔTV V h h h h d	22.87 19.3 0.25 1872 541.00 521.70 2.052 13.14 11.09 537.07 525.63 10.377 4.190 531.35 22.87	°R Btu/ft²-day °R °R psia psia psia °R °R r ft³ ft ft
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _V =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _{v=} h _d -h _t) Deck height	ΔTV ΔTA α 1 TAX TAN ΔPV PVX PVN TLX TLN A B TAA ΔTV V h _v	22.87 19.3 0.25 1872 541.00 521.70 2.052 13.14 11.09 537.07 525.63 10.377 4.190 531.35 22.87	°R Btu/ft²-day °R °R psia psia psia °R °R r ft³ ft ft
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average tank surface solar absorptance, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average Daily Wapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLX = TAA + 0.40 Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _v =h _v ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _I) Deck height Liquid height	ΔTV ΔTA α 1 TAX TAN ΔPV PVX PVN TLX TLN A B TAA ΔTV V h h h h d	22.87 19.3 0.25 1872 541.00 521.70 2.052 13.14 11.09 537.07 525.63 10.377 4.190 531.35 22.87	°R Btu/ft²-day °R °R psia psia psia °R °R r ft³ ft ft
Average Daily Vapor Temperature Range (ΔTv) Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I) Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN) Average daily ambient temperature, dimensionless, Table 7.1-6 Daily total solar insolation on a horizontal surface Average daily maximum ambient temperature for the month Average daily minimum ambient temperature for the month Average Daily Vapor Pressure Range (ΔPv) Equation 1-9: ΔPV = PVX - PVN Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)] Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)] Average daily max liquid surface temp TLX = TAA + 0.25ΔTV Average daily min liquid surface temp TLN = TAA - 0.25ΔTV Vapor Pressure Equation Constant A Vapor Pressure Equation Constant B Average Daily Liquid Surface Temperature (TLA=TAA for landings) Average Daily Vapor Temperature Range Vapor Space Volume V _V =h _V ((PI)D ² /4) Height of vapor space under landed deck (h _v =h _d -h _t)	ΔΤν ΔΤΑ α i ΤΑΧ ΤΑΝ ΔΡν ΡVΧ ΡVΝ ΤLΧ ΤLN Α Β ΔΤΑ ΔΤΑ ΔΤΑ ΔΤΑ ΔΤν Λη Α Β ΔΤν Λη Α Α Α Α Α Α Α Α Α Α Α Α Α Α Α Α Α Α	22.87 19.3 0.25 1872 541.00 521.70 2.052 13.14 11.09 537.07 4.190 531.35 22.87 26,134.12 2.75 3.00 0.25	°R Btu/ft²-day °R °R psia psia psia °R °R ft³ ft ft ft ft ft

CLEANING PTE CALCULATIONS												
Includes Landing (standing and filling losses) and Additonal Pur	ges associated Symbol	with this cleaning	ng event Units		Symbol		Units					
	•											
otal Cleaning Losses LFV = LP+LCV+ LF+LS	LFV	22,692.37	Ib/event ton/event									
Product in tank	prior to cleaning		tonievent									
Month the clea	aning occurred:	July] [Additional Purge Emissions	3			
Calibration Gas		Propane (C3)		Standing Idle Losses Eq. 3-7 $L_{SL} = n_d^*KE^*((P_{VA}^*))$	L _{SL}	6042.17	lb		Day 2	Day 3		
Ouration of the continued forced ventilation	n _{CV}	3	days	Number of days the tank stays idle	n _d	3		L _P	2696.693	2699.738		
Height of deck during cleaning (assume 6 ft if unknown)	h _d	6	lft	Vapor space expansion factor, per day	K _E	0.8759		S *	0.25		*S is based on fixed	I roof Eq. 4-6 < 1day
Number of days standing idle before cleaning	n _d	3	days	True vapor pressure of stock liquid (avg. ambient	P _{VA}	12.086		H _I	0.241	0.23		
Height of the stock liquid	h _I	0.250 10000	π	Volume of the vapor space	V _V	101610.89		V _V	101,776.19	101,891.10 5.77		
Average ventilation rate during continued forced ventilation			ft ³ /min	Ideal gas constant	T _V (T _{AA})	531.35	(psia-ft3)/(lb-mole degR)	h _v	5.76 6.00	6.00		
Hours per day of force ventilation Average LEL Reading	t _v	10	hrs/day	Average vapor temperature (average ambient tem Stock vapor molecular weight	M _V		lb/lb-mol	h _{d2}	6.00	6.00		
LEL of Calibration Gas	LEL	2.1	0/.	Standing idle saturation factor	K _S	0.21					J.	
Average vapor concentration by volume during continued forced ven	C _V	0.0021	//	Standing fulle Saturation factor	NS	0.21		Height of Vapor Space Calc	ulation for Cons	Pottom		
Calibration Gas Molecular Weight	M _{CG}		lb/lb-mole	Filling Losses Eq. 3-18 L _{FL} = (P _{VA} V _V /RT _V)M _V (C _s	L _{FL}	1,615.39	lh	Height of vapor space under			heel/(#D²/٨\\±/0 f	6.37 ft
Sanstans. Sub Moloculai Froight	***CG	74.1	INCIDENTIAL PROPERTY.	True vapor pressure of stock liquid (avg. ambient	P _{VA}	12.086		Tank cone bottom slope	idinaed deck, (IId +	SD/O/- [(VOIGING OI	neei/(πD /4))+(0.0	0.02 ft/ft
Vapor Space Purge Losses				Volume of the vapor space	V _V	101610.89	!'	Diameter			D	150 ft
Eq. 4-2 LP=(PVA*VV/R*TV)*MV*S	Lp	5384.626		Ideal gas constant	R		(psia-ft3)/(lb-mole degR)	Deck leg height			h _d	6 ft
Saturation Factor (0.5 for IFR with a partial liquid heel)	S	0.5		Average vapor temperature (average ambient ter	T _V (T _{AA})	531.4		Volume of heel, (πD²/12)*((sE	0/2-h _a) ³))/(sD/2) ²)		,	2727 ft3
deal gas constant	R		(psia-ft3)/(lb-mole degR)	Stock vapor molecular weight	M _V	50	lb/lb-mole	Vertical distance from bottom	p	surface in cone bo	h _o	0.5 ft
Average temperature of the vapor space = average ambient tempera	T _V (T _{AA})	531.35		Filling saturation correction factor for wind (1.0 for	C _{sf}	1		Effective height of cone-down				0.5 ft
True vapor pressure of the exposed volatile material in the tank	P _{VA}	12.086		Filling Saturation Factor (0.15 for drain dry)	S	0.15		Height of liquid in bottom of c		•		0 ft
Volume of vapor space	V _V	101,610.89		1								
Stock vapor molecular weight	M_V	50	lb/lb-mol	Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/	KE	0.8759	per day					
				Average Daily Vapor Temperature Range	ΔΤν	22.87	°R					
Continued Forced Ventiliation Emissions				Average Daily Vapor Pressure Range	ΔΡν	2.0518	psi					
$L_{CV} = 60 ^{\circ}\text{Qv} ^{\circ}\text{n}_{CV} ^{\circ}\text{tv} ^{\circ}\text{C}_{V} ^{\circ}\text{(P}_{a} ^{*}\text{M}_{CG})/(\text{R}^{*}\text{T}_{V})$	L _{cv}	4,253.76		Breather Vent Pressure Setting Range (ΔPB = 0)	ΔΡΒ	0.0000	psi					
Average ventilation rate during continued forced ventilation	Q_V		ft ³ /min	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	12.0864	<u>!</u>					
Duration of continued forced ventilation, days	n _{CV}		days	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35						
Daily period of forced ventilation	t _v		hrs/day	Atmospheric Pressure	P _A	14.55	psia					
Average vapor concentration by volume during continued forced ven	C _V	0.0021		_ լ								
Atmospheric pressure at the tank location	Pa	14.55		Average Daily Vapor Temperature Range (ΔTv)			0-	-				
Calibration gas molecular weight	M _{CG}	44.1		Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α l)	ΔΤν	22.87		-				
Average temperature of vapor below the floating roof = average amb	T _V (T _{AA})	531.35		Average daily ambient temperature range - Equat	ΔΤΑ	19.3 0.25		4				
Prior Stock Remains = LCV max				Average tank surface solar absorptance, dimension Daily total solar insolation on a horizontal surface	α		Btu/ft ² -dav	_				
L _{CV} max = 5.9*D ² *(hl)*Wl		235631.25		Average daily maximum ambient temperature for	TAX	541.00		-				
$Cvmax = P_{VA}/Pa$		0.830678947		Average daily minimum ambient temperature for t	TAN	521.70		-				
CVIIIAX - 1 VAI U		0.030070347		Average daily minimum ambient temperature for t	IAN	321.70	N.					
Average Ambient Temp during Month TAA = (TAX+TAN) /2	TAA	531.35	 •p	Average Daily Vapor Pressure Range (ΔΡν)				-				
Average daily monthly maximum ambient temperature, Table 7.1-2	TAX	541		Equation 1-9: ΔPV = PVX - PVN	ΔΡν	2.052	psia	1				
Average daily monthly minimum ambient temperature, Table 7.1-2	TAN	521.7		Vapor pressure Eq. 1-25; PVX = exp[A-(B/TLX)]	PVX	13.14		1				
, .,,			1 * *	Vapor pressure Eq. 1-25; PVN = exp[A-(B/TLN)]	PVN	11.09	<u>'</u>					
Product Vapor Pressure				Average daily max liquid surface temp TLX = TAA	TLX	537.07	!'	1				
P _{VA} = exp(A-(B/TAA)) (modified Eq 1-25 where TLA= TAA)	P _{VA}	12.086	psia	Average daily min liquid surface temp TLN = TAA	TLN	525.63	°R					
/apor Pressure Equation Constant A (Table 7.1-2)	A	10.377		Vapor Pressure Equation Constant A	Α	10.377		1				
/apor Pressure Equation Constant B (Table 7.1-2)	В	4,189.7	°R	Vapor Pressure Equation Constant B	В	4,190						
Average ambient temperature during month	TAA	531.4	°R	Average Daily Liquid Surface Temperature (TLA=	TAA	531.35						
				Average Daily Vapor Temperature Range	ΔΤν	22.87						
Vapor Space Volume V _V =h _v ((PI)D ² /4)	V _v	101,610.89	11					_				
Height of vapor space under landed deck (h _{v=} h _d -h _l)	h _v	5.75										
Deck height	hd	6.00		_								
iquid height	hl	0.25	[ft	_								

Attachment 5 Results for Benzene and Non-HTACs

Summary of Model Results¹

Summary of Model Results ¹								
File Name	Annual or Hourly	Overall Comments	Benzene, all source group, ug/m ³	Xylenes, all source group, ug/m ³	Toluene, all source group, ug/m ³	Hexane, all source group, ug/m ³	Ethylbenzene, all source group, ug/m ³	2,2,4-TMP, all source group, ug/m ³
Global Alb Annual All Run 1	Annual	max loading for truck and rail under OS #1	0.24	1.10	0.67	1.73	0.08	0.28
Global Alb Annual All Run 2	Annual	max fugitives at marine, some fugitives at rail	0.24	1.16	0.64	1.75	0.08	0.27
Global Alb Annual All Run 3	Annual	max fugitives at marine, some fugitives at truck	0.25	1.27	0.69	1.76	0.08	0.28
Global Alb Annual All Run 4	Annual	max loading for marine under OS#1, max loading at rail, remaining loading at truck under OS#1	0.24	1.07	0.66	1.73	0.08	0.28
Global Alb Annual All Run 5	Annual	max loading for marine under OS#1, max loading at truck under OS#1, remaining loading at rail	0.24	1.10	0.67	1.74	0.08	0.28
Global Alb Annual All Run 6	Annual	max fugitives at truck, max crude fugitives at marine	0.27	1.60	0.79	1.75	0.09	0.30
Global Alb Annual All Run 7	Annual	max fugitives at rail to subcap with some truck fugitives, max crude fugitives at marine	0.25	1.64	0.76	1.74	0.09	0.25
Global Alb Annual All Run 8	Annual	worst case annual assumptions from previous runs (Run 6) with landings distributed only between blendstock tanks	0.29	1.63	0.89	2.10	0.11	0.33
Global Alb Annual Run 9	Annual	emissions at VCUM1 instead of VCUM2	0.26	0.91	0.59	1.72	0.07	0.26
Global Alb Hourly All Run 0	Hourly	hourly loading with fugitives, no cleanings or landings	28.00	344.8	144.9			
Global Alb Hourly All Run 1	Hourly	hourly loading with fugitives and tank 31 landing	208.5	345.8	242.7			
Global Alb Hourly All Run 2	Hourly	hourly loading with fugitives and tank 32 landing	220.1	345.8	252.2			
Global Alb Hourly All Run 3	Hourly	hourly loading with fugitives and tank 39 landing	150.5	345.8	173.0			
Global Alb Hourly All Run 4	Hourly	hourly loading with fugitives and tank 114 landing	173.7	347.8	193.9			/
Global Alb Hourly All Run 5	Hourly	hourly loading with fugitives and tank 115 landing	183.1	345.8	203.2			
Global Alb Hourly All Run 6	Hourly	hourly loading with fugitives and tank 117 landing	219.8	345.8	243.6			
Global Alb Hourly All Run 7	Hourly	hourly loading with fugitives and tank 118 landing	125.3	345.8	148.7			
Global Alb Hourly All Run 8	Hourly	hourly loading with fugitives and tank 119 landing	125.0	346.0	155.9			
Global Alb Hourly All Run 9	Hourly	hourly loading with fugitives and tank 121 landing	187.2	345.8	208.3			
Global Alb Hourly All Run 10	Hourly	hourly loading with fugitives and tank 120 landing	88.1	345.9	148.1			
Global Alb Hourly All Run 11	Hourly	hourly loading with fugitives, cleaning at	26,635.4	8,661.7	30,317.0			
Global Alb Hourly All Run 12	Hourly	tank 31, vapor space purge over 1 hour hourly loading with fugitives, cleaning at	27,592.1	9,010.2	31,534.8			//
Global Alb Hourly All Run 13	Hourly	tank 32, vapor space purge over 1 hour hourly loading with fugitives, cleaning at	17,250.9	5,998.6	19,638.7			//
Global Alb Hourly All Run 14	Hourly	tank 39, vapor space purge over 1 hour hourly loading with fugitives, cleaning at	15,563.7	4,579.0	17,187.2			$\overline{}$
Global Alb Hourly All Run 15	Hourly	tank 114, vapor space purge over 1 hour hourly loading with fugitives, cleaning at	30,308.4	3,383.5	33,230.0			$\overline{}$
Global Alb Hourly All Run 16	Hourly	tank 115, vapor space purge over 1 hour hourly loading with fugitives, cleaning at	21,649.1	6,452.9	23,821.6		$\overline{}$	//
Global Alb Hourly All Run 17	Hourly	tank 117, vapor space purge over 1 hour hourly loading with fugitives, cleaning at	8,379.5	2,452.7	9,166.2		$\overline{}$	//
Global Alb Hourly All Run 18	Hourly	tank 118, vapor space purge over 1 hour hourly loading with fugitives, cleaning at	5,369.7	1,583.8	5,913.0			$\overline{}$
Global Alb Hourly All Run 19	Hourly	tank 119, vapor space purge over 1 hour hourly loading with fugitives, cleaning at	30,660.2	9,105.9	33,752.2			$\overline{}$
Global Alb Hourly All Run 20	Hourly	tank 121, vapor space purge over 1 hour hourly loading with fugitives, cleaning at	3,110.2	1,068.7	3,550.2			$\overline{}$
Global Alb Hourly All Rull 20	riouriy	tank 120, vapor space purge over 1 hour hourly loading no fugitives, cleaning at	3,110.2	1,008.7	3,330.2			$\overline{}$
Global Alb Hourly Run 220	Hourly	tank 31, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer	38.5					
Global Alb Hourly Run 221	Hourly	hourly loading no fugitives, cleaning at tank 32, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer	38.2					
Global Alb Hourly Run 222	Hourly	hourly loading no fugitives, cleaning at tank 39, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer	39.4					
Global Alb Hourly Run 223	Hourly	hourly loading no fugitives, cleaning at tank 120, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer	18.80					
Global Alb Hourly Run 224	Hourly	hourly loading no fugitives, cleaning at tank 114, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer	43.9					
Global Alb Hourly Run 225	Hourly	hourly loading no fugitives, cleaning at tank 115, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer	67.3					
Global Alb Hourly Run 226	Hourly	hourly loading no fugitives, cleaning at tank 117, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer	38.8					
Global Alb Hourly Run 227	Hourly	hourly loading no fugitives, cleaning at tank 118, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer	34.40					

Summary of Model Results¹

Summary of Model Results ¹								
File Name	Annual or Hourly	Overall Comments	Benzene, all source group, ug/m ³	Xylenes, all source group, ug/m ³	Toluene, all source group, ug/m ³	Hexane, all source group, ug/m³	Ethylbenzene, all source group, ug/m³	2,2,4-TMP, all source group, ug/m ³
Global Alb Hourly Run 228	Hourly	hourly loading no fugitives, cleaning at tank 119, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer	22.10					
Global Alb Hourly Run 229	Hourly	hourly loading no fugitives, cleaning at tank 121, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer	70.7					
Global Alb Hourly Run 230	Hourly	hourly loading no fugitives, cleaning at tank 31, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer		52.8				
Global Alb Hourly Run 231	Hourly	hourly loading no fugitives, cleaning at tank 32, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer		52.8				
Global Alb Hourly Run 232	Hourly	hourly loading no fugitives, cleaning at tank 39, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer		60.7				
Global Alb Hourly Run 233	Hourly	hourly loading no fugitives, cleaning at tank 120, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer		52.8				
Global Alb Hourly Run 234	Hourly	hourly loading no fugitives, cleaning at tank 114, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer		52.8				
Global Alb Hourly Run 235	Hourly	hourly loading no fugitives, cleaning at tank 115, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer		52.8				
Global Alb Hourly Run 236	Hourly	hourly loading no fugitives, cleaning at tank 117, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer		52.8				
Global Alb Hourly Run 237	Hourly	hourly loading no fugitives, cleaning at tank 118, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer		52.8				
Global Alb Hourly Run 238	Hourly	hourly loading no fugitives, cleaning at tank 119, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer		52.8				
Global Alb Hourly Run 239	Hourly	hourly loading no fugitives, cleaning at tank 121, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer		52.8				
Global Alb Hourly Run 240	Hourly	hourly loading no fugitives, cleaning at tank 31, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer			44.2			
Global Alb Hourly Run 241	Hourly	hourly loading no fugitives, cleaning at tank 32, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer			43.7			
Global Alb Hourly Run 242	Hourly	hourly loading no fugitives, cleaning at tank 39, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer			59.4			
Global Alb Hourly Run 243	Hourly	hourly loading no fugitives, cleaning at tank 120, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer			29.3			
Global Alb Hourly Run 244	Hourly	hourly loading no fugitives, cleaning at tank 114, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer			51.3			
Global Alb Hourly Run 245	Hourly	hourly loading no fugitives, cleaning at tank 115, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer			76.1			
Global Alb Hourly Run 246	Hourly	hourly loading no fugitives, cleaning at tank 117, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer			44.6			
Global Alb Hourly Run 247	Hourly	hourly loading no fugitives, cleaning at tank 118, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer			44.2			
Global Alb Hourly Run 248	Hourly	hourly loading no fugitives, cleaning at tank 119, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer			31.6			
Global Alb Hourly Run 249	Hourly	hourly loading no fugitives, cleaning at tank 121, vapor space purge over 1 hour, 98% control during vapor space purge using therma oxidizer			79.9			

^{1 =} For the annual runs, the maximum offsite concentration during the 5 year period is provided. For the hourly runs, the max 1-hr offsite concentration during the 5 year period is provided.

Attachment 6 Results for H₂S

Summary of Model Results¹

File Name	Annual or Hourly	Overall Comments	H ₂ S, all source group, ug/m ³
Global Albany H₂S Annual	Annual	Annual emission rates no fugitives	0.03
Global Albany H ₂ S Annual fug	Annual	Annual emission rates with marine fugitives	0.03
Global Albany H ₂ S Hourly Run 0	Hourly	Hourly emission rates with fugitives, no cleanings or landings	0.84
Global Albany H ₂ S Hourly Run 1	Hourly	Hourly emission rates with fugitives and landing at tank 32 (worst-case gasoline tank from benzene model)	58.9
Global Albany H ₂ S Hourly Run 2	Hourly	Hourly emission rates with fugitives and landing at tank 117 (worst-case blendstock tank from benzene model)	52.3
Global Alb H ₂ S Hourly Run 3	Hourly	Hourly emission rates with fugitives and vapor space purge during cleaning at tank 32 (worst-case gasoline tank from benzene model)	7,455.1
Global Alb H ₂ S Hourly Run 4	Hourly	Hourly emission rates with fugitives and vapor space purge during cleaning at tank 121 (worst-case blendstock tank from benzene model)	7,127

^{1 =} For the annual runs, the maximum offsite concentration during the 5 year period is provided. For the hourly runs, the max 1-hr offsite concentration during the 5 year period is provided.

Attachment XV

Modeling Plumes







Attachment XVI

Maximum Short-term Benzene Emission Rates for Tank Refills and Cleanings

Maximum Short-term Benzene Emission Rates for Tank Refills and Cleanings Emission rates that pass model for each month

		Value that Passes for Refill in	Value that Passes for Controlled
Tank	Month	Given Month (lb/hr)	Cleaning in Given Month (lb/hr) ¹
31	January	0.18136	N/A - Passes Model
31	February	0.2056	N/A - Passes Model
31	March	0.16707	N/A - Passes Model
31	April	0.26945	N/A - Passes Model
31	May	0.199927	N/A - Passes Model
31	June	0.197623	0.249655527
31	July	0.191487	0.256347
31	August	0.266099	0.24481823
31	September	0.2236987	0.242351109
31	October	0.153262	N/A - Passes Model
31	November	0.1874966	N/A - Passes Model
31	December	0.1632428	N/A - Passes Model
32	January	0.2123877	N/A - Passes Model
32	February	0.2065167	N/A - Passes Model
32	March	0.154556	N/A - Passes Model
32	April	0.225035	N/A - Passes Model
32	May	0.174947	N/A - Passes Model
32	June	0.1866589	0.235357
32	July	0.1847927	0.236003
32	August	0.20854027	0.2289614
32	September	0.1815158	0.232027
32	October	0.1554019	N/A - Passes Model
32	November	0.228017	N/A - Passes Model
32	December	0.1611252	N/A - Passes Model
39	January	0.19744958	N/A - Passes Model
39	February	0.2449646	N/A - Passes Model
39	March	0.309294	N/A - Passes Model
39	April	0.2359436	N/A - Passes Model
39	May	0.321661	N/A - Passes Model
39	June	0.2793019	0.2281318
39	July	0.2434566	0.224603
39	August	0.24788353	0.211787
39	September	0.26952	0.2152724
39	October	0.28028295	N/A - Passes Model
39	November	0.271344	N/A - Passes Model
39	December	0.25519083	N/A - Passes Model
120	January	0.3030807	N/A - Passes Model
120	February	0.3880615	N/A - Passes Model
120	March	0.399009	N/A - Passes Model
120	April	0.4131778	N/A - Passes Model
120	May	0.409195	N/A - Passes Model
120	June	0.43075835	N/A - Passes Model
120	July	0.3971246	N/A - Passes Model
120	August	0.3950467	N/A - Passes Model
120	September	0.396398	N/A - Passes Model

^{1 =} N/A - Passes Model indicates that the model passed under worst case (1.8 wt%) benzene assumptions.

ATTACHMENT A Emission rates that pass model for each month

		Value that Passes for Refill in	Value that Passes for Controlled
Tank	Month	Given Month (lb/hr)	Cleaning in Given Month (lb/hr) ¹
120	October	0.395835	N/A - Passes Model
120	November	0.397206	N/A - Passes Model
120	December	0.398206	N/A - Passes Model
114	_		N/A - Passes Model N/A - Passes Model
	January	0.310277	
114	February	0.2178502	N/A - Passes Model
114	March	0.3687577	N/A - Passes Model
114	April	0.23601	N/A - Passes Model
114	May	0.398004	0.221853
114	June	0.436524	0.2472804
114	July	0.355614	0.2136376
114	August	0.3873946	0.219312
114	September	0.253614	0.2198611
114	October	0.2973013	N/A - Passes Model
114	November	0.396876	N/A - Passes Model
114	December	0.305584	N/A - Passes Model
115	January	0.2271075	N/A - Passes Model
115	February	0.248271	N/A - Passes Model
115	March	0.2224849	N/A - Passes Model
115	April	0.33184	0.212252
115	May	0.248749	0.236676
115	June	0.249682	0.241726
115	July	0.23786	0.21748
115	August	0.319674	0.213419
115	September	0.194072	0.214467
115	October	0.218239	0.2192924
115	November	0.206163	0.226913
115	December	0.269567	N/A - Passes Model
117	January	0.2042329	N/A - Passes Model
117	February	0.2200619	N/A - Passes Model
117	March	0.169627	N/A - Passes Model
117	April	0.242102	N/A - Passes Model
117	May	0.2136175	N/A - Passes Model
117	June	0.197666	0.196361
117	July	0.1868254	0.1976813
117	August	0.248203	0.199485
117	September	0.2738947	0.196242
117	October	0.1679948	N/A - Passes Model
117	November	0.2212611	N/A - Passes Model
117	December	0.1641477	N/A - Passes Model
118	January	0.2712149	N/A - Passes Model
118	February	0.28666	N/A - Passes Model
118	March	0.351896	N/A - Passes Model
118	April	0.35779	N/A - Passes Model
118	May	0.35197	N/A - Passes Model
118	June	0.310569	0.1864352

^{1 =} N/A - Passes Model indicates that the model passed under worst case (1.8 wt%) benzene assumptions.

ATTACHMENT A Emission rates that pass model for each month

		Value that Passes for Refill in	Value that Passes for Controlled
Tank	Month	Given Month (lb/hr)	Cleaning in Given Month (lb/hr) ¹
118	July	0.327469	0.1839057
118	August	0.352797	0.1780886
118	September	0.332413	0.1827436
118	October	0.351574	N/A - Passes Model
118	November	0.355718	N/A - Passes Model
118	December	0.304204	N/A - Passes Model
119	January	0.409281	N/A - Passes Model
119	February	0.285819	N/A - Passes Model
119	March	0.410459	N/A - Passes Model
119	April	0.311328	N/A - Passes Model
119	May	0.4139964	N/A - Passes Model
119	June	0.449732	N/A - Passes Model
119	July	0.3978	N/A - Passes Model
119	August	0.41429	N/A - Passes Model
119	September	0.36475	N/A - Passes Model
119	October	0.319549	N/A - Passes Model
119	November	0.375371	N/A - Passes Model
119	December	0.343385	N/A - Passes Model
121	January	0.219633	N/A - Passes Model
121	February	0.2585262	N/A - Passes Model
121	March	0.23977	N/A - Passes Model
121	April	0.305566	0.2053122
121	May	0.22249155	0.214755
121	June	0.284176	0.220439
121	July	0.2581097	0.207047
121	August	0.309774	0.200547
121	September	0.2364688	0.1974176
121	October	0.194625	0.198385
121	November	0.237605	0.20955215
121	December	0.21153	N/A - Passes Model

Attachment XVII

Calculation Protocols

Refilling Losses After Cleaning

Proposed permit condition parameters to be used for hourly emission calculations:

- Refill rate the expected delivery rate of product. For the predicted calculation, this is the
 expected delivery rate of the product. For the actual calculation, this is based on the change in
 the gauge over the time period of the refill or a flowmeter. The start and stop time of the refill
 period will be recorded.
- Temperature For the predicted calculation, the expected temperature of the incoming product or the average of the daily average for the seven day time period prior to the scheduled day for the vapor space purge, based on the past five (5) years of met data, whichever is higher or the average of the predicted temperature for the 7 day week the work is anticipated as projected by the National Weather Service. (Note there is no liquid in the tank or remaining vapors, so it is the contribution of the incoming liquid per AP-42). For the actual calculation, the instantaneous temperature of the product following refill of the tank or the average of the daily ambient average of the previous seven (7) day period based on the Albany Weather Station. This temperature is used as T_V in AP-42 Chapter 7 Equation 3-18 and P_{VA} in AP-42 Chapter 7 Equation 1-25.
- Benzene Content percent liquid by volume to be documented by Certificate of Analysis or sample from the tank/vessel/rail car providing the refill product. Benzene content is used for Z_{Lbz} in AP-42 Equation 40-4 (see Section 4 of this document).

Supporting Equations for emissions calculations:

AP-42 Chapter 7, Equation 3-18 to Calculate Filling Losses

$$L_{FL} = \frac{P_{VA}V_V M_V C_{sf} S}{RT_V}$$

where:

L_{FL} = VOC filling loss during roof landing, lb

P_{VA} = true vapor pressure of the liquid within the tank, psia (calculated using equation 1-25)

 V_V = volume of the vapor space, ft³, set equal to volume refilled in one hour to support modeling calculations, unless tank can be refilled in less than an hour. In this case, equation below will be used

 M_V = stock vapor molecular weight, lb/lb-mol

 C_{sf} = filling saturation correction factor for wind, dimensionless (value = 1 for IFR and domed EFR)

S = filling saturation factor (0.15 after cleaning)

R = ideal gas constant, $10.731 \text{ (psia-ft}^3)/\text{(lb-mol}^\circ\text{R)}$

 T_V = average temperature of the vapor below the floating roof (see Equation 3-6), $^{\circ}R$ – per Equation 3-6, T_V is equal to the average vapor temperature, $^{\circ}R$, given that the tank bottom is in contact with the

ground, the temperature is assumed to be equal to ground temperature, which is taken as the average ambient temperature for the month in which the landing occurs, unless a different temperature is known.

<u>Vapor Space Volume Calculation (in cases where tank would refill in less than an hour):</u>

$$V_V = \frac{\pi}{4} D^2 h_v$$

where:

D = tank diameter

 h_v = height of vapor space, ft

$$h_v = h_d - h_L$$

where:

h_d = height of deck, ft

h_L = height of liquid, ft

AP-42 Chapter 7, Equation 1-25 (this equation is not for maintenance activities so we would change what temperature we use to Taa)

$$P_{VA} = exp\left[A - \frac{B}{T_{LA}}\right]$$

where:

A = constant in the vapor pressure equation, dimensionless

B = constant in the vapor pressure equation, °R

 T_{LA} = average daily liquid surface temperature, ${}^{\circ}R$, temperature assumed for this equation will vary based on the type of maintenance activity, as discussed above

<u>Equations to Determine Vapor Pressure Constant A, AP-42 Chapter 7 Figure 7.1-15, Refined Petroleum Stocks</u>

$$A = 15.64 - 1.854 S^{0.5} - (0.8742 - 0.3280 S^{0.5}) \ln (RVP)$$

<u>Equations to Determine Vapor Pressure Constant B, AP-42 Chapter 7 Figure 7.1-15, Refined Petroleum Stocks</u>

$$B = 8742 - 1042 S^{0.5} - (1049 - 179.4 S^{0.5}) \ln (RVP)$$

Equations to Determine Vapor Pressure Constant A, AP-42 Chapter 7 Figure 7.1-16, Crude Oil Stocks

$$A = 12.82 - 0.9672 \ln{(RVP)}$$

Equations to Determine Vapor Pressure Constant B, AP-42 Chapter 7 Figure 7.1-16, Crude Oil Stocks

$$B = 7261 - 1216 \ln{(RVP)}$$

Benzene Losses During Refill

$$L_{FLB} = L_{FL}Z_{Vhz}$$

L_{FLB} = Benzene Filling loss during roof landing, lb

 Z_{Vbz} = weight fraction of benzene in vapor (lb/lb) (see calculation below)

Benzene Vapor Weight Fraction Calculation

Parameters to be used for emission calculations:

- Benzene Content (Z_{Lbz}) liquid weight fraction of benzene in liquid documented by Certificate of Analysis or sample collection (as outlined in refill section above)
- Temperature Depends on situation (as outlined in refill section above)

Supporting Equations for emissions calculations:

AP-42 Chapter 7, Equation 40-6 (using benzene as the component):

$$Z_{Vbz} = \frac{y_{bz} M_{bz}}{M_V}$$

where:

 Z_{Vbz} = vapor weight fraction of benzene (lb/lb)

y_{bz} = vapor mole fraction of benzene, lb-mol/lb-mol

M_{bz} = molecular weight of benzene, lb/lb-mol (78.11 lb/lb-mol)

M_V = molecular weight of vapor stock, lb/lb-mol

AP-42 Chapter 7, Equation 40-5 (using benzene as the component):

$$y_{bz} = \frac{P_{bz}}{P_{VA}}$$

where:

yi = vapor mole fraction of benzene, lb-mole/lb-mole

P_{bz} = partial pressure of benzene, psia

P_{VA} = true vapor pressure of liquid mixture, psia (see Equation 1-25 in refill section above)

AP-42, Chapter 7, Equation 40-3 (using benzene as the component):

$$P_{hz} = P x_{hz}$$

where:

Pbz = partial pressure of benzene, psia

P = vapor pressure of pure benzene, psia

 x_{bz} = liquid mole fraction of benzene, lb-mol/lb-mol

Antoine's equation (temperature will depend on situation)¹:

$$P = (0.019337)10^{\land} \left[A - \frac{B}{T + C} \right]$$

where:

A = constant in vapor pressure equation, dimensionless (6.906 for benzene)

B = constant in vapor pressure equation, °C (1211°C for benzene)

¹ See AP-42 Chapter 7, Footnote to Table 7.1-3

C = constant in vapor pressure equation, °C (220.79°C for benzene)

T = temperature depends on situation – see AP-42, °C

AP-42 Chapter 7, Equation 40-4 (using benzene as the component):

$$x_{bz} = \frac{Z_{Lbz}M_L}{M_{bz}}$$

where:

 x_{bz} = liquid mole fraction of benzene, lb-mole/lb-mole

Z_{Lbz} = weight fraction of benzene in the liquid, lb/lb

M_L = molecular weight of liquid stock, lb/lb-mol

M_{bz} = molecular weight of benzene, lb/lbmol (78.11 lb/lb-mol)

Refill After a Cleaning Example Scenario

Variables are defined as follows for the example refill after an IFR cleaning:

- V_v (volume of vapor space, set equal to volume refilled in one hour): 10,114.25 ft³ (1500 barrels per hour)
- RVP: 9
- Mv (stock vapor molecular weight): 68 lb/lbmol
- C_{sf} (filling saturation correction factor for wind) = 1
- S (saturation factor, after cleaning): 0.15
- A (constant, assuming RVP 9): 11.756
- B (constant, assuming RVP 9): 5315.1°R

Temperature calculation based on daily averages from past 5 years of met data (this is for example purposes only and is not intended to match a specific set of met data):

In this example, the assumption is that the refill would occur on July 15, 2023. Assuming that met data would be available for the time period from 2017 through 2021, the following steps would be taken to calculate the temperature:

- The Daily Average for each of the following days in 2017, 2018, 2019, 2020, and 2021 would be determined based on historical met data:
 - o July 8
 - o July 9
 - o July 10

- o July 11
- o July 12
- o July 13
- o July 14
- The average for each date would be calculated based on the 5 year period
- The overall average of the daily averages would be calculated

This example assumes the following daily average temperatures for each date. The average of the daily averages was then calculated, as shown at the bottom of the table. This temperature would then be converted from $73.393^{\circ}F$ to $533.1^{\circ}R$. For this example, it is assumed that the expected temperature of the incoming product would be $70^{\circ}F$, so the average of the daily averages would be used since it is higher.

Date	Average Temperature (°F)
July 8, 201	7 69.33
July 9, 201	7 70.08
July 10, 201	7 73.63
July 11, 201	7 74.47
July 12, 201	7 75.1
July 13, 201	7 67.4
July 14, 201	7 65.58
July 8, 201	8 72.38
July 9, 201	8 76.83
July 10, 201	8 76.73
July 11, 201	8 74.08
July 12, 201	8 72.79
July 13, 201	8 76.25
July 14, 201	8 78.33
July 8, 201	9 71.54
July 9, 201	9 74.33
July 10, 201	9 76.17
July 11, 201	9 77.29
July 12, 201	9 74.67
July 13, 201	9 76.17
July 14, 201	9 77.42
July 8, 202	0 77.53
July 9, 202	0 80.93
July 10, 202	0 79.5
July 11, 202	0 79.79
July 12, 202	0 80.23
July 13, 202	0 78.13
July 14, 202	0 74.34
July 8, 202	1 63.54

Date	Average Temperature (°F)
July 9, 2021	69.91
July 10, 2021	67.46
July 11, 2021	62.97
July 12, 2021	64.98
July 13, 2021	68.25
July 14, 2021	70.61
AVERAGE	73.393

The above variables would be used to calculate the VOC emissions from the tank in a one hour period as follows:

$$P_{VA} = exp\left[A - \frac{B}{T_{LA}}\right]$$

$$P_{VA} = exp \left[11.756 - \frac{5315.1 \, ^{\circ}R}{533.1 \, ^{\circ}R} \right]$$

$$P_{VA} = 5.965 \, psia$$

$$L_{FL} = \frac{5.965 \ psia * 10114.25 \ ft3 * 68 \frac{lb}{lbmol} * 1 * 0.15}{10.731 \frac{psia - ft3}{lb - mol - {}^{\circ}R} * 533.1 \ {}^{\circ}R}$$

$$L_{FL} = 107.6 lb/hr$$

To confirm that this does not exceed the total filling losses that could be generated for the entire vapor space during the refill, the following calculation would be completed (0 ft liquid height after cleaning assumed):

$$h_v = h_d - h_L$$

$$h_v = 6 ft - 0 ft$$

$$h_v = 6 ft$$

$$V_V = \frac{\pi}{4} D^2 h_v$$

$$V_V = \frac{\pi}{4} (110 \, ft)^2 (6 \, ft)$$

$$V_V = 57,019.9 ft^3$$

Since the calculated vapor space is significantly greater than the refill rate, the volume refilled in one hour is used for the calculation. If the vapor space volume were smaller than the refill rate, then the filling losses would be calculated with the vapor space volume.

In this example, the benzene content is based on Certificate of Analyses for two (2) shipments of product. Terminal records indicate the following:

- The product in the tank consists of 60% of Shipment #1 and 40% of Shipment #2
- The benzene content for Shipment #1 is 0.8 volume % or 1.05 weight %
- The benzene content for Shipment #2 is 0.6 volume % or 0.788 weight %

The benzene content would be calculated as follows:

Benzene content of the mixture = Benzene Weight % in Shipment #1 * % of Shipment #1 in tank + Benzene Weight % in Shipment #2 * % of Shipment #2 in tank

Benzene content of the mixture = 1.05 wt% * 0.6 + 0.788 wt% * 0.4 = 0.9452 wt%, or 0.009452 weight fraction

The value of 0.009452 would then be used as the Z_{Lbz} (liquid weight fraction variable) for the calculations, as follows, given that molecular weight of benzene is 78.11 lb/lbmol:

To calculate liquid mole fraction of benzene:

$$x_{bz} = \frac{Z_{Lbz}M_L}{M_{hz}}$$

$$x_{bz} = \frac{0.009452 * 92 \ lb/lbmol}{78.11 \frac{lb}{lbmol}}$$

$$x_{bz} = 0.0111$$

To calculate benzene vapor pressure:

$$P = (0.019337)10^{\land} \left[A - \frac{B}{T+C} \right]$$

$$P = (0.019337)10^{\land} \left[6.906 - \frac{1211 \, \mathcal{C}}{23 \, \mathcal{C} + 220.79 \, \mathcal{C}} \right]$$

$$P = 1.68 \, psia$$

To calculate benzene partial pressure:

$$P_{bz} = P x_{bz}$$

$$P_{bz} = 1.68 \, psia * 0.0111$$

$$P_{bz} = 0.0186 \, psia$$

To calculate benzene vapor mole fraction:

$$y_{bz} = \frac{P_{bz}}{P_{VA}}$$

$$y_{bz} = \frac{0.0186\,psia}{5.965\,psia}$$

$$y_{bz} = 0.00312$$

To calculate benzene vapor weight fraction:

$$Z_{Vbz} = \frac{y_{bz} M_{bz}}{M_V}$$

$$Z_{Vbz} = \frac{0.00312*78.11\;lb/lbmol}{68\;lb/lbmol}$$

$$Z_{Vbz} = 0.00359$$

$$L_{FLB} = L_{FL}Z_{Vbz}$$

$$L_{FLB} = 107.6 \frac{lb}{hr} * 0.00359$$

 $L_{FLB} = 0.386 lb/hr$

Refilling Losses After In-Service Landing

Proposed permit condition parameters to be used for hourly emission calculations:

- Refill rate the expected delivery rate of product. For the predicted calculation, this is the
 expected delivery rate of the product. For the actual calculation, this is based on the change in
 the gauge over the time period of the refill or a flowmeter. The start and stop time of the refill
 period will be recorded.
- Temperature For predicted calculations, the average of the temperature of the product in the tank or the average ambient temperature, whichever is higher and the expected temperature of the incoming product. The ambient temperature will be calculated based on average of the daily average for the seven day time period prior to the scheduled day for the vapor space purge, based on the past five (5) years of met data or the average of the predicted temperature for the 7 day week the work is anticipated based on the National Weather Service. (Note there is contribution from both the arrival component and the generated component per AP-42) This temperature is used as T_V in AP-42 Chapter 7 Equation 3-18 and to calculate P_{VA} in AP-42 Chapter 7 Equation 1-25. For the actual calculation, the temperature of the product remaining in the tank or the average of the daily ambient average of the previous seven (7) day period based on the Albany Weather Station would be used. For arrival and generated components for a change in service, the calculations would be done separately for each product.
- Benzene Content percent liquid by volume to be documented by Certificate of Analysis or sample from the current product in the tank and from the tank/vessel/rail car providing the refill product. If the arrival component (based on current product in tank prior to refill) contains product from multiple product shipments, either a weighted average of the benzene content from each shipment will be calculated based on the volume from each shipment within the tank and the Certificate of Analysis for each shipment or the maximum benzene from the combined shipments will be used. Alternatively, instead of COA, the benzene content will be based on a sample taken from the tank that is representative of the contents. In the case where there is not a change in service, either the maximum benzene content between the current product in the tank and the refill product will be used or a weighted average calculation will be completed based on the product remaining in the tank and the volume necessary to complete the refill.

 Benzene content is used for Z_{Lbz} in AP-42 Equation 40-4 (see Section 4 of this document).
- Control Efficiency for predicted calculations, for tanks with a guide pole, there is an option of controlling the refill using a collection efficiency of 75% and a destruction efficiency of 98%. For actual calculations, the collection efficiency will remain 75% and the destruction efficiency documented by the cleaning contractor will be used, which is based on reading of the LEL in the inlet to the control device and the outlet VOC concentration.

Supporting Equations for emissions calculations:

AP-42 Chapter 7, Equation 3-18 to Calculate VOC Losses

$$L_{FL} = \frac{P_{VA}V_{V}M_{V}C_{sf}S}{RT_{V}}$$

where:

L_{FL} = VOC filling loss during roof landing, lb

P_{VA} = true vapor pressure of the liquid within the tank, psia (calculated using equation 1-25)

 V_V = volume of the vapor space, ft^3 , set equal to volume refilled in one hour to support modeling calculations, unless tank can be refilled in less than an hour. In this case, equation below will be used

 M_V = stock vapor molecular weight, lb/lb-mol

C_{sf} = filling saturation correction factor for wind, dimensionless (value = 1 for IFR and domed EFR)

S = filling saturation factor (0.5 for partial liquid heel, 0.6 for full liquid heel)

R = ideal gas constant, 10.731 (psia-ft³)/(lb-mol- $^{\circ}$ R)

 T_V = average temperature of the vapor below the floating roof (see Equation 3-6), ${}^{\circ}R$ – per Equation 3-6, T_V is equal to the average vapor temperature, ${}^{\circ}R$, given that the tank bottom is in contact with the ground, the temperature is assumed to be equal to ground temperature, which is taken as the average ambient temperature for the month in which the landing occurs, unless a different temperature is known

Per Ap-42, page 7.1-45, In the event of a change of service during the landing event, the equation should be run separately for the arrival and generated components. The arrival component should be based on the liquid properties of the prior service and a saturation factor of (Csf S – 0.15). The generated component should be based on the properties of the incoming liquid and a saturation factor of 0.15. Internal or Domed External Floating Roof Tank with a Liquid Heel.

Vapor Space Volume Calculation (in cases where tank would refill in less than an hour):

$$V_V = \frac{\pi}{4} D^2 h_v$$

where:

D = tank diameter

 h_v = height of vapor space, ft

$$h_{v} = h_{d} - h_{L}$$

where:

h_d = height of deck, ft

h_L = height of liquid, ft

<u>AP-42 Chapter 7, Equation 1-25 (this equation is not for maintenance activities so we would change what temperature we use to Taa)</u>

$$P_{VA} = exp\left[A - \frac{B}{T_{LA}}\right]$$

where:

A = constant in the vapor pressure equation, dimensionless

B = constant in the vapor pressure equation, °R

 T_{LA} = average daily liquid surface temperature, ${}^{\circ}R$, temperature assumed for this equation will vary based on the type of maintenance activity, as discussed above

<u>Equations to Determine Vapor Pressure Constant A, AP-42 Chapter 7 Figure 7.1-15, Refined Petroleum Stocks</u>

$$A = 15.64 - 1.854 S^{0.5} - (0.8742 - 0.3280 S^{0.5}) \ln (RVP)$$

<u>Equations to Determine Vapor Pressure Constant B, AP-42 Chapter 7 Figure 7.1-15, Refined Petroleum Stocks</u>

$$B = 8742 - 1042 S^{0.5} - (1049 - 179.4 S^{0.5}) \ln{(RVP)}$$

Equations to Determine Vapor Pressure Constant A, AP-42 Chapter 7 Figure 7.1-16, Crude Oil Stocks

$$A = 12.82 - 0.9672 \ln{(RVP)}$$

Equations to Determine Vapor Pressure Constant B, AP-42 Chapter 7 Figure 7.1-16, Crude Oil Stocks

$$B = 7261 - 1216 \ln{(RVP)}$$

Benzene Losses During Refill

$$L_{FLB} = L_{FL}Z_{Vbz}$$

L_{FLB} = Benzene Filling loss during roof landing, lb

 Z_{Vbz} = weight fraction of benzene in vapor (lb/lb) (see calculation below)

Benzene Vapor Weight Fraction Calculation

Parameters to be used for emission calculations:

- Benzene Content (Z_{Lbz}) liquid weight fraction of benzene in liquid documented by Certificate of Analysis or sample collection (as outlined in refill section)
- Temperature Depends on situation (as outlined in refill section)

Supporting Equations for emissions calculations:

AP-42 Chapter 7, Equation 40-6 (using benzene as the component):

$$Z_{Vbz} = \frac{y_{bz} M_{bz}}{M_V}$$

where:

 Z_{Vbz} = vapor weight fraction of benzene (lb/lb)

y_{bz} = vapor mole fraction of benzene, lb-mol/lb-mol

M_{bz} = molecular weight of benzene, lb/lb-mol (78.11 lb/lb-mol)

M_V = molecular weight of vapor stock, lb/lb-mol

AP-42 Chapter 7, Equation 40-5 (using benzene as the component):

$$y_{bz} = \frac{P_{bz}}{P_{VA}}$$

where:

yi = vapor mole fraction of benzene, lb-mole/lb-mole

P_{bz} = partial pressure of benzene, psia

P_{VA} = true vapor pressure of liquid mixture, psia (see Equation 1-25 in refill section)

AP-42, Chapter 7, Equation 40-3 (using benzene as the component):

$$P_{hz} = P x_{hz}$$

where:

Pbz = partial pressure of benzene, psia

P = vapor pressure of pure benzene, psia

 x_{bz} = liquid mole fraction of benzene, lb-mol/lb-mol

Antoine's equation (temperature will depend on situation)1:

$$P = (0.019337)10^{\land} \left[A - \frac{B}{T + C} \right]$$

where:

A = constant in vapor pressure equation, dimensionless (6.906 for benzene)

B = constant in vapor pressure equation, °C (1211°C for benzene)

C = constant in vapor pressure equation, °C (220.79°C for benzene)

T = temperature depends on situation - see AP-42, °C

AP-42 Chapter 7, Equation 40-4 (using benzene as the component):

$$x_{bz} = \frac{Z_{Lbz}M_L}{M_{hz}}$$

where:

 x_{bz} = liquid mole fraction of benzene, lb-mole/lb-mole

 Z_{Lbz} = weight fraction of benzene in the liquid, lb/lb

M_L = molecular weight of liquid stock, lb/lb-mol

M_{bz} = molecular weight of benzene, lb/lbmol (78.11 lb/lb-mol)

Refill After a Landing Example Scenario #1

Variables are defined as follows for the example refill after an IFR landing that includes a change in service:

¹ See AP-42 Chapter 7, Footnote to Table 7.1-3

- V_{ν} (volume of vapor space, set equal to volume refilled in one hour): 10,114.25 ft³ (1500 barrels per hour)
- Tank Diameter: 110 ft
- Arrival Component RVP: 9 (Gasoline)
- Generated Component RVP: 11 (Crude)
- Mv (stock vapor molecular weight, arrival component): 68 lb/lbmol
- Mv (stock vapor molecular weight, generated component): 50 lb/lbmol
- C_{sf} (filling saturation correction factor for wind) = 1
- S (saturation factor): 0.5 for partial heel
- Deck Height: 3 ft
- Height of product remaining in tank: 0.25 ft
- A (constant, arrival component): 11.756
- B (constant, arrival component): 5315.1°R
- A (constant, generated component): 10.501
- B (constant, generated component): 4345.2°R
- Arrival Component temperature (average of daily average for 7 days prior to event based on previous 5 years of met data): calculated below
- Generated Component temperature (expected incoming product temperature): 75°F (23.9°C or 534.67°R)

Temperature calculation based on daily averages from past 5 years of met data (this is for example purposes only and is not intended to match a specific set of met data):

In this example, the assumption is that the refill would occur on July 15, 2023. Assuming that met data would be available for the time period from 2017 through 2021, the following steps would be taken to calculate the temperature:

- The Daily Average for each of the following days in 2017, 2018, 2019, 2020, and 2021 would be determined based on historical met data:
 - o July 8
 - o July 9
 - o July 10
 - o July 11
 - July 12
 - o July 13
 - o July 14
- The average for each date would be calculated based on the 5 year period
- The overall average of the daily averages would be calculated

This example assumes the following daily average temperatures for each date. The average of the daily averages was then calculated, as shown at the bottom of the table. This temperature would then be converted from 73.393°F to 533.1°R.

Date	Average Temperature (°F)		
July 8, 2017	69.33		
July 9, 2017	70.08		

Date	Average Temperature (°F)
July 10, 2017	73.63
July 11, 2017	74.47
July 12, 2017	75.1
July 13, 2017	67.4
July 14, 2017	65.58
July 8, 2018	72.38
July 9, 2018	76.83
July 10, 2018	76.73
July 11, 2018	74.08
July 12, 2018	72.79
July 13, 2018	76.25
July 14, 2018	78.33
July 8, 2019	71.54
July 9, 2019	74.33
July 10, 2019	76.17
July 11, 2019	77.29
July 12, 2019	74.67
July 13, 2019	76.17
July 14, 2019	77.42
July 8, 2020	77.53
July 9, 2020	80.93
July 10, 2020	79.5
July 11, 2020	79.79
July 12, 2020	80.23
July 13, 2020	78.13
July 14, 2020	74.34
July 8, 2021	63.54
July 9, 2021	69.91
July 10, 2021	67.46
July 11, 2021	62.97
July 12, 2021	64.98
July 13, 2021	68.25
July 14, 2021	70.61
AVERAGE	73.393

The above variables would be used to calculate the VOC emissions from the tank in a one hour period as follows:

To calculate the true vapor pressure of the arrival component:

$$P_{VA} = exp\left[A - \frac{B}{T_{LA}}\right]$$

$$P_{VA} = exp \left[11.756 - \frac{5315.1 \, \text{R}}{533.1 \, \text{R}} \right]$$

$$P_{VA} = 5.965 \, psia$$

To calculate the filling losses from the arrival component, where the saturation factor is determined by subtracting 0.15 from the overall saturation factor:

$$L_{FL} = \frac{5.965 \ psia * 10114.25 \ ft3 * 68 \frac{lb}{lbmol} * 1 * (0.5 - 0.15)}{10.731 \frac{psia - ft3}{lb - mol - {}^{\circ}R} * 533.1 \ {}^{\circ}R}$$

$$L_{FL} = 251 lb/hr$$

To confirm that this does not exceed the total filling losses that could be generated for the entire vapor space during the refill, the following calculation would be completed:

$$h_v = h_d - h_L$$

$$h_v = 3 ft - 0.25 ft$$

$$h_{12} = 2.75 ft$$

$$V_V = \frac{\pi}{4} D^2 h_v$$

$$V_V = \frac{\pi}{4} (110 \, ft)^2 (2.75 \, ft)$$

$$V_V = 26,134.1 \, ft^3$$

Since the calculated vapor space is greater than the hourly refill rate, the volume refilled in one hour is used for the calculation. If the vapor space volume were smaller than the refill rate, then the filling losses would be calculated with the vapor space volume.

To calculate the true vapor pressure of the generated component:

$$P_{VA} = exp\left[A - \frac{B}{T_{LA}}\right]$$

$$P_{VA} = exp \left[10.501 - \frac{4345.2 \, ^{\circ}R}{534.67 \, ^{\circ}R} \right]$$

$$P_{VA} = 10.74 \ psia$$

To calculate the filling losses from the generated component:

$$L_{FL} = \frac{10.74 \ psia * 10114.25 \ ft3 * 50 \ \frac{lb}{lbmol} * 1 * 0.15}{10.731 \frac{psia - ft3}{lb - mol - {}^{\circ}R} * 534.67 \, {}^{\circ}R}$$

$$L_{FL} = 142 lb/hr$$

Total of arrival and generated components VOC losses due to refill = 381.9 lb/hr

Benzene Content for Arrival Component

In this example, the benzene content is based on Certificate of Analyses for two (2) shipments of product. Terminal records indicate the following:

- The product in the tank consists of 60% of Shipment #1 and 40% of Shipment #2
- The benzene content for Shipment #1 is 0.8 volume % or 1.05 weight %
- The benzene content for Shipment #2 is 0.6 volume % or 0.788 weight %

The benzene content would be calculated as follows:

Benzene content of the mixture = Benzene Weight % in Shipment #1 * % of Shipment #1 in tank + Benzene Weight % in Shipment #2 * % of Shipment #2 in tank

Benzene content of the mixture = 1.05 wt% * 0.6 + 0.788 wt% * 0.4 = 0.9452 wt%, or 0.009452 weight fraction

The value of 0.009452 would then be used as the Z_{Lbz} (liquid weight fraction variable) for the calculations, as follows, given that molecular weight of benzene is 78.11 lb/lbmol:

To calculate liquid mole fraction of benzene:

$$x_{bz} = \frac{Z_{Lbz}M_L}{M_{bz}}$$

$$x_{bz} = \frac{0.009452 * 92 lb/lbmol}{78.11 \frac{lb}{lbmol}}$$
$$x_{bz} = 0.0111$$

To calculate benzene vapor pressure:

$$P = (0.019337)10^{\land} \left[A - \frac{B}{T+C} \right]$$

$$P = (0.019337)10^{\land} \left[6.906 - \frac{1211 \, \mathcal{C}}{23 \, \mathcal{C} + 220.79 \, \mathcal{C}} \right]$$

$$P = 1.68 \, psia$$

To calculate benzene partial pressure:

$$P_{hz} = P x_{hz}$$

$$P_{bz} = 1.68 \, psia * 0.0111$$

$$P_{bz} = 0.0186 \ psia$$

To calculate benzene vapor mole fraction:

$$y_{bz} = \frac{P_{bz}}{P_{VA}}$$

$$y_{bz} = \frac{0.0186 \, psia}{5.965 \, psia}$$

$$y_{bz} = 0.00312$$

To calculate benzene vapor weight fraction:

$$Z_{Vbz} = \frac{y_{bz} M_{bz}}{M_V}$$

$$Z_{Vbz} = \frac{0.00312 * 78.11 \ lb/lbmol}{68 \ lb/lbmol}$$

$$Z_{Vbz} = 0.00359$$

Benzene Content for Generated Component:

In this example, the liquid wt% of benzene in the crude to be filled in the tank is 0.4%.

To calculate liquid mole fraction of benzene:

$$x_{bz} = \frac{Z_{Lbz}M_L}{M_{bz}}$$

$$x_{bz} = \frac{0.004 * 207 \ lb/lbmol}{78.11 \frac{lb}{lbmol}}$$

$$x_{bz} = 0.011$$

To calculate benzene vapor pressure (using the expected temperature of the incoming product):

$$P = (0.019337)10^{\land} \left[A - \frac{B}{T+C} \right]$$

$$P = (0.019337)10^{\land} \left[6.906 - \frac{1211 \, \mathcal{C}}{23.9 \, \mathcal{C} + 220.79 \, \mathcal{C}} \right]$$

$$P = 1.75 \, psia$$

To calculate benzene partial pressure:

$$P_{bz} = P x_{bz}$$

$$P_{bz} = 1.75 \ psia * 0.011$$

$$P_{bz}=0.01925\,psia$$

To calculate benzene vapor mole fraction:

$$y_{bz} = \frac{P_{bz}}{P_{VA}}$$

$$y_{bz} = \frac{0.01925 \ psia}{10.74 \ psia}$$

$$y_{bz} = 0.00179$$

To calculate benzene vapor weight fraction:

$$Z_{Vbz} = \frac{y_{bz} M_{bz}}{M_V}$$

$$Z_{Vbz} = \frac{0.00179*78.11\;lb/lbmol}{50\;lb/lbmol}$$

$$Z_{Vbz} = 0.0028$$

Based on this calculation, the benzene refill losses after a landing with a change in service (over a one hour period) is as follows:

$$L_{FLB} = L_{FL}Z_{Vbz}$$

$$L_{FLB} = 251 \frac{lb}{hr} * 0.00359 + 142 \frac{lb}{hr} * 0.0028$$

 $L_{FLB} = 1.3 lb/hr$

Refill After a Landing Example Scenario #2

Variables are defined as follows for the example refill after an IFR landing for an RVP change:

- V_v (volume of vapor space, set equal to volume refilled in one hour): 10,114.25 ft³ (1500 barrels per hour)
- Tank Diameter: 110 ft
- Current Product RVP: 13 (Gasoline)
- Product to be Refilled RVP: 9 (Gasoline)
- Mv (stock vapor molecular weight, Gasoline RVP 13): 62 lb/lbmol
- Mv (stock vapor molecular weight, Gasoline RVP 9): 68 lb/lbmol
- C_{sf} (filling saturation correction factor for wind) = 1
- S (saturation factor): 0.5 for partial heel
- Deck Height: 3 ft
- Height of product remaining in tank: 0.25 ft
- A (constant, Gasoline RVP 13): 11.644
- B (constant, Gasoline RVP 13): 5043.6°R
- A (constant, Gasoline RVP 9): 11.756
- B (constant, Gasoline RVP 9): 5315.1°R
- Current Product/ Gasoline RVP 13 temperature (average of daily average for 7 days prior to event based on previous 5 years of met data): calculated below
- Product to be refilled/ Gasoline RVP 9 temperature (expected incoming product temperature):
 predicted to be the same as the temperature calculated for the current product in this example

Temperature calculation based on daily averages from past 5 years of met data (this is for example purposes only and is not intended to match a specific set of met data):

In this example, the assumption is that the refill would occur on April 15, 2023. Assuming that met data would be available for the time period from 2018 through 2022, the following steps would be taken to calculate the temperature:

- The Daily Average for each of the following days in 2018, 2019, 2020, 2021, and 2022 would be determined based on historical met data:
 - o April 8
 - o April 9
 - o April 10
 - o April 11
 - o April 12
 - o April 13
 - o April 14
- The average for each date would be calculated based on the 5 year period
- The overall average of the daily averages would be calculated

This example assumes the following daily average temperatures for each date. The average of the daily averages was then calculated, as shown at the bottom of the table. This temperature would then be converted from 48.343°F to 508.0°R. Since this is also the predicted temperature of the incoming product in this scenario, 508.0°R would also be the average temperature for use in the calculations.

Date	Average Temperature (°F)
April 8, 2018	29.0
April 9, 2018	33.5
April 10, 2018	37.0
April 11, 2018	35.5
April 12, 2018	41.5
April 13, 2018	51.5
April 14, 2018	38.5
April 8, 2019	51.5
April 9, 2019	53.0
April 10, 2019	41.0
April 11, 2019	39.5
April 12, 2019	50.0
April 13, 2019	63.0
April 14, 2019	52.0
April 8, 2020	51.0
April 9, 2020	45.5
April 10, 2020	42.5
April 11, 2020	41.0
April 12, 2020	46.5
April 13, 2020	56.5
April 14, 2020	46.0
April 8, 2021	54.5
April 9, 2021	58.0
April 10, 2021	61.5
April 11, 2021	59.5
April 12, 2021	46.5
April 13, 2021	49.0
April 14, 2021	57.0
April 8, 2022	51.0
April 9, 2022	44.0
April 10, 2022	42.5
April 11, 2022	45.0
April 12, 2022	55.5
April 13, 2022	59.0
April 14, 2022	63.5
AVERAGE	48.343

The above variables would be used to calculate the VOC emissions from the tank in a one hour period as follows:

To calculate the true vapor pressure:

$$P_{VA} = exp\left[A - \frac{B}{T_{LA}}\right]$$

$$P_{VA} = exp \left[11.644 - \frac{5043.6 \, \Re}{508.0 \, \Re} \right]$$

$$P_{VA} = 5.560 \ psia$$

To calculate the filling losses from the RVP 13 gasoline component:

$$L_{FL} = \frac{5.560 \ psia * 10,114.25 \ ft3 * 62 \frac{lb}{lbmol} * 1 * 0.5}{10.731 \frac{psia - ft3}{lb - mol - {}^{\circ}R} * 508.0 \ {}^{\circ}R}$$

$$L_{FL} = 319.8 \ lb/hr$$

To confirm that this does not exceed the total filling losses that could be generated for the entire vapor space during the refill, the following calculation would be completed:

$$h_v = h_d - h_L$$

$$h_v = 3 ft - 0.25 ft$$

$$h_v = 2.75 \, ft$$

$$V_V = \frac{\pi}{4} D^2 h_v$$

$$V_V = \frac{\pi}{4} (110 \, ft)^2 (2.75 \, ft)$$

$$V_V = 26,134.1 \, ft^3$$

Since the calculated vapor space is greater than the refill rate, the volume refilled in one hour is used for the calculation. If the vapor space volume were smaller than the refill rate, then the filling losses would be calculated with the vapor space volume.

Benzene Content

In this example, the benzene content of the RVP 13 gasoline in the tank is based on Certificate of Analyses for two (2) shipments of product. Terminal records indicate the following:

- The product in the tank consists of 60% of Shipment #1 and 40% of Shipment #2
- The benzene content for Shipment #1 is 0.8 volume % or 1.05 weight %
- The benzene content for Shipment #2 is 0.6 volume % or 0.788 weight %

The benzene content would be calculated as follows:

Benzene content of the mixture = Benzene Weight % in Shipment #1 * % of Shipment #1 in tank + Benzene Weight % in Shipment #2 * % of Shipment #2 in tank

Benzene content of the mixture = 1.05 wt% * 0.6 + 0.788 wt% * 0.4 = 0.9452 wt%, or 0.009452 weight fraction

The COA for the refill/ incoming product indicates that the shipment is 0.5 wt%. The terminal is using the option to do a weighted average of the incoming product and the product in the tank. The remaining product in the tank prior to refill would be calculated as follows (based on 0.25 ft of product remaining in tank):

$$V = \frac{\pi}{4}D^2h$$

$$V = \frac{\pi}{4} (110 \, ft)^2 (0.25 \, ft)$$

$$V = 2375.83 ft^3$$

$$V = 17.772 \ gal$$

The volume of product required for the refill would be estimated as follows for the predicted calculation (and actuals would be used for the actual calculation), based on a 3 ft roof height:

$$V = \frac{\pi}{4}D^2h$$

$$V = \frac{\pi}{4} (110 \, ft)^2 (3 \, ft)$$

$$V = 28,509.95 ft^3$$

$$V = 213,269.3 \ gal$$

Based on this calculation, the volume of the product within the tank would make up 7.7% of the total and the incoming product would make up the remaining 92.3%. The weighted average of the benzene content of the current and incoming product would then be calculated as follows:

Benzene content of the mixture = Benzene Weight % of Current Product * % of Current Product in tank + Benzene Weight % Incoming Product * % of Incoming Product in tank

Benzene content of the mixture = 0.9452 wt% * 0.077 + 0.5 wt% * 0.923 = 0.534 wt%, or 0.00534 weight fraction

The value of 0.00534 would then be used as the Z_{Lbz} (liquid weight fraction variable) for the calculations, as follows, given that molecular weight of benzene is 78.11 lb/lbmol:

To calculate liquid mole fraction of benzene:

$$x_{bz} = \frac{Z_{Lbz}M_L}{M_{bz}}$$

$$x_{bz} = \frac{0.00534 * 92 \ lb/lbmol}{78.11 \frac{lb}{lbmol}}$$
$$x_{bz} = 0.0063$$

To calculate benzene vapor pressure:

$$P = (0.019337)10^{\land} \left[A - \frac{B}{T+C} \right]$$

$$P = (0.019337)10^{\land} \left[6.906 - \frac{1211 \, \mathcal{C}}{9.1 \, \mathcal{C} + 220.79 \, \mathcal{C}} \right]$$

$$P = 0.84 psia$$

To calculate benzene partial pressure:

$$P_{bz} = P x_{bz}$$

$$P_{bz} = 0.84 \, psia * 0.0063$$

$$P_{bz} = 0.0053 \ psia$$

To calculate benzene vapor mole fraction:

$$y_{bz} = \frac{P_{bz}}{P_{VA}}$$

$$y_{bz} = \frac{0.0053 \, psia}{5.560 \, psia}$$

$$y_{bz} = 0.00095$$

To calculate benzene vapor weight fraction:

$$Z_{Vbz} = \frac{y_{bz} M_{bz}}{M_V}$$

$$Z_{Vbz} = \frac{0.00095*78.11\ lb/lbmol}{62\ lb/lbmol}$$

$$Z_{Vbz} = 0.0012$$

To calculate the hourly benzene losses:

$$L_{FLB} = L_{FL}Z_{Vbz}$$

$$L_{FLB} = 319.8 \frac{lb}{hr} * 0.0012$$

$$L_{FLB} = 0.38 \, lb/hr$$

The following calculation is provided for RVP 9 to show that the calculation for benzene would not be dependent on RVP.

To calculate the true vapor pressure of RVP 9 product:

$$P_{VA} = exp\left[A - \frac{B}{T_{LA}}\right]$$

$$P_{VA} = exp\left[11.756 - \frac{5315.1 \,^{\circ}R}{508.0 \,^{\circ}R}\right]$$

$$P_{VA} = 3.64 \ psia$$

To calculate the filling losses from the incoming product:

$$L_{FL} = \frac{3.64 \ psia * 10114.25 \ ft3 * 68 \ \frac{lb}{lbmol} * 1 * 0.5}{10.731 \frac{psia - ft3}{lb - mol - {}^{\circ}R} * 508.0 \ {}^{\circ}R}$$

$$L_{FL} = 229.9 \; lb/hr$$

Benzene Content for Incoming Product:

To calculate liquid mole fraction of benzene:

$$x_{bz} = \frac{Z_{Lbz} M_L}{M_{bz}}$$

$$x_{bz} = \frac{0.00534 * 92 \ lb/lbmol}{78.11 \frac{lb}{lbmol}}$$

$$x_{bz} = 0.0063$$

To calculate benzene vapor pressure:

$$P = (0.019337)10^{\land} \left[A - \frac{B}{T+C} \right]$$

$$P = (0.019337)10^{\land} \left[6.906 - \frac{1211 \, \mathcal{C}}{9.1 \, \mathcal{C} + 220.79 \, \mathcal{C}} \right]$$

$$P = 0.84 psia$$

To calculate benzene partial pressure:

$$P_{bz} = P x_{bz}$$

$$P_{bz} = 0.84 \, psia * 0.0063$$

$$P_{bz} = 0.0053 \, psia$$

To calculate benzene vapor mole fraction:

$$y_{bz} = \frac{P_{bz}}{P_{VA}}$$

$$y_{bz} = \frac{0.0053\,psia}{3.64\,psia}$$

$$y_{bz} = 0.0015$$

To calculate benzene vapor weight fraction:

$$Z_{Vbz} = \frac{y_{bz} M_{bz}}{M_V}$$

$$Z_{Vbz} = \frac{0.0015*78.11\;lb/lbmol}{68\;lb/lbmol}$$

$$Z_{Vbz} = 0.00167$$

Based on this calculation, the benzene refill losses after a landing would be as follows:

$$L_{FLB} = L_{FL}Z_{Vbz}$$

$$L_{FLB} = 229.9 \frac{lb}{hr} * 0.00167$$

 $L_{FLB} = 0.38 \, lb/hr$

Vapor Space Purge Losses for IFR

Proposed permit condition parameters to be used for hourly emission calculations:

- Temperature For the predicted calculation, either the average of the daily average for the seven day time period prior to the scheduled day for the vapor space purge, based on the past five (5) years of met data or the predicted average temperature for the week the work is anticipated as projected by the National Weather Service. For the actual calculations, the actual temperature of the liquid prior to the purge or ambient average temperature from the days the tank was sitting empty prior to the vapor space purge will be used (whichever is higher). This will be the average of the daily average for the seven (7) day period based on the Albany Weather Station. The use of the seven (7) day time period is based on AP-42 Chapter 7.1.3.8.1(b) that states that it takes nine (9) days for thermal equilibrium to be reached. (Note The vapors for the vapor space purge would be at the same temperature as the product in the tank that was removed for the cleaning). This temperature is used for T_v in AP-42 Chapter 7 Equation 4-2 and T_{LA} in AP-42 Chapter 7 Equation 1-25.
- Benzene Content percent liquid by volume to be documented by Certificate of Analysis or a sample taken from the tank representative of the contents. If the tank contains product from multiple product shipments, either a weighted average of the benzene content from each shipment will be calculated based on the volume from each shipment within the tank and the Certificate of Analysis (COA) for each shipment or the maximum benzene from the combined shipments will be used. Alternatively, instead of COA, the benzene content will be based on a sample taken from the tank that is representative of the contents. Benzene content is used for Z_{Lbz} in AP-42 Equation 40-4 (see Section 4 of this document).
- \underline{RVP} the Reid Vapor Pressure of the product in the tank from a Certificate of Analysis or from a sample collected from the tank. The RVP determines the A and B constants to be used in the P_{VA} equation (AP-42 Chapter 7 Equation 1-25).
- <u>Destruction Efficiency</u> for predicted calculations, an efficiency of 98% will be used. For actual calculations, the efficiency documented by the cleaning contractor will be used and is based on reading of the LEL in the inlet to the control device and the outlet VOC concentration.

Supporting Equations for emissions calculations:

AP-42 Chapter 7, Equation 4-2 for Vapor Space Purge Emissions

$$L_P = \frac{P_{VA}V_V M_V S}{RT_V}$$

where:

L_p = VOC vapor space purge loss, lb

 P_{VA} = true vapor pressure of the exposed volatile material in the tank, psia (calculated using Equation 1-25, based on average temperature of product in the tank)

 V_V = volume of vapor space in ft³ (see Equation below)

M_V = stock vapor molecular weight (lb/lb-mol)

S = saturation factor (0.5 for IFR with partial liquid heel, 0.6 for IFR with full liquid heel, 0.15 for drain dry)

R = ideal gas constant, 10.731 (psia-ft³)/(lb-mol- $^{\circ}$ R)

 T_V = the average temperature of the vapor space, ${}^{\circ}R$ = the average ambient temperature, ${}^{\circ}R$

Vapor Space Volume Calculation:

$$V_V = \frac{\pi}{4} D^2 h_v$$

where:

D = tank diameter

h_v = height of vapor space, ft

$$h_{v} = h_{d} - h_{L}$$

where:

h_d = height of deck, ft

h_L = height of liquid, ft

AP-42 Chapter 7, Equation 1-25 (this equation is not for maintenance activities so we would change what temperature we use to Taa)

$$P_{VA} = exp\left[A - \frac{B}{T_{IA}}\right]$$

where:

A = constant in the vapor pressure equation, dimensionless

B = constant in the vapor pressure equation, °R

 T_{LA} = average daily liquid surface temperature, ${}^{\circ}R$, temperature assumed for this equation will vary based on the type of maintenance activity, as discussed above

<u>Equations to Determine Vapor Pressure Constant A, AP-42 Chapter 7 Figure 7.1-15, Refined Petroleum Stocks</u>

$$A = 15.64 - 1.854 S^{0.5} - (0.8742 - 0.3280 S^{0.5}) \ln{(RVP)}$$

<u>Equations to Determine Vapor Pressure Constant B, AP-42 Chapter 7 Figure 7.1-15, Refined Petroleum Stocks</u>

$$B = 8742 - 1042 S^{0.5} - (1049 - 179.4 S^{0.5}) \ln (RVP)$$

Equations to Determine Vapor Pressure Constant A, AP-42 Chapter 7 Figure 7.1-16, Crude Oil Stocks

$$A = 12.82 - 0.9672 \ln{(RVP)}$$

Equations to Determine Vapor Pressure Constant B, AP-42 Chapter 7 Figure 7.1-16, Crude Oil Stocks

$$B = 7261 - 1216 \ln{(RVP)}$$

Benzene Losses During Vapor Space Purge

$$L_{pBz} = L_p Z_{Vbz}$$

L_{pBz} = Benzene loss during vapor space purge, lb

 Z_{Vbz} = weight fraction of benzene in vapor (lb/lb) (see calculation below)

Benzene Vapor Weight Fraction Calculation

Parameters to be used for emission calculations:

- Benzene Content (Z_{Lbz}) liquid weight fraction of benzene in liquid documented by Certificate of Analysis or sample collection (as outlined in vapor space purge section above)
- Temperature Depends on situation (as outlined in vapor space purge section above)

Supporting Equations for emissions calculations:

AP-42 Chapter 7, Equation 40-6 (using benzene as the component):

$$Z_{Vbz} = \frac{y_{bz} M_{bz}}{M_V}$$

where:

 Z_{Vbz} = vapor weight fraction of benzene (lb/lb)

y_{bz} = vapor mole fraction of benzene, lb-mol/lb-mol

M_{bz} = molecular weight of benzene, lb/lb-mol (78.11 lb/lb-mol)

M_V = molecular weight of vapor stock, lb/lb-mol

AP-42 Chapter 7, Equation 40-5 (using benzene as the component):

$$y_{bz} = \frac{P_{bz}}{P_{VA}}$$

where:

yi = vapor mole fraction of benzene, lb-mole/lb-mole

P_{bz} = partial pressure of benzene, psia

P_{VA} = true vapor pressure of liquid mixture, psia (see Equation 1-25 in vapor space purge section above)

AP-42, Chapter 7, Equation 40-3 (using benzene as the component):

$$P_{bz} = P x_{bz}$$

where:

Pbz = partial pressure of benzene, psia

P = vapor pressure of pure benzene, psia

 x_{bz} = liquid mole fraction of benzene, lb-mol/lb-mol

Antoine's equation (temperature will depend on situation)¹:

$$P = (0.019337)10^{\land} \left[A - \frac{B}{T + C} \right]$$

where:

¹ See AP-42 Chapter 7, Footnote to Table 7.1-3

A = constant in vapor pressure equation, dimensionless (6.906 for benzene)

B = constant in vapor pressure equation, °C (1211°C for benzene)

C = constant in vapor pressure equation, °C (220.79°C for benzene)

T = temperature depends on situation – see AP-42, °C

AP-42 Chapter 7, Equation 40-4 (using benzene as the component):

$$x_{bz} = \frac{Z_{Lbz}M_L}{M_{bz}}$$

where:

 x_{bz} = liquid mole fraction of benzene, lb-mole/lb-mole

 Z_{Lbz} = weight fraction of benzene in the liquid, lb/lb

M_L = molecular weight of liquid stock, lb/lb-mol

M_{bz} = molecular weight of benzene, lb/lbmol (78.11 lb/lb-mol)

Vapor Space Purge Example Scenario

Variables are defined as follows for the example IFR vapor space purge for a predicted calculation:

- D (tank diameter): 110 ft
- h_d (height of deck during cleaning): 6 ft
- h_L (height of liquid): 0.25 ft
- RVP: 9
- Mv (stock vapor molecular weight): 68 lb/lbmol
- S (saturation factor, partial heel): 0.5
- A (constant, assuming RVP 9): 11.756
- B (constant, assuming RVP 9): 5315.1°R

The above variables would be used to calculate the VOC emissions from the tank as follows:

Temperature calculation based on daily averages from past 5 years of met data (this is for example purposes only and is not intended to match a specific set of met data):

In this example, the assumption is that the cleaning would occur on July 15, 2023. Assuming that met data would be available for the time period from 2017 through 2021, the following steps would be taken to calculate the temperature:

- The Daily Average for each of the following days in 2017, 2018, 2019, 2020, and 2021 would be determined based on historical met data:
 - o July 8
 - o July 9
 - o July 10
 - o July 11
 - o July 12
 - o July 13
 - o July 14
- The average for each date would be calculated based on the 5 year period
- The overall average of the daily averages would be calculated

This example assumes the following daily average temperatures for each date. The average of the daily averages was then calculated, as shown at the bottom of the table. This temperature would then be converted from 73.393°F to 533.1°R.

Date	Average Temperature (°F)
July 8, 2017	69.33
July 9, 2017	70.08
July 10, 2017	73.63
July 11, 2017	74.47
July 12, 2017	75.1
July 13, 2017	67.4
July 14, 2017	65.58
July 8, 2018	72.38
July 9, 2018	76.83
July 10, 2018	76.73
July 11, 2018	74.08
July 12, 2018	72.79
July 13, 2018	76.25
July 14, 2018	78.33
July 8, 2019	71.54
July 9, 2019	74.33
July 10, 2019	76.17
July 11, 2019	77.29
July 12, 2019	74.67
July 13, 2019	76.17
July 14, 2019	77.42
July 8, 2020	77.53
July 9, 2020	80.93
July 10, 2020	79.5
July 11, 2020	79.79
July 12, 2020	80.23

Date	Average Temperature (°F)
July 13, 2020	78.13
July 14, 2020	74.34
July 8, 2021	63.54
July 9, 2021	69.91
July 10, 2021	67.46
July 11, 2021	62.97
July 12, 2021	64.98
July 13, 2021	68.25
July 14, 2021	70.61
AVERAGE	73.393

$$P_{VA} = exp\left[A - \frac{B}{T_{LA}}\right]$$

$$P_{VA} = exp \left[11.756 - \frac{5315.1 \, ^{\circ}R}{533.1 \, ^{\circ}R} \right]$$

$$P_{VA} = 5.965 \ psia$$

$$h_v = h_d - h_L$$

$$h_v = 6 ft - 0.25 ft$$

$$h_v = 5.75 ft$$

$$V_V = \frac{\pi}{4} D^2 h_v$$

$$V_V = \frac{\pi}{4} (110 \, ft)^2 (5.75 \, ft)$$

$$V_V = 54,644.08 \, ft^3$$

$$L_P = \frac{P_{VA}V_V M_V S}{RT_V}$$

$$L_P = \frac{(5.965 \ psia)(54644.08 \ ft^3)(68 \frac{lb}{lbmol})(0.5)}{(10.731 \frac{psia - ft3}{lb - mol - {}^{\circ}R})(533.1 \ R)}$$

$$L_P = 1937.1 \ lbs \ VOCs$$

In this example, the benzene content is based on Certificate of Analyses for two (2) shipments of product. Terminal records indicate the following:

- The product in the tank consists of 60% of Shipment #1 and 40% of Shipment #2
- The benzene content for Shipment #1 is 0.8 volume % or 1.05 weight %
- The benzene content for Shipment #2 is 0.6 volume % or 0.788 weight %

The benzene content would be calculated as follows:

Benzene content of the mixture = Benzene Weight % in Shipment #1 * % of Shipment #1 in tank + Benzene Weight % in Shipment #2 * % of Shipment #2 in tank

Benzene content of the mixture = 1.05 wt% * 0.6 + 0.788 wt% * 0.4 = 0.9452 wt%, or 0.009452 weight fraction

The value of 0.009452 would then be used as the Z_{Lbz} (liquid weight fraction variable) for the calculations, as follows, given that molecular weight of benzene is 78.11 lb/lbmol:

To calculate liquid mole fraction of benzene:

$$x_{bz} = \frac{Z_{Lbz}M_L}{M_{bz}}$$

$$x_{bz} = \frac{0.009452 * 92 \ lb/lbmol}{78.11 \frac{lb}{lbmol}}$$
$$x_{bz} = 0.0111$$

To calculate benzene vapor pressure:

$$P = (0.019337)10^{\land} \left[A - \frac{B}{T+C} \right]$$

$$P = (0.019337)10^{\land} \left[6.906 - \frac{1211 \, \text{°C}}{23 \, \text{°C} + 220.79 \, \text{°C}} \right]$$

$$P = 1.68 \, psia$$

To calculate benzene partial pressure:

$$P_{bz} = P x_{bz}$$

$$P_{bz} = 1.68 \, psia * 0.0111$$

$$P_{bz} = 0.0186 \, psia$$

To calculate benzene vapor mole fraction:

$$y_{bz} = \frac{P_{bz}}{P_{VA}}$$

$$y_{bz} = \frac{0.0186 \, psia}{5.965 \, psia}$$

$$y_{bz} = 0.00312$$

To calculate benzene vapor weight fraction:

$$Z_{Vbz} = \frac{y_{bz} M_{bz}}{M_V}$$

$$Z_{Vbz} = \frac{0.00312*78.11\;lb/lbmol}{68\;lb/lbmol}$$

$$Z_{Vbz} = 0.00359$$

Using the above calculations, the benzene vapor space purge loss would be as follows:

$$L_{pB} = L_p Z_{Vbz}$$

$$L_{pB} = 1937.1 \, lbs \, VOCs * 0.00359$$

$$L_{pB} = 6.95 \, lbs$$

Assuming a destruction efficiency of 98%, a value of 0.139 lbs of benzene (2% of L_{pB} above) would assumed to be emitted during vapor space purge for use in the air dispersion model.

Attachment XVIII

Sampling Protocols



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SAMPLING PROTOCOL

Samples will be collected by qualified personnel in accordance with recognized methods established by industry standards such as API MPMS Chapter 8 or referenced method. Sampling methods will be as outlined below. Alternative sample methods may be used upon approval by NYSDEC.

Crude Hydrogen Sulfide Sampling

Samples will be collected from tanks storing crude oil and analyzed for hydrogen sulfide vapor concentration per ASTM D5705 MOD or ITM 3468.

Samples will be collected once per month unless no new product has been received into the tank since the last sample. Once additional product is received, a new sample will be collected. The ratio method outlined in this protocol may be used.

Vapor Pressure Sampling

Samples will be collected from tanks storing gasoline, crude oil, and blendstock/component and analyzed for vapor pressure. Crude vapor pressure will be analyzed per ASTM D6377. Gasoline and Blendstock/component vapor pressure will be analyzed by ASTM D5191. The sampling methods apply to both Reid Vapor Pressure (RVP) and True Vapor Pressure (TVP). Vapor pressure may be determined from the certificate of analysis (COA) rather than through sampling.

Samples will be collected once per month for blendstock/component and crude oil unless no new product has been received into the tank since the last sample. Once additional product is received, a new sample will be collected. The ratio method outlined in this protocol may be used. The vapor pressure may be determined from the COA rather than through sampling.

Samples will be collected once per month during summer RVP season for gasoline unless no new product has been received into the tank since the last sample. Once additional product is received, a new sample will be collected. The ratio method outlined in this protocol may be used. The vapor pressure may be determined from the COA rather than through sampling. The higher of the COAs may be used for the entire tank contents.

If the COA shows vapor pressure for all product in the tanks is lower than the limits specified in the permit, no sampling is required.

When the local maximum monthly average temperature exceeds 75 degree F, as reported by the National Weather Service, a TVP sample will be collected from crude, blendstock/component tanks to ensure TVP is less than 76.6 kPa (11.1 psia). A sample will only be collected if the RVP on the COA for the product in the tank (or any COA if there is a mixture of products) is greater than 11 psi. The TVP will be analyzed at the monthly average temperature reported by the National Weather Service.

Benzene Sampling

Samples will be collected from tanks storing gasoline, crude oil, and blendstock/component and analyzed for benzene per ASTM D3606 for gasoline and blendstock/component and per ASTM D6730 MOD for crude oil. The benzene content may also be determined from the COA rather than through sampling. The COA will be reported in volume percent and converted to weight percent as determined below. When sampling is conducted, results will be reported in weight percent.

Samples will be collected once per month unless no new product has been received into the tank since the last sample. Once additional product is received, a new sample will be collected. The ratio method outlined in this protocol may be used. The benzene content may be determined from the certificate of analysis (COA) rather than through sampling. The higher of the COAs may be used for the entire tank contents.

If the COA shows benzene for all product in the tanks is lower than the limits specified in the permit, no sampling is required.

Benzene Conversion from Volume % to Weight %

In this example, the benzene content is based on a COA for gasoline.

wt%=vol%*(density of benzene/density of the product) wt%=0.8%*(7.32 lb/gal / 5.6 lb/gal) wt%= 1.05 wt% benzene

Ratio Method

Samples will be collected two times to confirm accuracy of the ratio method. Once accuracy is approved by NYSDEC, no additional samples will be required unless requested by NYSDEC. The ratio method is accurate if it is within 10% of the measured value. If accuracy is not within 10% the ratio method will be revised as necessary.

The ratio method uses the volume of product from multiple shipments into the tank and the corresponding COA to calculate the parameter as outlined below.

Example: Determining Benzene Content for a Mixture

In this example, the benzene content is based on the COA for two (2) shipments of product.

Terminal records indicate the following:

- The product in the tank consists of 60% of Shipment #1 and 40% of Shipment #2
- The benzene content for Shipment #1 is 0.8 volume % or 1.05 weight %
- The benzene content for Shipment #2 is 0.6 volume % or 0.788 weight %



Benzene content of the mixture = Benzene Volume/Weight % in Shipment #1 * % of Shipment #1 in tank + Benzene Volume/Weight % in Shipment #2 * % of Shipment #2 in tank

Benzene content of the mixture = 1.05 wt% * 0.6 + 0.788 wt% * 0.4 = 0.9452 wt% benzene

Example: Determining RVP for a Mixture

In this example, the RVP is based on the COA for two (2) shipments of product.

Terminal records indicate the following:

- The product in the tank consists of 60% of Shipment #1 and 40% of Shipment #2
- The RVP of Shipment #1 is 13 psi.
- The RVP of Shipment #2 is 9 psi.

The RVP would be calculated as follows:

RVP of the mixture = (Shipment 1 RVP^{1.25*} % of Shipment #1 in tank + Shipment 2 RVP^{1.25*} % of Shipment #2 in tank) $^{1/1.25}$

RVP of the mixture = $(13^{1.25} \text{ psi } * 0.6 + 8^{1.25} \text{ psi } * 0.4)^{1/1.25} = 11.1 \text{ psi}$

The RVP in the example was calculated based on the formulas below. RVP blending indices were used because RVP is not an additive property.

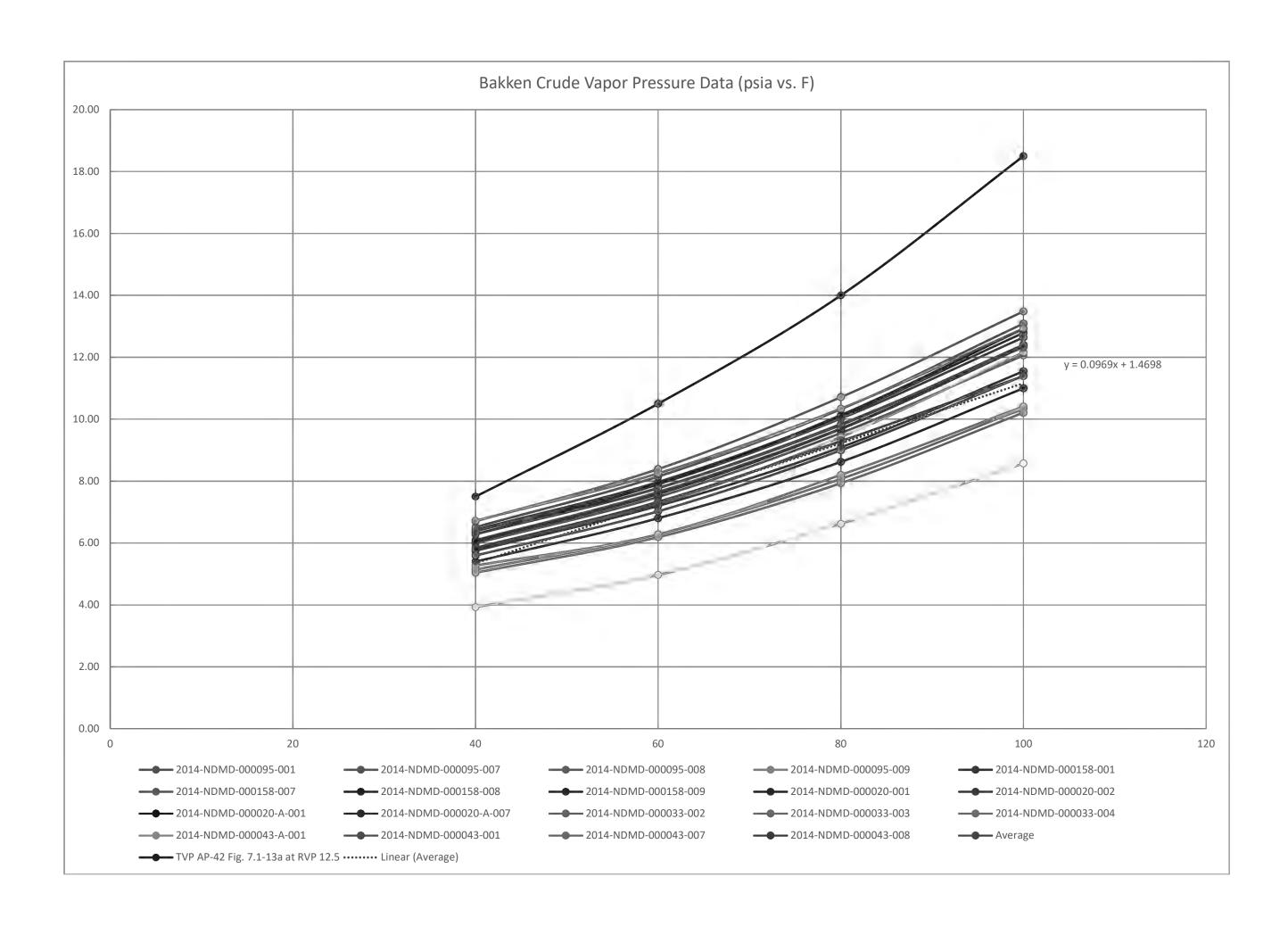
 $BI_{RVPi} = RVP_i^{1.25}$

 $\mathsf{BI}_{\mathsf{RVP},\mathsf{Blend}} = \sum_{i=1}^n \, \mathsf{x}_{\mathit{vi}} \mathsf{BI}_{\mathsf{RVP}i}$



Attachment XIX

Crude Vapor Pressure Graphs



Attachment XX

Crude H2S Sampling Results



Client: Global Companies, LLC

Job Location: Global Petroleum - Stampede

Our Reference Number: US01155-0000073

Client Reference Number:

None

Sample ID: 2014-NDMD-000072-001

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global

Representing: Stampede Terminal - Tank 01 Running

Date Taken: 12-March-2014

Date Submitted: 12-March-2014

Date Tested: 17-March-2014

Drawn By: Intertek

Method	Test	Result	Units	-
ITM 3468	Determination of Hydrogen Sulfide in Vapor Phase	se of Volatile Samples		
	Test temperature	77	~	
	Hydrogen Sulfide in vapor phase	<1	ppm v/v	5201001
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Direction	ct Injection Gas Chromatograpl	ny	
	Benzene	0.18	Vol %	
	Toluene	0.42	Vol %	
	Ethylbenzene	0.34	Vol %	
	Xylenes	0.99	Vol %	

Sample ID: 2014-NDMD-000072-002

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global

Representing: Stampede Terminal - Tank 02 Running

Date Taken: 12-March-2014

Date Submitted: 12-March-2014

Date Tested: 17-March-2014

Drawn By: Intertek

Test	Result	Units	
Determination of Hydrogen Sulfide in Vapor Pha	se of Volatile Samples		
Test temperature	77		
Hydrogen Sulfide in vapor phase	<1	ppm v/v	24112
Determination of Light Ends in Crude Oil by Dire	ct Injection Gas Chromatograp	hy	-634-
Benzene	0.18	Vol %	32352
Toluene	0.42	Vol %	55225
Ethylbenzene	0.31	Vol %	20000
Xylenes	0.93	Vol %	50000
	Determination of Hydrogen Sulfide in Vapor Pha Test temperature Hydrogen Sulfide in vapor phase Determination of Light Ends in Crude Oil by Dire Benzene Toluene Ethylbenzene	Determination of Hydrogen Sulfide in Vapor Phase of Volatile Samples Test temperature 77 Hydrogen Sulfide in vapor phase < 1 Determination of Light Ends in Crude Oil by Direct Injection Gas Chromatograp Benzene 0.18 Toluene 0.42 Ethylbenzene 0.31	Determination of Hydrogen Sulfide in Vapor Phase of Volatile Samples Test temperature 77 F Hydrogen Sulfide in vapor phase < 1 ppm v/v Determination of Light Ends in Crude Oil by Direct Injection Gas Chromatography Benzene 0.18 Vol % Toluene 0.42 Vol % Ethylbenzene 0.31 Vol %

Sample ID: 2014-NDMD-000072-003

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global

Representing: Beulah Terminal - Tank 01 Running

Date Taken: 12-March-2014

Date Submitted: 12-March-2014

Date Tested: 17-March-2014

Drawn By: Intertek

Method	Test	Result	Units	- 1
ITM 3468	Determination of Hydrogen Sulfide in Vapor Phase	se of Volatile Samples		
	Test temperature	77	F	
	Hydrogen Sulfide in vapor phase	< 1	ppm v/v	
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Direct	ct Injection Gas Chromatograp	hy	200000
	Benzene	0.21	Vol %	
	Toluene	0.38	Vol %	
	€ 526 6376 5376 6376 6376 6376 6376 6376 637		**************************************	021501



Sample ID: 2014-NDMD-000072-003

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global

Representing: Beulah Terminal - Tank 01 Running

Date Taken: 12-March-2014

Date Submitted: 12-March-2014

Date Tested: 17-March-2014

Drawn By: Intertek

Method	Test	Result	Units
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by	Direct Injection Gas Chromatography	у
	Ethylbenzene	0.22	Vol %
	Xylenes	1.01	Vol %

Sample ID: 2014-NDMD-000072-004

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global

Representing: Beulah Terminal - Tank 02 Running

Date Taken: 12-March-2014

Date Submitted: 12-March-2014

Date Tested: 17-March-2014

Drawn By: Intertek

Method	Test	Result	Units
ITM 3468	Determination of Hydrogen Sulfide in Vapor Pha-	se of Volatile Samples	
	Test temperature	77	F
	Hydrogen Sulfide in vapor phase	< 1	ppm v/v
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Dire	ct Injection Gas Chromatograp	hy
	Benzene	0.20	Vol %
	Toluene	0.36	Vol %
	Ethylbenzene	0.21	Vol %
	Xylenes	0.96	Vol %

This final report has been reviewed for accuracy, completeness, and comparison against specifications when available. The reported results are only representative of the samples submitted for testing. This report shall not be reproduced except in full without written approval of the laboratory.

Signed:		Date:	
-	Intertek Jordan Reinbold, Laboratory Technician		



Client: Global Companies, LLC

Job Location: Global Petroleum - Stampede

Our Reference Number: US01155-0000080

Client Reference Number:

None

Sample ID: 2014-NDMD-000082-001

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global

Representing: Stampede Tank 01 Running

Date Taken: 19-March-2014

Date Submitted:19-March-2014

Date Tested: 25-March-2014

Drawn By: Intertek

Method	Test	Result	Units
ITM 3468	Determination of Hydrogen Sulfide in Vapor Pha	se of Volatile Samples	
	Test temperature	77	F
	Hydrogen Sulfide in vapor phase	8	ppm v/v
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Dire	ct Injection Gas Chromatograph	ny
	Benzene	0.18	Vol %
	Toluene	0.45	Vol %
	Ethylbenzene	0.35	Vol %
	Xylenes	1.00	Vol %

Sample ID: 2014-NDMD-000082-002

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global

Representing: Stampede Tank 02 Running

Date Taken: 19-March-2014

Date Submitted:19-March-2014

Date Tested: 25-March-2014

Drawn By: Intertek

Method	Test	Result	Units	-
ITM 3468	Determination of Hydrogen Sulfide in Vapor Pha	se of Volatile Samples		
	Test temperature	77		
	Hydrogen Sulfide in vapor phase	< 1	ppm v/v	
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Dire	ct Injection Gas Chromatograp	hy	
	Benzene	0.18	Vol %	
	Toluene	0.41	Vol %	202222222
	Ethylbenzene	0.30	Vol %	
	Xylenes	0.92	Vol %	2401004401
			LILITERAL CONCENTRAL PROPERTY OF THE PARTY O	25412

Sample ID: 2014-NDMD-000082-003

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global

Representing: Beulah Tank 01 Running

Date Taken: 19-March-2014

Date Submitted: 19-March-2014

Date Tested: 25-March-2014

Drawn By: Intertek

Method	Test	Result	Units	
ITM 3468	Determination of Hydrogen Sulfide in Vapor Pha	se of Volatile Samples		
	Test temperature	77		
	Hydrogen Sulfide in vapor phase	<1	ppm v/v	
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Dire	ct Injection Gas Chromatograp	hy	.03505503
	Benzene	0.21	Vol %	
	Toluene	0.38	Vol %	
ASTM D6730 MOD	Benzene	0.21	Vol %	1141115



Sample ID: 2014-NDMD-000082-003
Sample Designated As: Bakken Crude Oil

Vessel/Location: Global

Representing: Beulah Tank 01 Running

Date Taken: 19-March-2014

Date Submitted:19-March-2014
Date Tested:25-March-2014

Drawn By: Intertek

Method	Test	Result	Units
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by	Direct Injection Gas Chromatograph	пу
	Ethylbenzene	0.23	Vol %
	Xylenes	0.96	Vol %

Sample ID: 2014-NDMD-000082-004

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global

Representing: Beulah Tank 02 Running

Date Taken: 19-March-2014

Date Submitted: 19-March-2014

Date Tested: 25-March-2014

Drawn By: Intertek

Method	Test	Result	Units
ITM 3468	Determination of Hydrogen Sulfide in Vapor Pha-	se of Volatile Samples	
	Test temperature	77	F
	Hydrogen Sulfide in vapor phase	<1	ppm v/v
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Dire	ct Injection Gas Chromatograpl	hy
	Benzene	0.20	Vol %
	Toluene	0.36	Vol %
	Ethylbenzene	0.21	Vol %
	Xylenes	0.95	Vol %

This final report has been reviewed for accuracy, completeness, and comparison against specifications when available. The reported results are only representative of the samples submitted for testing. This report shall not be reproduced except in full without written approval of the laboratory.

Signed:		Date:	
-	Intertek Jordan Reinbold, Laboratory Technician		



Client: Global Companies, LLC

Our Reference Number: US01155-0000102

Job Location:

Client Reference Number:

None

Sample ID: 2014-NDMD-000103-001

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global ND

Representing: Stampede Tank 1 Submitted Sample

Date Taken: 01-April-2014

Date Submitted:01-April-2014

Date Tested: 04-April-2014

Drawn By: Intertek

Method	Test	Result	Units	
ITM 3468	Determination of Hydrogen Sulfide in Vapor Phas	se of Volatile Samples		
	Test temperature	77		
	Hydrogen Sulfide in vapor phase	< 1	ppm v/v	4501001
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Direct	et Injection Gas Chromatograph	ny	
	Benzene	0.18	Vol %	

Sample ID: 2014-NDMD-000103-002

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global ND

Representing: Stampede Tank 2 Submitted Sample

Date Taken: 01-April-2014

Date Submitted:01-April-2014

Date Tested: 04-April-2014

Drawn By: Intertek

Method	Test	Result	Units	
ITM 3468	Determination of Hydrogen Sulfide in Vapor Pha	se of Volatile Samples		
	Test temperature	77	Marion Emiliario Merrico	
	Hydrogen Sulfide in vapor phase	<1	ppm v/v	
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Direct	ct Injection Gas Chromatograp	ny	
	Benzene	0.20	Vol %	

Sample ID: 2014-NDMD-000103-003

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global ND

Representing: Beulah Tank 1 Submitted Sample

Date Taken: 01-April-2014

Date Submitted:01-April-2014

Date Tested: 04-April-2014

Drawn By: Intertek

Method	Test	Result	Units	
ITM 3468	Determination of Hydrogen Sulfide in Vapor Pha	se of Volatile Samples		
	Test temperature	77	sweetswEmericanismismismismi	
	Hydrogen Sulfide in vapor phase	2	ppm v/v	********
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Dire	ct Injection Gas Chromatograp	hy	********
	Benzene	0.20	Vol %	

Sample ID: 2014-NDMD-000103-004

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global ND

Representing: Beulah Tank 2 Submitted Sample

Date Taken: 01-April-2014

Date Submitted:01-April-2014

Date Tested: 04-April-2014

Drawn By: Intertek

Method	Test	Result	Units	
ITM 3468	Determination of Hydrogen Sulfide in Var	or Phase of Volatile Samples		
	Test temperature	77	F	
	144444444444444444444444444444444444444			46446411111



Signed:

Sample ID: 2014-NDMD-000103-004

Report of Analysis

Sample Designated As: Bakken Crude Oil

Vessel/Location: Global ND

Representing: Beulah Tank 2 Submitted Sample

ethod

Test

Date Submitted:01-April-2014

Date Tested:04-April-2014

Drawn By: Intertek

Result

Units

Method	Test	Result	Units	
ITM 3468	Determination of Hydrogen Sulfide in Vapor Pha	se of Volatile Samples		
	Hydrogen Sulfide in vapor phase	<1<1	ppm v/v	45714111141
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Dire	ct Injection Gas Chromatograph	ıy	
	Benzene	0.20	Vol %	
•	wed for accuracy, completeness, and comparison against spe submitted for testing. This report shall not be reproduced exce			

Date Taken: 01-April-2014



Client: Global Companies, LLC

Our Reference Number: US01155-0000114

Client Reference Number:

None

Sample ID: 2014-NDMD-000116-001

Sample Designated As: Bakken Crude Oil

Vessel/Location: Other

Job Location:

Representing: Stampede Tank 01 Running

Date Taken: 09-April-2014

Date Submitted:09-April-2014

Date Tested: 14-April-2014

Drawn By: Intertek

Method	Test	Result	Units
ITM 3468	Determination of Hydrogen Sulfide in Vapor Phas	se of Volatile Samples	
	Test temperature	77	F
	Hydrogen Sulfide in vapor phase		ppm v/v
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Direct	ct Injection Gas Chromatograph	hy
	Benzene	0.19	Vol %

Sample ID: 2014-NDMD-000116-002

Sample Designated As: Bakken Crude Oil

Vessel/Location: Other

Representing: Stampede Tank 02 Running

Date Taken: 09-April-2014

Date Submitted:09-April-2014 Date Tested: 14-April-2014

Drawn By: Intertek

Method	Test	Result	Units
ITM 3468	Determination of Hydrogen Sulfide in Vapor Pha	se of Volatile Samples	
	Test temperature	77	
	Hydrogen Sulfide in vapor phase	<1	ppm v/v
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Dire	ct Injection Gas Chromatograp	hy
	Benzene	0.18	Vol %

Sample ID: 2014-NDMD-000116-003

Sample Designated As: Bakken Crude Oil

Vessel/Location: Other

Representing: Beulah Tank 01 Running

Date Taken: 09-April-2014

Date Submitted:09-April-2014

Date Tested: 14-April-2014

Drawn By: Intertek

Method	Test	Result	Units	
ITM 3468	Determination of Hydrogen Sulfide in Vapor Pha-	se of Volatile Samples		
	Test temperature	77	DASSISTACIONISTA SANCIANI	224524524
	Hydrogen Sulfide in vapor phase	< 1	ppm v/v	32734114
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Direction	ct Injection Gas Chromatograp	hy	
	Benzene	0.20	Vol %	

Sample ID: 2014-NDMD-000116-004

Sample Designated As: Bakken Crude Oil

Vessel/Location: Other

Representing: Beulah Tank 02 Running

Date Taken: 09-April-2014

Date Submitted:09-April-2014 Date Tested: 14-April-2014

Drawn By: Intertek

Method	Test	Result	Units	
ITM 3468	Determination of Hydrogen Sulfide in Vapor Phase of Volatile Samples			
	Test temperature	77	F	
	*************************************		تتنانين فينسوه وومووو والسابين	



Report of Analysis

Sample ID: 2014-NDMD-000116-004

Sample Designated As: Bakken Crude Oil

Vessel/Location: Other

Representing: Beulah Tank 02 Running

Test

Result

Date Taken: 09-April-2014

Date Submitted: 09-April-2014

Date Tested: 14-April-2014

Drawn By: Intertek

Method	Test	Result	Units	
ITM 3468	Determination of Hydrogen Sulfide in Vapor Phase Hydrogen Sulfide in vapor phase	· · · · · · · · · · · · · · · · · · ·	ppm v/v	*********
ASTM D6730 MOD	Determination of Light Ends in Crude Oil by Dire	ct Injection Gas Chromatograph	ту	
	Benzene	0.20	Vol %	
This final report has been revie	ewed for accuracy, completeness, and comparison against spe	ecifications when available. The re	ported results are only	

representative of the samples submitted for testing. This report shall not be reproduced except in full without written approval of the laboratory.

Signed:		Date:
	Intertek	

Jordan Reinbold, Laboratory Technician

Attachment XXI

VCU Performance Letter



John Zink Company LLC 11920 East Apache Street Tulsa, Oklahoma 74116 United States T: +1.918.234.1800 F: +1.918.234.2700

March 21st, 2023

Attention: Gianna Aiezza, on behalf of Global Partners, LP

Reference: John Zink VCU SO Numbers AO03051, 9103822, 9125497

Subject: VCU Performance

Dear Gianna,

AO03051 VCURR

Below is a summary of three John Zink Vapor Combustion Units at Global Partners Albany Site. John Zink has evaluated the designs for updated emissions requirements. The below updated emissions are what John Zink would expect for equipment functioning correctly with no faults. The VCUs will require air source testing by others to confirm emissions at the estimated operating temperatures. The loading rates allowed to meet these emissions may be different than the originally listed loading rates.

Stack Size:8' OD x 35' OAH Application: Railcar Loading Liquid Loading Rate: 2,500 GPM Updated Fuel Gas Consumption: 0-175 SCFM 9103822 VCUM1 Product: Ethanol, Gasoline, Crude, Blend Stock Vapor Composition: Varies By Product Liquid Loading Rate: Updated Fuel Gas Consumption: 0-60 SCFM

9125497 VCUM2

Stack Size:	10' OD x 60' OAH
Application:	Marine Loading
Product:	Ethanol, Gasoline, Crude, Blend Stock
Vapor Composition:	Varies By Product
Liquid Loading Rate:	
Ethanol (3.5 PSI TVP):	15,000 bbl/hr
Gasoline (12.5 PSI TVP):	7,000 bbl/hr
Crude Oil (12.5 PSI TVP):	7,000 bbl/hr
Blend Stock (15 PSI TVP):	5,300 bbl/hr
Updated Minimum Operating Temperature:	1400° F
Updated Emissions Limit:	
Updated Fuel Gas Consumption:	0-400 SCFM
NOTE: Fuel Gas does not include Enrichment Gas at	Dock.

This estimate assumes that the units are in proper working condition and are operating as intended. This estimate assumes a maximum True Vapor Pressure of 3.5 PSI for ethanol, 12.5 PSI for Gasoline, 12.5 PSI for Crude Oil, and 15 PSI for Blend Stock.

Respectfully,

Benjamin Bolin

John Zink Company, LLC

Attachment XXII

John Zink CEMS Limit



International Headquarters P.O. Box 21220 Tulsa, Oklahoma 74121-1220 Tel: 918/234-1800 **Harold Dinsmore**

Vice President Vapor Control Systems

Tel: 918-234-2914 Fax: 918-234-1968

Email: dinsmorh@kochind.com

December 6, 1998

Subject:

Continuous Emission Monitors For Carbon Adsorption Based Vapor Recovery

Systems

Dear Customer:

This is in response to requests for a recommendation as to the proper alarm settings for continuous emission monitors (CEMs) used on carbon adsorption based gasoline vapor recovery systems. Specifically, we have been requested to specify maximum total hydrocarbon concentration values that will assure compliance with regulatory volatile organic compound (VOC) emission standards.

In the United States and in other countries which have adopted the U.S. standards, emission standards for gasoline bulk distribution terminals are expressed as an allowable weight of VOC which can be emitted per unit volume of gasoline loaded. The current U.S. Federal standards are either 10 or 35 milligrams of VOC per liter of gasoline loaded averaged over a 6 hour continuous testing period. While standards expressed in these units of measurement are good ones in that they directly relate VOC emissions to truck rack loading activity, nevertheless, they do require a relatively complex test procedure involving collection of multiple data to determine compliance.

The required test procedure is described in the U.S. Code of Federal Regulations, Title 40, Part 60, Subpart XX. The test procedure requires a determination of the mass of VOCs vented from the VRU during each 5 minute interval over a 6 hour test period. To do this calculation, it is necessary to measure, for each 5 minute interval during the test, the total hydrocarbon concentration of the VRU vent expressed as volume percent, the total actual volume of vented air/hydrocarbon vapor, the vent pressure at the vent volume measuring meter, and the vent temperature at the vent volume measuring meter. This data, with the proper conversion factors, enables the weight of hydrocarbon vapor vented from the VRU during each 5 minute interval to be calculated. The total weight of hydrocarbon vented from the VRU during the 6 hour test period is the sum of the weight of hydrocarbon vented during each 5 minute interval. Compliance with the Federal emission standard is then determined by dividing the sum of the weight of hydrocarbon vented during each 5 minute interval by the total volume of gasoline loaded during the 6 hour test period. Because of the expense and complexity of this type of

testing, U.S. regulatory agencies require compliance testing on only an infrequent basis, with none requiring testing more frequently than once per year.

In an effort to discover a means whereby the operation of the VRU can be relatively easily and continuously monitored to ascertain whether or not it is operating within compliance of the required emission standard, some regulatory agencies have required that a continuous emission monitor be provided with the unit to continuously measure hydrocarbon concentration in the air stream vented from the VRU. These continuous emission monitors are normally non dispersive infrared based analyzers which read total hydrocarbon concentration in volume % expressed as propane or butane equivalents. However, since there is no direct correlation relating vent hydrocarbon concentration to the weight of hydrocarbon vapor emitted from the VRU, this data by itself, can only be used as a guideline. As discussed above, it is necessary to not only know the concentration of hydrocarbon vented from the VRU, it is also required to know the corresponding volume, measured at standard conditions, of the vent stream to determine the weight of hydrocarbon vapor emitted. Without equipment to measure vent stream volume corrected to standard conditions, it is necessary to make several assumptions to correlate hydrocarbon vent stream concentration to the weight of total hydrocarbon vapor vented during the test period.

There are several variables that determine the volume of the vent stream from the VRU. The major variable that influences the volume of air vented from the VRU is the inlet hydrocarbon concentration which typically varies between 10 and 60 volume %. For example, higher inlet hydrocarbon concentrations mean lower air content of the inlet air+vapor stream which results in lower vented air volume from the VRU. Conversely, lower inlet hydrocarbon concentrations result in higher air volume vented from the VRU. The temperature and pressure of the gasoline transport being loaded also affects the standard volume of air vented from the VRU. For example, at higher pressures and lower temperatures, a higher standard volume of air is displaced from the gasoline transport while being loaded than when the transport is being loaded at lower pressures and higher temperatures.. Another variable affecting the volume of air vented from the VRU is determined by the volume of outside air introduced into the VRU during adsorber repressurization and the amount of purge air introduced into the VRU during the carbon bed regeneration process. The air vented from the VRU includes air from not only the inlet vapor stream, but also, this repressurization and purge air as well. The total volume of repressurization and purge air typically is about 15 to 35% of the inlet air+vapor volume. Finally, a variable having an influence on the amount of air vented from the VRU is the vapor growth factor. This factor is expressed as a ratio of the volume of air+hydrocarbon vapor displaced from the transport vehicle divided by the volume of gasoline loaded during the loading operation. Typically, vapor growth factors range from 1.0 to 1.2.

The attached Tables Numbers 1 and 2 lists the allowable vent stream hydrocarbon concentration without exceeding the VOC emission standards using different combinations of those variables discussed above. Table Number 1 provides data for an emission standard of 10 milligrams of VOC per liter of gasoline loaded while Table Number 2 provides data for an emission standard of 35 milligrams per liter. For each emission standard, allowable vent hydrocarbon concentrations were calculated for 9 cases involving varying combinations of operating variables which are likely to be encountered in gasoline bulk distribution terminals. It is obvious from an analysis of this table that for the conditions evaluated, the maximum allowable vent hydrocarbon concentration can vary from approx. 0.4 to 1.1 vol. % for the 10 mg/l standard and from approx. 1.3 to 3.7 vol. % without exceeding the 35 mg/l emission standard.

Based on an analysis of the attached data, it can be concluded that a continuous vent analyzer can be used as a rough guideline to ascertain whether the VRU is operating in compliance with the emission standard, however, it should not be used as an absolute measure to determine compliance because of the influence of several other operating variables. However, if regulatory agencies insist on a requirement that vent analyzer total hydrocarbon concentration values, alone, be used as a means of judging compliance with the emission standards, then it is very important that the maximum allowable hydrocarbon vent concentration be set high enough so as not to impose a more stringent standard than is actually required. It also is important to average the analyzer readings over a sufficient period since the emission standards allow for averaging of results over several hours. In this event, it is John Zink's recommendation that the maximum allowable vent total hydrocarbon concentrations be set no lower than 1.1 vol. % and 3.7 vol. %, measured as propane equivalent, for the two emission standards of 10 mg/l and 35 mg/l respectively. Further, it is our recommendation that the allowable vent hydrocarbon emission concentration be averaged over at least a one hour period. In addition, an allowance should be made for the exclusion of methane or ethane should these compounds be detected in the VRU vent stream. Because these compounds are not normally present in gasoline vapor, this is generally not an issue. However, on a few occasions, because of the practice of storing gasoline in tanks blanketed with natural or refinery fuel gas, it can be an issue and the proper allowances must be taken because the recovery of these compounds is not required by the emission standard and is not included as part of John Zink's performance guarantee.

Sincerely,

Harold Dinsmore Vice President Vapor Control Systems Group John Zink Company

Attachments "cemsalm1"

TABLE NUMBER 1 MAX ALLOWABLE ADAB VRU VENT TOTAL HYDROCARBON CONCENTRATION, VOLUME % AS PROPANE AT VOC EMISSION STANDARD OF 10 MILLIGRAMS PER LITER OF GASOLINE LOADED

	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7	CASE 8	CASE 9
PERATING VARIABLES						W			
Emission Standard, mg/l	10	10	10	10	10	10	10	10	10
Temp Of Inlet Vapor, Degree F.	100	60	20	100	20	60	60	100	100
Press Of Inlet Vapor, "HgA	31	31	30	31	29	31	29	31	29
Repress/Purge Air Factor	0.35	0.35	0.15	0.25	0.15	0.15	0.15	0.15	0.15
Vapor Growth Factor	1.2	1.1	1.2	1	1	1	1	1	1

VRU Inlet Hydrocarbon	MAX_VENT HYDROCARBON CONCENTRATION								
Concentration	VOLUME % AS PROPANE								
Vol%	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7	CASE 8	CASE 9
10	0.370	0.375	0.390	0,482	0.484	0.491	0.524	0.528	0.564
15	0.386	0.391	0.410	0.504	0.508	0.515	0.550	0.554	0.592
20	0.402	0.408	0.431	0.528	0.535	0.542	0.579	0.583	0.623
25	0.421	0.426	0.455	0.554	0.564	0.572	0.611	0.616	0.658
30	0.441	0.446	0.482	0.583	0.597	0.605	0.647	0.652	0.696
35	0.462	0.468	0.512	0.616	0.635	0.643	0.687	0.692	0.739
40	0.487	0.493	0.546	0.652	0.677	0.686	0.733	0.738	0.788
45	0.514	0.520	0.584	0.692	0.725	0.734	0.784	0.790	0.844
50	0.544	0.551	0.629	0.738	0.780	0.790	0.844	0.850	0,909
55	0,577	0.585	0.681	0.790	0.844	0.855	0.914	0.921	0.984
60	0.616	0.624	0.743	0.850	0.920	0.933	0.996	1.004	1.072

A ratio can be used to get the maximum vent hydrocarbon concentration when the emission standard is 2 mg/l, assuming the operating variables from each case and VRU inlet hydrocarbon concentration are the same. Example using case 8 and 60 vol% VRU inlet hydrocarbon concentration.

If 10 mg/l = 1.004 vol% as propane, then 2 mg/l = 0.20 vol% as propane

Sample Calculation

Correlating Allowable VRU Vent Hydrocarbon Concentration Not To Exceed VOC Emission Standard Of 10 Milligrams Per Liter Of Product Loaded

Case Number 4, Table Number 1 @ 40% Inlet Hydrocarbon Vapor Contentration:

VOC Emission Standard:

10 milligrams of VOC per liter of

product loaded.

Operating Conditions:

Temp. of inlet vapor:

 $100 \, {}^{\circ}\text{F} = 560 \, {}^{\circ}\text{R}$

Pressure of inlet vapor:

31 "HgA

Inlet vapor hydrocarbon conc:

40 vol% actual concentration

Repressurization/Purge Air Factor:

0.25

Vapor Growth Factor:

1.0

Calculations:

Basis:

1000 gallon of liquid gasoline loaded.

Gasoline Loaded:

= 1000 gallons (3.785 liters / gallon) = 3785 liters

Standard vapor flow volume to VRU from truck rack:

= (1000 gallons) (1 cubic foot / 7.48 gallons) (520°R / 560°R) (31 "HgA / 29.92 "HgA) (1.0) = 128.62 standard cubic feet

Air to VRU from truck rack:

= (128.62 scf) (1-0.4) = 77.17 scf

Air in VRU vent = Air from truck rack + (repressurization air and purge air)

= 77.17 scf + (repressurization and purge air factor) (

128.62)

= 77.17 + (0.25)(128.62) = 109.32 scf

Maximum allowable hydrocarbon vapor emissions from VRU:

- = (10 milligrams / liter) (3785 liters)
- = 37850 milligrams of hydrocarbon vapor
- = (37850 mg) (1 pound / 453592 mg) (1 lb. mole / 44.1 lb.) (379 scf/ lb. mole)
- = 0.717 scf of hydrocarbon vapor measured as propane equivalent

Maximum allowable VRU vent concentration of hydrocarbon vapor:

- = [scf of hydrocarbon / (scf of hydrocarbon + scf of air)] (100)
- = [0.717 / (0.717 + 109.32)] (100)
- = 0.652 vol. % as propane equivalent

Attachment XXIII

Kb Tank Table

Global Albany Kb Summary

Tank		Kb	Date
TK031	4,200,000 gallon tank	Yes	2010 - tank permitted for ethanol
TK032	4,200,000 gallon tank	Yes	2010 - tank permitted for ethanol
TK039	4,200,000 gallon tank	Yes	2009 - tank permitted for gasoline
TK114	3,887,898 gallon tank	Yes	2009 - IFR installed
TK115	5,851,902 gallon tank	Yes	2009 - IFR installed
TK117	3,028,032 gallon tank	No	
TK118	2,426,550 gallon tank	No	
TK119	1,619,268 gallon tank	No	
TK120	1,640,940 gallon tank	No	
TK121	5,370,204 gallon tank	No	

Attachment XXIV

Biodiesel SDS



1. IDENTIFICATION

Product Identifier B99

Synonyms: B99.9; Biofuel, Biodiesel, Methyl Esters

Intended use of the

product:

Fuel or Fuel Additive

Contact: Global Companies LLC

Water Mill Center 800 South St.

Waltham, MA 02454-9161

www.globalp.com

Contact Information: EMERGENCY TELEPHONE NUMBER (24 hrs): CHEMTREC (800) 424-9300

COMPANY CONTACT (business hours): 800-542-0778

2. HAZARD IDENTIFICATION

According to OSHA 29 CFR 1910.1200 HCS

Classification of the Substance or Mixture

Classification (GHS-US):

Not Classified

Labeling Elements

None

Signal Word (GHS-US) : No signal word

Hazard Statements (GHS-US) : Not classified as a health hazard.

Precautionary Statements (GHS-US) : Not applicable.

Other information:

NFPA 704 Health: 0 Fire: 1 Reactivity: 0



3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Composition Information

This material is a complex mixture of methyl esters derived from the processing of tallow, animal fat and/or vegetable oil.

Name	Product Identifier (CAS#)	% (w/w)	Classification
Methyl Esters	Various	>99	None
Distillate	Various	<1	None

Page 1 of 9 June 2019



Additional Formulation Information

Also see Section 15 for list of SARA Section 313 toxic chemicals.

4. FIRST AID MEASURES

Route	Measures
Inhalation	Remove person to fresh air.
Ingestion	DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.
Eye Contact	If present, remove contact lenses. In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 minutes. Hold eyelids open to ensure adequate flushing. Seek medical attention.
Skin Contact	Remove contaminated clothing and shoes. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.
Absorption	As with skin contact, remove contaminated clothing and flush with copious amounts of water. Flush affected area for at least 15 minutes to minimize potential for further absorption.

Most Important Symptoms

Contact may cause eye, skin and mucous membrane irritation.

Medical Conditions Aggravated by Exposure

Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash).

5. FIRE-FIGHTING MEASURES

Extinguishing Media

Foam, carbon dioxide, dry chemical are most suitable

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, firefighting foam, or Halon. Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other firefighting equipment.

LARGE FIRES: Water spray, fog or firefighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Specific Hazards / Products of Combustion

Combustion may produce smoke, carbon monoxide and other products of incomplete combustion.

Special Precautions and Protective Equipment for Firefighters

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other firefighting equipment.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied firefighting foam.

Fighting Equipment/Instructions

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH- approved pressure-demand self-contained breathing apparatus with full face piece and protective clothing.

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6. ACCIDENTAL RELEASE MEASURES

Personal Precautions

ACTIVATE FACILITY SPCC, SPILL CONTINGENCY or EMERGENCY PLAN.

Depending on the size of the spill, downwind receptors may need to be notified.

Evacuate nonessential personnel and remove or secure all ignition sources (flame, spark, hot work, hot metal, etc.). Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Do not touch or walk-through spilled material.

Use appropriate personal protective equipment to prevent eye/skin contact and absorption. Use NIOSH approved respiratory protection, if warranted, to prevent exposures above permissible limits (see Section 8). Contaminated clothing should not be near sources of ignition.

Environmental Precautions

Stop the spill to prevent environmental release if it can be done safely. Take action to isolate environmental receptors including drains, storm sewers and natural water bodies. Keep on impervious surface if at all possible. Use water sparingly to prevent product from spreading. Foam and absorbents may be used to reduce / prevent airborne release.

Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Follow federal, state or local requirements for reporting environmental release where necessary (see Section 15 for further information)

Containment and Clean-Up Methods

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with dry earth, sand or other non-combustible, inert oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container with clean, non-sparking tools for reclamation or disposal. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING AND STORAGE

Handling Precautions

USE ONLY AS A FUEL
DO NOT SIPHON BY MOUTH

Use good personal hygiene practices. Use only with protective equipment specified in Section 8. Avoid repeated and/or prolonged skin exposure. Use only outdoors or in well ventilated areas. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Consider the need to discard contaminated leather shoes and gloves. Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure.

Storage

Use approved vented containers. Keep containers closed and clearly labeled. Label all secondary containers that this material is transferred into with the chemical name and associated hazard(s). Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition. Separate from incompatible materials (see Section 10) by distance or secondary containment.

Store in a well-ventilated area. Protect containers from damage and vehicular traffic. Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Limits

Component	CAS#	List	Value
Methyl Esters	Various	OSHA PEL TWA (Oil Mist Standard)	5 mg/m3
Distillate	Various	OSHA PEL TWA (Oil Mist Standard)	5 mg/m3

Engineering Controls

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure limits.

Emergency shower and eyewash should be provided in proximity to handling areas in the event of exposure to decontaminate.

Personal Protective Equipment

Exposure	Equipment
Eye / Face	Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.
Skin	Gloves constructed of nitrile or neoprene are recommended when handling this material. If contact with the body is expected, chemical protective clothing such as of E.l. DuPont Tychem [®] , Barricade [®] , or equivalent recommended based on degree of exposure.
	Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.
Respiratory	A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.
	Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.
Thermal	Product is stored at ambient temperature. No thermal protection is required except for emergency operations involving actual or potential for fire.

9. PHYSICAL AND CHEMICAL PROPERTIES

Property		Value		Comments
Appearance	A clear, water-like lic			
Odor	Mild petroleum distil	llate odor		
Odor Threshold	Parameter	Odor Detection	Odor Recognition	
	Methyl esters	Not available	>1000 ppm	
	Distillate	< 1ppm	Not available	
рН	Not available			
Melting / Freeze Point	Not available			
Boiling Point And Range	>392 °F (>200°C)			
Flash Point	>214 °F (101 °C)			
Evaporation Rate	<<1			(n-butyl acetate = 1)

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Property	Value	Comments
Flammability	N/A	
Flammability Limits	N/A	(est)
Vapor Pressure	0.42 KPa (77°F) (25 °C)	
Vapor Density	0.8	
Specific Gravity	>0.88	(water =1)
Solubility	Immiscible	
Partition Coefficient	N/A	as Log P
Autoignition Temperature	N/A	
Decomposition Temperature	Evaporation or ignition likely before decomposition will occur	
Viscosity	3.5-5 cSt	
Percent Volatiles	N/A	

10. STABILITY AND REACTIVITY

Reactivity

Material is not self-reacting.

Stability

Normally stable unless mixed with incompatibles or fire in presence of an ignition source.

Reactions / Polymerization

Stable. Hazardous polymerization will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

Incompatible Materials

Keep away from strong acids and oxidizers.

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:

Acute Toxicity (Oral LD50)

Methyl Esters

LD50 Oral Rat >14400 mg/kg

Acute Toxicity (Oral LD50)

Distillate (various)

LD50 Oral Rat >9g/kg

Skin Corrosion/Irritation: Causes skin irritation Serious Eye Damage/Irritation: Not classified Respiratory or Skin Sensitization: Not classified

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Germ Cell Mutagenicity: May cause genetic defects

Carcinogenicity: OSHA: NO IARC: NO NTP: NO ACGIH: NO

Reproductive Toxicity: Not available

Teratogenicity: Not available

Specific Target Organ Toxicity (Repeated Exposure): Excessive exposure may cause irritations to the nose, throat, lungs and

respiratory tract

Specific Target Organ Toxicity (Single Exposure): None.

Aspiration Hazard: This chemical may be aspirated. No known hazardous effects.

Potential Health Effects: None

Chronic effects: None

WARNING: The burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

12. ECOLOGICAL INFORMATION

Toxicity

Material is not considered to be toxic.

EC50 Daphnia Not toxic LC 50 Fish Not toxic

Persistence and Degradation: Not available Bioaccumulative Potential: Not available

Mobility in Soil: Not available

Other Adverse Effects: None known

Other Information: Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options. May be considered a hazardous waste if disposed. Direct solid waste (landfill) or incineration at a solid waste facility is not permissible. Do not discharge to sanitary or storm sewer. Personnel handling waste containers should follow precautions provided in this document.

Shipping containers must be DOT authorized packages if considered a federally regulated hazardous waste or as prescribed by law. Follow licensure and regulations for transport of hazardous material and hazardous waste where applicable.

14. TRANSPORT INFORMATION

This product is not a hazardous material regulated under the Hazardous Material Transportation Act (HMTA)

US DOT

UN Identification Number N/A
Proper Shipping Name N/A
Hazard Class and Packing Group N/A
Shipping Label N/A
Placard / Bulk Package N/A
Emergency Response Guidebook Guide Number N/A

IATA Cargo

UN Identification Number N/A
Shipping Name / Description N/A

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Hazard Class and Packing Group	N/A
ICAO Label	N/A
Packing Instructions Cargo	N/A
Max Quantity Per Package Cargo	N/A
IATA Passenger	
UN Identification Number	N/A
Shipping Name / Description	N/A
Hazard Class and Packing Group	N/A
ICAO Label	N/A
Packing Instructions Passenger	N/A
Max Quantity Per Package	N/A
IMDG	
UN Identification Number	N/A
Shipping Name / Description	N/A
Hazard Class and Packing Group	N/A
IMDG Label	N/A
EmS Number	N/A

15. REGULATORY INFORMATION

U.S. Federal, State, and Local Regulatory Information

Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

OSHA Hazard Communication Standard

Marine Pollutant

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health HazardNoDelayed (Chronic) Health HazardNoFire HazardNoReactive HazardNoSudden Release of Pressure HazardNo

Clean Water Act (Oil Spills)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) or, if not practical, the U.S. Coast Guard with follow-up to the National Response Center, as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA Section 103 and SARA Section 304 (Release to the Environment)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA Section 313- Supplier Notification

This product does not contain any chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372.

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EPA Notification (Oil Spills)

If the there is a discharge of more than 1,000-gallons of oil into or upon navigable waters of the United States, or if it is the second spill event of 42 gallons or more of oil into water within a twelve (12) month period, a written report must be submitted to the Regional Administrator of the EPA within sixty days of the event.

Pennsylvania Right to Know Hazardous Substance list:

The following product components are cited in the Pennsylvania Special Hazardous Substance List, and are present at levels which require reporting: none.

New Jersey Right to Know Hazardous Substance list:

The following product components are cited in the New Jersey Right to Know Hazardous Substance List, and are present at levels which require reporting: none.

California Prop. 65

This product does not contain chemicals known to the State of California to cause Cancer or Reproductive Toxicity.

U.S. Toxic Substances Control Act

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30.

CEPA - Domestic Substances List (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

Canadian Regulatory Information (WHMIS): none.

16. OTHER INFORMATION

Version 4

Issue Date June 26, 2019 Prior Issue Date May 2015

Description of Revisions

Section 3: Additional information on chemical composition

Degrees fahrenheit (temperature)

Section 14: Added statement that product is not a hazardous material per DOT HMTA.

Abbreviations

-	0 (6	
<	Less than	mL	Milliliter
=	Equal to	mm^2	Square millimeters
>	Greater than	mmHg	Millimeters of mercury (pressure)
AP	Approximately	ppm	Parts per million
С	Centigrade (temperature)	sec	Second
kg	Kilogram	ug	Micrograms
L	Liter		

Milligrams

mø

Acronyms

ACGIH	American Conference of Governmental	ERPG	Emergency Response Planning Guideline
	Industrial Hygienists	GHS	Global Harmonized System
AIHA	American Industrial Hygiene Association	HMIS	Hazardous Materials Information System
AL	Action Level	IARC	International Agency for Research On Cancer
ANSI	American National Standards Institute	IATA	International Air Transport Association
API	American Petroleum Institute	IMDG	International Maritime Dangerous Goods
CAS	Chemical Abstract Service	Koc	Soil Organic Carbon
CERCLA	Comprehensive Emergency Response,	LC50	Lethal concentration 50%
	Compensation, and Liability Act	LD50	Lethal dose 50%
DOT	U.S. Department of Transportation	MSHA	Mine Safety and Health Administration
EC50	Ecological concentration 50%	NFPA	National Fire Protection Association
EPA	U.S. Environmental Protection Agency		

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NIOSH	National Institute of Occupational Safety and Health	SPCC	Spill Prevention, Control, and Countermeasures
NOIC	Notice of Intended Change	STEL	Short-Term Exposure Limit (generally 15
NTP	National Toxicology Program		minutes)
OPA	Oil Pollution Act of 1990	TLV	Threshold Limit Value (ACGIH)
OSHA	U.S. Occupational Safety & Health	TSCA	Toxic Substances Control Act
	Administration	TWA	Time Weighted Average (8 hr.)
PEL	Permissible Exposure Limit (OSHA)	UN	United Nations
RCRA	Resource Conservation and Recovery Act	UNECE	United Nations Economic Commission for
	Reauthorization Act of 1986 Title III		Europe
REL	Recommended Exposure Limit (NIOSH)	WEEL	Workplace Environmental Exposure Level
RVP	Reid Vapor Pressure		(AIHA)
SARA	Superfund Amendments and	WHMIS	Canadian Workplace Hazardous Materials
SCBA	Self Contained Breathing Apparatus		Information System

Disclaimer of Expressed and Implied Warranties

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

** End of Safety Data Sheet **

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Attachment XXV

HAP Speciation – API 19.4

Manual of Petroleum Measurement Standards Chapter 19.4

Evaporative Loss Reference Information and Speciation Methodology

THIRD EDITION, OCTOBER 2012

ADDENDUM 1, NOVEMBER 2013

ADDENDUM 2, JUNE 2017



Table 4—Concentrations (weight percent) of Selected Components in Selected Petroleum Liquids

Compound	Gasoline	JP-4 ^a (Jet Naphtha)	Jet A (Jet Kerosene)	Diesel (Distillate Fuel Oil No. 2)	Crude Oil
n-hexane	1.0	1.5	0.005	0.0001	0.4
benzene	1.8 (3)	0.6	0.004	0.0008	0.6
iso-octane {2,2,4 trimethylpentane}	4.0	0.0	0.0	0.0	0.1
toluene	7.0	2.0	0.133	0.032	1.0
ethylbenzene	1.4	0.5	0.127	0.013	0.4
xylenes ^b	7.0	2.5	0.31	0.29	1.4
cumene {isopropylbenzene}	0.5	0.2	0.0	0.0	0.1
MTBE	(5)	0.0	0.0	0.0	0.0
1,2,4 trimethylbenzene	2.5	0.0	0.0	1.0	0.33
cyclohexane	0.24	1.2	0.0	0.0	0.7

NOTE 1 Concentrations in this table are the default values in EPA's TANKS software^[24]. Actual product profiles may differ greatly from the TANKS default values, and TANKS has the ability to accept custom profiles.

NOTE 3 MTBE concentrations vary significantly. EPA^[24,33] suggested in the early 1990s the following liquid-phase concentrations (weight percent). Subsequently, however, the use of MTBE as a gasoline additive has been phased out in the U.S.

Normal gasoline	Reformulated with MTBE	Oxygenated with MTBE
0	8.8	12.0

^a The use of JP-4 in the United States was phased out in 1998.

Table 5—Concentrations (weight percent) of Selected Components in No. 6 Fuel Oil

Species	Suggested Default (weight percent)
PACs	0.07
benzo(g,h,i)perylene	0.007
phenanthrene	0.09
benzene	0.002
biphenyl	0.02
cumene	0.002
cyclohexane	0.001
ethylbenzene	0.009
hexane (-n)	0.002
naphthalene	0.1
phenol	0
styrene	0
toluene	0.01
trimethylbenzene (1,2,4-)	0.1
xylenes (m, o, and p)	0.05
NOTE Source: Annex G (se G.4).	e Section G.3 and Table

NOTE 2 The benzene content shown for gasoline in this table was based on 1990 data. Benzene content in gasoline has been driven to significantly lower levels than this by the EPA Fuels Specifications.

^b Xylenes includes mixed isomers; for convenience, TANKS^[24] uses *m*-xylene to represent all isomers of xylene.

		Concentrations (ppmw) in Selected Petroleum Liquids							
Compound	CAS No.	Crude Oil	Gasoline	Diesel	Jet Fuel	Heavy Fuel Oil (Bunker)	Light Cycle Oil	Heavy Cycle Oil	Asphalt
benzo[a]anthracene	56-55-3	6.4	5.3	2.5	0.0	144.9	11.3	344.0	8.2
benzo[a]phenanthrene {chrysene}	218-01-9	25.7	3.0	4.3	6.8	256.9	13.5	680.0	0.0
benzo[a]pyrene	50-32-8	2.4	2.4	0.0	0.0	127.6	1.6	61.4	0.0
benzo[b]fluoranthene	205-99-2	6.1	4.1	0.0	0.0	67.4	3.5	49.0	0.0
benzo[j]fluoranthene	205-82-3	See Note 2	See Note 2	0.0	0.0	See Note 2	See Note 2	See Note 2	0.0
benzo[k]fluoranthene	207-08-9	2.3	4.1	0.0	0.0	11.1	0.0	5.8	0.0
dibenzo[a,h]anthracene	53-70-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
indeno[1,2,3-cd]pyrene	193-39-5	2.4	3.6	3.0	0.0	0.0	0.0	0.0	0.0
benzo[j,k]fluorene {fluoranthene}	206-44-0	5.7	3.0	10.2	0.0	34.1	88.1	390.0	0.0
benzo(r,s,t)pentaphene {dibenzo[a,i]pyrene}	189-55-9	0.0	0.0	2.6	0.0	9.4	0.0	0.0	0.0
Total PACs (ppm) (see Note 3)		51.0	25.5	22.6	6.8	651.4	118.0	1530.2	8.2
Other PAHs (not in the EPCF	RA Section	313 catego	ry for PAC	s)					
benzo(g,h,i)perylene	191-24-2	3.6	3.1	9.3	4.3	70.0	0.0	12.5	0.0
naphthalene	91-20-3	368.4	4150.0	756.5	796.7	630.7	4713.3	880.0	2.1

Table 6—Concentrations of PAHs in Selected Petroleum Liquids (see Note 1)

NOTE 1 The Canadian Petroleum Products Institute (CPPI) commissioned a speciation study of refinery streams^[36], which included analyzing the streams for the presence of numerous polycyclic aromatic hydrocarbons (PAHs)—also known as polycyclic aromatic compounds (PACs). This study represents the most comprehensive dataset available for the concentration of these compounds in petroleum liquids. Results for the more common streams from that study are summarized in this table, with concentrations for compounds that are potentially subject to Toxic Chemical Release Inventory (TRI) reporting under EPCRA Section 313. See Annex F for additional background on the EPA characterization of PAHs and PACs.

NOTE 2 Included with benzo[b]fluoranthene.

NOTE 3 Total PACs includes all the compounds from the EPCRA Section 313 category for PACs that are identified by EPA as detected in these petroleum liquids^[31]. EPCRA Section 313 specifies that these compounds are to be reported in aggregate, rather than individually. These PACs may be speciated in aggregate by using the Total PACs concentration given in this table (in the absence of more accurate data), and applying the physical properties of chrysene (from Table 3) as being representative of the entire group.

4.8 Tank Solar Absorptance α

The tank outside surface solar absorptance α is a function of its color and reflective condition. Table 7 provides solar absorptance values.

- a) If the tank color is unknown, use the solar absorptance for white paint.
- b) If the tank roof and shell have different solar absorptances, $\alpha = (\alpha_R + \alpha_S)/2$.

Attachment XXVI

Blendstock HAP Speciation Table

Blendstock HAP Summary									
	Current Blendstock	TABLE 7 Alkylate	TABLE 23 ATM Heavy Naphtha	Table 25 ATM light Ends	Table 26 Straight run gas	Table 28 ATM Straight run Naphtha	Table 30 Heavy HC Naphtha	Table 32 Light HC Cracked Naphtha	
hexane	13.6	1.2 /0.01	6.48/0.8	13.6/8.3	13.6/8.3	12.1/5.72	2.46/0.137	18/2.56	
benzene	2	0.291/0/01	1.57/0.36	2.06/1.93	4.64/1.33	5.23/1.2	1.1/0.228	5.46/0.7	
224 tmp	4	nd	0.045/0.01	0.05/0.05	0.06/0.06	0.72/0.04	0.039/0.006	not reported	
toluene	7.5	13.8/0.1	7.34/1.4	0.7/0.14	4.25/1.66	13.2/3.02	7.24/3.52	1.47/0.7	
ethylebenzene	2	0.015/0.009	1/0.5	0.06/0.06	1/0.32	1.87/0.58	1.7/0.74	ND	
xylenes	7	0.07/0.2	3.9/1.66	0.31/	3.3/2	11.6/1.51	4.3/1.6	ND	
naphthalene	0.415	0.14/0.04	0.47/0.04	nd	nd	0.016/0.005	nd	0.01/0.003	
cumene	0.5	0.15/0.01	0.158/0.168		0.06/0.57	0.3/0.131	0.34/0.134	nd	
methanol	0	ND	not reported	Not reported	not reported	0.14/0.05	0.1/0.05	0.09/0.069	

^{*}Data from API Refinery Stream Composition Data - Update to Speciation data from API-4723 (API Document 4723-A- Dec 2018)

Attachment XXVII

Subpart Y Applicability



349 Northern Blvd, Suite 3 Albany, NY 12204 Phone: 518.453.2203 Fax: 518.453.2204 www.envirospeceng.com

Global Albany Terminal NESHAP Subpart Y Applicability August 2021

National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart Y (for Marine Tank Vessel Loading Operations) applies to new and existing sources at affected marine loading operations. Marine loading at the Global Albany Terminal would be an existing source with emissions less than 10 tons per year of a single HAP and less than 25 tons of total HAPs.

Existing sources with emissions less than 10 and 25 tons are not subject to the emission standards in Subpart Y. However, the recording keeping requirements of Subpart Y (63.567(j)(4)) do apply to existing sources with emissions less than 10 and 25 tons per 63.560(a)(3). This requires the facility to retain records of the emissions estimates determined in 63.565(l) and records of their actual throughputs for 5 years. The facility is required to calculate an annual estimate of HAPs from marine loading activities based on test data or measurement or estimating techniques generally accepted in industry practice.

Existing sources with actual throughput less than 10 M barrels (420 MM gal) of gasoline and 200 M barrels (8,400 MMgal) of crude are also not subject to the RACT standards of Subpart Y per 63.560(b)(2). If these throughputs are exceeded, the facility would become subject to the RACT requirements and would have three (3) years following the exceedance of the threshold levels to come into compliance with Subpart Y, in accordance with 63.560(e)(2)(iv). The actual throughputs at the Global Terminal have not exceeded these throughputs and therefore the RACT standards do not apply.

40 CFR 63.560(d) states that Subpart Y does not apply to the loading of products with a vapor pressure less than 1.5 psia at 20 degrees C (68 degrees F). The vapor pressure of ethanol is less than 1.5 psia at 20 degrees C and therefore Subpart Y does not apply to marine loading of ethanol.

Attachment XXVIII

MIP/CAM – VRU & VCU



VRU Monitoring and Inspection Plan and CAM Plan Truck Loading Rack VRU

Background			
Facility Name Street Address City/Town/State Zip Code	Global Companies LLC 50 Church Street, Port of Albany, NY 12202	C – Albany, NY Terminal f Albany	
Source Informatio	n]
Date Plan Submit Permit No. / Sour Regulated Polluta CAS No. Emission Limit	ce ID No.	4-0101-00112/00029/1-RACK-1 VRUTK VOC 0NY998-00-0 2 mg/l	and VRUT2
Submittal Type MARK THE A	PPROPRIATE BOX BE	ELOW AS TO WHY THIS PLAN IS BEING	,]
National Emis	sion Standards for Hazard	inals subject to 40 CFR 63 Subpart BBBBBB ous Air Pollutants for Source Category: Gasoline s, and Pipeline Facilities, 63.11092(b)(1)(i)(B)(2)	
(VRU Unit-B)	odification to Control Sy) was installed. The ex	ystem. In June 2021, a new Vapor Recover Unit isting VRU (Unit-A) is used as back-up to the the Monitoring and Inspection (M&I) Plan was	

Ownership Transfer

updated to reflect current facility operation.*



July 2021

Subpart BBBBB Monitoring and Inspection Plan Applicability Determination
Is the source a Gasoline Terminal with a thermal oxidizer other than an open TYES NO flare which must meet the requirements of 40 CFR 63.11092(b)(1)(iii)? (If yes determine applicability below)
APPLICABILITY: Is the oxidizer/enclosed flare fitted with a Continuous Parameter Monitoring System (CPMS) meeting the requirements of 40 CFR 63.11092(b)(1)(iii)(A) If YES: The remainder of this form need not be completed If NO: Complete the remainder of the form.
Is the source a Gasoline Terminal with a <u>carbon adsorption system</u> which MYES NO must meet the requirements of 40 CFR 63.11092(b)(1)(i)? (If yes determine applicability below)
APPLICABILITY: Is the carbon adsorption system fitted with a Continuous Emissions Monitoring System (CEMS) meeting the requirements of 40 CFR 63.11092(b)(1)(i)(A) If YES: The remainder of this form need not be completed If NO: Complete the remainder of the form.
*The terminal shall perform alternative monitoring per 40 CFR 63.11092(b)(1)(i)(B) during periods of CEMS downtime in accordance with the M&I Plan. Therefore, the remainder of this form is completed.



July 2021

CAM Applicability Determination		
Does the source have a Pollutant Specific Emissions Unit (PSEU) that is		
subject to CAM, 40 CFR part 64, which must be addressed in a 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):	\boxtimes 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 <u>not</u> 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 Title V Permit specifies a continuous compliance determination method, as defined in the CAM rule.
- An emission cap that meets the requirements specified in 40 CFR 70.4(b)(12).
- C. The PSEU uses an add-on control device 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 major source threshold levels.

Note: A CEMS is used as the continuous monitoring parameter for this CAM. This facility is equipped with a Data Acquisition System (DAS) which stores data on a web server. Daily drift checks are performed automatically by the system.

During periods of CEMS downtime, the parameters specified in the M&I P / CAM Plan below shall be monitored.



July 2021

Control Technology Description

VRU ID No <u>1-RACK1</u> VRUT2 and VRUTK

VRUT2 Unit A - John Zink VRU Model AA-1281-11-7

VRUTK Unit B = John Zink VRU Model RSSEAA-N3080-0810-1008-25

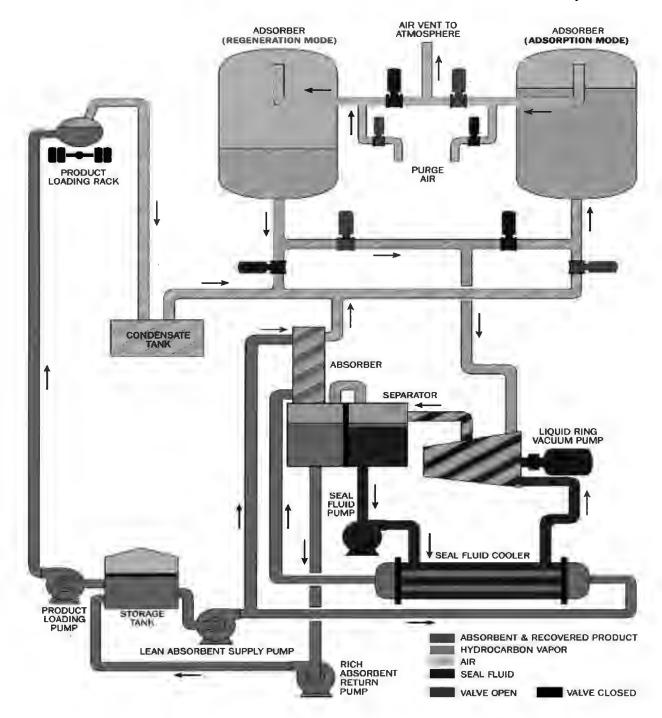
VRU Type

VOC emissions are controlled by a John Zink Vapor Recovery Unit (VRU) (e.g., Model RSSEAA-N3080-0810-1008-25). The VRU is guaranteed by the manufacturer to have a VOC emission control rate of 2 mg/l or better of gasoline/liquid product loaded. Figure 1 provides a schematic of a typical John Zink Carbon Adsorption System. Unit A VRU (Model AA-1281-11-7) is used as a back-up to the primary VRU.

Carbon adsorption vapor recovery systems use beds of activated carbon to remove gasoline vapors from the air-vapor mixture. These units consist of two vertically positioned carbon beds and a carbon regeneration system. During gasoline tank truck loading activity, one carbon bed is used for adsorption while the other bed is being regenerated, using by vacuum application accompanied by an air purge.



July 2021





July 2021

Major / Non-Major Source Determination*				
VOC Potential to Emit (TPY Major Source Thresholds (TF VOC PTE (TPY)		or source threshold		
major source thresholds, but	e those with a pre-control device t post-control device potential to units are those with a pre-control the major source thresholds.	emit less than the major source		
Monitoring and Inspection Pl	•			
I. General Criteria				
Indicator	Indicator 1	Indicator 2		
	Carbon Bed Temperature	Carbon regeneration cycle vacuum pressure		
Measurement Approach	Bed temperature measured continuously via probe inserted directly in bed. Signal from probe directed to external thermocouple.	Carbon bed when not in use collecting VOC is in regeneration cycle. Regeneration performed with bed under vacuum in combination with air purge. Pressure gauge in line measures pressure in inches of Hg and verifies that bed is under vacuum and regeneration in progress.		
II. Indicator Range	< 175 F If temperature > 175 F for two consecutive 30 minute bed regeneration cycles or > 200 F for a	Vacuum during regeneration > 25 " Hg sustained. If the vacuum is not sustained for an		
	single cycle corrective action warranted.	entire cycle, observe an additional cycle. If the vacuum is not sustained during either of the cycles, corrective action is warranted.		
Quality Improvement Plan (QIP)				
III. Performance Criteria:				
Data Representativeness	Temperature probe placed directly in carbon bed. Rise in bed temperature indicative of poor performance or reduced VOC adsorption capacity.	Pressure or vacuum gauge placed in line such that it measures vacuum placed on carbon bed directly. If vacuum placed on bed is not adequate VOC may not be recovered and carbon bed not adequately regenerated. Bed if not regenerated properly will have reduced capacity for sorption of volatile organics.		
Verification of Operational Status	See Attachment 1 for checklist	See Attachment 1 for checklist		



July 2021

QA/QC Practices and Criteria

- Thermometer temperature calibrations performed annually. Accuracy of the thermometer will be determined against known standards.
- Preventative maintenance (PM) of VRU performed at a minimum on a semiannual basis by a certified subcontractor.
- Terminal staff perform daily checks to verify operational status of VRU and adherence to system performance criteria.
- Compliance testing of VRU emissions in compliance with the facility permit.
 Compliance testing includes demonstration that VOC emissions are below permit limit (mg VOC/liter product loaded).

Monitoring Frequency and Data Collection Procedure

Readings collected on a daily basis by direct reading of carbon bed temperature gauge for small CAM sources. Readings are recorded as the nearest 5 F increment (+/- 5 F). Duration of reading, at least one loading cycle of each carbon bed, approximately 30 minutes. Data recorded and reported on a daily basis.

If the reading exceeds the indicator threshold value of 175 F a second reading will be collected during the course of the next 30-minute bed loading cycle. If the second reading is above the threshold value, corrective action is taken.

- Preventative maintenance (PM) of VRU performed at a minimum on a semi-annual basis. By certified subcontractor to determine that the duration of vacuum is adequate for thorough bed regeneration. Pressure gauge calibrations performed annually. Annually test the carbon for absorption capacity.
- Terminal staff perform daily checks to verify operational status of VRU and adherence to system performance criteria.
- Compliance testing of VRU emissions in compliance with the facility permit. Compliance testing includes demonstration that VOC emissions are below permit limit (mg VOC/liter product loaded).

Readings collected on a daily basis by direct reading of vacuum gauge for small CAM sources. Duration of reading at least one regeneration cycle of each bed, approximately 30 minutes. Data recorded and reported on a daily basis.

If the pressure reading is below the indicator threshold value of 25 "Hg a second reading will be collected during the course of the next 30-minute bed loading cycle. If the second reading is below the threshold value corrective action is taken.



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IV. Corrective Action

If the system is shutdown, the system is reset. If the problem persists or another issue arises that needs corrective action the following steps are followed.

- (i) Initiate corrective action to determine the cause of the problem within 1 hour;
- (ii) Initiate corrective action to fix the problem within 24 hours;
- (iii) Complete all corrective actions needed to fix the problem as soon as practicable consistent with good air pollution control practices for minimizing emissions;
- (iv) Minimize periods of start-up, shutdown, or malfunction; and
- (v) Take any necessary corrective actions to restore normal operation and prevent the recurrence of the cause of the problem.

V. Other

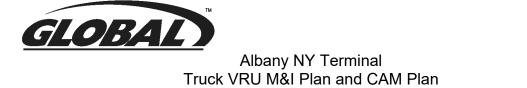
Under the alternative monitoring scenario, perform monthly monitoring of the VRU vent stack with an LEL meter. Measure during the last 5 minutes of an adsorption cycle for each carbon bed and compare the LEL meter reading versus the VOC emissions rate chart. Measurements shall be less than the 2 mg/L limit of the permit. (See Attachment 1 for checklist).

In addition to the items listed elsewhere in this plan, the terminal shall ensure proper valve sequencing, regeneration cycle time, gasoline flow, and purge air flow daily (See Attachment 1 for checklist).



July 2021

Glossary of Terms	
Acronym	Definition
VRU	Vapor Recovery Unit
VOC	Volatile Organic Compounds
TYP	Tons Per Year
PTE	Potential to Emit
QIP	Quality Improvement Plan



July 2021

ATTACHMENT 1

Date:										
	Compliance Ch	ecklis	t							
spect each item and place a "Y" in the corresponding daily box	•			nal para	meters.	Place an	"N" in the	e box		
ich corresponds to any item which is not operating within norm	al parameters. Record	a value v	vhere ind	icated.	Notify the	e Termina	l Superir	ntendent		
mediately of any discrepancies identified. Refer to the Alternat	ive Monitoirng Plan for o	orrective	action.	All corre	ctive act	ion must l	oe docun	nented in		
maintained on site. Record any actions taken in response to	out-of-range readings in	the com	ment sec	tion. Si	gn in the	appropria	ite daily s	signature		
ction.										
				RECO	RD RE	ADING	S			
		S	М	Τ	W	Τ	F	S		
Observe one (1) complete regeneration cycle and record ma	ximum carbon bed									
vacuum reading for each bed (Min: 25" Hg).* and length of	regeneration cycle									
D 14			-							
NECOND VALUE	MIN 25"		_		_	-				
Bed B: RECORD VALUE Note duraction of cycle time: (if not min of 25" REI	MIN 25"					-				
MONITORING PLAN FOR C										
minimum vacuum not reached, observe an additional regenera		ading be	low.						ı	
Additional cycles (only if first cycle did not meet setpoint)										
cle 2 Bed A: RECORD VALUE	MIN 25"									
Bed B: RECORD VALUE	MIN 25"									
		vole med	to cotnoi	nt .		ı			l	
at least one (1) cycle meets the setpoint, no further action requ FER TO ALTERNATIVE MONITORING PLAN FOR CORREC		yole illes	ns sethol	111,						
LET TO ALTERNATIVE MONITORING FLAN FOR CORRECT	TIVE ACTION			RECO	RD RF	ADING	S			
Pressure Readings		S	М	T	I W	T	F	S		
				Ė	T '	†				
Gasoline Inlet Absorber Pressure (flow) - Top			<u> </u>	<u> </u>		\vdash	_			
Was manual adjustment required?					<u> </u>					
Document valve adjustment in corrective action log										
Temperature Readings										
Gasoline Supply Temperature (°F) - should be LESS THAN	110 °F									
Liquid Seal Temperature leaving the Heat Exchanger (°F) -	should be LESS THAN									
120 °F										
If temperatures are not less than setpoints, REFER TO ALT	ERNATIVE MONITORIN	IG PLAN	FOR CO	ORRECT	IVE AC	ΓΙΟΝ				
		Note Y	' if ope	ating p	roperly	/			0	
Visually verify the following:		Note Y	if oper	ating p	roperly	/.			ň.	
	t stayed in operation?	Note Y	if oper	ating p	roperly	/.			ñ.	
Proper valve sequencing - did valves sequence and unit		Note Y	if oper	ating p	properly	/.			Ĭ.	
		Note Y	if oper	ating p	properly	/.				
Proper valve sequencing - did valves sequence and unit		Note Y	' if oper	ating p	properly	/.				
Proper valve sequencing - did valves sequence and unit IF NO REFER TO ALTERNATIVE MONITORING MANUAL ACTION CYCLE TIME		Note Y	' if ope	rating p	properly	/.				
Proper valve sequencing - did valves sequence and unit IF NO REFER TO ALTERNATIVE MONITORING MANUAL ACTION CYCLE TIME Visually observe and note cycle time. IF SETPOINT NOT	FOR CORRECTIVE	Note Y	' if oper	rating p	properly					
Proper valve sequencing - did valves sequence and unit IF NO REFER TO ALTERNATIVE MONITORING MANUAL ACTION CYCLE TIME		Note Y	' if oper	rating p	properly	1.				
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VCU Monitoring and Inspection Plan and CAM Plan Railcar Loading Rack VCU

Background		
Facility Name	Global Companies LLC – Albany, NY Terminal	
Street Address	50 Church Street, Port of Albany	
City/Town/State	Albany, NY	
Zip Code	12202	
-		

Source Information				
Date Plan Submitted (mo/day/yr)	08/30/19			
Permit No. / Source ID No.	4-0101-00112/00029/1-RACK2 VCURR			
Regulated Pollutant	VOC			
CAS No.	0NY998-00-0			
Emission Limit	10 mg/l			
Emission Limit	10 mg/I			

Si	ubmittal Type
	MARK THE APPROPRIATE BOX BELOW AS TO WHY THIS PLAN IS BEING SUBMITTED.
	OUBWITTED.
	<u>Initial Submittal:</u> Only Gasoline Terminals subject to 40 CFR 63 Subpart BBBBBB
	National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline
	Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities, 63.11092(b)(1)(iii)(B)(2)
	Renewal Application.
	Significant Modification to Control System. In August 2019, the Monitoring and
	Significant Modification to Control System. In August 2019, the Monitoring and Inspection (M&I) Plan was updated to reflect current facility operations, and to
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September 2019

Subpart BBBBB Monitoring and Inspection Plan Applicability Determination				
Is the source a Gasoline Terminal with a <u>thermal oxidizer other than an open flare</u> which must meet the requirements of 40 CFR 63.11092(b)(1)(iii)? (If yes determine applicability below)	⊠yes □no			
APPLICABILITY: Is the oxidizer/enclosed flare fitted with a Continuous Parameter Monitoring System (CPMS) meeting the requirements of 40 CFR 63.11092(b)(1)(iii)(A) If YES: The remainder of this form need not be completed If NO: Complete the remainder of the form.	□YES ⊠NO			
Is the source a Gasoline Terminal with a <u>carbon adsorption system</u> which must meet the requirements of 40 CFR 63.11092(b)(1)(i) ? (If yes determine applicability below)	□YES ⊠NO			
APPLICABILITY: Is the carbon adsorption system fitted with a Continuous Emissions Monitoring System (CEMS) meeting the requirements of 40 CFR 63.11092(b)(1)(i)(A) If YES: The remainder of this form need not be completed If NO: Complete the remainder of the form.	□YES □NO			



September 2019

CAM	App	licability	Determination

Does the source have a Pollutant Specific Emissions Unit (PSEU) that is subject to CAM, 40 CFR part 64, which must be addressed in a CAM plan submittal? To determine applicability, a PSEU must meet <u>all</u> of the following criteria (if no, then the remainder of this form need not be completed):

$\nabla \mathbf{v}_{\mathbf{r}\mathbf{c}}$	
	1 1110

- 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 <u>not</u> exempt:

<u>List of exempt emission limitations or standards:</u>

- 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 Title V Permit specifies a continuous compliance determination method, as defined in the CAM rule.
- An emission cap that meets the requirements specified in 40 CFR 70.4(b)(12).
- C. The PSEU uses an add-on control device 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 major source threshold levels.



September 2019

Control Technology Description

VCU ID No. <u>1-RACK2</u> <u>VCURR</u>

John Zink Vapor Combustion Unit, Model # ZTC-2-8-35-2-3/6-X

VCU Type

The major components of a **Vapor Combustion Unit (VCU)** are shown in Figure 1. Normal operation of the VCU typically consists of stack purge, pilot ignition, normal operation, normal shutdown and fault-related shutdown steps.

When either a local or remote start signal is received by the VCU, the assist air blower starts and purges the stack to help ensure that a flammable mixture is not present. After the purge is complete, the pilot ignites and must be confirmed by the flame monitor in order for the operation to proceed.

Once the pilot is confirmed, the system is ready for normal operation, and provides a "permissive" signal to the rack operating system that loading may begin.

The assist air blower provides a portion of the combustion air and mixing energy to ensure smokeless combustion of the vapors.

When the start signal is removed, the system begins a normal shutdown. The vapor shutdown valves and fuel gas shutdown valves close, and the pilot is extinguished. In addition the assist gas control valve closes, the quench air damper opens and the assist air blower stops.

If an unsafe condition, such as loss of pilot or assist air blower failure, is detected during operation, the system immediately initiates an annunciated fault-related shutdown, which results in the same system status as described for the normal shutdown. The system cannot be restarted until the fault is corrected and the system is reset.



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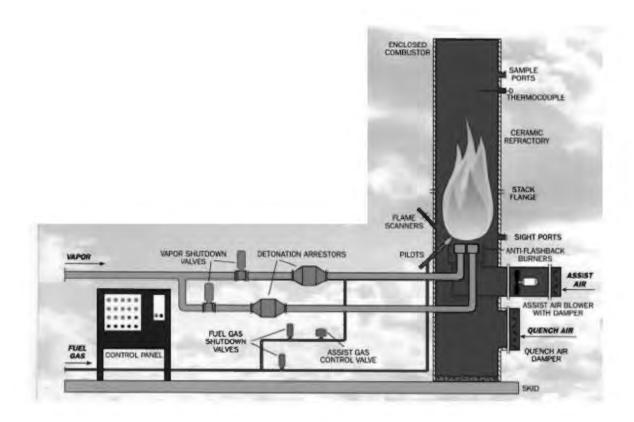


Figure 1. Vapor Combustion Unit (VCU) - System Schematic



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Major / Non-Major Source I	Determination*
VOC Potential to Emit (TP' Major Source Thresholds (TVOC PTE (TPY) * Non major or small units at major source thresholds, but thresholds. Major or large	Y) Post Control <50
Monitoring and Inspection Plan / CAM Plan	
I. General Criteria	
Indicators	Presence of Pilot Flame; Proper Operation of Assist-Air blower, Vapor Line Valve and Emergency Shutdown system.
Monitoring Approach	 Ultraviolet Flame Detector (UFD) monitors presence of flame on a continuous basis and generates an electric signal. After a rail tanker car is hooked up at the loading rack, a remote signal is sent to the VCU programmable logic controller (PLC) to automatically ignite the pilot flame. The PLC will shut down the combustion system due to pilot failure, improper operation of the air assist blower, failure of the vapor line valve to operate, or pressures outside of system parameters. After the UFD verifies that a flame is present and other systems are operational, it sends a permissive signal to the loading rack allowing loading to proceed. If the UFD signal is lost during loading or other system components are not operational or within system parameters, the loading rack automatically shuts down and the VCU alarm sounds at the loading rack.
II. Indicator Range	Electrical signal generated by UFD indicates flame is on and loss of signal indicates flame is absent.
Quality Improvement Plan	Minimize excursions per calendar quarter. Excursion threshold defined as failure of automatic shutdown system (i.e loading of product with loss of UFD signal (e.g., flame absent) or system pressures outside of VCU pressure limits).