Global Companies LLC., 800 South Street, P.O. Box 9161, Waltham, MA 02454-9161 ph: 781-894-8800

May 9, 2022

Via E-Mail Delivery (Christopher.lang@dec.ny.gov)

Chris Lang, Environmental Analyst
New York State Department of
Environmental Conservation
Division of Environmental Permits, Region 3
21 South Putt Corners Road
New Paltz, NY 12561-1620

RE: Climate Leadership and Community Protection Act (CLCPA) Analysis
Global Companies LLC, Cargo Terminal
Air Title V Permit Application
DEC Application ID 3-3348-00082/00010
Town of New Windsor, Orange County

Dear Mr. Lang:

Global Companies LLC (Global or Applicant) is submitting this letter to document the analysis of the above-referenced application in regards to the requirements and goals of the 2019 Climate Leadership and Community Protection Act (CLCPA). This analysis incorporates submittals sent to NYSDEC on April 14, 2021, March 10, 2022, April 6, 2022, and April 14, 2022.

On August 28, 2020, Global submitted an application for renewal and modification of its Cargo Terminal Title V permit. The application included provisions to modify the allowable throughputs of gasoline and distillate products while maintaining the same overall facility throughput and to install a new Vapor Recovery Unit (VRU) to treat vapors from the existing truck loading rack.

Global is asking to increase the throughput cap at Cargo to create redundancy with the Newburgh Terminal and operational flexibility across the Terminals. The increase in throughput at Cargo does not change the market demand for gasoline in the Newburgh area, and there is not expected to be a net increase in gasoline throughput across all of the Global Newburgh Terminals. Because loading can be done more efficiently at Cargo, Global plans to divert loading from Newburgh to Cargo. The increase in the Cargo cap allows Global the flexibility to make this change, as the Cargo Terminal is currently operating close to its throughput cap. Although the Newburgh Terminal has a higher gasoline throughput, it often has a bottleneck due to loading inefficiencies associated with the layout of the Terminal. In addition, traffic can build up from the Newburgh Terminal onto River Road and often needs to be diverted to Cargo, which has more room for trucks. After the improvements proposed at Cargo—most notably, installation of the VRU—loading emissions at the Terminal will decrease, benefitting the community. Moreover, the VRU will emit no GHGs. By increasing the cap at Cargo, the Terminals will have similar limits

and Global will have the flexibility to switch demand between the two Terminals. In addition, if one of the Terminals is shut down for any period of time, Global will still be able to meet the market demand in the area by using the other Terminal.

As further detailed in this letter, Global believes that the modification (or Project) is consistent with the CLCPA as it will result in a reduction in allowable facility greenhouse gas (GHG) emissions from 3255.6 to 418.1 tpy CO_2e[1], an 87 percent decrease. This is accomplished largely by replacing the existing flares at the facility with the VRU which captures and recycles the vapors rather than combusting them.

Details of the pre and post project GHG emissions, pre and post project combustion and non-combustion HAP emissions, and the upstream GHG analysis are included in the following sections. The calculations include emissions from on site emissions.

Allowable GHG Emissions Before and After the Project

To determine the GHG emission impacts of the Project, Global has quantified allowable GHG emissions both in actual terms and on a CO_2e basis before and after the Project. These emissions include GHG emissions associated with day-to-day operation of the Terminal, in particular, CO_2 and other GHG emissions associated with existing on-site fuel handling and related operations.

The regulations recently adopted by DEC setting statewide GHG emission limits under the CLCPA contain a list of pollutants regulated by New York State as GHGs and assigns each GHG a CO_2 equivalent. *See* 6 NYCRR § 496.5. The Facility emits only CO2, methane, and nitrous oxide from the State's list of GHGs. Accordingly, these are the only GHGs addressed in the analysis.

Total GHG emissions from the Terminal are relatively low. These emissions originate almost exclusively from two sources—operation of the Terminal's existing open flares, which are used to control emissions of VOCs associated with the Terminal's gasoline loading activities and—to a much lesser extent—miscellaneous exempt combustion equipment (e.g., emergency gas-fired generators and a boiler used to heat the building). Going forward, the Project calls for replacing the existing flares with a VRU permitted at 2 mg/l (except for limited circumstances where the flares will be used as a backup with an allowable gasoline throughput limit of 5,000,000 gallons per year at 80 mg/L without the operation of the vac assist system). There will also be a change to the product throughput subcaps at the truck loading rack. While the overall Terminal throughput will not increase, allowable gasoline throughput will increase from 236 to 550 million gallons and the allowable distillate loading will decrease from 1.419 to 1.1 billion gallons.

The allowable emissions before and after the Project are set forth below. All emissions are measured in tons per year. Information about how the emissions below were calculated can be found in Attachment A, which includes the Potential to Emit (PTE) for the Terminal's combustion sources.

[1] tpy CO_2e = tons per year carbon dioxide equivalent

Current Potential Emissions (based on allowable throughputs):
CO_2: 3,225.55 tpy
Methane: 0.07 tpy
Nitrous Oxide: 0.01 tpy
Total CO_2e: 3,234.01 tpy

Future Potential Emissions (based on proposed allowable throughputs):
CO_2: 415.99 tpy
Methane: 0.01 tpy
Nitrous Oxide: 0.003 tpy
Total CO_2e: 418.13 tpy

As set forth above and in Attachment A, the Project will reduce allowable GHG emissions by approximately 2,815.88 tpy relative to current allowable emissions, an 87 percent decrease.

Combustion HAP Emissions Before and After the Project

As outlined in the attached combustion potential to emit (PTE) (Attachment A), hazardous air pollutant (HAP) emissions associated with combustion sources and generators are as follows:

Pollutant	**lb/yr**	**ton/yr**
Benzene	6.11E-03	3.06E-06
Ethylbenzene	1.82E-03	9.08E-07
Toluene	1.77E-01	8.85E-05
Xylenes	3.11E-03	1.56E-06
Formaldehyde	9.42E-01	4.71E-04
Naphthalene	3.23E-02	1.61E-05
Total HAPs	1.16E+00	5.81E-04

Emission factors used to calculate the HAPs associated with combustion sources are from AP-42 Table 1.3-9. The sources contributing to these HAP emissions, as outlined in the attached PTE, are two diesel generators and a distillate furnace. There are no changes to the operations of these sources as a result of the project and, therefore, the combustion HAP emissions before and after the project will not change.

Non-combustion HAP Emissions Before and After the Project

Non-combustion HAP emissions before and after the project are summarized in the following table, with detailed calculations provided in the PTE in Attachment B and the previously submitted PTE for the project. Calculations before the project assumed annual throughputs of 236,000,000 gallons of gasoline and 1,419,100,000 gallons of distillate. The proposed project includes an increase to the annual gasoline throughput to 550,000,000 gallons and a decrease in annual distillate throughput to 1,100,000,000 gallons. However, a Vapor Recovery Unit (VRU) will be installed, which will operate at 2 mg/l with a vacuum assist system to capture fugitive emissions and significantly lower emissions. The throughput to the flares, which operate at an emission limit of 80 mg/l without vacuum assist, would be limited to 5,000,000 gallons per year.

Therefore, as is illustrated in the table below, overall HAP emissions at the facility will decrease as a result of the project. Air dispersion modeling efforts for the facility are ongoing. A protocol has been submitted and modeling will be completed in accordance with the approved protocol and submitted to NYSDEC.

Pollutant	**Total PTE (TPY), Before Project**	**Total PTE (TPY), After Project**
Total HAP	4.23	2.39
hexane	0.60	0.26
benzene	0.69	0.31
2,2,4 TMP	0.76	0.34
toluene	1.04	0.59
ethylbenzene	0.12	0.10
xylenes	1.01	0.78
naphthalene	6.63E-03	6.83E-03
cumene	5.85E-03	1.83E-03

Upstream GHG Analysis

An analysis of the impact of the proposed project on upstream GHG emissions was conducted. The proposed modification would decrease upstream GHG emissions associated with combustion at the terminal, due to the decreased propane usage to operate the flares. The upstream calculations associated with current and proposed propane usage are provided as Attachment C and are summarized below. Emission factors are from "Appendix A Emission Factors for Use by State Agencies and Applicants" provided by NYSDEC.

Current Potential Upstream Emissions (based on current maximum allowable throughput to estimate propane usage for flare):
CO_2: 30.49 tpy
Methane: 0.213 tpy
Nitrous Oxide: 0.0005 tpy
Total CO_2e: 48.535 tpy

Future Potential Upstream Emissions (based on proposed maximum allowable throughput to estimate propane usage for flare):
CO_2: 0.867 tpy
Methane: 0.006 tpy
Nitrous Oxide: 0.00001 tpy
Total CO_2e: 1.381 tpy

As previously noted, operation of the other small combustion sources at the terminal will not change as a result of the project. Accordingly, as set forth above and in Attachment C, the

project will reduce upstream GHG emissions by approximately 47.154 tpy relative to current upstream calculations, a 97 percent decrease.

Conclusion

Based on the reduction in GHGs presented above the Project is consistent with the goals of the CLCPA. If there are any questions or concerns regarding the CLCPA consistency analysis, please contact me via e mail at tkeefe@globalp.com.

Many thanks for your attention to this matter. I look forward to hearing from you.

Very truly yours,

Tom Keefe
Vice President, EHS

Attachment A

Potential To Emit for Combustion Sources

Fuel Consumption

Exempt Combustion Sources:

Product	Unit	Gal/yr (Liquid)	SCF/yr (Gas)	s/year (Gas)	MMBTU/yr*
Distillate	Furnace	2,155			297
Propane	Flares	17,575			1,599

* MMBTU/yr based on default high heat values from 40 CFR 98 Subpart C Table C-1.

Distillate Combustion Emissions:

	Combustion Emissions									
Pollutant	PM 2.5	PM 10	SOx	NOx	VOC	CO	CH4	N2O	CO2	GHG**
Emission Factor *	2.00	2.00	0.21	20.00	0.20	5.00	0.01	0.0013	163.05	(CH4*84)+(N2O*264)+(CO2*1)
lb/yr	4.31	4.31	0.46	43.10	0.43	10.78	1.97	0.39	48490.10	48,759.17
tons/yr	0.002	0.002	0.00	0.02	0.0002	0.005	0.001	0.000	24.245	24.380

* PM, NOx, CO, VOC, and SOx Emission factors used to estimate emissions are from AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition, Volume I and are in units of lb/1000 gallons. SOx, NOx, CO, and PM
Emission Factors are from Table 1.3-1. VOC Emission Factors are from Table 1.3-3. CO2 emission factor is from 40 CFR 98 Subpart C Table C-1 for Distillate Fuel Oil 2, converted to lb/MMBTU. CH4 and N2O
** GHG Emission calculated by using the CO2 Equivalency Factor for CO2 (1), CH4 (84) and N2O (264).

Example calculation (using SOx):
= gal/yr / 1000 gal * emission factor
= 2155 gal/yr / 1000 gal * 0.21 lb/1000 gal (SOx)
= 0.46 lb/yr

Propane Combustion Emissions

Propane Vapor Service

	Combustion Emissions									
Pollutant	PM2.5	PM10	SOx	NOx	VOC	CO	CH4	N2O	CO2	GHG**
Emission Factor *	0.7	0.7	0.00015	13	NA	7.5	0.01	0.0013	139	(CH4*84)+(N2O*264)+(CO2*1)
lb/yr	12.303	12.303	0.003	228.475	NA	131.813	10.578	2.116	221,671.566	223,118.58
tons/yr	0.006	0.006	0.000	0.114	NA	0.066	0.005	0.001	110.836	111.559

* Emission factors used to estimate emissions for PM, SOx, NOx, VOC and CO are from AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition, Volume 1 Table 1.5-1, in units of lb/1000 gallons. CO2 emission factor is from 40 CFR 98 Subpart C Table C-1 for Propane, converted to lb/MMBTU. CH4 and N2O emission factors are from 40 CFR 98 Subpart C Table C-2 for Petroleum Products, converted to lb/MMBTU.
** GHG Emission calculated by using the CO2 Equivalency Factor for CO2 (1), CH4 (84) and N2O (264).

Vapor Combustion Emissions from Flare Loading Based on Flare Loading before throughput modification 236000000 gal/yr
(Emissions from Combustion of Petroleum Product Loaded)

Petroleum Vapor Combusted (lbs), based on loading to flare
2,247,394 Total
2,247,394 Uncontrolled VOC emissions at 1-RACK1, Emission Point U0001 (Truck Loading Rack Flares)

Uncontrolled VOC emissions = Annual loading volume (1000 gallons) * Loading Emission factor (lbs/1000 gallons)
Emission factor = 12.46 SPM/T = 9.52 lb/1000 gallons
S = 1.00 (dimensionless)
Vapor Pressure = 5.93 psia (average over year for gasoline)
Molecular weight = 66.00 lb/lbmol
Temperature 512.24 degrees R, same as used for loading, average for year

Conversion from Petroleum Vapor Combusted in lbs to MMSCF (as Natural Gas Equivalent):
MMSCF (as Natural Gas) = Petroleum Vapor Combusted (lbs) * (21,000 BTUs / lb gasoline (high avg. for C4-C8 gases) (/ 1,000 BTU/SCF) / (1,000,000)
MMSCF (as Natural Gas) combusted at U0001 = 47.195
MMBTU for Flare Combustion = (21,000 BTUs / lb gasoline (high avg. for C4-C8 gases)/1,000,000 = 47195.27931

Truck Rack Flare Emissions from Gasoline Loading (Emission Unit U0001)

	Combustion Emissions									
Pollutant	PM2.5	PM10	SOx	NOx	VOC*	CO	CH4	N2O	CO2	GHG**
Emission Factor**	274	274	0.60	0.068	NA	0.31	0.002	0.0002	117	(CH4*84)+(N2O*264)+(CO2*1)
lb/yr	0.04	0.04	28.32	3,209.28	NA	14,630.54	104.05	10.40	5,520,718.58	5,532,205.34
tons/yr	0.00	0.00	0.01	1.60	NA	7.32	0.052	0.005	2760.359	2766.10

*These emissions are from gasoline vapor combustion and pilot light gas. Gasoline VOCs are already accounted for in the VCU emissions.

** NOx emissions factor is from Table 13.5-1, in units of lb/MMBTU. CO emission factor is from Table 13.5-2 in units of lb/MMBTU. The PM emission factors were conservatively assumed based on values for soot in Table 13.5-1, in units of ug/l. The SOx emission factor is from AP-42 Table 1.4-2, in units of lb/MMSCF. CH4 and N2O emission factors are from 40 CFR 98 Subpart C Table C-2 converted to units of lb/MMBTU. CO2 emission factor is from 40 CFR 98 Subpart C Table C-1 converted to units of lb/MMBTU.

Total of Combustion Sources

Pollutant	PM 2.5	PM 10	SOx	NOx	VOC	CO	CH4	N2O	CO2	GHG**
lb/yr	16.65	16.65	28.78	3,480.85	0.43	14,773.12	116.59	12.91	5,790,880.24	5,804,083.09
tons/yr	0.01	0.01	0.01	1.74	0.00	7.39	0.06	0.006	2,895.44	2,902.04

HAP Speciation from Fuel Oil Combustion Sources

Pollutant	Emission Factor (lb/1000 gallons)	lb/yr	ton/yr
Benzene	2.14E-04	4.61E-04	2.31E-07
Ethylbenzene	6.36E-05	0.000137058	6.85E-08
Toluene	6.20E-03	0.013361	6.68E-06
Xylenes	1.09E-04	0.000234895	1.17E-07
Formaldehyde	3.30E-02	0.071115	3.56E-05
Naphthalene	1.13E-03	0.00243515	1.22E-06

Emission Factors for HAPs are from AP-42 Table 1.3-9

Fuel Consumption

Exempt Combustion Sources:

Product	Unit	Gal/yr (Liquid)	SCF/yr (Gas)	s/year (Gas)	MMBTU/yr*
Distillate	Furnace	2,155			297
Propane	Flares	500			46

* MMBTU/yr based on default high heat values from 40 CFR 98 Subpart C Table C-1.

Distillate Combustion Emissions:

	Combustion Emissions									
Pollutant	PM 2.5	PM 10	SOx	NOx	VOC	CO	CH4	N2O	CO2	GHG**
Emission Factor *	2.00	2.00	0.21	20.00	0.20	5.00	0.01	0.0013	163.05	(4*84)+(N2O*264)+(CO2*1)
lb/yr	4.31	4.31	0.46	43.10	0.43	10.78	1.97	0.39	48490.10	48,759.17
tons/yr	0.002	0.002	0.00	0.02	0.0002	0.005	0.001	0.000	24.245	24.380

* PM, NOx, CO, VOC, and SOx Emission factors used to estimate emissions are from AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition, Volume I and are in units of lb/1000 gallons. SOx, NOx, CO, and PM Emission Factors are from Table 1.3-1. VOC Emission Factors are from Table 1.3-3. CO2 emission factor is from 40 CFR 98 Subpart C Table C-1 for Distillate Fuel Oil 2, converted to lb/MMBTU. CH4 and N2O emission factors are from 40 CFR 98 Subpart C Table C-2 for Petroleum Products, converted to lb/MMBTU.

** GHG Emission calculated by using the CO2 Equivalency Factor for CO2 (1), CH4 (84) and N2O (264).

Example calculation (using SOx):
= gal/yr / 1000 gal * emission factor
= 2155 gal/yr / 1000 gal * 0.21 lb/1000 gal (SOx)
= 0.46 lb/yr

Propane Combustion Emissions

Propane Vapor Service

Pollutant	PM2.5	PM10	SOx	NOx	VOC	CO	CH4	N2O	CO2	GHG**
Emission Factor *	0.7	0.7	0.00015	13	NA	7.5	0.01	0.0013	138.60	(4*84)+(N2O*264)+(CO2*1)
lb/yr	0.350	0.350	0.000	6.500	NA	3.750	0.301	0.060	6,306.446	6,347.61
tons/yr	0.000	0.000	0.000	0.003	NA	0.002	0.000	0.000	3.153	3.174

* Emission factors used to estimate emissions for PM, SOx, NOx, VOC and CO are from AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition, Volume 1 Table 1.5-1, in units of lb/1000 gallons. CO2 emission factor is from 40 CFR 98 Subpart C Table C-1 for Propane, converted to lb/MMBTU. CH4 and N2O emission factors are from 40 CFR 98 Subpart C Table C-2 for Petroleum
** GHG Emission calculated by using the CO2 Equivalency Factor for CO2 (1), CH4 (84) and N2O (264).

Vapor Combustion Emissions from Flare Loading Based on Flare Loading after throughput modification 5000000 gal/yr
(Emissions from Combustion of Petroleum Product Loaded)

Petroleum Vapor Combusted (lbs), based on loading to flare
47,614 Total
47,614 Uncontrolled VOC emissions at 1-RACK1, Emission Point U0001 (Truck Loading Rack Flares)

Uncontrolled VOC emissions = Annual loading volume (1000 gallons) * Loading Emission factor (lbs/1000 gallons)
Emission factor = 12.46 SPM/T = 9.52 lb/1000 gallons
S = 1.00 (dimensionless)
Vapor Pressure = 5.93 psia (average over year for gasoline)
Molecular weight = 66.00 lb/lbmol
Temperature 512.24 degrees R, same as used for loading, average for year

Conversion from Petroleum Vapor Combusted in lbs to MMSCF (as Natural Gas Equivalent):
MMSCF (as Natural Gas) = Petroleum Vapor Combusted (lbs) * (21,000 BTUs / lb gasoline (high avg. for C4-C8 gases) (/ 1,000 BTU/SCF) / (1,000,000)
MMSCF (as Natural Gas) combusted at U0001 = 1.000
MMBTU for Flare Combustion = (21,000 BTUs / lb gasoline (high avg. for C4-C8 gases)/1,000,000 = 999.8999854

Truck Rack Flare Emissions from Gasoline Loading (Emission Unit U0001)

	Combustion Emissions									
Pollutant	PM2.5	PM10	SOx	NOx	VOC*	CO	CH4	N2O	CO2	GHG**
Emission Factor**	274	274	0.60	0.068	NA	0.31	0.002	0.0002	117	(4*84)+(N2O*264)+(CO2*1)
lb/yr	0.00	0.00	0.60	67.99	NA	309.97	2.204	0.2204	116,964.38	117,207.74
tons/yr	0.00	0.00	0.00	0.03	NA	0.15	0.001	0.000	58.482	58.60

*These emissions are from gasoline vapor combustion and pilot light gas. Gasoline VOCs are already accounted for in the VCU emissions.

** NOx emissions factor is from Table 13.5-1, in units of lb/MMBTU. CO emission factor is from Table 13.5-2 in units of lb/MMBTU. The PM emission factors were conservatively assumed based on values for soot in Table 13.5-1, in units of ug/l. The SOx emission factor is from AP-42 Table 1.4-2, in units of lb/MMSCF. CH4 and N2O emission factors are from 40 CFR 98 Subpart C Table C-2 converted to units of lb/MMBTU. CO2 emission factor is from 40 CFR 98 Subpart C Table C-1 converted to units of lb/MMBTU.

Total of Combustion Sources

Pollutant	PM 2.5	PM 10	SOx	NOx	VOC	CO	CH4	N2O	CO2	GHG**
lb/yr	4.66	4.66	1.06	117.59	0.43	324.49	4.47	0.67	171,760.92	172,314.52
tons/yr	0.00	0.00	0.00	0.06	0.00	0.16	0.002	0.0003	85.88	86.16

HAP Speciation from Fuel Oil Combustion Sources

Pollutant	Emission Factor (lb/1000 gallons)	lb/yr	ton/yr
Benzene	2.14E-04	4.61E-04	2.31E-07
Ethylbenzene	6.36E-05	0.000137058	6.85E-08
Toluene	6.20E-03	0.013361	6.68E-06
Xylenes	1.09E-04	0.000234895	1.17E-07
Formaldehyde	3.30E-02	0.071115	3.56E-05
Naphthalene	1.13E-03	0.00243515	1.22E-06
Total HAPs		8.77E-02	4.39E-05

Emission Factors for HAPs are from AP-42 Table 1.3-9

Emergency Generators (Exempt)

Emergency Generator Sources:

Fuel Type	Source	Gal/hr (Liquid)	SCF/hr (Gas)	Gal/hr (Gas)	MMBTU/hr*
Diesel	North Generator - 400 kV	21.3			2.94
Diesel	South Generator - 600 kV	31.5			4.35
Propane	100 kW				0.96

* MMBTU/hr for diesel generators calculated based on high heat value in 40 CFR 98 Subpart C Table C-1. MMBTU/hr for propane generator is based on the spec sheet from the manufa

Distillate Fired Engine Emissions:

	Pollutant									
Pollutant	PM2.5	PM10	SOx	NOx	VOC	CO	CH4	N2O	CO2	GHG**
Emission Factor *	2.00	2.00	0.21	20.00	0.20	5.00	0.01	0.001	163.05	CH4*84)+(N2O*264)+(CO2*1)
lb/yr	52.80	52.80	5.62	528.00	5.28	132.00	24.10	4.82	594,031.83	597,328.08
tons/yr	0.03	0.03	0.00	0.26	0.00	0.07	0.01	0.00	297.02	298.66

* PM, SOx, NOx, VOC and CO Emission factors used to estimate emissions are from AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition, Volume I in units of lb/1000 gallon. SOx, NOx, CO, and PM Emission Factors are from Table 1.3-1. VOC Emission Factor is from Table 1.3-3. CO2 emission factor is from 40 CFR 98 Subpart C Table C-1 for Distillate Fuel Oil 2, converted to lb/MMBTU. CH4 and N2O emission factors are from 40 CFR 98 Subpart C Table C-2 for Petroleum Products, converted to lb/MMBTU.

** GHG Emission calculated by using the CO2 Equivalency Factors for CH4 (84), N2O (264) and CO2 (1).

Example calculation:
= gal/yr / 1000 gal * emission factor

Natural Gas & Propane Fired Engine Emissions:

	lbs Pollutant / MM BTU									
Pollutant	PM2.5	PM10	SOx	NOx	VOC	CO	CH4	N2O	CO2	GHG**
Emission Factor* - lb/MMBtu	0.0099	0.0099	0.0006	2.270	0.0296	3.720	0.007	0.0013	138.603	CH4*84)+(N2O*264)+(CO2*1)
lb/yr	4.73	4.73	0.28	1,083.93	14.13	1,776.30	3.16	0.63	66,183.03	66,615.06
tons/yr	0.00	0.00	0.00	0.54	0.01	0.89	0.00	0.00	33.09	33.31

* PM, SOx, NOx, VOC and CO Emission factors used to estimate emissions are from AP-42 Table 3.2-3. CO2 emission factor is from 40 CFR 98 Subpart C Table C-1 for Propane. CH4 and N2O emission factors are from 40 CFR 98 Subpart C Table C-2 for Petroleum Products.

** GHG Emission calculated by using the CO2 Equivalency Factors for CH4 (84), N2O (264) and CO2 (1).

MMBTU/yr Calculation = 0.96 MM BTU/hr * 500 hrs 478 MMBTU/yr Assumes 500 hours/yr

Total of Generator Sources

Pollutant	PM2.5	PM10	SOx	NOx	VOC	CO	CH4	N2O	CO2	GHG
lb/yr	57.53	57.53	5.90	1,611.93	19.41	1,908.30	27.25	5.45	660,214.86	663,943.14
tons/yr	0.03	0.03	0.00	0.81	0.01	0.95	0.01	0.003	330.11	331.97

HAP Speciation from Diesel Generators

Pollutant	Emission Factor (lb/1000 gallons)	lb/yr	ton/yr
Benzene	2.14E-04	5.65E-03	2.82E-06
Ethylbenzene	6.36E-05	0.00167904	8.40E-07
Toluene	6.20E-03	0.16368	8.18E-05
Xylenes	1.09E-04	0.0028776	1.44E-06
Formaldehyde	3.30E-02	0.8712	4.36E-04
Naphthalene	1.13E-03	0.029832	1.49E-05
Total HAPs		1.07E+00	5.37E-04

Emission Factors for HAPs are from AP-42 Table 1.3-9. Calculations are based on 500 hours/yr of operation.

Attachment B

Pre-Project Potential To Emit

Total Facility PTE Pre-Project Summary

Pollutant	Tank Emissions (TPY)	Loading Emissions (TPY)	Equipment Fugitive Emissions (TPY)	Total (TPY)
VOC	45.74	94.91	0.27	140.92
Total HAP	1.64	2.57	0.03	4.23
hexane	0.22	0.37	0.001	0.60
benzene	0.26	0.43	0.002	0.69
2,2,4 TMP	0.29	0.46	0.005	0.76
toluene	0.38	0.64	0.009	1.04
ethylbenzene	0.07	0.05	0.002	0.12
xylenes	0.41	0.60	0.009	1.01
naphthalene	0.003	0.00	0.001	6.63E-03
cumene	0.001	0.00	0.001	5.85E-03

* = includes VOCs from Combustion and Emergency Generators

Total Emissions from Combustion Sources and Emergency Generators

Pollutant	Combustion Sources (TPY)	Generators (TPY)	Total (TPY)
PM 2.5	0.00	0.03	0.03
PM 10	0.00	0.03	0.03
SOx	0.01	0.00	0.02
NOx	1.63	0.81	2.44
VOC	0.00	0.01	0.01
CO	7.32	0.95	8.28
CH4	0.05	0.01	0.07
N2O	0.01	0.00	0.01
CO2	2787.76	330.11	3117.86
GHG	2,793.66	331.97	3125.63

SUMMARY OF PTE TANK EMISSIONS

No. of Landings per IFR **Assumes 3 landings all occuring in July for 2 days idle.**

SUMMARY OF VOC EMISSIONS				SUMMARY PER MONTH											
Tank ID				January	February	March	April	May	June	July	August	September	October	November	December
ROUTINE	lb/yr	tpy	lb/hr	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month
IFR Tanks															
17414	11,595	5.80	1.32	677.96	714.60	853.66	984.77	775.47	986.47	1,123.20	1,095.26	1,523.78	1,111.10	983.70	765.24
30531	2,411	1.21	0.28	141.88	149.37	177.83	204.67	161.83	205.02	233.00	227.28	314.98	230.52	204.45	159.74
30532	2,831	1.42	0.32	166.96	175.73	208.99	240.35	190.29	240.76	273.46	266.78	369.28	270.57	240.09	187.84
30534	12,147	6.07	1.39	711.22	749.47	894.65	1,031.55	813.02	1,033.32	1,176.08	1,146.91	1,594.32	1,163.45	1,030.43	802.34
30533	2,489	1.24	0.28	146.14	153.92	183.47	211.33	166.86	211.69	240.75	234.81	325.88	238.18	211.11	164.68
30535	12,146	6.07	1.39	711.12	749.37	894.55	1,031.45	812.92	1,033.22	1,175.98	1,146.81	1,594.22	1,163.35	1,030.33	802.24
SubTotal	43,618	21.81	4.98												
VFR Tanks															
17413	5,561	2.78	0.63	192.30	201.87	268.94	381.90	530.19	711.09	840.62	810.76	636.86	443.69	315.75	227.22
17415	1,972	0.99	0.23	68.18	71.58	95.35	135.41	187.99	252.15	298.08	287.48	225.82	157.32	111.96	80.56
SubTotal	7,533	3.77	0.86												
Horizontal Tanks															
10454A	33	0.0166	0.00	0.95	1.05	1.50	2.29	3.33	4.52	5.35	5.00	3.80	2.53	1.66	1.13
10455A	33.1	0.0166	0.00	0.95	1.05	1.50	2.29	3.33	4.52	5.35	5.00	3.80	2.53	1.66	1.13
13061A	33	0.0166	0.00	0.95	1.05	1.50	2.29	3.33	4.52	5.35	5.00	3.80	2.53	1.66	1.13
13316A	33	0.0166	0.00	0.95	1.05	1.50	2.29	3.33	4.52	5.35	5.00	3.80	2.53	1.66	1.13
10456	0	0.0001	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01
10457	33	0.0165	0.00	0.95	1.05	1.49	2.28	3.31	4.49	5.32	4.98	3.79	2.53	1.66	1.13
10458	33	0.0165	0.00	0.95	1.05	1.49	2.28	3.31	4.49	5.32	4.98	3.78	2.53	1.66	1.13
10459B	1	0.0006	0.00	0.04	0.04	0.06	0.09	0.13	0.17	0.20	0.19	0.14	0.10	0.06	0.04
10460	0	0.0001	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.02	0.02	0.01	0.01	0.01
10470	33	0.0167	0.00	0.58	0.76	1.37	2.38	3.87	5.30	6.41	5.50	3.52	1.99	1.03	0.65
10480	19	0.0097	0.00	0.34	0.44	0.79	1.38	2.23	3.06	3.70	3.18	2.04	1.16	0.61	0.38
SubTotal	253	0.13	0.03												
TOTAL ROUTINE	51,404	25.70	5.87												

LANDINGS [1/]															
IFR Tanks										lb/month [1/]					
17414	8,188	4.094	0.93							8,187.96					
30531	2,931	1.465	0.33							2,930.89					
30532	5,981	2.991	0.68							5,981.42					
30534	10,740	5.370	1.23							10,740.23					
30533	1,495	0.748	0.17							1,495.35					
30535	10,740	5.370	1.23							10,740.23					
SubTotal	40,076	20.04	5												

TOTAL TANK PTE			
	LB/YR	TPY	LB/HR
Total	**91,480**	**46**	**10**

SUMMARY OF TANK HAP EMISSIONS

Tank ID	Total HAPS	hexane	benzene	2,2,4 TMP	toluene	ethylbenzene	xylenes	naphthalene	cumene
	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr
ROUTINE EMISSIONS									
IFR Tanks									
17414	269.59	51.27	57.07	66.10	66.74	4.92	22.13	0.34	1.02
30531	63.84	10.87	12.35	15.03	16.28	1.53	7.15	0.22	0.40
30532	77.80	12.84	14.69	18.11	20.00	1.98	9.32	0.32	0.53
30534	290.82	53.93	60.31	70.63	72.51	5.71	25.93	0.52	1.26
30533	63.02	11.14	12.57	15.04	15.92	1.39	6.44	0.17	0.34
30535	290.53	53.92	60.29	70.58	72.43	5.69	25.85	0.51	1.26
SubTotal	1055.59	193.98	217.30	255.50	263.89	21.23	96.82	2.08	4.80
VFR Tanks									
17413	491.82	2.35	14.38	0.00	130.62	16.73	325.43	2.32	0.00
17415	174.39	0.83	5.10	0.00	46.31	5.93	115.39	0.82	0.00
SubTotal	666.22	3.18	19.48	0.00	176.93	22.67	440.82	3.14	0.00
Horizontal Tanks									
10454A	33.12	0.00	0.00	0.00	0.00	9.65	23.46	0.00	0.00
10455A	33.12	0.00	0.00	0.00	0.00	9.65	23.46	0.00	0.00
13061A	33.12	0.00	0.00	0.00	0.00	9.65	23.46	0.00	0.00
13316A	33.12	0.00	0.00	0.00	0.00	9.65	23.46	0.00	0.00
10456	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
10457	32.99	0.00	0.00	0.00	0.00	9.62	23.37	0.00	0.00
10458	32.97	0.00	0.00	0.00	0.00	9.61	23.36	0.00	0.00
10459B	1.25	0.00	0.00	0.00	0.00	0.37	0.89	0.00	0.00
10460	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
10470	33.39	0.00	0.00	0.00	0.00	9.71	23.67	0.00	0.00
10480	19.31	0.00	0.00	0.00	0.00	5.62	13.69	0.00	0.00
SubTotal	252.40	0.00	0.00	0.00	0.01	73.53	178.85	0.00	0.00
TOTAL ROUTINE	1974.21	197.16	236.78	255.50	440.82	117.43	716.49	5.22	4.80

LANDING PTE EMISSIONS (LB/YR) [1/]

Tank ID	Total HAPS	hexane	benzene	2,2,4 TMP	toluene	ethylbenzene	xylenes	naphthalene	cumene
IFR Tanks									
17414	266.86	50.91	57.68	66.44	67.01	4.47	19.55	0.04	0.77
30531	95.52	18.22	20.65	23.78	23.98	1.60	7.00	0.01	0.28
30532	194.95	37.19	42.14	48.54	48.95	3.26	14.28	0.03	0.56
30534	350.05	66.78	75.66	87.15	87.89	5.86	25.64	0.05	1.01
30533	48.74	9.30	10.53	12.13	12.24	0.82	3.57	0.01	0.14
30535	350.05	66.78	75.66	87.15	87.89	5.86	25.64	0.05	1.01
SubTotal	1306.17	249.19	282.33	325.20	327.96	21.86	95.68	0.18	3.76

TOTAL TANK PTE

	Total HAPS	hexane	benzene	2,2,4 TMP	toluene	ethylbenzene	xylenes	naphthalene	cumene
Total (lb/yr)	**3,280**	**446**	**519**	**581**	**769**	**139**	**812**	**5**	**9**
Total (tpy)	1.64	0.22	0.26	0.29	0.38	0.07	0.41	0.00	0.00
Total (lb/hr)	0.37	0.05	0.06	0.07	0.09	0.02	0.09	0.00	0.00

SUMMARY OF PTE ROUTINE TANK EMISSIONS

SUMMARY OF VOC EMISSIONS				SUMMARY PER MONTH											
Tank ID				January	February	March	April	May	June	July	August	September	October	November	December
ROUTINE	lb/yr	tpy	lb/hr	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month	lb/month
IFR Tanks															
17414															
Total	11,595	5.80	1.32	677.96	714.60	853.66	984.77	775.47	986.47	1,123.20	1,095.26	1,523.78	1,111.10	983.70	765.24
Standing	11,521	5.76	1.32	671.77	708.41	847.46	978.58	769.28	980.27	1,117.01	1,089.07	1,517.59	1,104.91	977.51	759.05
Working	74	0.04	0.01	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19	6.19
30531															
Total	2,411	1.21	0.28	141.88	149.37	177.83	204.67	161.83	205.02	233.00	227.28	314.98	230.52	204.45	159.74
Standing	2,358	1.18	0.27	137.49	144.98	173.44	200.28	157.44	200.63	228.61	222.89	310.59	226.13	200.06	155.35
Working	53	0.03	0.01	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39
30532															
Total	2,831	1.42	0.32	166.96	175.73	208.99	240.35	190.29	240.76	273.46	266.78	369.28	270.57	240.09	187.84
Standing	2,756	1.38	0.31	160.68	169.45	202.71	234.07	184.01	234.47	267.18	260.50	363.00	264.29	233.81	181.56
Working	75	0.04	0.01	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28
30534															
Total	12,147	6.07	1.39	711.22	749.47	894.65	1,031.55	813.02	1,033.32	1,176.08	1,146.91	1,594.32	1,163.45	1,030.43	802.34
Standing	12,029	6.01	1.37	701.39	739.64	884.82	1,021.72	803.19	1,023.49	1,166.25	1,137.08	1,584.49	1,153.62	1,020.60	792.51
Working	118	0.06	0.01	9.83	9.83	9.83	9.83	9.83	9.83	9.83	9.83	9.83	9.83	9.83	9.83
30533															
Total	2,489	1.24	0.28	146.14	153.92	183.47	211.33	166.86	211.69	240.75	234.81	325.88	238.18	211.11	164.68
Standing	2,448	1.22	0.28	142.75	150.54	180.09	207.95	163.47	208.31	237.37	231.43	322.49	234.80	207.72	161.30
Working	41	0.02	0.00	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38
30535															
Total	12,146	6.07	1.39	711.12	749.37	894.55	1,031.45	812.92	1,033.22	1,175.98	1,146.81	1,594.22	1,163.35	1,030.33	802.24
Standing	12,029	6.01	1.37	701.39	739.64	884.82	1,021.72	803.19	1,023.49	1,166.25	1,137.08	1,584.49	1,153.62	1,020.60	792.51
Working	117	0.06	0.01	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73
SubTotal	43,618	21.81	4.98												
FRT Tanks															
17413															
Total	5,561	2.78	0.63	192.30	201.87	268.94	381.90	530.19	711.09	840.62	810.76	636.86	443.69	315.75	227.22
Standing	353	0.18	0.04	9.14	10.15	16.51	25.72	38.70	50.01	59.20	53.08	38.53	26.01	15.17	10.32
Working	5,209	2.60	0.59	183.17	191.72	252.43	356.18	491.50	661.08	781.43	757.68	598.32	417.68	300.57	216.91
17415															
Total	1,972	0.99	0.23	68.18	71.58	95.35	135.41	187.99	252.15	298.08	287.48	225.82	157.32	111.96	80.56
Standing	125	0.06	0.01	3.24	3.60	5.85	9.12	13.72	17.74	21.01	18.84	13.67	9.22	5.38	3.65
Working	1,847	0.92	0.21	64.94	67.99	89.50	126.29	174.27	234.41	277.07	268.65	212.16	148.10	106.58	76.91
SubTotal	7,533	3.77	0.86												
Horizontal Tanks															
10454A															
Total	33	0.02	0.00	0.95	1.05	1.50	2.29	3.33	4.52	5.35	5.00	3.80	2.53	1.66	1.13
Standing	12	0.01	0.00	0.27	0.31	0.53	0.86	1.34	1.76	2.10	1.86	1.32	0.86	0.47	0.31
Working	21	0.01	0.00	0.68	0.74	0.97	1.43	1.99	2.76	3.25	3.15	2.48	1.67	1.19	0.82
10455A															
Total	33	0.02	0.00	0.95	1.05	1.50	2.29	3.33	4.52	5.35	5.00	3.80	2.53	1.66	1.13
Standing	12	0.01	0.00	0.27	0.31	0.53	0.86	1.34	1.76	2.10	1.86	1.32	0.86	0.47	0.31
Working	21	0.01	0.00	0.68	0.74	0.97	1.43	1.99	2.76	3.25	3.15	2.48	1.67	1.19	0.82

13061A															
Total	33	0.02	0.00	0.95	1.05	1.50	2.29	3.33	4.52	5.35	5.00	3.80	2.53	1.66	1.13
Standing	12	0.01	0.00	0.27	0.31	0.53	0.86	1.34	1.76	2.10	1.86	1.32	0.86	0.47	0.31
Working	21	0.01	0.00	0.68	0.74	0.97	1.43	1.99	2.76	3.25	3.15	2.48	1.67	1.19	0.82
13316A															
Total	33	0.02	0.00	0.95	1.05	1.50	2.29	3.33	4.52	5.35	5.00	3.80	2.53	1.66	1.13
Standing	12	0.01	0.00	0.27	0.31	0.53	0.86	1.34	1.76	2.10	1.86	1.32	0.86	0.47	0.31
Working	21	0.01	0.00	0.68	0.74	0.97	1.43	1.99	2.76	3.25	3.15	2.48	1.67	1.19	0.82
10456															
Total	0.2	0.0001	0.0000	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01
Standing	0.1	0.0000	0.0000	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Working	0.1	0.0000	0.0000	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
10457															
Total	33	0.02	0.00	0.95	1.05	1.49	2.28	3.31	4.49	5.32	4.98	3.79	2.53	1.66	1.13
Standing	12	0.01	0.00	0.26	0.30	0.52	0.84	1.31	1.72	2.04	1.81	1.29	0.84	0.46	0.30
Working	21	0.01	0.00	0.69	0.75	0.98	1.44	2.01	2.78	3.28	3.17	2.50	1.69	1.20	0.83
10458															
Total	33	0.02	0.00	0.95	1.05	1.49	2.28	3.31	4.49	5.32	4.98	3.78	2.53	1.66	1.13
Standing	12	0.01	0.00	0.26	0.30	0.51	0.84	1.30	1.71	2.04	1.81	1.28	0.84	0.46	0.30
Working	21	0.01	0.00	0.69	0.75	0.98	1.44	2.01	2.78	3.28	3.17	2.50	1.69	1.20	0.83
10459B															
Total	1	0.00	0.00	0.04	0.04	0.06	0.09	0.13	0.17	0.20	0.19	0.14	0.10	0.06	0.04
Standing	0.4	0.00	0.00	0.01	0.01	0.02	0.03	0.05	0.06	0.08	0.07	0.05	0.03	0.02	0.01
Working	1	0.00	0.00	0.03	0.03	0.04	0.06	0.08	0.11	0.13	0.12	0.10	0.07	0.05	0.03
10460															
Total	0.2	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.02	0.02	0.01	0.01	0.01
Standing	0.1	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
Working	0.1	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
10470															
Total	33	0.02	0.00	0.58	0.76	1.37	2.38	3.87	5.30	6.41	5.50	3.52	1.99	1.03	0.65
Standing	28	0.01	0.00	0.44	0.59	1.13	2.03	3.36	4.59	5.58	4.72	2.93	1.61	0.78	0.48
Working	5	0.00	0.00	0.15	0.17	0.23	0.35	0.51	0.71	0.83	0.78	0.59	0.38	0.26	0.18
10480															
Total	19	0.01	0.00	0.34	0.44	0.79	1.38	2.23	3.06	3.70	3.18	2.04	1.16	0.61	0.38
Standing	16	0.01	0.00	0.25	0.34	0.64	1.15	1.91	2.60	3.17	2.68	1.66	0.91	0.44	0.27
Working	3	0.00	0.00	0.09	0.11	0.15	0.23	0.33	0.45	0.53	0.50	0.38	0.24	0.16	0.11
SubTotal	253	1.26E-01	2.88E-02												
TOTAL ROUTINE	51,404	25.70	5.87												

Floating Roof
Material: Gasoline
Permitted Material Throughput: **259,600,000** gallons/yr (includes 10% for tank-to-tank transfers)

ID	Type	Shell Capacity (gal)	Calculated Throughput (gal/yr)	Diameter	Tank Height or Length
17414	IFR	2,356,148	40,548,985	117	36
30531	IFR	1,136,066	19,551,541	70	48
30532	IFR	2,321,969	39,960,769	100	48
30534	IFR	4,351,191	74,883,403	134	48
30533	IFR	612,766	10,545,619	50	48
30535	IFR	4,306,233	74,109,682	134	48
	Total =	**15,084,373**			

Fixed Roof
Material: Distillate
Permitted Material Throughput: **1,561,010,000** gallons/yr (includes 10% for tank-to-tank transfers)

ID	Type	Shell Capacity (gal)	Calculated Throughput (gal/yr)	Diameter	Tank Height or Length
17413	FRT	2,512,053	1,151,804,368	117	36
17415	FRT	892,466	409,205,632	78	29
	Total =	**3,404,519**			

Horizontal Tank
Material:
Permitted Material Throughput: **NA** gallons/yr

ID	Type	Max Shell Capacity (gal)	Calculated Throughput * (gal/yr)	Diameter	Tank Height or Length
10454A	HT	6,400	76,800	10	14.0
10455A	HT	6,400	76,800	10	14.0
13061A	HT	6,400	76,800	10	14.0
13316A	HT	6,400	76,800	10	14.0
10456	HT	410	4,920	4	6.0
10457	HT	6,450	77,400	8	21.3
10458	HT	6,450	77,400	8	21.3
10459B	HT	250	3,000	3.166667	5.0
10460	HT	410	4,920	5.5	4.0
10470	HT	1,250	15,000	15	5.0
10480	HT	800	9,600	13.5	3.5
	Total =	**41,620**			

*assume 12 turnovers per year.

				Gasoline Loading Losses - VRU		Gasoline Loading Losses - Flare		Gasoline Loading Fugitives**		Total Gasoline Loading Losses		Distillate Loading Losses			Total Loading Losses	
				Vapor Fraction - Gasoline	Lbs/Year	Tons/Yr.	Lbs/Year	Tons/Yr.	Lbs/Year	Tons/Yr.	Lbs/Year	Tons/Yr.	Vapor Fraction - Distillate	Lbs/Year	Tons/Yr.	Lbs/Year	Tons/Yr.
Gasoline Throughput	**236,000,000.0**	gal	Total VOC	100.00%	-	-	157,544	78.772	15,754	7.877	173,298.647	86.649	100.00%	16,515	8.258	189,814	94.907
Gasoline Throughput to VRU	**-**	gal	hexane	0.43%	-	-	674.6	0.337	67	0.034	742.081	0.371	0.04%	7	0.004	749	0.375
Gasoline Through to Flare	**236,000,000.0**	gal	benzene	0.47%	-	-	741.3	0.371	74	0.037	815.404	0.408	0.27%	45	0.022	860	0.430
Distillate Throughput	**1,419,100,000**	gal	2,2,4 TMP	0.53%	-	-	837.6	0.419	84	0.042	921.395	0.461	0.00%	-	-	921	0.461
VRU Emission Rating (permitted)	**2**	mg/l	toluene	0.52%	-	-	812.6	0.406	81	0.041	893.885	0.447	2.38%	393	0.197	1,287	0.644
	0.000017	lb/gal	ethylbenzene	0.03%	-	-	50.9	0.025	5	0.003	55.958	0.028	0.30%	49	0.024	105	0.052
Flare Emission Rating (permitted)	**80**	mg/l	xylenes	0.14%	-	-	221.6	0.111	22	0.011	243.771	0.122	5.74%	949	0.474	1,193	0.596
	0.000668	lb/gal	naphthalene	0.0002%	-	-	0.4	0.000	0	0.000	0.387	0.000	0.04%	6	0.003	7	0.003
			cumene	0.0053%	-	-	8.4	0.0042	1	0.000	9.234	0.005	0.00%	-	-	9	0.005
			Total HAP		-	-	3,347	1.674	334.738	0.167	3,682.116	1.841		1,449	0.725	5,131	2.566

Gasoline fugitives during VRU loading **0** mg/l

\- lb/gal

Gasoline fugitives during Flare loading **8** mg/l

0.000067 lb/gal

Distillate emission factor, bottom loading **1.4** mg/l

0.000012 lb/gal

Average True Vapor Pressure for Distillate Loading Emission Factor	0.00613422	psia
Average TAA for Distillate Loading Emission F	512.24	°R
Saturation Factor	0.6	From AP-42 Section 5.2 Table 5.2-1
Distillate Vapor Molecular Weight	130	lb/lb mol

NOTE: Loading emission calculations were performed in accordance with guidance in AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition, Volume I. Section 5.2

* A vac assist will be installed.

** Gasoline loading fugitives are only calculated for flare loading scenario.

Tank No.	17,414	30,531	30,532	30,534	30,533	30,535
Tank Diam	117	70	100	134	50	134
Heel Height	4.0	4.0	4.0	4.0	4.0	4.0
Volume ft3	43,005	15,394	31,416	56,410	7,854	56,410
Vol bbl	7,660	2,742	5,596	10,048	1,399	10,048
Volume gal	321,722.09	115,161	235,022	422,006	58,756	422,006
Vol liters	1,217,718	435,884	889,560	1,597,293	222,390	1,597,293
Avg Temp F	60.65	60.65	60.65	60.65	60.65	60.65
Avg Temp K	289.07	289.07	289.07	289.07	289.07	289.07
temp corr	0.9449	0.9449	0.9449	0.9449	0.9449	0.9449
moles	51,369.098	18,388	37,526	67,381	9,381	67,381
VP of VOC(psia)	7.55	7.55	7.55	7.55	7.55	7.55
VOC theo fraction	0.51	0.51	0.51	0.51	0.51	0.51
Sat Factor	0.60	0.60	0.60	0.60	0.60	0.60
moles VOC	15,823	5,664	11,559	20,756	2,890	20,756
mol weight g/g-mole	60.00	60.00	60.00	60.00	60.00	60.00
VOC grams/landing	949,402	339,840	693,551	1,245,340	173,388	1,245,340
VOC lbs/landing	2,093.04	749.21	1,528.99	2,745.46	382.25	2,745.46
VOC tons/landing	1.05	0.37	0.76	1.37	0.19	1.37
land/yr	3	3	3	3	3	3
average days per landin	2.0	2.0	2.0	2.0	2.0	2.0
VOC lb filling	6,279	2,248	4,587	8,236	1,147	8,236
VOC lb standing	1,909	683	1,394	2,504	349	2,504
VOC lb/hr when landing	57	20	42	75	10	75
VOC lb/day when landin	4,094	1,465	2,991	5,370	748	5,370
Total VOC lbs	8,188	2,931	5,981	10,740	1,495	10,740
Total VOC tons	4.09	1.47	2.99	5.37	0.75	5.37

July Vapor Fraction Speciation for Landings

	Gasoline
	Vapor Wt%
hexane	0.622%
benzene	0.704%
2,2,4 TMP	0.811%
toluene	0.818%
ethylbenzene	0.055%
xylenes	0.239%
naphthalene	0.0004%
cumene	0.009%

Fugitive Emissions for PTE

Fugitive Equipment	Number of units			Emission Factor lb/hour			Light Devices (lb/yr)	Heavy Devices (lb/yr)	Gas Devices (lb/yr)	Total VOC Emission (lb/yr)
	Light Devices	Heavy Device	Gas Devices	Light Devices	Heavy Device	Gas Devices				
Flanges	504	472	54	0.000017	0.000017	0.00009	75.05568	70.29024	42.5736	187.91952
Loading Arm Valve	12	12	0	0.000095	0.000095	0.000029	9.9864	9.9864	0	19.9728
Other	0	0	0	0.000287	0.000287	0.000265	0	0	0	0
Pumps	5	5	0	0.00117	0.00117	0.000143	51.246	51.246	0	102.492
Valves	135	126	15	0.000095	0.000095	0.000029	112.347	104.8572	3.8106	221.0148
						Total	248.63508	236.37984	46.3842	**531.399**

HAP Speciation

HAP	Light Service Liquid Weight Percent	Heavy Service Liquid Weight Percent	Vapor Weight Percent (for gas service)	lb/year	tpy	lb/hr
hexane	1.00	0.0001	0.43	2.685209	0.001342604	0.000306531
benzene	1.80	0.001	0.47	4.696042	0.002348021	0.000536078
2,2,4 TMP	4.00	0	0.53	10.192019	0.005096009	0.001163472
toluene	7.00	0.032	0.52	17.719350	0.008859675	0.002022757
ethylbenzene	1.40	0.013	0.03	3.526598	0.001763299	0.00040258
xylenes	7.00	0.29	0.14	18.155204	0.009077602	0.002072512
naphthalene	0.42	0.07565	0.00	1.210761	0.00060538	0.000138215
cumene	0.50	0	0.00	1.243175	0.000621588	0.000141915
				Total	0.029092591	tpy

MONTHLY IFRT TANK VOC AND HAP ESTIMATIONS

INPUT DATA	Symbol		Units
Tank No.	**17414**		
Nearest US Location		**Bridgeport, CT**	
Absolute Pressure	P_A	14.69	psi
Product Information			
Average organic liquid density	W_L	**5.60**	lb/gal
Average Reid Vapor Pressure	RVP	**13.00**	
Product factor; 0.4 for crude oils or 1 for other organic liquids	K_c	**1.00**	
Tank design data		**0**	
Shell height	Hs	**36.00**	ft
Diameter	D	**117.00**	ft
Throughput	Q	**3,379,082**	gal/month
Maximum Filling Height (use Hs-1 if unknown)	H_{LX}	**35.00**	ft
Minimum Filling Height (use 1 if unknown)	H_{LN}	**1.00**	ft
Liquid height (assume 1/2 Hs)	H_L	**18.00**	ft
Tank Construction (pick from drop down list)		**Riveted**	
Tank Color (pick from drop down list)		**White**	
Tank Shell Condition (pick from drop down list)		**Average**	
Tank Interior Condition (pick from drop down list)		**Light Rust**	
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**	
Internal floating roof design data			
Rim Seal Type: **Vapor-mounted seal**		**Rim-mounted secondary**	
Rim Seal Fit (Average or Tight fitting)		**Average**	
Number of fixed roof support columns	Nc	**16.00**	NA
Effective column diameter (1.1 for 9x7 in. built up columns; 0.7 for 8 in. pipe columns; 1.0	Fc	**1.00**	ft
Deck seam loss per unit seam length factor; 0.0 or 0.14	KD	**0.14**	lb-mole/ft-yr
Zero wind speed LR factor; see Table 7.1-8	KRa	**2.2**	lb-mole/ft-yr
Wind speed dependent LR factor; see Table 7.1-8	KRb	**0.0**	lb-mole/(mph)^n/ft*yr
Average ambient wind speed at tank site; for IFR use Zero	v	**0.0**	mph
Seal-related wind speed exponent; see Table 7.1-8	n	**4.3**	NA
Shell clingage factor; see Table 7.1-10	Cs	**0.0015**	bbl/1,000 ft^2
Deck Design Data		**Bolted**	
Deck Seam (choose Welded or Bolted)		**Continuous sheet**	
Select Deck Construction Type		**5**	
If bolted continuous sheet or panel, enter width		**0**	
If bolted panel, also enter length		**0.20**	ft/ft^2
Deck seam length factor; Length of Seam / Area of Deck	SD		
		Loss Factor	
Deck Fitting Data	**Qty**	**Kf (Table 7.1-12)**	
Access Hatch — Bolted cover, gasketed	**2**	1.6	
Column Well — Built-up column, gasketed sliding cover	**16**	33.0	
Unslotted Guidepole and Well — Gasketed sliding cover w/pole sleeve	**0**	8.6	
Slotted guidepole/sample well — Gasketed sliding cover, with pole sleeve	**0**	11.0	
Gauge-float well (automatic ga — Bolted cover, gasketed	**0**	2.8	
Gauge-hatch/sample port — Slit fabric seal, 10% open area	**2**	12.0	
Vacuum Breaker — Weighted mechanical actuation, gasketed	**1**	6.2	
Deck drain — Stub drain (1-inch diameter)	**110**	1.2	
Legs (IFR type) — IFR type, Adjustable	**0**	7.9	
Rim Vent — Weighted mechanical actuation, gasketed	**0**	0.7	
Ladder — Sliding cover, gasketed	**1**	56.0	
Ladder / Guide-Pole Combinat — Ladder sleeve, gasketed sliding cover	**0**	60.0	
Monthly deck fitting loss factor	F_F	62.45	per month

[1] Deck legs determined from AP-42 Table 7.1-15. Stub drains determined from AP-42 7.1-15. All other fitting data taken from assumptions provided in Global IFR roof summary table

MONTH January

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**677.96**	lb/month
		0.34	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	80,454.34	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	560.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**490.50**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	496.90	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	484.10	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	490.92	
Average Daily Liquid Surface Temperature Eq. 2-6			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**491.35**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.713	psia
Vapor pressure function Eq. 2-4:			
$P^* = P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.096	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**124.39**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**6.19**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^* M_v K_c$)	**LF**	**362.15**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c$)/12 months	**LD**	**185.23**	lb/month
HAPS Speciation			
Product - select from list		Gasoline	
Total HAP Monthly Emissions		10.422	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$	L_{Ti}		
hexane		2.0389	lb/month
benzene		2.1790	lb/month
TMP		2.5113	lb/month
toluene		2.4895	lb/month
ethylbenzene		0.2011	lb/month
xylenes		0.9278	lb/month
naphthalene		0.0263	lb/month
cumene		0.0483	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_i M_i / M_V$

	M_i	M_V	Z_{Vi}
hexane	86.18	60	0.00294
benzene	78.11	60	0.00308
2,2,4 TMP	114.23	60	0.00337
toluene	92.14	60	0.00306
ethylbenzene	106.17	60	0.00017
xylenes	106.17	60	0.00074
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.009680	4.713	0.00205
benzene	0.011169	4.713	0.00237
2,2,4 TMP	0.008362	4.713	0.00177
toluene	0.009416	4.713	0.00200
ethylbenzene	0.000455	4.713	0.00010
xylenes	0.001965	4.713	0.00042
naphthalene	0.000002	4.713	0.00000
cumene	0.000061	4.713	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	0.8690
benzene	6.906	1211	220.79	0.5049
2,2,4 TMP	6.812	1257.8	220.74	0.2487
toluene	7.017	1377.6	222.64	0.1291
ethylbenzene	6.95	1419.3	212.61	0.0359
xylenes	7.009	1462.3	215.11	0.0310
naphthalene	7.146	1831.6	211.82	0.0006
cumene	6.929	1455.8	207.2	0.0153

MONTH February

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**714.60**	lb/month
		0.36	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	80,454.34	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	847.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**492.20**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	498.80	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	485.60	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	492.84	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**493.49**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.922	psia
Vapor pressure function Eq. 2-4:			
$P^* = P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.102	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**131.17**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**6.19**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^* M_v K_c$)	**LF**	**381.90**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c$)/12 months	**LD**	**195.33**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		11.172	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$	L_{Ti}		
hexane		2.1886	lb/month
benzene		2.3450	lb/month
TMP		2.6996	lb/month
toluene		2.6725	lb/month
ethylbenzene		0.2125	lb/month
xylenes		0.9774	lb/month
naphthalene		0.0263	lb/month
cumene		0.0502	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_i M_i / M_V$

	M_i	M_V	Z_{Vi}
hexane	86.18	60	0.00300
benzene	78.11	60	0.00315
2,2,4 TMP	114.23	60	0.00346
toluene	92.14	60	0.00316
ethylbenzene	106.17	60	0.00018
xylenes	106.17	60	0.00077
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.010314	4.922	0.00210
benzene	0.011951	4.922	0.00243
2,2,4 TMP	0.008971	4.922	0.00182
toluene	0.010156	4.922	0.00206
ethylbenzene	0.000495	4.922	0.00010
xylenes	0.002141	4.922	0.00044
naphthalene	0.000002	4.922	0.00000
cumene	0.000067	4.922	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	0.9259
benzene	6.906	1211	220.79	0.5402
2,2,4 TMP	6.812	1257.8	220.74	0.2669
toluene	7.017	1377.6	222.64	0.1393
ethylbenzene	6.95	1419.3	212.61	0.0391
xylenes	7.009	1462.3	215.11	0.0338
naphthalene	7.146	1831.6	211.82	0.0007
cumene	6.929	1455.8	207.2	0.0167

MONTH March

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**853.66**	lb/month
		0.43	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	80,454.34	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	1156.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**498.90**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	506.00	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	491.80	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	499.77	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**500.66**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.681	psia
Vapor pressure function Eq. 2-4:			
$P^* = P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.122	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**156.92**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**6.19**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^* M_v K_c$)	**LF**	**456.87**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c$)/12 months	**LD**	**233.67**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		14.158	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$	L_{Ti}		
hexane		2.7757	lb/month
benzene		3.0016	lb/month
2,2,4 TMP		3.4481	lb/month
toluene		3.4083	lb/month
ethylbenzene		0.2592	lb/month
xylenes		1.1809	lb/month
naphthalene		0.0267	lb/month
cumene		0.0579	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_i M_i / M_V$

	M_i	M_V	Z_{Vi}
hexane	86.18	60	0.00320
benzene	78.11	60	0.00341
2,2,4 TMP	114.23	60	0.00378
toluene	92.14	60	0.00351
ethylbenzene	106.17	60	0.00020
xylenes	106.17	60	0.00088
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.012697	5.681	0.00224
benzene	0.014919	5.681	0.00263
2,2,4 TMP	0.011297	5.681	0.00199
toluene	0.013018	5.681	0.00229
ethylbenzene	0.000655	5.681	0.00012
xylenes	0.002839	5.681	0.00050
naphthalene	0.000003	5.681	0.00000
cumene	0.000090	5.681	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.1398
benzene	6.906	1211	220.79	0.6744
2,2,4 TMP	6.812	1257.8	220.74	0.3360
toluene	7.017	1377.6	222.64	0.1785
ethylbenzene	6.95	1419.3	212.61	0.0518
xylenes	7.009	1462.3	215.11	0.0449
naphthalene	7.146	1831.6	211.82	0.0010
cumene	6.929	1455.8	207.2	0.0226

MONTH April

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**984.77**	lb/month
		0.49	tons/month
Product Type		**Gasoline - RVP 13.5**	
Monthly Throughput (only change if actual is known)	Q_{month}	80,454.34	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	°R
Daily total solar insolation on a horizontal surface	**I**	1490.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**509.15**	°R
Average daily maximum ambient temperature, Table 7.1	T_{AX}	516.80	°R
Average daily minimum ambient temperature, Table 7.1	T_{AN}	501.50	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	510.27	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**511.42**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.201	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.136	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**181.20**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_L)/D]*[1+(N_cF_c/D)]$	L_W	**6.19**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**527.55**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	LD	**269.83**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		18.897	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{Ti}	
hexane		3.6600	lb/month
benzene		4.0201	lb/month
2,2,4 TMP		4.6301	lb/month
toluene		4.6125	lb/month
ethylbenzene		0.3402	lb/month
xylenes		1.5351	lb/month
naphthalene		0.0273	lb/month
cumene		0.0718	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_V	Z_{Vi}
hexane	86.18	62	0.00368
benzene	78.11	62	0.00399
2,2,4 TMP	114.23	62	0.00448
toluene	92.14	62	0.00427
ethylbenzene	106.17	62	0.00026
xylenes	106.17	62	0.00113
naphthalene	128.17	62	0.00000
cumene	120.19	62	0.00004

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(X_i)$	P_{VA}	y_i
hexane	0.016404	6.201	0.00265
benzene	0.019660	6.201	0.00317
2,2,4 TMP	0.015073	6.201	0.00243
toluene	0.017820	6.201	0.00287
ethylbenzene	0.000938	6.201	0.00015
xylenes	0.004077	6.201	0.00066
naphthalene	0.000005	6.201	0.00000
cumene	0.000134	6.201	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.5366
benzene	6.906	1211	220.79	0.9273
2,2,4 TMP	6.812	1257.8	220.74	0.4679
toluene	7.017	1377.6	222.64	0.2550
ethylbenzene	6.95	1419.3	212.61	0.0773
xylenes	7.009	1462.3	215.11	0.0672
naphthalene	7.146	1831.6	211.82	0.0016
cumene	6.929	1455.8	207.2	0.0349

MONTH May

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**775.47**	lb/month
		0.39	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is known)	Q_{month}	80,454.34	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1750.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**518.65**	°R
Average daily maximum ambient temperature, Tab	T_{AX}	526.50	°R
Average daily minimum ambient temperature, Tab	T_{AN}	510.80	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	519.96	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**521.32**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.763	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.098	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**142.45**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_L)/D]*[1+(N_cF_c/D)]$	L_W	**6.19**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**414.72**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	LD	**212.11**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		23.265	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{Ti}	
hexane		4.4240	lb/month
benzene		4.9320	lb/month
2,2,4 TMP		5.7117	lb/month
toluene		5.7626	lb/month
ethylbenzene		0.4227	lb/month
xylenes		1.8976	lb/month
naphthalene		0.0280	lb/month
cumene		0.0866	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_V	Z_{Vi}
hexane	86.18	68	0.00567
benzene	78.11	68	0.00627
2,2,4 TMP	114.23	68	0.00710
toluene	92.14	68	0.00693
ethylbenzene	106.17	68	0.00044
xylenes	106.17	68	0.00190
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00007

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(X_i)$	P_{VA}	y_i
hexane	0.021310	4.763	0.00447
benzene	0.025982	4.763	0.00546
2,2,4 TMP	0.020138	4.763	0.00423
toluene	0.024350	4.763	0.00511
ethylbenzene	0.001333	4.763	0.00028
xylenes	0.005806	4.763	0.00122
naphthalene	0.000008	4.763	0.00000
cumene	0.000195	4.763	0.00004

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.9962
benzene	6.906	1211	220.79	1.2255
2,2,4 TMP	6.812	1257.8	220.74	0.6251
toluene	7.017	1377.6	222.64	0.3484
ethylbenzene	6.95	1419.3	212.61	0.1098
xylenes	7.009	1462.3	215.11	0.0957
naphthalene	7.146	1831.6	211.82	0.0026
cumene	6.929	1455.8	207.2	0.0509

MONTH June

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**986.47**	lb/month
		0.49	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is known)	Q_{month}	80,454.34	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1862.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**528.60**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	536.10	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	521.10	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	530.00	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**531.44**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.783	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.124	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**181.52**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_L)/D]*[1+(N_cF_c/D)]$	L_W	**6.19**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**528.47**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	LD	**270.29**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		31.927	lb/month
Individual HAP Monthly Emission Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{Ti}	
hexane		5.9722	lb/month
benzene		6.7518	lb/month
2,2,4 TMP		7.8549	lb/month
toluene		8.0186	lb/month
ethylbenzene		0.5830	lb/month
xylenes		2.6021	lb/month
naphthalene		0.0295	lb/month
cumene		0.1152	lb/month

Vapor Weight Concentrations Eq. $Z_{Vi} = y_iM_i / M_v$

	M_i	M_V	Z_{Vi}
hexane	86.18	68	0.00603
benzene	78.11	68	0.00677
2,2,4 TMP	114.23	68	0.00776
toluene	92.14	68	0.00774
ethylbenzene	106.17	68	0.00051
xylenes	106.17	68	0.00221
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(X_i)$	P_{VA}	y_i
hexane	0.027513	5.783	0.00476
benzene	0.034106	5.783	0.00590
2,2,4 TMP	0.026717	5.783	0.00462
toluene	0.033027	5.783	0.00571
ethylbenzene	0.001875	5.783	0.00032
xylenes	0.008195	5.783	0.00142
naphthalene	0.000012	5.783	0.00000
cumene	0.000281	5.783	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.5773
benzene	6.906	1211	220.79	1.6087
2,2,4 TMP	6.812	1257.8	220.74	0.8293
toluene	7.017	1377.6	222.64	0.4725
ethylbenzene	6.95	1419.3	212.61	0.1546
xylenes	7.009	1462.3	215.11	0.1351
naphthalene	7.146	1831.6	211.82	0.0040
cumene	6.929	1455.8	207.2	0.0735

MONTH July

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,123.20**	lb/month
		0.56	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is known)	Q_{month}	80,454.34	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1904.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**533.90**	°R
Average daily maximum ambient temperature, T	T_{AX}	541.10	°R
Average daily minimum ambient temperature, T	T_{AN}	526.70	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	535.33	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**536.80**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.391	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.142	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**206.83**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_L)/D]*[1+(N_cF_c/D)]$	L_W	**6.19**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	**LF**	**602.18**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	**LD**	**307.99**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		37.837	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} =Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$		L_{TI}	
hexane		7.0073	lb/month
benzene		7.9806	lb/month
2,2,4 TMP		9.3118	lb/month
toluene		9.5744	lb/month
ethylbenzene		0.6961	lb/month
xylenes		3.1003	lb/month
naphthalene		0.0306	lb/month
cumene		0.1358	lb/month

Vapor Weight Concentrations Eq. 40-3 $Z_{VI} = y_iM_i / M_v$

	M_i	M_V	Z_{VI}
hexane	86.18	68	0.00622
benzene	78.11	68	0.00704
2,2,4 TMP	114.23	68	0.00811
toluene	92.14	68	0.00818
ethylbenzene	106.17	68	0.00055
xylenes	106.17	68	0.00239
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
hexane	0.031357	6.391	0.00491
benzene	0.039198	6.391	0.00613
2,2,4 TMP	0.030873	6.391	0.00483
toluene	0.038599	6.391	0.00604
ethylbenzene	0.002233	6.391	0.00035
xylenes	0.009773	6.391	0.00153
naphthalene	0.000015	6.391	0.00000
cumene	0.000339	6.391	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAI}
hexane	6.878	1171.5	224.37	2.9373
benzene	6.906	1211	220.79	1.8489
2,2,4 TMP	6.812	1257.8	220.74	0.9583
toluene	7.017	1377.6	222.64	0.5523
ethylbenzene	6.95	1419.3	212.61	0.1841
xylenes	7.009	1462.3	215.11	0.1611
naphthalene	7.146	1831.6	211.82	0.0050
cumene	6.929	1455.8	207.2	0.0887

MONTH August

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,095.26**	lb/month
		0.55	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is know	Q_{month}	80,454.34	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1685.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**533.20**	°R
Average daily maximum ambient tempe	T_{AX}	540.10	°R
Average daily minimum ambient temper	T_{AN}	526.30	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	534.46	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**535.77**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.270	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.138	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ month	L_R	**201.66**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_L)/D]*[1+(N_cF_c/D)]$	L_W	**6.19**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	**LF**	**587.12**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	**LD**	**300.29**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		36.613	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} =Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$		L_{TI}	
hexane		6.7941	lb/month
benzene		7.7268	lb/month
2,2,4 TMP		9.0104	lb/month
toluene		9.2513	lb/month
ethylbenzene		0.6725	lb/month
xylenes		2.9961	lb/month
naphthalene		0.0304	lb/month
cumene		0.1315	lb/month

Vapor Weight Concentrations Eq. 40-3 $Z_{VI} = y_iM_i / M_v$

	M_i	M_V	Z_{VI}
hexane	86.18	68	0.00618
benzene	78.11	68	0.00699
2,2,4 TMP	114.23	68	0.00805
toluene	92.14	68	0.00810
ethylbenzene	106.17	68	0.00054
xylenes	106.17	68	0.00235
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
hexane	0.030584	6.270	0.00488
benzene	0.038170	6.270	0.00609
2,2,4 TMP	0.030033	6.270	0.00479
toluene	0.037467	6.270	0.00598
ethylbenzene	0.002160	6.270	0.00034
xylenes	0.009450	6.270	0.00151
naphthalene	0.000014	6.270	0.00000
cumene	0.000327	6.270	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAI}
hexane	6.878	1171.5	224.37	2.8649
benzene	6.906	1211	220.79	1.8004
2,2,4 TMP	6.812	1257.8	220.74	0.9322
toluene	7.017	1377.6	222.64	0.5361
ethylbenzene	6.95	1419.3	212.61	0.1781
xylenes	7.009	1462.3	215.11	0.1558
naphthalene	7.146	1831.6	211.82	0.0048
cumene	6.929	1455.8	207.2	0.0856

MONTH eptember

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,523.78**	lb/month
		0.76	tons/month
Product Type		**Gasoline - RVP 13.5**	
Monthly Throughput (only change if actual is known)	Q_{month}	80,454.34	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	°R
Daily total solar insolation on a horizontal surface	**I**	1320.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**526.15**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	533.40	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	518.90	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	527.14	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**528.16**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	8.462	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.211	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**281.01**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_L)/D]*[1+(N_cF_c/D)]$	L_W	**6.19**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	**LF**	**818.14**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	**LD**	**418.45**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		33.737	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} =Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$		L_{TI}	
hexane		6.3841	lb/month
benzene		7.1774	lb/month
2,2,4 TMP		8.3151	lb/month
toluene		8.4210	lb/month
ethylbenzene		0.6033	lb/month
xylenes		2.6885	lb/month
naphthalene		0.0295	lb/month
cumene		0.1180	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{VI} = y_iM_i / M_v$

	M_i	M_V	Z_{VI}
hexane	86.18	62	0.00417
benzene	78.11	62	0.00466
2,2,4 TMP	114.23	62	0.00532
toluene	92.14	62	0.00526
ethylbenzene	106.17	62	0.00034
xylenes	106.17	62	0.00149
naphthalene	128.17	62	0.00000
cumene	120.19	62	0.00006

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
hexane	0.025362	8.462	0.00300
benzene	0.031274	8.462	0.00370
2,2,4 TMP	0.024416	8.462	0.00289
toluene	0.029970	8.462	0.00354
ethylbenzene	0.001682	8.462	0.00020
xylenes	0.007343	8.462	0.00087
naphthalene	0.000010	8.462	0.00000
cumene	0.000250	8.462	0.00003

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAI}
hexane	6.878	1171.5	224.37	2.3757
benzene	6.906	1211	220.79	1.4751
2,2,4 TMP	6.812	1257.8	220.74	0.7579
toluene	7.017	1377.6	222.64	0.4288
ethylbenzene	6.95	1419.3	212.61	0.1387
xylenes	7.009	1462.3	215.11	0.1211
naphthalene	7.146	1831.6	211.82	0.0035
cumene	6.929	1455.8	207.2	0.0654

MONTH October

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,111.10**	lb/month
		0.56	tons/month
Product Type		**Gasoline - RVP 13.5**	
Monthly Throughput (only change if actual is known)	Q_{month}	80,454.34	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	°R
Daily total solar insolation on a horizontal surface	**I**	948.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**514.75**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	522.40	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	507.10	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	515.46	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**516.20**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.790	psia
Vapor pressure function Eq. 2-4:			
$P^* = P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.154	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**204.59**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**6.19**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^* M_v K_c$)	LF	**595.66**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c$)/12 months	LD	**304.66**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		22.203	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{Ti}	
hexane		4.2778	lb/month
benzene		4.7297	lb/month
2,2,4 TMP		5.4533	lb/month
toluene		5.4524	lb/month
ethylbenzene		0.3970	lb/month
xylenes		1.7835	lb/month
naphthalene		0.0277	lb/month
cumene		0.0816	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_i M_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	62	0.00382
benzene	78.11	62	0.00418
2,2,4 TMP	114.23	62	0.00471
toluene	92.14	62	0.00454
ethylbenzene	106.17	62	0.00028
xylenes	106.17	62	0.00122
naphthalene	128.17	62	0.00000
cumene	120.19	62	0.00005

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.018638	6.790	0.00275
benzene	0.022527	6.790	0.00332
2,2,4 TMP	0.017363	6.790	0.00256
toluene	0.020754	6.790	0.00306
ethylbenzene	0.001114	6.790	0.00016
xylenes	0.004845	6.790	0.00071
naphthalene	0.000006	6.790	0.00000
cumene	0.000161	6.790	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.7459
benzene	6.906	1211	220.79	1.0625
2,2,4 TMP	6.812	1257.8	220.74	0.5390
toluene	7.017	1377.6	222.64	0.2969
ethylbenzene	6.95	1419.3	212.61	0.0918
xylenes	7.009	1462.3	215.11	0.0799
naphthalene	7.146	1831.6	211.82	0.0020
cumene	6.929	1455.8	207.2	0.0420

MONTH November

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**983.70**	lb/month
		0.49	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	80,454.34	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	621.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**505.35**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	512.10	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	498.60	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	505.82	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**506.30**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.340	psia
Vapor pressure function Eq. 2-4:			
$P^* = P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.140	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**181.00**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**6.19**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^* M_v K_c$)	LF	**526.98**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c$)/12 months	LD	**269.53**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		17.125	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{Ti}	
hexane		3.3480	lb/month
benzene		3.6481	lb/month
2,2,4 TMP		4.1899	lb/month
toluene		4.1478	lb/month
ethylbenzene		0.3074	lb/month
xylenes		1.3909	lb/month
naphthalene		0.0270	lb/month
cumene		0.0660	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_i M_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	60	0.00336
benzene	78.11	60	0.00362
2,2,4 TMP	114.23	60	0.00403
toluene	92.14	60	0.00380
ethylbenzene	106.17	60	0.00023
xylenes	106.17	60	0.00098
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00004

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.014875	6.340	0.00235
benzene	0.017664	6.340	0.00279
2,2,4 TMP	0.013463	6.340	0.00212
toluene	0.015726	6.340	0.00248
ethylbenzene	0.000811	6.340	0.00013
xylenes	0.003518	6.340	0.00055
naphthalene	0.000004	6.340	0.00000
cumene	0.000114	6.340	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.3354
benzene	6.906	1211	220.79	0.7984
2,2,4 TMP	6.812	1257.8	220.74	0.4005
toluene	7.017	1377.6	222.64	0.2156
ethylbenzene	6.95	1419.3	212.61	0.0641
xylenes	7.009	1462.3	215.11	0.0556
naphthalene	7.146	1831.6	211.82	0.0013
cumene	6.929	1455.8	207.2	0.0285

MONTH December

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**765.24**	lb/month
		0.38	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	80,454.34	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	501.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**495.50**	°R
Average daily maximum ambient temperature, Table 7.1	T_{AX}	501.80	°R
Average daily minimum ambient temperature, Table 7.1	T_{AN}	489.20	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	495.88	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**496.26**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.205	psia
Vapor pressure function Eq. 2-4:			
$P^* = P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.109	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**140.55**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**6.19**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^* M_v K_c$)	LF	**409.21**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c$)/12 months	LD	**209.29**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		12.235	lb/month
Individual HAP Monthly Em Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{Ti}	
hexane		2.3991	lb/month
benzene		2.5795	lb/month
TMP		2.9662	lb/month
toluene		2.9333	lb/month
ethylbenzene		0.2289	lb/month
xylenes		1.0488	lb/month
naphthalene		0.0264	lb/month
cumene		0.0529	lb/month

Vapor Weight Concentratio $Z_{Vi} = y_i M_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	60	0.00308
benzene	78.11	60	0.00325
2,2,4 TMP	114.23	60	0.00358
toluene	92.14	60	0.00329
ethylbenzene	106.17	60	0.00019
xylenes	106.17	60	0.00081
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.011186	5.205	0.00215
benzene	0.013033	5.205	0.00250
2,2,4 TMP	0.009817	5.205	0.00189
toluene	0.011191	5.205	0.00215
ethylbenzene	0.000553	5.205	0.00011
xylenes	0.002391	5.205	0.00046
naphthalene	0.000002	5.205	0.00000
cumene	0.000075	5.205	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.0042
benzene	6.906	1211	220.79	0.5891
2,2,4 TMP	6.812	1257.8	220.74	0.2920
toluene	7.017	1377.6	222.64	0.1534
ethylbenzene	6.95	1419.3	212.61	0.0436
xylenes	7.009	1462.3	215.11	0.0378
naphthalene	7.146	1831.6	211.82	0.0008
cumene	6.929	1455.8	207.2	0.0188

MONTHLY IFRT TANK VOC AND HAP ESTIMATIONS

INPUT DATA		Symbol		Units
Tank No.	**30531**			
Nearest US Location			**Bridgeport, CT**	
Absolute Pressure		P_A	14.69	psi
Product Information				
Average organic liquid density		W_L	**5.60**	lb/gal
Average Reid Vapor Pressure		RVP	**13.00**	
Product factor; 0.4 for crude oils or 1 for other organic liquids		K_C	**1.00**	
Tank design data			**0**	
Shell height		Hs	**48.00**	ft
Diameter		D	**70.00**	ft
Throughput		Q	**1,629,295**	gal/month
Maximum Filling Height (use Hs-1 if unknown)		H_{LX}	**47.00**	ft
Minimum Filling Height (use 1 if unknown)		H_{LN}	**1.00**	ft
Liquid height (assume 1/2 Hs)		H_L	**24.00**	ft
Tank Construction (pick from drop down list)			**Welded**	
Tank Color (pick from drop down list)			**White**	
Tank Shell Condition (pick from drop down list)			**Average**	
Tank Interior Condition (pick from drop down list)			**Light Rust**	
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**	
Internal floating roof design data				
Rim Seal Type:			**Mechanical-shoe seal | Shoe-mounted secondary**	
Rim Seal Fit (Average or Tight fitting)			**Average**	
Number of fixed roof support columns		Nc	**0.00**	NA
Effective column diameter (1.1 for 9x7 in. built up columns; 0.7 for 8 in. pipe columns; 1.0		Fc	**1.00**	ft
Deck seam loss per unit seam length factor; 0.0 or 0.14		KD	**0.00**	lb-mole/ft-yr
Zero wind speed LR factor; see Table 7.1-8		KRa	**1.6**	lb-mole/ft-yr
Wind speed dependent LR factor; see Table 7.1-8		KRb	**0.3**	lb-mole/(mph)^{n}ft*yr
Average ambient wind speed at tank site; for IFR use Zero		v	**0.0**	mph
Seal-related wind speed exponent; see Table 7.1-8		n	**1.6**	NA
Shell clingage factor; see Table 7.1-10		Cs	**0.0015**	bbl/1,000 ft^2
Deck Design Data				
Deck Seam (choose Welded or Bolted)			**Welded**	
Deck construction type not required for welded seams			**NA**	
If bolted continuous sheet or panel, enter width			**0**	
If bolted panel, also enter length			**0**	
Deck seam length factor; Length of Seam / Area of Deck		SD	**NA**	ft/ft^2
			Loss Factor	
Deck Fitting Data		**Qty**	**Kf (Table 7.1-12)**	
Access Hatch	Bolted cover, gasketed	**5**	1.6	
Column Well	Built-up column, gasketed sliding cover	**0**	33.0	
Unslotted Guidepole and Well	Gasketed sliding cover w/pole sleeve	**0**	8.6	
Slotted guidepole/sample well	Gasketed sliding cover, with pole sleeve	**0**	11.0	
Gauge-float well (automatic ga	Bolted cover, gasketed	**0**	2.8	
Gauge-hatch/sample port	Slit fabric seal, 10% open area	**2**	12.0	
Vacuum Breaker	Weighted mechanical actuation, gasketed	**1**	6.2	
Deck drain	Stub drain (1-inch diameter)	**0**	1.2	
Legs (IFR type)	IFR type, Adjustable	**17**	7.9	
Rim Vent	Weighted mechanical actuation, gasketed	**0**	0.7	
Ladder	Sliding cover, gasketed	**0**	56.0	
Ladder / Guide-Pole Combinat	Ladder sleeve, gasketed sliding cover	**0**	60.0	
	Monthly deck fitting loss factor	F_F	14.38	per month

[1] Deck legs determined from AP-42 Table 7.1-15. Stub drains determined from AP-42 7.1-15. All other fitting data taken from assumptions provided in Global IFR roof summary table

MONTH January

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**141.88**	lb/month
		0.07	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	38,792.74	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	560.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**490.50**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	496.90	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	484.10	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	490.92	
Average Daily Liquid Surface Temperature Eq. 2-6			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**491.35**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.713	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.096	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**54.12**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**4.39**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	LF	**83.36**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c)/12$ months	LD	**0.00**	lb/month
HAPS Speciation			
Product - select from list		Gasoline	
Total HAP Monthly Emissions		2.855	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{TI}	
hexane		0.4485	lb/month
benzene		0.5022	lb/month
TMP		0.6389	lb/month
toluene		0.7281	lb/month
ethylbenzene		0.0849	lb/month
xylenes		0.4085	lb/month
naphthalene		0.0183	lb/month
cumene		0.0255	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_V$

	M_i	M_V	Z_{Vi}
hexane	86.18	60	0.00294
benzene	78.11	60	0.00308
2,2,4 TMP	114.23	60	0.00337
toluene	92.14	60	0.00306
ethylbenzene	106.17	60	0.00017
xylenes	106.17	60	0.00074
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.009680	4.713	0.00205
benzene	0.011169	4.713	0.00237
2,2,4 TMP	0.008362	4.713	0.00177
toluene	0.009416	4.713	0.00200
ethylbenzene	0.000455	4.713	0.00010
xylenes	0.001965	4.713	0.00042
naphthalene	0.000002	4.713	0.00000
cumene	0.000061	4.713	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	0.8690
benzene	6.906	1211	220.79	0.5049
2,2,4 TMP	6.812	1257.8	220.74	0.2487
toluene	7.017	1377.6	222.64	0.1291
ethylbenzene	6.95	1419.3	212.61	0.0359
xylenes	7.009	1462.3	215.11	0.0310
naphthalene	7.146	1831.6	211.82	0.0006
cumene	6.929	1455.8	207.2	0.0153

MONTH February

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**149.37**	lb/month
		0.07	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	38,792.74	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	847.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**492.20**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	498.80	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	485.60	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	492.84	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**493.49**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.922	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.102	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**57.08**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**4.39**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	LF	**87.91**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c)/12$ months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		3.008	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{TI}	
hexane		0.4791	lb/month
benzene		0.5361	lb/month
TMP		0.6774	lb/month
toluene		0.7655	lb/month
ethylbenzene		0.0872	lb/month
xylenes		0.4186	lb/month
naphthalene		0.0183	lb/month
cumene		0.0259	lb/month

Vapor Weight Concentrations Eq. 40- $Z_{Vi} = y_iM_i / M_V$

	M_i	M_V	Z_{Vi}
hexane	86.18	60	0.00300
benzene	78.11	60	0.00315
2,2,4 TMP	114.23	60	0.00346
toluene	92.14	60	0.00316
ethylbenzene	106.17	60	0.00018
xylenes	106.17	60	0.00077
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.010314	4.922	0.00210
benzene	0.011951	4.922	0.00243
2,2,4 TMP	0.008971	4.922	0.00182
toluene	0.010156	4.922	0.00206
ethylbenzene	0.000495	4.922	0.00010
xylenes	0.002141	4.922	0.00044
naphthalene	0.000002	4.922	0.00000
cumene	0.000067	4.922	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	0.9259
benzene	6.906	1211	220.79	0.5402
2,2,4 TMP	6.812	1257.8	220.74	0.2669
toluene	7.017	1377.6	222.64	0.1393
ethylbenzene	6.95	1419.3	212.61	0.0391
xylenes	7.009	1462.3	215.11	0.0338
naphthalene	7.146	1831.6	211.82	0.0007
cumene	6.929	1455.8	207.2	0.0167

MONTH March

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**177.83**	lb/month
		0.09	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	38,792.74	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	1156.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**498.90**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	506.00	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	491.80	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	499.77	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**500.66**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.681	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.122	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**68.28**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**4.39**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	LF	**105.16**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c)/12$ months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		3.619	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{TI}	
hexane		0.5993	lb/month
benzene		0.6705	lb/month
2,2,4 TMP		0.8306	lb/month
toluene		0.9161	lb/month
ethylbenzene		0.0968	lb/month
xylenes		0.4603	lb/month
naphthalene		0.0184	lb/month
cumene		0.0275	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_V$

	M_i	M_V	Z_{Vi}
hexane	86.18	60	0.00320
benzene	78.11	60	0.00341
2,2,4 TMP	114.23	60	0.00378
toluene	92.14	60	0.00351
ethylbenzene	106.17	60	0.00020
xylenes	106.17	60	0.00088
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.012697	5.681	0.00224
benzene	0.014919	5.681	0.00263
2,2,4 TMP	0.011297	5.681	0.00199
toluene	0.013018	5.681	0.00229
ethylbenzene	0.000655	5.681	0.00012
xylenes	0.002839	5.681	0.00050
naphthalene	0.000003	5.681	0.00000
cumene	0.000090	5.681	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.1398
benzene	6.906	1211	220.79	0.6744
2,2,4 TMP	6.812	1257.8	220.74	0.3360
toluene	7.017	1377.6	222.64	0.1785
ethylbenzene	6.95	1419.3	212.61	0.0518
xylenes	7.009	1462.3	215.11	0.0449
naphthalene	7.146	1831.6	211.82	0.0010
cumene	6.929	1455.8	207.2	0.0226

MONTH April

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**204.67**	lb/month
		0.10	tons/month
Product Type		Gasoline - RVP 13.5	
Monthly Throughput (only change if actual is known)	Q_{month}	38,792.74	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	°R
Daily total solar insolation on a horizontal surface	**I**	1490.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**509.15**	°R
Average daily maximum ambient temperature, Table 7.1	T_{AX}	516.80	°R
Average daily minimum ambient temperature, Table 7.1	T_{AN}	501.50	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	510.27	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**511.42**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.201	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.136	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_C)/12$ months	L_R	**78.84**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_L)/D]*[1+(N_FC_F/D)]$	L_W	**4.39**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_C)$	LF	**121.43**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_v)/12$ months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		4.589	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		0.7803	lb/month
benzene		0.8790	lb/month
2,2,4 TMP		1.0725	lb/month
toluene		1.1626	lb/month
ethylbenzene		0.1134	lb/month
xylenes		0.5327	lb/month
naphthalene		0.0185	lb/month
cumene		0.0303	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	62	0.00368
benzene	78.11	62	0.00399
2,2,4 TMP	114.23	62	0.00448
toluene	92.14	62	0.00427
ethylbenzene	106.17	62	0.00026
xylenes	106.17	62	0.00113
naphthalene	128.17	62	0.00000
cumene	120.19	62	0.00004

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VA}(x_i)$	P_{VA}	y_i
hexane	0.016404	6.201	0.00265
benzene	0.019660	6.201	0.00317
2,2,4 TMP	0.015073	6.201	0.00243
toluene	0.017820	6.201	0.00287
ethylbenzene	0.000938	6.201	0.00015
xylenes	0.004077	6.201	0.00066
naphthalene	0.000005	6.201	0.00000
cumene	0.000134	6.201	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.5366
benzene	6.906	1211	220.79	0.9273
2,2,4 TMP	6.812	1257.8	220.74	0.4679
toluene	7.017	1377.6	222.64	0.2550
ethylbenzene	6.95	1419.3	212.61	0.0773
xylenes	7.009	1462.3	215.11	0.0672
naphthalene	7.146	1831.6	211.82	0.0016
cumene	6.929	1455.8	207.2	0.0349

MONTH May

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**161.83**	lb/month
		0.08	tons/month
Product Type		Gasoline - RVP 9	
Monthly Throughput (only change if actual is known)	Q_{month}	38,792.74	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1750.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**518.65**	°R
Average daily maximum ambient temperature, Tab	T_{AX}	526.50	°R
Average daily minimum ambient temperature, Tab	T_{AN}	510.80	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	519.96	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**521.32**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.763	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.098	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_C)/12$ months	L_R	**61.98**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_L)/D]*[1+(N_FC_F/D)]$	L_W	**4.39**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_C)$	LF	**95.46**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_v)/12$ months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		5.483	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		0.9367	lb/month
benzene		1.0656	lb/month
2,2,4 TMP		1.2939	lb/month
toluene		1.3980	lb/month
ethylbenzene		0.1302	lb/month
xylenes		0.6069	lb/month
naphthalene		0.0187	lb/month
cumene		0.0333	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	68	0.00567
benzene	78.11	68	0.00627
2,2,4 TMP	114.23	68	0.00710
toluene	92.14	68	0.00693
ethylbenzene	106.17	68	0.00044
xylenes	106.17	68	0.00190
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00007

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VA}(x_i)$	P_{VA}	y_i
hexane	0.021310	4.763	0.00447
benzene	0.025982	4.763	0.00546
2,2,4 TMP	0.020138	4.763	0.00423
toluene	0.024350	4.763	0.00511
ethylbenzene	0.001333	4.763	0.00028
xylenes	0.005806	4.763	0.00122
naphthalene	0.000008	4.763	0.00000
cumene	0.000195	4.763	0.00004

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.9962
benzene	6.906	1211	220.79	1.2255
2,2,4 TMP	6.812	1257.8	220.74	0.6251
toluene	7.017	1377.6	222.64	0.3484
ethylbenzene	6.95	1419.3	212.61	0.1098
xylenes	7.009	1462.3	215.11	0.0957
naphthalene	7.146	1831.6	211.82	0.0026
cumene	6.929	1455.8	207.2	0.0509

MONTH June

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**205.02**	lb/month
		0.10	tons/month
Product Type		Gasoline - RVP 9	
Monthly Throughput (only change if actual is known)	Q_{month}	38,792.74	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1862.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**528.60**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	536.10	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	521.10	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	530.00	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**531.44**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.783	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.124	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_C)/12$ months	L_R	**78.98**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_L)/D]*[1+(N_FC_F/D)]$	L_W	**4.39**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_C)$	LF	**121.64**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_v)/12$ months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		7.256	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		1.2535	lb/month
benzene		1.4380	lb/month
TMP		1.7325	lb/month
toluene		1.8597	lb/month
ethylbenzene		0.1630	lb/month
xylenes		0.7511	lb/month
naphthalene		0.0190	lb/month
cumene		0.0392	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	68	0.00603
benzene	78.11	68	0.00677
2,2,4 TMP	114.23	68	0.00776
toluene	92.14	68	0.00774
ethylbenzene	106.17	68	0.00051
xylenes	106.17	68	0.00221
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VA}(x_i)$	P_{VA}	y_i
hexane	0.027513	5.783	0.00476
benzene	0.034106	5.783	0.00590
2,2,4 TMP	0.026717	5.783	0.00462
toluene	0.033027	5.783	0.00571
ethylbenzene	0.001875	5.783	0.00032
xylenes	0.008195	5.783	0.00142
naphthalene	0.000012	5.783	0.00000
cumene	0.000281	5.783	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.5773
benzene	6.906	1211	220.79	1.6087
2,2,4 TMP	6.812	1257.8	220.74	0.8293
toluene	7.017	1377.6	222.64	0.4725
ethylbenzene	6.95	1419.3	212.61	0.1546
xylenes	7.009	1462.3	215.11	0.1351
naphthalene	7.146	1831.6	211.82	0.0040
cumene	6.929	1455.8	207.2	0.0735

MONTH July

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**233.00**	lb/month
		0.12	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is known)	Q_{month}	38,792.74	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1904.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**533.90**	°R
Average daily maximum ambient temperature, T	T_{AX}	541.10	°R
Average daily minimum ambient temperature, T	T_{AN}	526.70	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	535.33	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**536.80**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.391	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.142	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^2)DP^* M_v K_c)/12$ months	L_R	**90.00**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**4.39**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c$)	LF	**138.61**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c$)/12 months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		8.466	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		1.4654	lb/month
benzene		1.6895	lb/month
2,2,4 TMP		2.0307	lb/month
toluene		2.1781	lb/month
ethylbenzene		0.1862	lb/month
xylenes		0.8531	lb/month
naphthalene		0.0192	lb/month
cumene		0.0434	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_i M_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	68	0.00622
benzene	78.11	68	0.00704
2,2,4 TMP	114.23	68	0.00811
toluene	92.14	68	0.00818
ethylbenzene	106.17	68	0.00055
xylenes	106.17	68	0.00239
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.031357	6.391	0.00491
benzene	0.039198	6.391	0.00613
2,2,4 TMP	0.030873	6.391	0.00483
toluene	0.038599	6.391	0.00604
ethylbenzene	0.002233	6.391	0.00035
xylenes	0.009773	6.391	0.00153
naphthalene	0.000015	6.391	0.00000
cumene	0.000339	6.391	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.9373
benzene	6.906	1211	220.79	1.8489
2,2,4 TMP	6.812	1257.8	220.74	0.9583
toluene	7.017	1377.6	222.64	0.5523
ethylbenzene	6.95	1419.3	212.61	0.1841
xylenes	7.009	1462.3	215.11	0.1611
naphthalene	7.146	1831.6	211.82	0.0050
cumene	6.929	1455.8	207.2	0.0887

MONTH August

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**227.28**	lb/month
		0.11	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is know	Q_{month}	38,792.74	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1685.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**533.20**	°R
Average daily maximum ambient tempe	T_{AX}	540.10	°R
Average daily minimum ambient temper	T_{AN}	526.30	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	534.46	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**535.77**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.270	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.138	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^2)DP^* M_v K_c)/12$ month	L_R	**87.75**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**4.39**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c$)	LF	**135.15**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c$)/12 months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		8.215	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		1.4217	lb/month
benzene		1.6376	lb/month
2,2,4 TMP		1.9690	lb/month
toluene		2.1120	lb/month
ethylbenzene		0.1813	lb/month
xylenes		0.8318	lb/month
naphthalene		0.0192	lb/month
cumene		0.0425	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_i M_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	68	0.00618
benzene	78.11	68	0.00699
2,2,4 TMP	114.23	68	0.00805
toluene	92.14	68	0.00810
ethylbenzene	106.17	68	0.00054
xylenes	106.17	68	0.00235
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.030584	6.270	0.00488
benzene	0.038170	6.270	0.00609
2,2,4 TMP	0.030033	6.270	0.00479
toluene	0.037467	6.270	0.00598
ethylbenzene	0.002160	6.270	0.00034
xylenes	0.009450	6.270	0.00151
naphthalene	0.000014	6.270	0.00000
cumene	0.000327	6.270	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.8649
benzene	6.906	1211	220.79	1.8004
2,2,4 TMP	6.812	1257.8	220.74	0.9322
toluene	7.017	1377.6	222.64	0.5361
ethylbenzene	6.95	1419.3	212.61	0.1781
xylenes	7.009	1462.3	215.11	0.1558
naphthalene	7.146	1831.6	211.82	0.0048
cumene	6.929	1455.8	207.2	0.0856

MONTH eptember

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**314.98**	lb/month
		0.16	tons/month
Product Type		**Gasoline - RVP 13.5**	
Monthly Throughput (only change if actual is known)	Q_{month}	38,792.74	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	°R
Daily total solar insolation on a horizontal surface	**I**	1320.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**526.15**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	533.40	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	518.90	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	527.14	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**528.16**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	8.462	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.211	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^2)DP^* M_v K_c)/12$ months	L_R	**122.27**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**4.39**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c$)	LF	**188.32**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c$)/12 months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		7.626	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		1.3378	lb/month
benzene		1.5251	lb/month
2,2,4 TMP		1.8267	lb/month
toluene		1.9420	lb/month
ethylbenzene		0.1672	lb/month
xylenes		0.7688	lb/month
naphthalene		0.0190	lb/month
cumene		0.0398	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_i M_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	62	0.00417
benzene	78.11	62	0.00466
2,2,4 TMP	114.23	62	0.00532
toluene	92.14	62	0.00526
ethylbenzene	106.17	62	0.00034
xylenes	106.17	62	0.00149
naphthalene	128.17	62	0.00000
cumene	120.19	62	0.00006

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.025362	8.462	0.00300
benzene	0.031274	8.462	0.00370
2,2,4 TMP	0.024416	8.462	0.00289
toluene	0.029970	8.462	0.00354
ethylbenzene	0.001682	8.462	0.00020
xylenes	0.007343	8.462	0.00087
naphthalene	0.000010	8.462	0.00000
cumene	0.000250	8.462	0.00003

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.3757
benzene	6.906	1211	220.79	1.4751
2,2,4 TMP	6.812	1257.8	220.74	0.7579
toluene	7.017	1377.6	222.64	0.4288
ethylbenzene	6.95	1419.3	212.61	0.1387
xylenes	7.009	1462.3	215.11	0.1211
naphthalene	7.146	1831.6	211.82	0.0035
cumene	6.929	1455.8	207.2	0.0654

MONTH October

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**230.52**	lb/month
		0.12	tons/month
Product Type		**Gasoline - RVP 13.5**	
Monthly Throughput (only change if actual is known)	Q_{month}	38,792.74	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	^oR
Daily total solar insolation on a horizontal surface	**I**	948.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**514.75**	^oR
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	522.40	^oR
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	507.10	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	515.46	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**516.20**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.790	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.154	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**89.02**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**4.39**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**137.11**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		5.266	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} =Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$			
		L_{TI}	
hexane		0.9067	lb/month
benzene		1.0242	lb/month
2,2,4 TMP		1.2410	lb/month
toluene		1.3345	lb/month
ethylbenzene		0.1250	lb/month
xylenes		0.5836	lb/month
naphthalene		0.0186	lb/month
cumene		0.0323	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{VI} = y_iM_i / M_v$

	M_i	M_v	Z_{VI}
hexane	86.18	62	0.00382
benzene	78.11	62	0.00418
2,2,4 TMP	114.23	62	0.00471
toluene	92.14	62	0.00454
ethylbenzene	106.17	62	0.00028
xylenes	106.17	62	0.00122
naphthalene	128.17	62	0.00000
cumene	120.19	62	0.00005

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
hexane	0.018638	6.790	0.00275
benzene	0.022527	6.790	0.00332
2,2,4 TMP	0.017363	6.790	0.00256
toluene	0.020754	6.790	0.00306
ethylbenzene	0.001114	6.790	0.00016
xylenes	0.004845	6.790	0.00071
naphthalene	0.000006	6.790	0.00000
cumene	0.000161	6.790	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAI}
hexane	6.878	1171.5	224.37	1.7459
benzene	6.906	1211	220.79	1.0625
2,2,4 TMP	6.812	1257.8	220.74	0.5390
toluene	7.017	1377.6	222.64	0.2969
ethylbenzene	6.95	1419.3	212.61	0.0918
xylenes	7.009	1462.3	215.11	0.0799
naphthalene	7.146	1831.6	211.82	0.0020
cumene	6.929	1455.8	207.2	0.0420

MONTH November

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**204.45**	lb/month
		0.10	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	38,792.74	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	^oR
Daily total solar insolation on a horizontal surface	**I**	621.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**505.35**	^oR
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	512.10	^oR
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	498.60	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	505.82	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**506.30**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.340	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.140	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**78.76**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**4.39**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**121.30**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		4.227	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} =Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$			
		L_{TI}	
hexane		0.7164	lb/month
benzene		0.8028	lb/month
2,2,4 TMP		0.9824	lb/month
toluene		1.0675	lb/month
ethylbenzene		0.1066	lb/month
xylenes		0.5032	lb/month
naphthalene		0.0185	lb/month
cumene		0.0291	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{VI} = y_iM_i / M_v$

	M_i	M_v	Z_{VI}
hexane	86.18	60	0.00336
benzene	78.11	60	0.00362
2,2,4 TMP	114.23	60	0.00403
toluene	92.14	60	0.00380
ethylbenzene	106.17	60	0.00023
xylenes	106.17	60	0.00098
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00004

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
hexane	0.014875	6.340	0.00235
benzene	0.017664	6.340	0.00279
2,2,4 TMP	0.013463	6.340	0.00212
toluene	0.015726	6.340	0.00248
ethylbenzene	0.000811	6.340	0.00013
xylenes	0.003518	6.340	0.00055
naphthalene	0.000004	6.340	0.00000
cumene	0.000114	6.340	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAI}
hexane	6.878	1171.5	224.37	1.3354
benzene	6.906	1211	220.79	0.7984
2,2,4 TMP	6.812	1257.8	220.74	0.4005
toluene	7.017	1377.6	222.64	0.2156
ethylbenzene	6.95	1419.3	212.61	0.0641
xylenes	7.009	1462.3	215.11	0.0556
naphthalene	7.146	1831.6	211.82	0.0013
cumene	6.929	1455.8	207.2	0.0285

MONTH December

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**159.74**	lb/month
		0.08	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	38,792.74	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	^oR
Daily total solar insolation on a horizontal surface	**I**	501.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**495.50**	^oR
Average daily maximum ambient temperature, Table 7.1	T_{AX}	501.80	^oR
Average daily minimum ambient temperature, Table 7.1	T_{AN}	489.20	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	495.88	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**496.26**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.205	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.109	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**61.16**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**4.39**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**94.19**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		3.226	lb/month
Individual HAP Monthly Em Eq. 40-2 $L_{TI} =Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$			
		L_{TI}	
hexane		0.5222	lb/month
benzene		0.5841	lb/month
TMP		0.7320	lb/month
toluene		0.8189	lb/month
ethylbenzene		0.0906	lb/month
xylenes		0.4332	lb/month
naphthalene		0.0184	lb/month
cumene		0.0264	lb/month

Vapor Weight Concentratio $Z_{VI} = y_iM_i / M_v$

	M_i	M_v	Z_{VI}
hexane	86.18	60	0.00308
benzene	78.11	60	0.00325
2,2,4 TMP	114.23	60	0.00358
toluene	92.14	60	0.00329
ethylbenzene	106.17	60	0.00019
xylenes	106.17	60	0.00081
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
hexane	0.011186	5.205	0.00215
benzene	0.013033	5.205	0.00250
2,2,4 TMP	0.009817	5.205	0.00189
toluene	0.011191	5.205	0.00215
ethylbenzene	0.000553	5.205	0.00011
xylenes	0.002391	5.205	0.00046
naphthalene	0.000002	5.205	0.00000
cumene	0.000075	5.205	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAI}
hexane	6.878	1171.5	224.37	1.0042
benzene	6.906	1211	220.79	0.5891
2,2,4 TMP	6.812	1257.8	220.74	0.2920
toluene	7.017	1377.6	222.64	0.1534
ethylbenzene	6.95	1419.3	212.61	0.0436
xylenes	7.009	1462.3	215.11	0.0378
naphthalene	7.146	1831.6	211.82	0.0008
cumene	6.929	1455.8	207.2	0.0188

MONTHLY IFRT TANK VOC AND HAP ESTIMATIONS

INPUT DATA		Symbol		Units
Tank No.	**30532**			
Nearest US Location			**Bridgeport, CT**	
Absolute Pressure		P_A	14.69	psi
Product Information				
Average organic liquid density		W_L	**5.60**	lb/gal
Average Reid Vapor Pressure		RVP	**13.00**	
Product factor; 0.4 for crude oils or 1 for other organic liquids		K_C	**1.00**	
Tank design data			**0**	
Shell height		Hs	**48.00**	ft
Diameter		D	**100.00**	ft
Throughput		Q	**3,330,064**	gal/month
Maximum Filling Height (use Hs-1 if unknown)		H_{LX}	**47.00**	ft
Minimum Filling Height (use 1 if unknown)		H_{LN}	**1.00**	ft
Liquid height (assume 1/2 Hs)		H_L	**24.00**	ft
Tank Construction (pick from drop down list)			**Welded**	
Tank Color (pick from drop down list)			**White**	
Tank Shell Condition (pick from drop down list)			**Average**	
Tank Interior Condition (pick from drop down list)			**Light Rust**	
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**	
Internal floating roof design data				
Rim Seal Type:	**Mechanical-shoe seal | Shoe-mounted secondary**			
Rim Seal Fit (Average or Tight fitting)			**Average**	
Number of fixed roof support columns		Nc	**0.00**	NA
Effective column diameter (1.1 for 9x7 in. built up columns; 0.7 for 8 in. pipe columns; 1.0		Fc	**1.00**	ft
Deck seam loss per unit seam length factor; 0.0 or 0.14		KD	**0.00**	lb-mole/ft-yr
Zero wind speed LR factor; see Table 7.1-8		KRa	**1.6**	lb-mole/ft-yr
Wind speed dependent LR factor; see Table 7.1-8		KRb	**0.3**	lb-mole/(mph)^{n}ft*yr
Average ambient wind speed at tank site; for IFR use Zero		v	**0.0**	mph
Seal-related wind speed exponent; see Table 7.1-8		n	**1.6**	NA
Shell clingage factor; see Table 7.1-10		Cs	**0.0015**	bbl/1,000 ft^2
Deck Design Data				
Deck Seam (choose Welded or Bolted)			**Welded**	
Deck construction type not required for welded seams			**NA**	
If bolted continuous sheet or panel, enter width			**0**	
If bolted panel, also enter length			**0**	
Deck seam length factor; Length of Seam / Area of Deck		SD	**NA**	ft/ft^2
			Loss Factor	
Deck Fitting Data		**Qty**	**Kf (Table 7.1-12)**	
Access Hatch	Bolted cover, gasketed	**5**	1.6	
Column Well	Built-up column, gasketed sliding cover	**0**	33.0	
Unslotted Guidepole and Well	Gasketed sliding cover w/pole sleeve	**0**	8.6	
Slotted guidepole/sample well	Gasketed sliding cover, with pole sleeve	**0**	11.0	
Gauge-float well (automatic ga	Bolted cover, gasketed	**0**	2.8	
Gauge-hatch/sample port	Slit fabric seal, 10% open area	**2**	12.0	
Vacuum Breaker	Weighted mechanical actuation, gasketed	**1**	6.2	
Deck drain	Stub drain (1-inch diameter)	**0**	1.2	
Legs (IFR type)	IFR type, Adjustable	**17**	7.9	
Rim Vent	Weighted mechanical actuation, gasketed	**0**	0.7	
Ladder	Sliding cover, gasketed	**0**	56.0	
Ladder / Guide-Pole Combina	Ladder sleeve, gasketed sliding cover	**0**	60.0	
	Monthly deck fitting loss factor	F_F	14.38	per month

[1] Deck legs determined from AP-42 Table 7.1-15. Stub drains determined from AP-42 7.1-15. All other fitting data taken from assumptions provided in Global IFR roof summary table

MONTH January

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**166.96**	lb/month
		0.08	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	79,287.24	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	560.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**490.50**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	496.90	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	484.10	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	490.92	
Average Daily Liquid Surface Temperature Eq. 2-6			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**491.35**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.713	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.096	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_C)/12$ months	L_R	**77.32**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**6.28**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_C)$	**LF**	**83.36**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_C)/12$ months	**LD**	**0.00**	lb/month
HAPS Speciation			
Product - select from list		Gasoline	
Total HAP Monthly Emissions		3.602	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
	L_{TI}		
hexane		0.5357	lb/month
benzene		0.6076	lb/month
TMP		0.7927	lb/month
toluene		0.9314	lb/month
ethylbenzene		0.1153	lb/month
xylenes		0.5579	lb/month
naphthalene		0.0262	lb/month
cumene		0.0356	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_V$

	M_i	M_V	Z_{Vi}
hexane	86.18	60	0.00294
benzene	78.11	60	0.00308
2,2,4 TMP	114.23	60	0.00337
toluene	92.14	60	0.00306
ethylbenzene	106.17	60	0.00017
xylenes	106.17	60	0.00074
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.009680	4.713	0.00205
benzene	0.011169	4.713	0.00237
2,2,4 TMP	0.008362	4.713	0.00177
toluene	0.009416	4.713	0.00200
ethylbenzene	0.000455	4.713	0.00010
xylenes	0.001965	4.713	0.00042
naphthalene	0.000002	4.713	0.00000
cumene	0.000061	4.713	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	0.8690
benzene	6.906	1211	220.79	0.5049
2,2,4 TMP	6.812	1257.8	220.74	0.2487
toluene	7.017	1377.6	222.64	0.1291
ethylbenzene	6.95	1419.3	212.61	0.0359
xylenes	7.009	1462.3	215.11	0.0310
naphthalene	7.146	1831.6	211.82	0.0006
cumene	6.929	1455.8	207.2	0.0153

MONTH February

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**175.73**	lb/month
		0.09	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	79,287.24	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	847.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**492.20**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	498.80	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	485.60	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	492.84	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**493.49**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.922	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.102	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_C)/12$ months	L_R	**81.54**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**6.28**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_C)$	**LF**	**87.91**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_C)/12$ months	**LD**	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		3.782	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
	L_{TI}		
hexane		0.5715	lb/month
benzene		0.6473	lb/month
TMP		0.8377	lb/month
toluene		0.9752	lb/month
ethylbenzene		0.1180	lb/month
xylenes		0.5697	lb/month
naphthalene		0.0262	lb/month
cumene		0.0360	lb/month

Vapor Weight Concentrations Eq. 40- $Z_{Vi} = y_iM_i / M_V$

	M_i	M_V	Z_{Vi}
hexane	86.18	60	0.00300
benzene	78.11	60	0.00315
2,2,4 TMP	114.23	60	0.00346
toluene	92.14	60	0.00316
ethylbenzene	106.17	60	0.00018
xylenes	106.17	60	0.00077
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.010314	4.922	0.00210
benzene		4.922	0.00243
2,2,4 TMP	0.008971	4.922	0.00182
toluene	0.010156	4.922	0.00206
ethylbenzene	0.000495	4.922	0.00010
xylenes	0.002141	4.922	0.00044
naphthalene	0.000002	4.922	0.00000
cumene	0.000067	4.922	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$ 0.011951

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	0.9259
benzene	6.906	1211	220.79	0.5402
2,2,4 TMP	6.812	1257.8	220.74	0.2669
toluene	7.017	1377.6	222.64	0.1393
ethylbenzene	6.95	1419.3	212.61	0.0391
xylenes	7.009	1462.3	215.11	0.0338
naphthalene	7.146	1831.6	211.82	0.0007
cumene	6.929	1455.8	207.2	0.0167

MONTH March

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**208.99**	lb/month
		0.10	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	79,287.24	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	1156.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**498.90**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	506.00	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	491.80	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	499.77	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**500.66**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.681	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.122	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_C)/12$ months	L_R	**97.54**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**6.28**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_C)$	**LF**	**105.16**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_C)/12$ months	**LD**	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		4.496	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
	L_{TI}		
hexane		0.7119	lb/month
benzene		0.8044	lb/month
2,2,4 TMP		1.0167	lb/month
toluene		1.1512	lb/month
ethylbenzene		0.1292	lb/month
xylenes		0.6184	lb/month
naphthalene		0.0263	lb/month
cumene		0.0378	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_V$

	M_i	M_V	Z_{Vi}
hexane	86.18	60	0.00320
benzene	78.11	60	0.00341
2,2,4 TMP	114.23	60	0.00378
toluene	92.14	60	0.00351
ethylbenzene	106.17	60	0.00020
xylenes	106.17	60	0.00088
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.012697	5.681	0.00224
benzene	0.014919	5.681	0.00263
2,2,4 TMP	0.011297	5.681	0.00199
toluene	0.013018	5.681	0.00229
ethylbenzene	0.000655	5.681	0.00012
xylenes	0.002839	5.681	0.00050
naphthalene	0.000003	5.681	0.00000
cumene	0.000090	5.681	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.1398
benzene	6.906	1211	220.79	0.6744
2,2,4 TMP	6.812	1257.8	220.74	0.3360
toluene	7.017	1377.6	222.64	0.1785
ethylbenzene	6.95	1419.3	212.61	0.0518
xylenes	7.009	1462.3	215.11	0.0449
naphthalene	7.146	1831.6	211.82	0.0010
cumene	6.929	1455.8	207.2	0.0226

MONTH April

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**240.35**	lb/month
		0.12	tons/month
Product Type		**Gasoline - RVP 13.5**	
Monthly Throughput (only change if actual is known)	Q_{month}	79,287.24	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	°R
Daily total solar insolation on a horizontal surface	**I**	1490.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**509.15**	°R
Average daily maximum ambient temperature, Table 7.1	T_{AX}	516.80	°R
Average daily minimum ambient temperature, Table 7.1	T_{AN}	501.50	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	510.27	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**511.42**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.201	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.136	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^b)DP^* M_v K_C)/12$ months	L_R	**112.64**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**6.28**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_C)$	**LF**	**121.43**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_R = K_aS_aD^2P^*M_vK_c)/12$ months	**LD**	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		5.629	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{Ti}	
hexane		0.9234	lb/month
benzene		1.0480	lb/month
2,2,4 TMP		1.2995	lb/month
toluene		1.4392	lb/month
ethylbenzene		0.1486	lb/month
xylenes		0.7031	lb/month
naphthalene		0.0264	lb/month
cumene		0.0412	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	62	0.00368
benzene	78.11	62	0.00399
2,2,4 TMP	114.23	62	0.00448
toluene	92.14	62	0.00427
ethylbenzene	106.17	62	0.00026
xylenes	106.17	62	0.00113
naphthalene	128.17	62	0.00000
cumene	120.19	62	0.00004

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.016404	6.201	0.00265
benzene	0.019660	6.201	0.00317
2,2,4 TMP	0.015073	6.201	0.00243
toluene	0.017820	6.201	0.00287
ethylbenzene	0.000938	6.201	0.00015
xylenes	0.004077	6.201	0.00066
naphthalene	0.000005	6.201	0.00000
cumene	0.000134	6.201	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.5366
benzene	6.906	1211	220.79	0.9273
2,2,4 TMP	6.812	1257.8	220.74	0.4679
toluene	7.017	1377.6	222.64	0.2550
ethylbenzene	6.95	1419.3	212.61	0.0773
xylenes	7.009	1462.3	215.11	0.0672
naphthalene	7.146	1831.6	211.82	0.0016
cumene	6.929	1455.8	207.2	0.0349

MONTH May

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**190.29**	lb/month
		0.10	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is known)	Q_{month}	79,287.24	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1750.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**518.65**	°R
Average daily maximum ambient temperature, Tab	T_{AX}	526.50	°R
Average daily minimum ambient temperature, Tab	T_{AN}	510.80	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	519.96	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**521.32**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.763	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.098	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^b)DP^* M_v K_C)/12$ months	L_R	**88.54**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**6.28**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_C)$	**LF**	**95.46**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_R = K_aS_aD^2P^*M_vK_c)/12$ months	**LD**	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		6.674	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{Ti}	
hexane		1.1062	lb/month
benzene		1.2661	lb/month
2,2,4 TMP		1.5582	lb/month
toluene		1.7143	lb/month
ethylbenzene		0.1683	lb/month
xylenes		0.7898	lb/month
naphthalene		0.0266	lb/month
cumene		0.0447	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	68	0.00567
benzene	78.11	68	0.00627
2,2,4 TMP	114.23	68	0.00710
toluene	92.14	68	0.00693
ethylbenzene	106.17	68	0.00044
xylenes	106.17	68	0.00190
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00007

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.021310	4.763	0.00447
benzene	0.025982	4.763	0.00546
2,2,4 TMP	0.020138	4.763	0.00423
toluene	0.024350	4.763	0.00511
ethylbenzene	0.001333	4.763	0.00028
xylenes	0.005806	4.763	0.00122
naphthalene	0.000008	4.763	0.00000
cumene	0.000195	4.763	0.00004

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.9962
benzene	6.906	1211	220.79	1.2255
2,2,4 TMP	6.812	1257.8	220.74	0.6251
toluene	7.017	1377.6	222.64	0.3484
ethylbenzene	6.95	1419.3	212.61	0.1098
xylenes	7.009	1462.3	215.11	0.0957
naphthalene	7.146	1831.6	211.82	0.0026
cumene	6.929	1455.8	207.2	0.0509

MONTH June

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**240.76**	lb/month
		0.12	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is known)	Q_{month}	79,287.24	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1862.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**528.60**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	536.10	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	521.10	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	530.00	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**531.44**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.783	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.124	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^b)DP^* M_v K_C)/12$ months	L_R	**112.83**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**6.28**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_C)$	**LF**	**121.64**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_R = K_aS_aD^2P^*M_vK_c)/12$ months	**LD**	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		8.746	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{Ti}	
hexane		1.4765	lb/month
benzene		1.7014	lb/month
TMP		2.0708	lb/month
toluene		2.2540	lb/month
ethylbenzene		0.2066	lb/month
xylenes		0.9584	lb/month
naphthalene		0.0270	lb/month
cumene		0.0516	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	68	0.00603
benzene	78.11	68	0.00677
2,2,4 TMP	114.23	68	0.00776
toluene	92.14	68	0.00774
ethylbenzene	106.17	68	0.00051
xylenes	106.17	68	0.00221
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.027513	5.783	0.00476
benzene	0.034106	5.783	0.00590
2,2,4 TMP	0.026717	5.783	0.00462
toluene	0.033027	5.783	0.00571
ethylbenzene	0.001875	5.783	0.00032
xylenes	0.008195	5.783	0.00142
naphthalene	0.000012	5.783	0.00000
cumene	0.000281	5.783	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.5773
benzene	6.906	1211	220.79	1.6087
2,2,4 TMP	6.812	1257.8	220.74	0.8293
toluene	7.017	1377.6	222.64	0.4725
ethylbenzene	6.95	1419.3	212.61	0.1546
xylenes	7.009	1462.3	215.11	0.1351
naphthalene	7.146	1831.6	211.82	0.0040
cumene	6.929	1455.8	207.2	0.0735

MONTH July

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**273.46**	lb/month
		0.14	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is known)	Q_{month}	79,287.24	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	^oR
Daily total solar insolation on a horizontal surface	**I**	1904.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**533.90**	^oR
Average daily maximum ambient temperature, T	T_{AX}	541.10	^oR
Average daily minimum ambient temperature, T	T_{AN}	526.70	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	535.33	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**536.80**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.391	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.142	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}V^n)DP^*M_vK_c)/12$ months	L_R	**128.57**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**6.28**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**138.61**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_D D^2P^*M_vK_c)/12$ months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		10.160	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} =Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$			
		L_{TI}	
hexane		1.7241	lb/month
benzene		1.9953	lb/month
2,2,4 TMP		2.4193	lb/month
toluene		2.6261	lb/month
ethylbenzene		0.2337	lb/month
xylenes		1.0775	lb/month
naphthalene		0.0272	lb/month
cumene		0.0565	lb/month

Vapor Weight Concentrations Eq. 40-3 $Z_{VI} = y_iM_i / M_V$

		M_i	M_V	Z_{VI}
	hexane	86.18	68	0.00622
	benzene	78.11	68	0.00704
	2,2,4 TMP	114.23	68	0.00811
	toluene	92.14	68	0.00818
	ethylbenzene	106.17	68	0.00055
	xylenes	106.17	68	0.00239
	naphthalene	128.17	68	0.00000
	cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

		$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
	hexane	0.031357	6.391	0.00491
	benzene	0.039198	6.391	0.00613
	2,2,4 TMP	0.030873	6.391	0.00483
	toluene	0.038599	6.391	0.00604
	ethylbenzene	0.002233	6.391	0.00035
	xylenes	0.009773	6.391	0.00153
	naphthalene	0.000015	6.391	0.00000
	cumene	0.000339	6.391	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

		Z_{Li}	M_L	M_i	X_i
	hexane	0.01	92	86.18	0.01068
	benzene	0.018	92	78.11	0.02120
	2,2,4 TMP	0.04	92	114.23	0.03222
	toluene	0.07	92	92.14	0.06989
	ethylbenzene	0.014	92	106.17	0.01213
	xylenes	0.07	92	106.17	0.06066
	naphthalene	0.00415	92	128.17	0.00298
	cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

		A	B	C	P_{VAI}
	hexane	6.878	1171.5	224.37	2.9373
	benzene	6.906	1211	220.79	1.8489
	2,2,4 TMP	6.812	1257.8	220.74	0.9583
	toluene	7.017	1377.6	222.64	0.5523
	ethylbenzene	6.95	1419.3	212.61	0.1841
	xylenes	7.009	1462.3	215.11	0.1611
	naphthalene	7.146	1831.6	211.82	0.0050
	cumene	6.929	1455.8	207.2	0.0887

MONTH August

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**266.78**	lb/month
		0.13	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is know	Q_{month}	79,287.24	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	^oR
Daily total solar insolation on a horizontal surface	**I**	1685.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**533.20**	^oR
Average daily maximum ambient tempe	T_{AX}	540.10	^oR
Average daily minimum ambient temper	T_{AN}	526.30	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	534.46	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**535.77**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.270	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.138	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}V^n)DP^*M_vK_c)/12$ month	L_R	**125.35**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**6.28**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**135.15**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_D D^2P^*M_vK_c)/12$ months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		9.867	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} =Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$			
		L_{TI}	
hexane		1.6731	lb/month
benzene		1.9346	lb/month
2,2,4 TMP		2.3472	lb/month
toluene		2.5488	lb/month
ethylbenzene		0.2280	lb/month
xylenes		1.0526	lb/month
naphthalene		0.0272	lb/month
cumene		0.0554	lb/month

Vapor Weight Concentrations Eq. 40-3 $Z_{VI} = y_iM_i / M_V$

		M_i	M_V	Z_{VI}
	hexane	86.18	68	0.00618
	benzene	78.11	68	0.00699
	2,2,4 TMP	114.23	68	0.00805
	toluene	92.14	68	0.00810
	ethylbenzene	106.17	68	0.00054
	xylenes	106.17	68	0.00235
	naphthalene	128.17	68	0.00000
	cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

		$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
	hexane	0.030584	6.270	0.00488
	benzene	0.038170	6.270	0.00609
	2,2,4 TMP	0.030033	6.270	0.00479
	toluene	0.037467	6.270	0.00598
	ethylbenzene	0.002160	6.270	0.00034
	xylenes	0.009450	6.270	0.00151
	naphthalene	0.000014	6.270	0.00000
	cumene	0.000327	6.270	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

		Z_{Li}	M_L	M_i	X_i
	hexane	0.01	92	86.18	0.01068
	benzene	0.018	92	78.11	0.02120
	2,2,4 TMP	0.04	92	114.23	0.03222
	toluene	0.07	92	92.14	0.06989
	ethylbenzene	0.014	92	106.17	0.01213
	xylenes	0.07	92	106.17	0.06066
	naphthalene	0.00415	92	128.17	0.00298
	cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

		A	B	C	P_{VAI}
	hexane	6.878	1171.5	224.37	2.8649
	benzene	6.906	1211	220.79	1.8004
	2,2,4 TMP	6.812	1257.8	220.74	0.9322
	toluene	7.017	1377.6	222.64	0.5361
	ethylbenzene	6.95	1419.3	212.61	0.1781
	xylenes	7.009	1462.3	215.11	0.1558
	naphthalene	7.146	1831.6	211.82	0.0048
	cumene	6.929	1455.8	207.2	0.0856

MONTH September

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**369.28**	lb/month
		0.18	tons/month
Product Type		**Gasoline - RVP 13.5**	
Monthly Throughput (only change if actual is known)	Q_{month}	79,287.24	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	^oR
Daily total solar insolation on a horizontal surface	**I**	1320.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**526.15**	^oR
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	533.40	^oR
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	518.90	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	527.14	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**528.16**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	8.462	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.211	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}V^n)DP^*M_vK_c)/12$ months	L_R	**174.68**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**6.28**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**188.32**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_D D^2P^*M_vK_c)/12$ months	LD	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		9.179	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} =Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$			
		L_{TI}	
hexane		1.5750	lb/month
benzene		1.8032	lb/month
2,2,4 TMP		2.1809	lb/month
toluene		2.3502	lb/month
ethylbenzene		0.2115	lb/month
xylenes		0.9790	lb/month
naphthalene		0.0270	lb/month
cumene		0.0522	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{VI} = y_iM_i / M_V$

		M_i	M_V	Z_{VI}
	hexane	86.18	62	0.00417
	benzene	78.11	62	0.00466
	2,2,4 TMP	114.23	62	0.00532
	toluene	92.14	62	0.00526
	ethylbenzene	106.17	62	0.00034
	xylenes	106.17	62	0.00149
	naphthalene	128.17	62	0.00000
	cumene	120.19	62	0.00006

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

		$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
	hexane	0.025362	8.462	0.00300
	benzene	0.031274	8.462	0.00370
	2,2,4 TMP	0.024416	8.462	0.00289
	toluene	0.029970	8.462	0.00354
	ethylbenzene	0.001682	8.462	0.00020
	xylenes	0.007343	8.462	0.00087
	naphthalene	0.000010	8.462	0.00000
	cumene	0.000250	8.462	0.00003

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

		Z_{Li}	M_L	M_i	X_i
	hexane	0.01	92	86.18	0.01068
	benzene	0.018	92	78.11	0.02120
	2,2,4 TMP	0.04	92	114.23	0.03222
	toluene	0.07	92	92.14	0.06989
	ethylbenzene	0.014	92	106.17	0.01213
	xylenes	0.07	92	106.17	0.06066
	naphthalene	0.00415	92	128.17	0.00298
	cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

		A	B	C	P_{VAI}
	hexane	6.878	1171.5	224.37	2.3757
	benzene	6.906	1211	220.79	1.4751
	2,2,4 TMP	6.812	1257.8	220.74	0.7579
	toluene	7.017	1377.6	222.64	0.4288
	ethylbenzene	6.95	1419.3	212.61	0.1387
	xylenes	7.009	1462.3	215.11	0.1211
	naphthalene	7.146	1831.6	211.82	0.0035
	cumene	6.929	1455.8	207.2	0.0654

MONTH October

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**270.57**	lb/month
		0.14	tons/month
Product Type		Gasoline - RVP 13.5	
Monthly Throughput (only change if actual is known)	Q_{month}	79,287.24	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	^oR
Daily total solar insolation on a horizontal surface	**I**	948.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**514.75**	^oR
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	522.40	^oR
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	507.10	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	515.46	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**516.20**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.790	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.154	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**127.18**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**6.28**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	**LF**	**137.11**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_c)/12$ months	**LD**	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		6.420	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		1.0712	lb/month
benzene		1.2177	lb/month
2,2,4 TMP		1.4964	lb/month
toluene		1.6401	lb/month
ethylbenzene		0.1622	lb/month
xylenes		0.7626	lb/month
naphthalene		0.0266	lb/month
cumene		0.0435	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}	
hexane	86.18	62	0.00382	
benzene	78.11	62	0.00418	
2,2,4 TMP	114.23	62	0.00471	
toluene	92.14	62	0.00454	
ethylbenzene	106.17	62	0.00028	
xylenes	106.17	62	0.00122	
naphthalene	128.17	62	0.00000	
cumene	120.19	62	0.00005	

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i	
hexane	0.018638	6.790	0.00275	
benzene	0.022527	6.790	0.00332	
2,2,4 TMP	0.017363	6.790	0.00256	
toluene	0.020754	6.790	0.00306	
ethylbenzene	0.001114	6.790	0.00016	
xylenes	0.004845	6.790	0.00071	
naphthalene	0.000006	6.790	0.00000	
cumene	0.000161	6.790	0.00002	

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.7459
benzene	6.906	1211	220.79	1.0625
2,2,4 TMP	6.812	1257.8	220.74	0.5390
toluene	7.017	1377.6	222.64	0.2969
ethylbenzene	6.95	1419.3	212.61	0.0918
xylenes	7.009	1462.3	215.11	0.0799
naphthalene	7.146	1831.6	211.82	0.0020
cumene	6.929	1455.8	207.2	0.0420

MONTH November

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**240.09**	lb/month
		0.12	tons/month
Product Type		Gasoline - RVP 15	
Monthly Throughput (only change if actual is known)	Q_{month}	79,287.24	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	^oR
Daily total solar insolation on a horizontal surface	**I**	621.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**505.35**	^oR
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	512.10	^oR
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	498.60	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	505.82	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**506.30**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.340	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.140	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**112.51**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**6.28**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	**LF**	**121.30**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_c)/12$ months	**LD**	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		5.206	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		0.8488	lb/month
benzene		0.9590	lb/month
2,2,4 TMP		1.1942	lb/month
toluene		1.3281	lb/month
ethylbenzene		0.1407	lb/month
xylenes		0.6686	lb/month
naphthalene		0.0264	lb/month
cumene		0.0398	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}	
hexane	86.18	60	0.00336	
benzene	78.11	60	0.00362	
2,2,4 TMP	114.23	60	0.00403	
toluene	92.14	60	0.00380	
ethylbenzene	106.17	60	0.00023	
xylenes	106.17	60	0.00098	
naphthalene	128.17	60	0.00000	
cumene	120.19	60	0.00004	

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i	
hexane	0.014875	6.340	0.00235	
benzene	0.017664	6.340	0.00279	
2,2,4 TMP	0.013463	6.340	0.00212	
toluene	0.015726	6.340	0.00248	
ethylbenzene	0.000811	6.340	0.00013	
xylenes	0.003518	6.340	0.00055	
naphthalene	0.000004	6.340	0.00000	
cumene	0.000114	6.340	0.00002	

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.3354
benzene	6.906	1211	220.79	0.7984
2,2,4 TMP	6.812	1257.8	220.74	0.4005
toluene	7.017	1377.6	222.64	0.2156
ethylbenzene	6.95	1419.3	212.61	0.0641
xylenes	7.009	1462.3	215.11	0.0556
naphthalene	7.146	1831.6	211.82	0.0013
cumene	6.929	1455.8	207.2	0.0285

MONTH December

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**187.84**	lb/month
		0.09	tons/month
Product Type		Gasoline - RVP 15	
Monthly Throughput (only change if actual is known)	Q_{month}	79,287.24	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	^oR
Daily total solar insolation on a horizontal surface	**I**	501.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**495.50**	^oR
Average daily maximum ambient temperature, Table 7.1	T_{AX}	501.80	^oR
Average daily minimum ambient temperature, Table 7.1	T_{AN}	489.20	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	495.88	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**496.26**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.205	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.109	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**87.37**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**6.28**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	**LF**	**94.19**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_c)/12$ months	**LD**	**0.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		4.036	lb/month
Individual HAP Monthly Em Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		0.6218	lb/month
benzene		0.7034	lb/month
TMP		0.9015	lb/month
toluene		1.0376	lb/month
ethylbenzene		0.1219	lb/month
xylenes		0.5868	lb/month
naphthalene		0.0262	lb/month
cumene		0.0366	lb/month

Vapor Weight Concentratio $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}	
hexane	86.18	60	0.00308	
benzene	78.11	60	0.00325	
2,2,4 TMP	114.23	60	0.00358	
toluene	92.14	60	0.00329	
ethylbenzene	106.17	60	0.00019	
xylenes	106.17	60	0.00081	
naphthalene	128.17	60	0.00000	
cumene	120.19	60	0.00003	

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i	
hexane	0.011186	5.205	0.00215	
benzene	0.013033	5.205	0.00250	
2,2,4 TMP	0.009817	5.205	0.00189	
toluene	0.011191	5.205	0.00215	
ethylbenzene	0.000553	5.205	0.00011	
xylenes	0.002391	5.205	0.00046	
naphthalene	0.000002	5.205	0.00000	
cumene	0.000075	5.205	0.00001	

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.0042
benzene	6.906	1211	220.79	0.5891
2,2,4 TMP	6.812	1257.8	220.74	0.2920
toluene	7.017	1377.6	222.64	0.1534
ethylbenzene	6.95	1419.3	212.61	0.0436
xylenes	7.009	1462.3	215.11	0.0378
naphthalene	7.146	1831.6	211.82	0.0008
cumene	6.929	1455.8	207.2	0.0188

MONTHLY IFRT TANK VOC AND HAP ESTIMATIONS

INPUT DATA		Symbol		Units
Tank No.	**30534**			
Nearest US Location			**Bridgeport, CT**	
Absolute Pressure		P_A	14.69	psi
Product Information				
Average organic liquid density		W_L	**5.60**	lb/gal
Average Reid Vapor Pressure		RVP	**13.00**	
Product factor; 0.4 for crude oils or 1 for other organic liquids		K_C	**1.00**	
Tank design data			**0**	
Shell height		Hs	**48.00**	ft
Diameter		D	**134.00**	ft
Throughput		Q	**6,240,284**	gal/month
Maximum Filling Height (use Hs-1 if unknown)		H_{LX}	**47.00**	ft
Minimum Filling Height (use 1 if unknown)		H_{LN}	**1.00**	ft
Liquid height (assume 1/2 Hs)		H_L	**24.00**	ft
Tank Construction (pick from drop down list)			**Welded**	
Tank Color (pick from drop down list)			**White**	
Tank Shell Condition (pick from drop down list)			**Average**	
Tank Interior Condition (pick from drop down list)			**Light Rust**	
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**	
Internal floating roof design data				
Rim Seal Type:	**Mechanical-shoe seal | Shoe-mounted secondary**			
Rim Seal Fit (Average or Tight fitting)			**Average**	
Number of fixed roof support columns		Nc	**16.00**	NA
Effective column diameter (1.1 for 9x7 in. built up columns; 0.7 for 8 in. pipe columns; 1.0		Fc	**1.00**	ft
Deck seam loss per unit seam length factor; 0.0 or 0.14		KD	**0.14**	lb-mole/ft-yr
Zero wind speed LR factor; see Table 7.1-8		KRa	**1.6**	lb-mole/ft-yr
Wind speed dependent LR factor; see Table 7.1-8		KRb	**0.3**	lb-mole/(mph)^{n}ft*yr
Average ambient wind speed at tank site; for IFR use Zero		v	**0.0**	mph
Seal-related wind speed exponent; see Table 7.1-8		n	**1.6**	NA
Shell clingage factor; see Table 7.1-10		Cs	**0.0015**	bbl/1,000 ft^2
Deck Design Data				
Deck Seam (choose Welded or Bolted)			**Bolted**	
Select Deck Construction Type			**Continuous sheet**	
If bolted continuous sheet or panel, enter width			**5**	
If bolted panel, also enter length			**0**	
Deck seam length factor; Length of Seam / Area of Deck		SD	**0.20**	ft/ft^2
			Loss Factor	
Deck Fitting Data		**Qty**	**Kf (Table 7.1-12)**	
Access Hatch	Bolted cover, gasketed	**2**	1.6	
Column Well	Built-up column, gasketed sliding cover	**16**	33.0	
Unslotted Guidepole and Well	Gasketed sliding cover w/pole sleeve	**0**	8.6	
Slotted guidepole/sample well	Gasketed sliding cover, with pole wiper	**0**	41.0	
Gauge-float well (automatic ga	Unbolted cover, ungasketed	**0**	14.0	
Gauge-hatch/sample port	Slit fabric seal, 10% open area	**2**	12.0	
Vacuum Breaker	Weighted mechanical actuation, gasketed	**1**	6.2	
Deck drain	Stub drain (1-inch diameter)	**144**	1.2	
Legs (IFR type)	IFR type, Adjustable	**0**	7.9	
Rim Vent	Weighted mechanical actuation, gasketed	**0**	0.7	
Ladder	Sliding cover, ungasketed	**0**	98.0	
Ladder / Guide-Pole Combinat	Ladder sleeve, gasketed sliding cover	**0**	60.0	
	Monthly deck fitting loss factor	F_F	61.18	per month

[1] Deck legs determined from AP-42 Table 7.1-15. Stub drains determined from AP-42 7.1-15. All other fitting data taken from assumptions provided in Global IFR roof summary table

MONTH January

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**711.22**	lb/month
		0.36	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	**148,578.18**	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	560.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**490.50**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	496.90	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	484.10	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	490.92	
Average Daily Liquid Surface Temperature Eq. 2-6			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**491.35**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.713	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.096	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**103.61**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.83**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	**LF**	**354.81**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c)/12$ months	**LD**	**242.97**	lb/month
HAPS Speciation			
Product - select from list		Gasoline	
Total HAP Monthly Emissions		11.660	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$		L_{TI}	
hexane		2.1625	lb/month
benzene		2.3356	lb/month
TMP		2.7567	lb/month
toluene		2.8349	lb/month
ethylbenzene		0.2571	lb/month
xylenes		1.2043	lb/month
naphthalene		0.0414	lb/month
cumene		0.0673	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{VI} = y_iM_i / M_V$

	M_i	M_V	Z_{VI}
hexane	86.18	60	0.00294
benzene	78.11	60	0.00308
2,2,4 TMP	114.23	60	0.00337
toluene	92.14	60	0.00306
ethylbenzene	106.17	60	0.00017
xylenes	106.17	60	0.00074
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
hexane	0.009680	4.713	0.00205
benzene	0.011169	4.713	0.00237
2,2,4 TMP	0.008362	4.713	0.00177
toluene	0.009416	4.713	0.00200
ethylbenzene	0.000455	4.713	0.00010
xylenes	0.001965	4.713	0.00042
naphthalene	0.000002	4.713	0.00000
cumene	0.000061	4.713	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	0.8690
benzene	6.906	1211	220.79	0.5049
2,2,4 TMP	6.812	1257.8	220.74	0.2487
toluene	7.017	1377.6	222.64	0.1291
ethylbenzene	6.95	1419.3	212.61	0.0359
xylenes	7.009	1462.3	215.11	0.0310
naphthalene	7.146	1831.6	211.82	0.0006
cumene	6.929	1455.8	207.2	0.0153

MONTH February

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**749.47**	lb/month
		0.37	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	**148,578.18**	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	847.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**492.20**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	498.80	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	485.60	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	492.84	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**493.49**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.922	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.102	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**109.26**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.83**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	**LF**	**374.16**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c)/12$ months	**LD**	**256.22**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		12.443	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$		L_{TI}	
hexane		2.3187	lb/month
benzene		2.5090	lb/month
TMP		2.9532	lb/month
toluene		3.0260	lb/month
ethylbenzene		0.2690	lb/month
xylenes		1.2561	lb/month
naphthalene		0.0415	lb/month
cumene		0.0692	lb/month

Vapor Weight Concentrations Eq. 40- $Z_{VI} = y_iM_i / M_V$

	M_i	M_V	Z_{VI}
hexane	86.18	60	0.00300
benzene	78.11	60	0.00315
2,2,4 TMP	114.23	60	0.00346
toluene	92.14	60	0.00316
ethylbenzene	106.17	60	0.00018
xylenes	106.17	60	0.00077
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
hexane	0.010314	4.922	0.00210
benzene	0.011951	4.922	0.00243
2,2,4 TMP	0.008971	4.922	0.00182
toluene	0.010156	4.922	0.00206
ethylbenzene	0.000495	4.922	0.00010
xylenes	0.002141	4.922	0.00044
naphthalene	0.000002	4.922	0.00000
cumene	0.000067	4.922	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	0.9259
benzene	6.906	1211	220.79	0.5402
2,2,4 TMP	6.812	1257.8	220.74	0.2669
toluene	7.017	1377.6	222.64	0.1393
ethylbenzene	6.95	1419.3	212.61	0.0391
xylenes	7.009	1462.3	215.11	0.0338
naphthalene	7.146	1831.6	211.82	0.0007
cumene	6.929	1455.8	207.2	0.0167

MONTH March

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**894.65**	lb/month
		0.45	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	**148,578.18**	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	1156.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**498.90**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	506.00	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	491.80	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	499.77	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**500.66**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.681	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.122	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**130.71**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.83**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	**LF**	**447.60**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c)/12$ months	**LD**	**306.51**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		15.561	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$		L_{TI}	
hexane		2.9318	lb/month
benzene		3.1945	lb/month
2,2,4 TMP		3.7347	lb/month
toluene		3.7942	lb/month
ethylbenzene		0.3178	lb/month
xylenes		1.4687	lb/month
naphthalene		0.0418	lb/month
cumene		0.0773	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{VI} = y_iM_i / M_V$

	M_i	M_V	Z_{VI}
hexane	86.18	60	0.00320
benzene	78.11	60	0.00341
2,2,4 TMP	114.23	60	0.00378
toluene	92.14	60	0.00351
ethylbenzene	106.17	60	0.00020
xylenes	106.17	60	0.00088
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
hexane	0.012697	5.681	0.00224
benzene	0.014919	5.681	0.00263
2,2,4 TMP	0.011297	5.681	0.00199
toluene	0.013018	5.681	0.00229
ethylbenzene	0.000655	5.681	0.00012
xylenes	0.002839	5.681	0.00050
naphthalene	0.000003	5.681	0.00000
cumene	0.000090	5.681	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.1398
benzene	6.906	1211	220.79	0.6744
2,2,4 TMP	6.812	1257.8	220.74	0.3360
toluene	7.017	1377.6	222.64	0.1785
ethylbenzene	6.95	1419.3	212.61	0.0518
xylenes	7.009	1462.3	215.11	0.0449
naphthalene	7.146	1831.6	211.82	0.0010
cumene	6.929	1455.8	207.2	0.0226

MONTH April				MONTH May				MONTH June			
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,031.55**	lb/month	**Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)**	**LT**	**813.02**	lb/month	**Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)**	**LT**	**1,033.32**	lb/month
		0.52	tons/month			0.41	tons/month			0.52	tons/month
Product Type		**Gasoline - RVP 13.5**		**Product Type**		**Gasoline - RVP 9**		**Product Type**		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is known)	Q_{month}	148,578.18	barrels/month	**Monthly Throughput (only change if actual is known)**	Q_{month}	148,578.18	barrels/month	**Monthly Throughput (only change if actual is known)**	Q_{month}	148,578.18	barrels/month
Vapor Molecular weight	M_v	**62.00**		Vapor Molecular weight	M_v	**68.00**		Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.63		Vapor Pressure Equation Constant A	A	11.76		Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5015.72	°R	Vapor Pressure Equation Constant B	B	5315.06	°R	Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1490.0	Btu/ft^2-day	Daily total solar insolation on a horizontal surface	**I**	1750.0	Btu/ft^2-day	Daily total solar insolation on a horizontal surface	**I**	1862.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30				**Average Daily Ambient Temperature Eq. 1-30**				**Average Daily Ambient Temperature Eq. 1-30**			
TAA = ((TAX+TAN)/2)	T_{AA}	**509.15**	°R	TAA = ((TAX+TAN)/2)	T_{AA}	**518.65**	°R	TAA = ((TAX+TAN)/2)	T_{AA}	**528.60**	°R
Average daily maximum ambient temperature, Table 7.1	T_{AX}	516.80	°R	Average daily maximum ambient temperature, Tab	T_{AX}	526.50	°R	Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	536.10	°R
Average daily minimum ambient temperature, Table 7.1	T_{AN}	501.50	°R	Average daily minimum ambient temperature, Tabl	T_{AN}	510.80	°R	Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	521.10	°R
Liquid Bulk Temperature Eq 1-31:				**Liquid Bulk Temperature Eq 1-31:**				**Liquid Bulk Temperature Eq 1-31:**			
TB = TAA + 0.003 αs I	T_B	510.27		TB = TAA + 0.003 αs I	T_B	519.96		TB = TAA + 0.003 αs I	T_B	530.00	
Average Daily Liquid Surface Temperature Eq. 1-28				**Average Daily Liquid Surface Temperature Eq. 1-28**				**Average Daily Liquid Surface Temperature Eq. 1-28**			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**511.42**	°R	TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**521.32**	°R	TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**531.44**	°R
True Vapor Pressure Eq. 1-25:				**True Vapor Pressure Eq. 1-25:**				**True Vapor Pressure Eq. 1-25:**			
PvA = exp(A-(B/TLA))	P_{vA}	6.201	psia	PvA = exp(A-(B/TLA))	P_{vA}	4.763	psia	PvA = exp(A-(B/TLA))	P_{vA}	5.783	psia
Vapor pressure function Eq. 2-4:				**Vapor pressure function Eq. 2-4:**				**Vapor pressure function Eq. 2-4:**			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.136	NA	$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.098	NA	$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.124	NA
Rim Seal Losses Eq. 2-3:				**Rim Seal Losses Eq. 2-3:**				**Rim Seal Losses Eq. 2-3:**			
$L_R = ((K_{Ra} + K_{Rb} v^b)DP^* M_v K_C)/12$ months	L_R	**150.93**	lb/month	$L_R = ((K_{Ra} + K_{Rb} v^b)DP^* M_v K_C)/12$ months	L_R	**118.65**	lb/month	$L_R = ((K_{Ra} + K_{Rb} v^b)DP^* M_v K_C)/12$ months	L_R	**151.19**	lb/month
Withdrawal losses Eq. 2-19:				**Withdrawal losses Eq. 2-19:**				**Withdrawal losses Eq. 2-19:**			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.83**	lb/month	$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.83**	lb/month	$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.83**	lb/month
Deck Fitting Losses Eq.2-13:				**Deck Fitting Losses Eq.2-13:**				**Deck Fitting Losses Eq.2-13:**			
$L_F = F_F P^*M_v K_C)$	**LF**	**516.85**	lb/month	$L_F = F_F P^*M_v K_C)$	**LF**	**406.31**	lb/month	$L_F = F_F P^*M_v K_C)$	**LF**	**517.75**	lb/month
Deck Seam Losses Eq. 2-18:				**Deck Seam Losses Eq. 2-18:**				**Deck Seam Losses Eq. 2-18:**			
$L_D = K_D S_D D^2 P^*M_v K_C)/12$ months	**LD**	**353.93**	lb/month	$L_D = K_D S_D D^2 P^*M_v K_C)/12$ months	**LD**	**278.23**	lb/month	$L_D = K_D S_D D^2 P^*M_v K_C)/12$ months	**LD**	**354.55**	lb/month
HAPS Speciation				**HAPS Speciation**				**HAPS Speciation**			
Product - same as January		Gasoline		**Product - same as January**		Gasoline		**Product - same as January**		Gasoline	
Total HAP Monthly Emissions		20.508	lb/month	**Total HAP Monthly Emissions**		25.069	lb/month	**Total HAP Monthly Emissions**		34.113	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$				**Individual HAP Monthly Emissions** Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$				**Individual HAP Monthly Emissi** Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}				L_{Ti}				L_{Ti}	
hexane		3.8550	lb/month	**hexane**		4.6527	lb/month	**hexane**		6.2691	lb/month
benzene		4.2579	lb/month	**benzene**		5.2100	lb/month	**benzene**		7.1100	lb/month
2,2,4 TMP		4.9688	lb/month	**2,2,4 TMP**		6.0981	lb/month	**TMP**		8.3358	lb/month
toluene		5.0516	lb/month	**toluene**		6.2523	lb/month	**toluene**		8.6078	lb/month
ethylbenzene		0.4024	lb/month	**ethylbenzene**		0.4885	lb/month	**ethylbenzene**		0.6559	lb/month
xylenes		1.8384	lb/month	**xylenes**		2.2169	lb/month	**xylenes**		2.9525	lb/month
naphthalene		0.0425	lb/month	**naphthalene**		0.0432	lb/month	**naphthalene**		0.0448	lb/month
cumene		0.0918	lb/month	**cumene**		0.1072	lb/month	**cumene**		0.1372	lb/month
Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$				**Vapor Weight Concentrations Eq. 40-6** $Z_{Vi} = y_iM_i / M_v$				**Vapor Weight Concentrations E** $Z_{Vi} = y_iM_i / M_v$			
	M_i	M_v	Z_{Vi}		M_i	M_v	Z_{Vi}		M_i	M_v	Z_{Vi}
hexane	86.18	62	0.00368	hexane	86.18	68	0.00567	hexane	86.18	68	0.00603
benzene	78.11	62	0.00399	benzene	78.11	68	0.00627	benzene	78.11	68	0.00677
2,2,4 TMP	114.23	62	0.00448	2,2,4 TMP	114.23	68	0.00710	2,2,4 TMP	114.23	68	0.00776
toluene	92.14	62	0.00427	toluene	92.14	68	0.00693	toluene	92.14	68	0.00774
ethylbenzene	106.17	62	0.00026	ethylbenzene	106.17	68	0.00044	ethylbenzene	106.17	68	0.00051
xylenes	106.17	62	0.00113	xylenes	106.17	68	0.00190	xylenes	106.17	68	0.00221
naphthalene	128.17	62	0.00000	naphthalene	128.17	68	0.00000	naphthalene	128.17	68	0.00000
cumene	120.19	62	0.00004	cumene	120.19	68	0.00007	cumene	120.19	68	0.00009
Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$				**Vapor Mole Fraction Eq. 40-5** $y_i = P_i / P_{VA}$				**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	0.016404	6.201	0.00265	hexane	0.021310	4.763	0.00447	hexane	0.027513	5.783	0.00476
benzene	0.019660	6.201	0.00317	benzene	0.025982	4.763	0.00546	benzene	0.034106	5.783	0.00590
2,2,4 TMP	0.015073	6.201	0.00243	2,2,4 TMP	0.020138	4.763	0.00423	2,2,4 TMP	0.026717	5.783	0.00462
toluene	0.017820	6.201	0.00287	toluene	0.024350	4.763	0.00511	toluene	0.033027	5.783	0.00571
ethylbenzene	0.000938	6.201	0.00015	ethylbenzene	0.001333	4.763	0.00028	ethylbenzene	0.001875	5.783	0.00032
xylenes	0.004077	6.201	0.00066	xylenes	0.005806	4.763	0.00122	xylenes	0.008195	5.783	0.00142
naphthalene	0.000005	6.201	0.00000	naphthalene	0.000008	4.763	0.00000	naphthalene	0.000012	5.783	0.00000
cumene	0.000134	6.201	0.00002	cumene	0.000195	4.763	0.00004	cumene	0.000281	5.783	0.00005
Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$				**Liquid Mole Fraction Eq. 40-4** $x_i = (Z_{Li}M_L)/M_i$				**Liquid Mole Fraction Eq. 40-4** $x_i = (Z_{Li}M_L)/M_i$			
	Z_{Li}	M_L	M_i	X_i	Z_{Li}	M_L	M_i	X_i	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068	0.01	92	86.18	0.01068	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120	0.018	92	78.11	0.02120	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222	0.04	92	114.23	0.03222	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989	0.07	92	92.14	0.06989	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213	0.014	92	106.17	0.01213	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066	0.07	92	106.17	0.06066	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298	0.00415	92	128.17	0.00298	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383	0.005	92	120.19	0.00383	0.005	92	120.19	0.00383
Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$				**Component Vapor pressure** $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$				**Component Vapor pressure** $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$			
	A	B	C	P_{VAi}	A	B	C	P_{VAi}	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.5366	6.878	1171.5	224.37	1.9962	6.878	1171.5	224.37	2.5773
benzene	6.906	1211	220.79	0.9273	6.906	1211	220.79	1.2255	6.906	1211	220.79	1.6087
2,2,4 TMP	6.812	1257.8	220.74	0.4679	6.812	1257.8	220.74	0.6251	6.812	1257.8	220.74	0.8293
toluene	7.017	1377.6	222.64	0.2550	7.017	1377.6	222.64	0.3484	7.017	1377.6	222.64	0.4725
ethylbenzene	6.95	1419.3	212.61	0.0773	6.95	1419.3	212.61	0.1098	6.95	1419.3	212.61	0.1546
xylenes	7.009	1462.3	215.11	0.0672	7.009	1462.3	215.11	0.0957	7.009	1462.3	215.11	0.1351
naphthalene	7.146	1831.6	211.82	0.0016	7.146	1831.6	211.82	0.0026	7.146	1831.6	211.82	0.0040
cumene	6.929	1455.8	207.2	0.0349	6.929	1455.8	207.2	0.0509	6.929	1455.8	207.2	0.0735

30534 PTE Estimate

MONTH July

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,176.08**	lb/month
		0.59	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is known)	Q_{month}	148,578.18	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1904.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**533.90**	°R
Average daily maximum ambient temperature, T	T_{AX}	541.10	°R
Average daily minimum ambient temperature, T	T_{AN}	526.70	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	535.33	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**536.80**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.391	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.142	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^2)DP^* M_v K_c)/12$ months	L_R	**172.28**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.83**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	LF	**589.97**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_S S_D D^2 P^* M_v K_c)/12$ months	LD	**404.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		40.283	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$			
		L_{TI}	
hexane		7.3499	lb/month
benzene		8.3930	lb/month
2,2,4 TMP		9.8570	lb/month
toluene		10.2321	lb/month
ethylbenzene		0.7739	lb/month
xylenes		3.4726	lb/month
naphthalene		0.0459	lb/month
cumene		0.1586	lb/month

Vapor Weight Concentrations Eq. 40-3 $Z_{VI} = y_i M_i / M_v$

	M_i	M_v	Z_{VI}
hexane	86.18	68	0.00622
benzene	78.11	68	0.00704
2,2,4 TMP	114.23	68	0.00811
toluene	92.14	68	0.00818
ethylbenzene	106.17	68	0.00055
xylenes	106.17	68	0.00239
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(X_i)$	P_{VA}	y_i
hexane	0.031357	6.391	0.00491
benzene	0.039198	6.391	0.00613
2,2,4 TMP	0.030873	6.391	0.00483
toluene	0.038599	6.391	0.00604
ethylbenzene	0.002233	6.391	0.00035
xylenes	0.009773	6.391	0.00153
naphthalene	0.000015	6.391	0.00000
cumene	0.000339	6.391	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.9373
benzene	6.906	1211	220.79	1.8489
2,2,4 TMP	6.812	1257.8	220.74	0.9583
toluene	7.017	1377.6	222.64	0.5523
ethylbenzene	6.95	1419.3	212.61	0.1841
xylenes	7.009	1462.3	215.11	0.1611
naphthalene	7.146	1831.6	211.82	0.0050
cumene	6.929	1455.8	207.2	0.0887

MONTH August

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,146.91**	lb/month
		0.57	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is know	Q_{month}	148,578.18	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1685.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**533.20**	°R
Average daily maximum ambient tempe	T_{AX}	540.10	°R
Average daily minimum ambient temper	T_{AN}	526.30	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	534.46	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**535.77**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.270	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.138	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^2)DP^* M_v K_c)/12$ month	L_R	**167.97**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.83**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	LF	**575.21**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_S S_D D^2 P^* M_v K_c)/12$ months	LD	**393.89**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		39.005	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$			
		L_{TI}	
hexane		7.1273	lb/month
benzene		8.1281	lb/month
2,2,4 TMP		9.5423	lb/month
toluene		9.8948	lb/month
ethylbenzene		0.7492	lb/month
xylenes		3.3639	lb/month
naphthalene		0.0457	lb/month
cumene		0.1541	lb/month

Vapor Weight Concentrations Eq. 40-3 $Z_{VI} = y_i M_i / M_v$

	M_i	M_v	Z_{VI}
hexane	86.18	68	0.00618
benzene	78.11	68	0.00699
2,2,4 TMP	114.23	68	0.00805
toluene	92.14	68	0.00810
ethylbenzene	106.17	68	0.00054
xylenes	106.17	68	0.00235
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(X_i)$	P_{VA}	y_i
hexane	0.030584	6.270	0.00488
benzene	0.038170	6.270	0.00609
2,2,4 TMP	0.030033	6.270	0.00479
toluene	0.037467	6.270	0.00598
ethylbenzene	0.002160	6.270	0.00034
xylenes	0.009450	6.270	0.00151
naphthalene	0.000014	6.270	0.00000
cumene	0.000327	6.270	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.8649
benzene	6.906	1211	220.79	1.8004
2,2,4 TMP	6.812	1257.8	220.74	0.9322
toluene	7.017	1377.6	222.64	0.5361
ethylbenzene	6.95	1419.3	212.61	0.1781
xylenes	7.009	1462.3	215.11	0.1558
naphthalene	7.146	1831.6	211.82	0.0048
cumene	6.929	1455.8	207.2	0.0856

MONTH eptember

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,594.32**	lb/month
		0.80	tons/month
Product Type		**Gasoline - RVP 13.5**	
Monthly Throughput (only change if actual is known)	Q_{month}	148,578.18	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	°R
Daily total solar insolation on a horizontal surface	**I**	1320.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**526.15**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	533.40	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	518.90	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	527.14	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**528.16**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	8.462	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.211	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^2)DP^* M_v K_c)/12$ months	L_R	**234.06**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.83**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	LF	**801.54**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_k = K_S S_D D^2 P^* M_v K_c)/12$ months	LD	**548.88**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		36.002	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$			
		L_{TI}	
hexane		6.6992	lb/month
benzene		7.5544	lb/month
2,2,4 TMP		8.8163	lb/month
toluene		9.0279	lb/month
ethylbenzene		0.6770	lb/month
xylenes		3.0427	lb/month
naphthalene		0.0448	lb/month
cumene		0.1400	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{VI} = y_i M_i / M_v$

	M_i	M_v	Z_{VI}
hexane	86.18	62	0.00417
benzene	78.11	62	0.00466
2,2,4 TMP	114.23	62	0.00532
toluene	92.14	62	0.00526
ethylbenzene	106.17	62	0.00034
xylenes	106.17	62	0.00149
naphthalene	128.17	62	0.00000
cumene	120.19	62	0.00006

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(X_i)$	P_{VA}	y_i
hexane	0.025362	8.462	0.00300
benzene	0.031274	8.462	0.00370
2,2,4 TMP	0.024416	8.462	0.00289
toluene	0.029970	8.462	0.00354
ethylbenzene	0.001682	8.462	0.00020
xylenes	0.007343	8.462	0.00087
naphthalene	0.000010	8.462	0.00000
cumene	0.000250	8.462	0.00003

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.3757
benzene	6.906	1211	220.79	1.4751
2,2,4 TMP	6.812	1257.8	220.74	0.7579
toluene	7.017	1377.6	222.64	0.4288
ethylbenzene	6.95	1419.3	212.61	0.1387
xylenes	7.009	1462.3	215.11	0.1211
naphthalene	7.146	1831.6	211.82	0.0035
cumene	6.929	1455.8	207.2	0.0654

MONTH October

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,163.45**	lb/month
		0.58	tons/month
Product Type		Gasoline - RVP 13.5	
Monthly Throughput (only change if actual is known)	Q_{month}	148,578.18	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	^oR
Daily total solar insolation on a horizontal surface	**I**	948.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**514.75**	^oR
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	522.40	^oR
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	507.10	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	515.46	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**516.20**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.790	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.154	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**170.42**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**9.83**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	**LF**	**583.58**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_c)/12$ months	**LD**	**399.62**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		23.960	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		4.5000	lb/month
benzene		4.9988	lb/month
2,2,4 TMP		5.8284	lb/month
toluene		5.9284	lb/month
ethylbenzene		0.4617	lb/month
xylenes		2.0978	lb/month
naphthalene		0.0429	lb/month
cumene		0.1021	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	62	0.00382
benzene	78.11	62	0.00418
2,2,4 TMP	114.23	62	0.00471
toluene	92.14	62	0.00454
ethylbenzene	106.17	62	0.00028
xylenes	106.17	62	0.00122
naphthalene	128.17	62	0.00000
cumene	120.19	62	0.00005

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.018638	6.790	0.00275
benzene	0.022527	6.790	0.00332
2,2,4 TMP	0.017363	6.790	0.00256
toluene	0.020754	6.790	0.00306
ethylbenzene	0.001114	6.790	0.00016
xylenes	0.004845	6.790	0.00071
naphthalene	0.000006	6.790	0.00000
cumene	0.000161	6.790	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.7459
benzene	6.906	1211	220.79	1.0625
2,2,4 TMP	6.812	1257.8	220.74	0.5390
toluene	7.017	1377.6	222.64	0.2969
ethylbenzene	6.95	1419.3	212.61	0.0918
xylenes	7.009	1462.3	215.11	0.0799
naphthalene	7.146	1831.6	211.82	0.0020
cumene	6.929	1455.8	207.2	0.0420

MONTH November

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,030.43**	lb/month
		0.52	tons/month
Product Type		Gasoline - RVP 15	
Monthly Throughput (only change if actual is known)	Q_{month}	148,578.18	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	^oR
Daily total solar insolation on a horizontal surface	**I**	621.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**505.35**	^oR
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	512.10	^oR
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	498.60	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	505.82	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**506.30**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.340	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.140	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**150.77**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**9.83**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	**LF**	**516.29**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_c)/12$ months	**LD**	**353.55**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		18.658	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		3.5292	lb/month
benzene		3.8696	lb/month
2,2,4 TMP		4.5093	lb/month
toluene		4.5663	lb/month
ethylbenzene		0.3680	lb/month
xylenes		1.6878	lb/month
naphthalene		0.0422	lb/month
cumene		0.0857	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	60	0.00336
benzene	78.11	60	0.00362
2,2,4 TMP	114.23	60	0.00403
toluene	92.14	60	0.00380
ethylbenzene	106.17	60	0.00023
xylenes	106.17	60	0.00098
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00004

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.014875	6.340	0.00235
benzene	0.017664	6.340	0.00279
2,2,4 TMP	0.013463	6.340	0.00212
toluene	0.015726	6.340	0.00248
ethylbenzene	0.000811	6.340	0.00013
xylenes	0.003518	6.340	0.00055
naphthalene	0.000004	6.340	0.00000
cumene	0.000114	6.340	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.3354
benzene	6.906	1211	220.79	0.7984
2,2,4 TMP	6.812	1257.8	220.74	0.4005
toluene	7.017	1377.6	222.64	0.2156
ethylbenzene	6.95	1419.3	212.61	0.0641
xylenes	7.009	1462.3	215.11	0.0556
naphthalene	7.146	1831.6	211.82	0.0013
cumene	6.929	1455.8	207.2	0.0285

MONTH December

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**802.34**	lb/month
		0.40	tons/month
Product Type		Gasoline - RVP 15	
Monthly Throughput (only change if actual is known)	Q_{month}	148,578.18	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	^oR
Daily total solar insolation on a horizontal surface	**I**	501.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**495.50**	^oR
Average daily maximum ambient temperature, Table 7.1	T_{AX}	501.80	^oR
Average daily minimum ambient temperature, Table 7.1	T_{AN}	489.20	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	495.88	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**496.26**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.205	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.109	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**117.07**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**9.83**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	**LF**	**400.91**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_c)/12$ months	**LD**	**274.53**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		13.553	lb/month
Individual HAP Monthly Em Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		2.5385	lb/month
benzene		2.7538	lb/month
TMP		3.2317	lb/month
toluene		3.2983	lb/month
ethylbenzene		0.2861	lb/month
xylenes		1.3307	lb/month
naphthalene		0.0416	lb/month
cumene		0.0720	lb/month

Vapor Weight Concentratio $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	60	0.00308
benzene	78.11	60	0.00325
2,2,4 TMP	114.23	60	0.00358
toluene	92.14	60	0.00329
ethylbenzene	106.17	60	0.00019
xylenes	106.17	60	0.00081
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.011186	5.205	0.00215
benzene	0.013033	5.205	0.00250
2,2,4 TMP	0.009817	5.205	0.00189
toluene	0.011191	5.205	0.00215
ethylbenzene	0.000553	5.205	0.00011
xylenes	0.002391	5.205	0.00046
naphthalene	0.000002	5.205	0.00000
cumene	0.000075	5.205	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.0042
benzene	6.906	1211	220.79	0.5891
2,2,4 TMP	6.812	1257.8	220.74	0.2920
toluene	7.017	1377.6	222.64	0.1534
ethylbenzene	6.95	1419.3	212.61	0.0436
xylenes	7.009	1462.3	215.11	0.0378
naphthalene	7.146	1831.6	211.82	0.0008
cumene	6.929	1455.8	207.2	0.0188

MONTHLY IFRT TANK VOC AND HAP ESTIMATIONS

INPUT DATA		Symbol		Units
Tank No.	**30533**			
Nearest US Location			**Bridgeport, CT**	
Absolute Pressure		P_A	14.69	psi
Product Information				
Average organic liquid density		W_L	**5.60**	lb/gal
Average Reid Vapor Pressure		RVP	**13.00**	
Product factor; 0.4 for crude oils or 1 for other organic liquids		K_C	**1.00**	
Tank design data			**0**	
Shell height		Hs	**48.00**	ft
Diameter		D	**50.00**	ft
Throughput		Q	**878,802**	gal/month
Maximum Filling Height (use Hs-1 if unknown)		H_{LX}	**47.00**	ft
Minimum Filling Height (use 1 if unknown)		H_{LN}	**1.00**	ft
Liquid height (assume 1/2 Hs)		H_L	**24.00**	ft
Tank Construction (pick from drop down list)			**Welded**	
Tank Color (pick from drop down list)			**White**	
Tank Shell Condition (pick from drop down list)			**Average**	
Tank Interior Condition (pick from drop down list)			**Light Rust**	
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**	
Internal floating roof design data				
Rim Seal Type:	**Mechanical-shoe seal | Shoe-mounted secondary**			
Rim Seal Fit (Average or Tight fitting)			**Average**	
Number of fixed roof support columns		Nc	**1.00**	NA
Effective column diameter (1.1 for 9x7 in. built up columns; 0.7 for 8 in. pipe columns; 1.0		Fc	**1.00**	ft
Deck seam loss per unit seam length factor; 0.0 or 0.14		KD	**0.14**	lb-mole/ft-yr
Zero wind speed LR factor; see Table 7.1-8		KRa	**1.6**	lb-mole/ft-yr
Wind speed dependent LR factor; see Table 7.1-8		KRb	**0.3**	lb-mole/(mph)^{n}ft*yr
Average ambient wind speed at tank site; for IFR use Zero		v	**0.0**	mph
Seal-related wind speed exponent; see Table 7.1-8		n	**1.6**	NA
Shell clingage factor; see Table 7.1-10		Cs	**0.0015**	bbl/1,000 ft^2
Deck Design Data				
Deck Seam (choose Welded or Bolted)			**Bolted**	
Select Deck Construction Type			**Continuous sheet**	
If bolted continuous sheet or panel, enter width			**5**	
If bolted panel, also enter length			**0**	
Deck seam length factor; Length of Seam / Area of Deck		SD	**0.20**	ft/ft^2
			Loss Factor	
Deck Fitting Data		**Qty**	**Kf (Table 7.1-12)**	
Access Hatch	Bolted cover, gasketed	**2**	1.6	
Column Well	Built-up column, gasketed sliding cover	**1**	33.0	
Unslotted Guidepole and Well	Gasketed sliding cover w/pole sleeve	**0**	8.6	
Slotted guidepole/sample well	Gasketed sliding cover, with pole sleeve	**1**	11.0	
Gauge-float well (automatic ga	Unbolted cover, ungasketed	**0**	14.0	
Gauge-hatch/sample port	Slit fabric seal, 10% open area	**1**	12.0	
Vacuum Breaker	Weighted mechanical actuation, gasketed	**1**	6.2	
Deck drain	Stub drain (1-inch diameter)	**20**	1.2	
Legs (IFR type)	IFR type, Adjustable	**0**	7.9	
Rim Vent	Weighted mechanical actuation, gasketed	**0**	0.7	
Ladder	Sliding cover, gasketed	**1**	56.0	
Ladder / Guide-Pole Combinat	Ladder sleeve, ungasketed sliding cover	**0**	65.0	
	Monthly deck fitting loss factor	F_F	12.12	per month

[1] Deck legs determined from AP-42 Table 7.1-15. Stub drains determined from AP-42 7.1-15. All other fitting data taken from assumptions provided in Global IFR roof summary table

MONTH January

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**146.14**	lb/month
		0.07	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	20,923.85	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	560.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**490.50**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	496.90	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	484.10	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	490.92	
Average Daily Liquid Surface Temperature Eq. 2-6			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**491.35**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.713	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.096	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**38.66**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**3.38**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	**LF**	**70.27**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c)/12$ months	**LD**	**33.83**	lb/month
HAPS Speciation			
Product - select from list		Gasoline	
Total HAP Monthly Emissions		2.692	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
	L_{Ti}		
hexane		0.4539	lb/month
benzene		0.5002	lb/month
TMP		0.6163	lb/month
toluene		0.6736	lb/month
ethylbenzene		0.0716	lb/month
xylenes		0.3417	lb/month
naphthalene		0.0142	lb/month
cumene		0.0206	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_V$

	M_i	M_V	Z_{Vi}
hexane	86.18	60	0.00294
benzene	78.11	60	0.00308
2,2,4 TMP	114.23	60	0.00337
toluene	92.14	60	0.00306
ethylbenzene	106.17	60	0.00017
xylenes	106.17	60	0.00074
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.009680	4.713	0.00205
benzene	0.011169	4.713	0.00237
2,2,4 TMP	0.008362	4.713	0.00177
toluene	0.009416	4.713	0.00200
ethylbenzene	0.000455	4.713	0.00010
xylenes	0.001965	4.713	0.00042
naphthalene	0.000002	4.713	0.00000
cumene	0.000061	4.713	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	0.8690
benzene	6.906	1211	220.79	0.5049
2,2,4 TMP	6.812	1257.8	220.74	0.2487
toluene	7.017	1377.6	222.64	0.1291
ethylbenzene	6.95	1419.3	212.61	0.0359
xylenes	7.009	1462.3	215.11	0.0310
naphthalene	7.146	1831.6	211.82	0.0006
cumene	6.929	1455.8	207.2	0.0153

MONTH February

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**153.92**	lb/month
		0.08	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	20,923.85	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	847.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**492.20**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	498.80	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	485.60	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	492.84	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**493.49**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.922	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.102	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**40.77**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**3.38**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	**LF**	**74.10**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c)/12$ months	**LD**	**35.67**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		2.852	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
	L_{Ti}		
hexane		0.4857	lb/month
benzene		0.5355	lb/month
TMP		0.6563	lb/month
toluene		0.7125	lb/month
ethylbenzene		0.0741	lb/month
xylenes		0.3523	lb/month
naphthalene		0.0142	lb/month
cumene		0.0210	lb/month

Vapor Weight Concentrations Eq. 40- $Z_{Vi} = y_iM_i / M_V$

	M_i	M_V	Z_{Vi}
hexane	86.18	60	0.00300
benzene	78.11	60	0.00315
2,2,4 TMP	114.23	60	0.00346
toluene	92.14	60	0.00316
ethylbenzene	106.17	60	0.00018
xylenes	106.17	60	0.00077
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.010314	4.922	0.00210
benzene	0.011951	4.922	0.00243
2,2,4 TMP	0.008971	4.922	0.00182
toluene	0.010156	4.922	0.00206
ethylbenzene	0.000495	4.922	0.00010
xylenes	0.002141	4.922	0.00044
naphthalene	0.000002	4.922	0.00000
cumene	0.000067	4.922	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	0.9259
benzene	6.906	1211	220.79	0.5402
2,2,4 TMP	6.812	1257.8	220.74	0.2669
toluene	7.017	1377.6	222.64	0.1393
ethylbenzene	6.95	1419.3	212.61	0.0391
xylenes	7.009	1462.3	215.11	0.0338
naphthalene	7.146	1831.6	211.82	0.0007
cumene	6.929	1455.8	207.2	0.0167

MONTH March

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**183.47**	lb/month
		0.09	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	20,923.85	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	1156.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**498.90**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	506.00	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	491.80	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	499.77	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**500.66**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.681	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.122	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**48.77**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**3.38**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	**LF**	**88.64**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c)/12$ months	**LD**	**42.68**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		3.486	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
	L_{Ti}		
hexane		0.6105	lb/month
benzene		0.6750	lb/month
2,2,4 TMP		0.8153	lb/month
toluene		0.8689	lb/month
ethylbenzene		0.0840	lb/month
xylenes		0.3955	lb/month
naphthalene		0.0142	lb/month
cumene		0.0226	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_V$

	M_i	M_V	Z_{Vi}
hexane	86.18	60	0.00320
benzene	78.11	60	0.00341
2,2,4 TMP	114.23	60	0.00378
toluene	92.14	60	0.00351
ethylbenzene	106.17	60	0.00020
xylenes	106.17	60	0.00088
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.012697	5.681	0.00224
benzene	0.014919	5.681	0.00263
2,2,4 TMP	0.011297	5.681	0.00199
toluene	0.013018	5.681	0.00229
ethylbenzene	0.000655	5.681	0.00012
xylenes	0.002839	5.681	0.00050
naphthalene	0.000003	5.681	0.00000
cumene	0.000090	5.681	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.1398
benzene	6.906	1211	220.79	0.6744
2,2,4 TMP	6.812	1257.8	220.74	0.3360
toluene	7.017	1377.6	222.64	0.1785
ethylbenzene	6.95	1419.3	212.61	0.0518
xylenes	7.009	1462.3	215.11	0.0449
naphthalene	7.146	1831.6	211.82	0.0010
cumene	6.929	1455.8	207.2	0.0226

MONTH	April		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**211.33**	lb/month
		0.11	tons/month
Product Type		Gasoline - RVP 13.5	
Monthly Throughput (only change if actual is known)	Q_{month}	20,923.85	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	°R
Daily total solar insolation on a horizontal surface	**I**	1490.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**509.15**	°R
Average daily maximum ambient temperature, Table 7.1	T_{AX}	516.80	°R
Average daily minimum ambient temperature, Table 7.1	T_{AN}	501.50	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	510.27	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**511.42**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.201	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.136	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_C)/12$ months	L_R	**56.32**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_L)/D]*[1+(N_CF_C/D)]$	L_W	**3.38**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_C)$	LF	**102.36**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_v)/12$ months	LD	**49.28**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		4.493	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		0.7984	lb/month
benzene		0.8915	lb/month
2,2,4 TMP		1.0665	lb/month
toluene		1.1248	lb/month
ethylbenzene		0.1012	lb/month
xylenes		0.4708	lb/month
naphthalene		0.0144	lb/month
cumene		0.0256	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	62	0.00368
benzene	78.11	62	0.00399
2,2,4 TMP	114.23	62	0.00448
toluene	92.14	62	0.00427
ethylbenzene	106.17	62	0.00026
xylenes	106.17	62	0.00113
naphthalene	128.17	62	0.00000
cumene	120.19	62	0.00004

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.016404	6.201	0.00265
benzene	0.019660	6.201	0.00317
2,2,4 TMP	0.015073	6.201	0.00243
toluene	0.017820	6.201	0.00287
ethylbenzene	0.000938	6.201	0.00015
xylenes	0.004077	6.201	0.00066
naphthalene	0.000005	6.201	0.00000
cumene	0.000134	6.201	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.5366
benzene	6.906	1211	220.79	0.9273
2,2,4 TMP	6.812	1257.8	220.74	0.4679
toluene	7.017	1377.6	222.64	0.2550
ethylbenzene	6.95	1419.3	212.61	0.0773
xylenes	7.009	1462.3	215.11	0.0672
naphthalene	7.146	1831.6	211.82	0.0016
cumene	6.929	1455.8	207.2	0.0349

MONTH	May		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**166.86**	lb/month
		0.08	tons/month
Product Type		Gasoline - RVP 9	
Monthly Throughput (only change if actual is known)	Q_{month}	20,923.85	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1750.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**518.65**	°R
Average daily maximum ambient temperature, Tab	T_{AX}	526.50	°R
Average daily minimum ambient temperature, Tab	T_{AN}	510.80	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	519.96	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**521.32**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.763	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.098	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_C)/12$ months	L_R	**44.27**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_L)/D]*[1+(N_CF_C/D)]$	L_W	**3.38**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_C)$	LF	**80.46**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_v)/12$ months	LD	**38.74**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		5.421	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		0.9608	lb/month
benzene		1.0852	lb/month
2,2,4 TMP		1.2964	lb/month
toluene		1.3692	lb/month
ethylbenzene		0.1187	lb/month
xylenes		0.5478	lb/month
naphthalene		0.0145	lb/month
cumene		0.0287	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	68	0.00567
benzene	78.11	68	0.00627
2,2,4 TMP	114.23	68	0.00710
toluene	92.14	68	0.00693
ethylbenzene	106.17	68	0.00044
xylenes	106.17	68	0.00190
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00007

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.021310	4.763	0.00447
benzene	0.025982	4.763	0.00546
2,2,4 TMP	0.020138	4.763	0.00423
toluene	0.024350	4.763	0.00511
ethylbenzene	0.001333	4.763	0.00028
xylenes	0.005806	4.763	0.00122
naphthalene	0.000008	4.763	0.00000
cumene	0.000195	4.763	0.00004

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.9962
benzene	6.906	1211	220.79	1.2255
2,2,4 TMP	6.812	1257.8	220.74	0.6251
toluene	7.017	1377.6	222.64	0.3484
ethylbenzene	6.95	1419.3	212.61	0.1098
xylenes	7.009	1462.3	215.11	0.0957
naphthalene	7.146	1831.6	211.82	0.0026
cumene	6.929	1455.8	207.2	0.0509

MONTH	June		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**211.69**	lb/month
		0.11	tons/month
Product Type		Gasoline - RVP 9	
Monthly Throughput (only change if actual is known)	Q_{month}	20,923.85	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1862.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**528.60**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	536.10	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	521.10	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	530.00	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**531.44**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.783	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.124	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_C)/12$ months	L_R	**56.41**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_L)/D]*[1+(N_CF_C/D)]$	L_W	**3.38**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_C)$	LF	**102.53**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_v)/12$ months	LD	**49.36**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		7.262	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		1.2898	lb/month
benzene		1.4720	lb/month
TMP		1.7518	lb/month
toluene		1.8486	lb/month
ethylbenzene		0.1528	lb/month
xylenes		0.6975	lb/month
naphthalene		0.0148	lb/month
cumene		0.0348	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	68	0.00603
benzene	78.11	68	0.00677
2,2,4 TMP	114.23	68	0.00776
toluene	92.14	68	0.00774
ethylbenzene	106.17	68	0.00051
xylenes	106.17	68	0.00221
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i
hexane	0.027513	5.783	0.00476
benzene	0.034106	5.783	0.00590
2,2,4 TMP	0.026717	5.783	0.00462
toluene	0.033027	5.783	0.00571
ethylbenzene	0.001875	5.783	0.00032
xylenes	0.008195	5.783	0.00142
naphthalene	0.000012	5.783	0.00000
cumene	0.000281	5.783	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.5773
benzene	6.906	1211	220.79	1.6087
2,2,4 TMP	6.812	1257.8	220.74	0.8293
toluene	7.017	1377.6	222.64	0.4725
ethylbenzene	6.95	1419.3	212.61	0.1546
xylenes	7.009	1462.3	215.11	0.1351
naphthalene	7.146	1831.6	211.82	0.0040
cumene	6.929	1455.8	207.2	0.0735

MONTH July

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**240.75**	lb/month
		0.12	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is known)	Q_{month}	20,923.85	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1904.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**533.90**	°R
Average daily maximum ambient temperature, T	T_{AX}	541.10	°R
Average daily minimum ambient temperature, T	T_{AN}	526.70	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	535.33	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**536.80**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.391	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.142	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}V^n)DP^*M_vK_c)/12$ months	L_R	**64.28**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D)^*[1+(N_cF_c/D)]$	L_W	**3.38**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**116.84**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_c)/12$ months	LD	**56.25**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		8.518	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$			
		L_{TI}	
hexane		1.5097	lb/month
benzene		1.7331	lb/month
2,2,4 TMP		2.0614	lb/month
toluene		2.1792	lb/month
ethylbenzene		0.1768	lb/month
xylenes		0.8034	lb/month
naphthalene		0.0151	lb/month
cumene		0.0392	lb/month

Vapor Weight Concentrations Eq. 40-3 $Z_{VI} = y_iM_i / M_V$

	M_i	M_V	Z_{VI}
hexane	86.18	68	0.00622
benzene	78.11	68	0.00704
2,2,4 TMP	114.23	68	0.00811
toluene	92.14	68	0.00818
ethylbenzene	106.17	68	0.00055
xylenes	106.17	68	0.00239
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(X_i)$	P_{VA}	y_i
hexane	0.031357	6.391	0.00491
benzene	0.039198	6.391	0.00613
2,2,4 TMP	0.030873	6.391	0.00483
toluene	0.038599	6.391	0.00604
ethylbenzene	0.002233	6.391	0.00035
xylenes	0.009773	6.391	0.00153
naphthalene	0.000015	6.391	0.00000
cumene	0.000339	6.391	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.9373
benzene	6.906	1211	220.79	1.8489
2,2,4 TMP	6.812	1257.8	220.74	0.9583
toluene	7.017	1377.6	222.64	0.5523
ethylbenzene	6.95	1419.3	212.61	0.1841
xylenes	7.009	1462.3	215.11	0.1611
naphthalene	7.146	1831.6	211.82	0.0050
cumene	6.929	1455.8	207.2	0.0887

MONTH August

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**234.81**	lb/month
		0.12	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is know	Q_{month}	20,923.85	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1685.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**533.20**	°R
Average daily maximum ambient tempe	T_{AX}	540.10	°R
Average daily minimum ambient temper	T_{AN}	526.30	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	534.46	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**535.77**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.270	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.138	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}V^n)DP^*M_vK_c)/12$ month	L_R	**62.68**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D)^*[1+(N_cF_c/D)]$	L_W	**3.38**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**113.91**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_vD^2P^*M_vK_c)/12$ months	LD	**54.84**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		8.258	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$			
		L_{TI}	
hexane		1.4644	lb/month
benzene		1.6792	lb/month
2,2,4 TMP		1.9974	lb/month
toluene		2.1105	lb/month
ethylbenzene		0.1718	lb/month
xylenes		0.7813	lb/month
naphthalene		0.0150	lb/month
cumene		0.0383	lb/month

Vapor Weight Concentrations Eq. 40-3 $Z_{VI} = y_iM_i / M_V$

	M_i	M_V	Z_{VI}
hexane	86.18	68	0.00618
benzene	78.11	68	0.00699
2,2,4 TMP	114.23	68	0.00805
toluene	92.14	68	0.00810
ethylbenzene	106.17	68	0.00054
xylenes	106.17	68	0.00235
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(X_i)$	P_{VA}	y_i
hexane	0.030584	6.270	0.00488
benzene	0.038170	6.270	0.00609
2,2,4 TMP	0.030033	6.270	0.00479
toluene	0.037467	6.270	0.00598
ethylbenzene	0.002160	6.270	0.00034
xylenes	0.009450	6.270	0.00151
naphthalene	0.000014	6.270	0.00000
cumene	0.000327	6.270	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.8649
benzene	6.906	1211	220.79	1.8004
2,2,4 TMP	6.812	1257.8	220.74	0.9322
toluene	7.017	1377.6	222.64	0.5361
ethylbenzene	6.95	1419.3	212.61	0.1781
xylenes	7.009	1462.3	215.11	0.1558
naphthalene	7.146	1831.6	211.82	0.0048
cumene	6.929	1455.8	207.2	0.0856

MONTH eptember

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**325.88**	lb/month
		0.16	tons/month
Product Type		**Gasoline - RVP 13.5**	
Monthly Throughput (only change if actual is known)	Q_{month}	20,923.85	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	°R
Daily total solar insolation on a horizontal surface	**I**	1320.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**526.15**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	533.40	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	518.90	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	527.14	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**528.16**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	8.462	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.211	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}V^n)DP^*M_vK_c)/12$ months	L_R	**87.34**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D)^*[1+(N_cF_c/D)]$	L_W	**3.38**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**158.74**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_k = K_DS_vD^2P^*M_vK_c)/12$ months	LD	**76.42**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		7.647	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$			
		L_{TI}	
hexane		1.3773	lb/month
benzene		1.5624	lb/month
2,2,4 TMP		1.8496	lb/month
toluene		1.9341	lb/month
ethylbenzene		0.1571	lb/month
xylenes		0.7159	lb/month
naphthalene		0.0148	lb/month
cumene		0.0354	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{VI} = y_iM_i / M_V$

	M_i	M_V	Z_{VI}
hexane	86.18	62	0.00417
benzene	78.11	62	0.00466
2,2,4 TMP	114.23	62	0.00532
toluene	92.14	62	0.00526
ethylbenzene	106.17	62	0.00034
xylenes	106.17	62	0.00149
naphthalene	128.17	62	0.00000
cumene	120.19	62	0.00006

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(X_i)$	P_{VA}	y_i
hexane	0.025362	8.462	0.00300
benzene	0.031274	8.462	0.00370
2,2,4 TMP	0.024416	8.462	0.00289
toluene	0.029970	8.462	0.00354
ethylbenzene	0.001682	8.462	0.00020
xylenes	0.007343	8.462	0.00087
naphthalene	0.000010	8.462	0.00000
cumene	0.000250	8.462	0.00003

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.3757
benzene	6.906	1211	220.79	1.4751
2,2,4 TMP	6.812	1257.8	220.74	0.7579
toluene	7.017	1377.6	222.64	0.4288
ethylbenzene	6.95	1419.3	212.61	0.1387
xylenes	7.009	1462.3	215.11	0.1211
naphthalene	7.146	1831.6	211.82	0.0035
cumene	6.929	1455.8	207.2	0.0654

MONTH October

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**238.18**	lb/month
		0.12	tons/month
Product Type		**Gasoline - RVP 13.5**	
Monthly Throughput (only change if actual is known)	Q_{month}	20,923.85	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	^oR
Daily total solar insolation on a horizontal surface	**I**	948.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**514.75**	^oR
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	522.40	^oR
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	507.10	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	515.46	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**516.20**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.790	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.154	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**63.59**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**3.38**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	**LF**	**115.57**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	**LD**	**55.64**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		5.196	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		0.9297	lb/month
benzene		1.0423	lb/month
2,2,4 TMP		1.2415	lb/month
toluene		1.3032	lb/month
ethylbenzene		0.1133	lb/month
xylenes		0.5236	lb/month
naphthalene		0.0145	lb/month
cumene		0.0277	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}	
hexane	86.18	62	0.00382	
benzene	78.11	62	0.00418	
2,2,4 TMP	114.23	62	0.00471	
toluene	92.14	62	0.00454	
ethylbenzene	106.17	62	0.00028	
xylenes	106.17	62	0.00122	
naphthalene	128.17	62	0.00000	
cumene	120.19	62	0.00005	

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i	
hexane	0.018638	6.790	0.00275	
benzene	0.022527	6.790	0.00332	
2,2,4 TMP	0.017363	6.790	0.00256	
toluene	0.020754	6.790	0.00306	
ethylbenzene	0.001114	6.790	0.00016	
xylenes	0.004845	6.790	0.00071	
naphthalene	0.000006	6.790	0.00000	
cumene	0.000161	6.790	0.00002	

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.7459
benzene	6.906	1211	220.79	1.0625
2,2,4 TMP	6.812	1257.8	220.74	0.5390
toluene	7.017	1377.6	222.64	0.2969
ethylbenzene	6.95	1419.3	212.61	0.0918
xylenes	7.009	1462.3	215.11	0.0799
naphthalene	7.146	1831.6	211.82	0.0020
cumene	6.929	1455.8	207.2	0.0420

MONTH November

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**211.11**	lb/month
		0.11	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	20,923.85	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	^oR
Daily total solar insolation on a horizontal surface	**I**	621.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**505.35**	^oR
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	512.10	^oR
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	498.60	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	505.82	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**506.30**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.340	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.140	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**56.26**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**3.38**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	**LF**	**102.25**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	**LD**	**49.22**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		4.117	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		0.7321	lb/month
benzene		0.8124	lb/month
2,2,4 TMP		0.9730	lb/month
toluene		1.0260	lb/month
ethylbenzene		0.0942	lb/month
xylenes		0.4401	lb/month
naphthalene		0.0143	lb/month
cumene		0.0244	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}	
hexane	86.18	60	0.00336	
benzene	78.11	60	0.00362	
2,2,4 TMP	114.23	60	0.00403	
toluene	92.14	60	0.00380	
ethylbenzene	106.17	60	0.00023	
xylenes	106.17	60	0.00098	
naphthalene	128.17	60	0.00000	
cumene	120.19	60	0.00004	

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i	
hexane	0.014875	6.340	0.00235	
benzene	0.017664	6.340	0.00279	
2,2,4 TMP	0.013463	6.340	0.00212	
toluene	0.015726	6.340	0.00248	
ethylbenzene	0.000811	6.340	0.00013	
xylenes	0.003518	6.340	0.00055	
naphthalene	0.000004	6.340	0.00000	
cumene	0.000114	6.340	0.00002	

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.3354
benzene	6.906	1211	220.79	0.7984
2,2,4 TMP	6.812	1257.8	220.74	0.4005
toluene	7.017	1377.6	222.64	0.2156
ethylbenzene	6.95	1419.3	212.61	0.0641
xylenes	7.009	1462.3	215.11	0.0556
naphthalene	7.146	1831.6	211.82	0.0013
cumene	6.929	1455.8	207.2	0.0285

MONTH December

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**164.68**	lb/month
		0.08	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	20,923.85	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	^oR
Daily total solar insolation on a horizontal surface	**I**	501.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**495.50**	^oR
Average daily maximum ambient temperature, Table 7.1	T_{AX}	501.80	^oR
Average daily minimum ambient temperature, Table 7.1	T_{AN}	489.20	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	495.88	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**496.26**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.205	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.109	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**43.68**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**3.38**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	**LF**	**79.39**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	**LD**	**38.22**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		3.077	lb/month
Individual HAP Monthly Em Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		0.5305	lb/month
benzene		0.5853	lb/month
TMP		0.7129	lb/month
toluene		0.7679	lb/month
ethylbenzene		0.0776	lb/month
xylenes		0.3675	lb/month
naphthalene		0.0142	lb/month
cumene		0.0216	lb/month

Vapor Weight Concentratio $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}	
hexane	86.18	60	0.00308	
benzene	78.11	60	0.00325	
2,2,4 TMP	114.23	60	0.00358	
toluene	92.14	60	0.00329	
ethylbenzene	106.17	60	0.00019	
xylenes	106.17	60	0.00081	
naphthalene	128.17	60	0.00000	
cumene	120.19	60	0.00003	

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i	
hexane	0.011186	5.205	0.00215	
benzene	0.013033	5.205	0.00250	
2,2,4 TMP	0.009817	5.205	0.00189	
toluene	0.011191	5.205	0.00215	
ethylbenzene	0.000553	5.205	0.00011	
xylenes	0.002391	5.205	0.00046	
naphthalene	0.000002	5.205	0.00000	
cumene	0.000075	5.205	0.00001	

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.0042
benzene	6.906	1211	220.79	0.5891
2,2,4 TMP	6.812	1257.8	220.74	0.2920
toluene	7.017	1377.6	222.64	0.1534
ethylbenzene	6.95	1419.3	212.61	0.0436
xylenes	7.009	1462.3	215.11	0.0378
naphthalene	7.146	1831.6	211.82	0.0008
cumene	6.929	1455.8	207.2	0.0188

MONTHLY IFRT TANK VOC AND HAP ESTIMATIONS

INPUT DATA		Symbol		Units
Tank No.	**30535**			
Nearest US Location			**Bridgeport, CT**	
Absolute Pressure		P_A	14.69	psi
Product Information				
Average organic liquid density		W_L	**5.60**	lb/gal
Average Reid Vapor Pressure		RVP	**13.00**	
Product factor; 0.4 for crude oils or 1 for other organic liquids		K_C	**1.00**	
Tank design data			**0**	
Shell height		Hs	**48.00**	ft
Diameter		D	**134.00**	ft
Throughput		Q	**6,175,807**	gal/month
Maximum Filling Height (use Hs-1 if unknown)		H_{LX}	**47.00**	ft
Minimum Filling Height (use 1 if unknown)		H_{LN}	**1.00**	ft
Liquid height (assume 1/2 Hs)		H_L	**24.00**	ft
Tank Construction (pick from drop down list)			**Welded**	
Tank Color (pick from drop down list)			**White**	
Tank Shell Condition (pick from drop down list)			**Average**	
Tank Interior Condition (pick from drop down list)			**Light Rust**	
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**	
Internal floating roof design data				
Rim Seal Type:	**Mechanical-shoe seal | Shoe-mounted secondary**			
Rim Seal Fit (Average or Tight fitting)			**Average**	
Number of fixed roof support columns		Nc	**16.00**	NA
Effective column diameter (1.1 for 9x7 in. built up columns; 0.7 for 8 in. pipe columns; 1.0		Fc	**1.00**	ft
Deck seam loss per unit seam length factor; 0.0 or 0.14		KD	**0.14**	lb-mole/ft-yr
Zero wind speed LR factor; see Table 7.1-8		KRa	**1.6**	lb-mole/ft-yr
Wind speed dependent LR factor; see Table 7.1-8		KRb	**0.3**	lb-mole/(mph)^{n}ft*yr
Average ambient wind speed at tank site; for IFR use Zero		v	**0.0**	mph
Seal-related wind speed exponent; see Table 7.1-8		n	**1.6**	NA
Shell clingage factor; see Table 7.1-10		Cs	**0.0015**	bbl/1,000 ft^2
Deck Design Data				
Deck Seam (choose Welded or Bolted)			**Bolted**	
Select Deck Construction Type			**Continuous sheet**	
If bolted continuous sheet or panel, enter width			**5**	
If bolted panel, also enter length			**0**	
Deck seam length factor; Length of Seam / Area of Deck		SD	**0.20**	ft/ft^2
			Loss Factor	
Deck Fitting Data		**Qty**	**Kf (Table 7.1-12)**	
Access Hatch	Bolted cover, gasketed	**2**	1.6	
Column Well	Built-up column, gasketed sliding cover	**16**	33.0	
Unslotted Guidepole and Well	Gasketed sliding cover w/pole sleeve	**0**	8.6	
Slotted guidepole/sample well	Gasketed sliding cover, with pole sleeve	**0**	11.0	
Gauge-float well (automatic ga	Bolted cover, gasketed	**0**	2.8	
Gauge-hatch/sample port	Slit fabric seal, 10% open area	**2**	12.0	
Vacuum Breaker	Weighted mechanical actuation, gasketed	**1**	6.2	
Deck drain	Stub drain (1-inch diameter)	**144**	1.2	
Legs (IFR type)	IFR type, Adjustable	**0**	7.9	
Rim Vent	Weighted mechanical actuation, gasketed	**0**	0.7	
Ladder	Sliding cover, gasketed	**0**	56.0	
Ladder / Guide-Pole Combinat	Ladder sleeve, gasketed sliding cover	**0**	60.0	
	Monthly deck fitting loss factor	F_F	61.18	per month

[1] Deck legs determined from AP-42 Table 7.1-15. Stub drains determined from AP-42 7.1-15. All other fitting data taken from assumptions provided in Global IFR roof summary table

MONTH January

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**711.12**	lb/month
		0.36	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	**147,043.02**	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	560.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**490.50**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	496.90	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	484.10	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	490.92	
Average Daily Liquid Surface Temperature Eq. 2-6			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**491.35**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.713	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.096	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**103.61**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.73**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	**LF**	**354.81**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c)/12$ months	**LD**	**242.97**	lb/month
HAPS Speciation			
Product - select from list		Gasoline	
Total HAP Monthly Emissions		11.636	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$		L_{TI}	
hexane		2.1615	lb/month
benzene		2.3338	lb/month
TMP		2.7526	lb/month
toluene		2.8278	lb/month
ethylbenzene		0.2557	lb/month
xylenes		1.1972	lb/month
naphthalene		0.0410	lb/month
cumene		0.0668	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{VI} = y_iM_i / M_V$

	M_i	M_V	Z_{VI}
hexane	86.18	60	0.00294
benzene	78.11	60	0.00308
2,2,4 TMP	114.23	60	0.00337
toluene	92.14	60	0.00306
ethylbenzene	106.17	60	0.00017
xylenes	106.17	60	0.00074
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
hexane	0.009680	4.713	0.00205
benzene	0.011169	4.713	0.00237
2,2,4 TMP	0.008362	4.713	0.00177
toluene	0.009416	4.713	0.00200
ethylbenzene	0.000455	4.713	0.00010
xylenes	0.001965	4.713	0.00042
naphthalene	0.000002	4.713	0.00000
cumene	0.000061	4.713	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAI}
hexane	6.878	1171.5	224.37	0.8690
benzene	6.906	1211	220.79	0.5049
2,2,4 TMP	6.812	1257.8	220.74	0.2487
toluene	7.017	1377.6	222.64	0.1291
ethylbenzene	6.95	1419.3	212.61	0.0359
xylenes	7.009	1462.3	215.11	0.0310
naphthalene	7.146	1831.6	211.82	0.0006
cumene	6.929	1455.8	207.2	0.0153

MONTH February

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**749.37**	lb/month
		0.37	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	**147,043.02**	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	847.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**492.20**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	498.80	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	485.60	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	492.84	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**493.49**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.922	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.102	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**109.26**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.73**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	**LF**	**374.16**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c)/12$ months	**LD**	**256.22**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		12.419	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$		L_{TI}	
hexane		2.3177	lb/month
benzene		2.5071	lb/month
TMP		2.9492	lb/month
toluene		3.0189	lb/month
ethylbenzene		0.2676	lb/month
xylenes		1.2490	lb/month
naphthalene		0.0410	lb/month
cumene		0.0687	lb/month

Vapor Weight Concentrations Eq. 40- $Z_{VI} = y_iM_i / M_V$

	M_i	M_V	Z_{VI}
hexane	86.18	60	0.00300
benzene	78.11	60	0.00315
2,2,4 TMP	114.23	60	0.00346
toluene	92.14	60	0.00316
ethylbenzene	106.17	60	0.00018
xylenes	106.17	60	0.00077
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
hexane	0.010314	4.922	0.00210
benzene	0.011951	4.922	0.00243
2,2,4 TMP	0.008971	4.922	0.00182
toluene	0.010156	4.922	0.00206
ethylbenzene	0.000495	4.922	0.00010
xylenes	0.002141	4.922	0.00044
naphthalene	0.000002	4.922	0.00000
cumene	0.000067	4.922	0.00001

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAI}
hexane	6.878	1171.5	224.37	0.9259
benzene	6.906	1211	220.79	0.5402
2,2,4 TMP	6.812	1257.8	220.74	0.2669
toluene	7.017	1377.6	222.64	0.1393
ethylbenzene	6.95	1419.3	212.61	0.0391
xylenes	7.009	1462.3	215.11	0.0338
naphthalene	7.146	1831.6	211.82	0.0007
cumene	6.929	1455.8	207.2	0.0167

MONTH March

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**894.55**	lb/month
		0.45	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	**147,043.02**	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	°R
Daily total solar insolation on a horizontal surface	**I**	1156.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**498.90**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	506.00	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	491.80	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	499.77	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**500.66**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.681	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.122	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^n)DP^* M_v K_c)/12$ months	L_R	**130.71**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.73**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_c)$	**LF**	**447.60**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_c)/12$ months	**LD**	**306.51**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		15.537	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{TI} = Z_{VI}(L_R + L_F + L_D) + Z_{LI}L_W$		L_{TI}	
hexane		2.9307	lb/month
benzene		3.1927	lb/month
2,2,4 TMP		3.7307	lb/month
toluene		3.7871	lb/month
ethylbenzene		0.3164	lb/month
xylenes		1.4616	lb/month
naphthalene		0.0414	lb/month
cumene		0.0768	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{VI} = y_iM_i / M_V$

	M_i	M_V	Z_{VI}
hexane	86.18	60	0.00320
benzene	78.11	60	0.00341
2,2,4 TMP	114.23	60	0.00378
toluene	92.14	60	0.00351
ethylbenzene	106.17	60	0.00020
xylenes	106.17	60	0.00088
naphthalene	128.17	60	0.00000
cumene	120.19	60	0.00003

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAI}(x_i)$	P_{VA}	y_i
hexane	0.012697	5.681	0.00224
benzene	0.014919	5.681	0.00263
2,2,4 TMP	0.011297	5.681	0.00199
toluene	0.013018	5.681	0.00229
ethylbenzene	0.000655	5.681	0.00012
xylenes	0.002839	5.681	0.00050
naphthalene	0.000003	5.681	0.00000
cumene	0.000090	5.681	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAI}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAI}
hexane	6.878	1171.5	224.37	1.1398
benzene	6.906	1211	220.79	0.6744
2,2,4 TMP	6.812	1257.8	220.74	0.3360
toluene	7.017	1377.6	222.64	0.1785
ethylbenzene	6.95	1419.3	212.61	0.0518
xylenes	7.009	1462.3	215.11	0.0449
naphthalene	7.146	1831.6	211.82	0.0010
cumene	6.929	1455.8	207.2	0.0226

MONTH April

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,031.45**	lb/month
		0.52	tons/month
Product Type		Gasoline - RVP 13.5	
Monthly Throughput (only change if actual is known)	Q_{month}	147,043.02	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	°R
Daily total solar insolation on a horizontal surface	**I**	1490.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**509.15**	°R
Average daily maximum ambient temperature, Table 7.1	T_{AX}	516.80	°R
Average daily minimum ambient temperature, Table 7.1	T_{AN}	501.50	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	510.27	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**511.42**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.201	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.136	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^b)DP^* M_v K_C)/12$ months	L_R	**150.93**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.73**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_C)$	**LF**	**516.85**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_C)/12$ months	**LD**	**353.93**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		20.485	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{Ti}	
hexane		3.8540	lb/month
benzene		4.2561	lb/month
2,2,4 TMP		4.9648	lb/month
toluene		5.0444	lb/month
ethylbenzene		0.4010	lb/month
xylenes		1.8313	lb/month
naphthalene		0.0420	lb/month
cumene		0.0913	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_i M_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	62	0.00368
benzene	78.11	62	0.00399
2,2,4 TMP	114.23	62	0.00448
toluene	92.14	62	0.00427
ethylbenzene	106.17	62	0.00026
xylenes	106.17	62	0.00113
naphthalene	128.17	62	0.00000
cumene	120.19	62	0.00004

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(X_i)$	P_{VA}	y_i
hexane	0.016404	6.201	0.00265
benzene	0.019660	6.201	0.00317
2,2,4 TMP	0.015073	6.201	0.00243
toluene	0.017820	6.201	0.00287
ethylbenzene	0.000938	6.201	0.00015
xylenes	0.004077	6.201	0.00066
naphthalene	0.000005	6.201	0.00000
cumene	0.000134	6.201	0.00002

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.5366
benzene	6.906	1211	220.79	0.9273
2,2,4 TMP	6.812	1257.8	220.74	0.4679
toluene	7.017	1377.6	222.64	0.2550
ethylbenzene	6.95	1419.3	212.61	0.0773
xylenes	7.009	1462.3	215.11	0.0672
naphthalene	7.146	1831.6	211.82	0.0016
cumene	6.929	1455.8	207.2	0.0349

MONTH May

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**812.92**	lb/month
		0.41	tons/month
Product Type		Gasoline - RVP 9	
Monthly Throughput (only change if actual is known)	Q_{month}	147,043.02	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1750.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**518.65**	°R
Average daily maximum ambient temperature, Tab	T_{AX}	526.50	°R
Average daily minimum ambient temperature, Tab	T_{AN}	510.80	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	519.96	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**521.32**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	4.763	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.098	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^b)DP^* M_v K_C)/12$ months	L_R	**118.65**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.73**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_C)$	**LF**	**406.31**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_C)/12$ months	**LD**	**278.23**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		25.046	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{Ti}	
hexane		4.6517	lb/month
benzene		5.2081	lb/month
2,2,4 TMP		6.0941	lb/month
toluene		6.2452	lb/month
ethylbenzene		0.4871	lb/month
xylenes		2.2098	lb/month
naphthalene		0.0428	lb/month
cumene		0.1067	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_i M_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	68	0.00567
benzene	78.11	68	0.00627
2,2,4 TMP	114.23	68	0.00710
toluene	92.14	68	0.00693
ethylbenzene	106.17	68	0.00044
xylenes	106.17	68	0.00190
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00007

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(X_i)$	P_{VA}	y_i
hexane	0.021310	4.763	0.00447
benzene	0.025982	4.763	0.00546
2,2,4 TMP	0.020138	4.763	0.00423
toluene	0.024350	4.763	0.00511
ethylbenzene	0.001333	4.763	0.00028
xylenes	0.005806	4.763	0.00122
naphthalene	0.000008	4.763	0.00000
cumene	0.000195	4.763	0.00004

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.9962
benzene	6.906	1211	220.79	1.2255
2,2,4 TMP	6.812	1257.8	220.74	0.6251
toluene	7.017	1377.6	222.64	0.3484
ethylbenzene	6.95	1419.3	212.61	0.1098
xylenes	7.009	1462.3	215.11	0.0957
naphthalene	7.146	1831.6	211.82	0.0026
cumene	6.929	1455.8	207.2	0.0509

MONTH June

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,033.22**	lb/month
		0.52	tons/month
Product Type		Gasoline - RVP 9	
Monthly Throughput (only change if actual is known)	Q_{month}	147,043.02	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	°R
Daily total solar insolation on a horizontal surface	**I**	1862.0	Btu/ft²-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**528.60**	°R
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	536.10	°R
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	521.10	°R
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	530.00	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**531.44**	°R
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.783	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.124	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb} v^b)DP^* M_v K_C)/12$ months	L_R	**151.19**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D]*[1+(N_cF_c/D)]$	L_W	**9.73**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_v K_C)$	**LF**	**517.75**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_D S_D D^2 P^* M_v K_C)/12$ months	**LD**	**354.55**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		34.090	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$		L_{Ti}	
hexane		6.2681	lb/month
benzene		7.1082	lb/month
TMP		8.3318	lb/month
toluene		8.6007	lb/month
ethylbenzene		0.6544	lb/month
xylenes		2.9454	lb/month
naphthalene		0.0444	lb/month
cumene		0.1367	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_i M_i / M_v$

	M_i	M_v	Z_{Vi}
hexane	86.18	68	0.00603
benzene	78.11	68	0.00677
2,2,4 TMP	114.23	68	0.00776
toluene	92.14	68	0.00774
ethylbenzene	106.17	68	0.00051
xylenes	106.17	68	0.00221
naphthalene	128.17	68	0.00000
cumene	120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(X_i)$	P_{VA}	y_i
hexane	0.027513	5.783	0.00476
benzene	0.034106	5.783	0.00590
2,2,4 TMP	0.026717	5.783	0.00462
toluene	0.033027	5.783	0.00571
ethylbenzene	0.001875	5.783	0.00032
xylenes	0.008195	5.783	0.00142
naphthalene	0.000012	5.783	0.00000
cumene	0.000281	5.783	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	2.5773
benzene	6.906	1211	220.79	1.6087
2,2,4 TMP	6.812	1257.8	220.74	0.8293
toluene	7.017	1377.6	222.64	0.4725
ethylbenzene	6.95	1419.3	212.61	0.1546
xylenes	7.009	1462.3	215.11	0.1351
naphthalene	7.146	1831.6	211.82	0.0040
cumene	6.929	1455.8	207.2	0.0735

MONTH July

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,175.98**	lb/month
		0.59	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is known)	Q_{month}	147,043.02	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	^oR
Daily total solar insolation on a horizontal surface	**I**	1904.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**533.90**	^oR
Average daily maximum ambient temperature, T	T_{AX}	541.10	^oR
Average daily minimum ambient temperature, T	T_{AN}	526.70	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	535.33	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**536.80**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.391	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.142	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}V^n)DP^*M_vK_c)/12$ months	L_R	**172.28**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D)^*[1+(N_cF_c/D)]$	L_W	**9.73**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**589.97**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_D D^2P^*M_vK_c)/12$ months	LD	**404.00**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		40.260	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		7.3489	lb/month
benzene		8.3912	lb/month
2,2,4 TMP		9.8529	lb/month
toluene		10.2250	lb/month
ethylbenzene		0.7725	lb/month
xylenes		3.4655	lb/month
naphthalene		0.0455	lb/month
cumene		0.1581	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_V$

		M_i	M_V	Z_{Vi}
hexane		86.18	68	0.00622
benzene		78.11	68	0.00704
2,2,4 TMP		114.23	68	0.00811
toluene		92.14	68	0.00818
ethylbenzene		106.17	68	0.00055
xylenes		106.17	68	0.00239
naphthalene		128.17	68	0.00000
cumene		120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

		$P_i = P_{VAi}(X_i)$	P_{VA}	y_i
hexane		0.031357	6.391	0.00491
benzene		0.039198	6.391	0.00613
2,2,4 TMP		0.030873	6.391	0.00483
toluene		0.038599	6.391	0.00604
ethylbenzene		0.002233	6.391	0.00035
xylenes		0.009773	6.391	0.00153
naphthalene		0.000015	6.391	0.00000
cumene		0.000339	6.391	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

		Z_{Li}	M_L	M_i	X_i
hexane		0.01	92	86.18	0.01068
benzene		0.018	92	78.11	0.02120
2,2,4 TMP		0.04	92	114.23	0.03222
toluene		0.07	92	92.14	0.06989
ethylbenzene		0.014	92	106.17	0.01213
xylenes		0.07	92	106.17	0.06066
naphthalene		0.00415	92	128.17	0.00298
cumene		0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

		A	B	C	P_{VAi}
hexane		6.878	1171.5	224.37	2.9373
benzene		6.906	1211	220.79	1.8489
2,2,4 TMP		6.812	1257.8	220.74	0.9583
toluene		7.017	1377.6	222.64	0.5523
ethylbenzene		6.95	1419.3	212.61	0.1841
xylenes		7.009	1462.3	215.11	0.1611
naphthalene		7.146	1831.6	211.82	0.0050
cumene		6.929	1455.8	207.2	0.0887

MONTH August

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,146.81**	lb/month
		0.57	tons/month
Product Type		**Gasoline - RVP 9**	
Monthly Throughput (only change if actual is know	Q_{month}	147,043.02	barrels/month
Vapor Molecular weight	M_v	**68.00**	
Vapor Pressure Equation Constant A	A	11.76	
Vapor Pressure Equation Constant B	B	5315.06	^oR
Daily total solar insolation on a horizontal surface	**I**	1685.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**533.20**	^oR
Average daily maximum ambient temper	T_{AX}	540.10	^oR
Average daily minimum ambient tempera	T_{AN}	526.30	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	534.46	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**535.77**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.270	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.138	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}V^n)DP^*M_vK_c)/12$ months	L_R	**167.97**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D)^*[1+(N_cF_c/D)]$	L_W	**9.73**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**575.21**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_D D^2P^*M_vK_c)/12$ months	LD	**393.89**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		38.982	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		7.1263	lb/month
benzene		8.1262	lb/month
2,2,4 TMP		9.5382	lb/month
toluene		9.8876	lb/month
ethylbenzene		0.7478	lb/month
xylenes		3.3568	lb/month
naphthalene		0.0453	lb/month
cumene		0.1536	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_V$

		M_i	M_V	Z_{Vi}
hexane		86.18	68	0.00618
benzene		78.11	68	0.00699
2,2,4 TMP		114.23	68	0.00805
toluene		92.14	68	0.00810
ethylbenzene		106.17	68	0.00054
xylenes		106.17	68	0.00235
naphthalene		128.17	68	0.00000
cumene		120.19	68	0.00009

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

		$P_i = P_{VAi}(X_i)$	P_{VA}	y_i
hexane		0.030584	6.270	0.00488
benzene		0.038170	6.270	0.00609
2,2,4 TMP		0.030033	6.270	0.00479
toluene		0.037467	6.270	0.00598
ethylbenzene		0.002160	6.270	0.00034
xylenes		0.009450	6.270	0.00151
naphthalene		0.000014	6.270	0.00000
cumene		0.000327	6.270	0.00005

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

		Z_{Li}	M_L	M_i	X_i
hexane		0.01	92	86.18	0.01068
benzene		0.018	92	78.11	0.02120
2,2,4 TMP		0.04	92	114.23	0.03222
toluene		0.07	92	92.14	0.06989
ethylbenzene		0.014	92	106.17	0.01213
xylenes		0.07	92	106.17	0.06066
naphthalene		0.00415	92	128.17	0.00298
cumene		0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

		A	B	C	P_{VAi}
hexane		6.878	1171.5	224.37	2.8649
benzene		6.906	1211	220.79	1.8004
2,2,4 TMP		6.812	1257.8	220.74	0.9322
toluene		7.017	1377.6	222.64	0.5361
ethylbenzene		6.95	1419.3	212.61	0.1781
xylenes		7.009	1462.3	215.11	0.1558
naphthalene		7.146	1831.6	211.82	0.0048
cumene		6.929	1455.8	207.2	0.0856

MONTH eptember

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,594.22**	lb/month
		0.80	tons/month
Product Type		**Gasoline - RVP 13.5**	
Monthly Throughput (only change if actual is known)	Q_{month}	147,043.02	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	^oR
Daily total solar insolation on a horizontal surface	**I**	1320.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**526.15**	^oR
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	533.40	^oR
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	518.90	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	527.14	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**528.16**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	8.462	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^{0.5})^2$	**P***	0.211	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}V^n)DP^*M_vK_c)/12$ months	L_R	**234.06**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[((0.943)QCsW_v)/D)^*[1+(N_cF_c/D)]$	L_W	**9.73**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**801.54**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_D D^2P^*M_vK_c)/12$ months	LD	**548.88**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		35.979	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} = Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		6.6982	lb/month
benzene		7.5525	lb/month
2,2,4 TMP		8.8122	lb/month
toluene		9.0208	lb/month
ethylbenzene		0.6756	lb/month
xylenes		3.0356	lb/month
naphthalene		0.0444	lb/month
cumene		0.1395	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_V$

		M_i	M_V	Z_{Vi}
hexane		86.18	62	0.00417
benzene		78.11	62	0.00466
2,2,4 TMP		114.23	62	0.00532
toluene		92.14	62	0.00526
ethylbenzene		106.17	62	0.00034
xylenes		106.17	62	0.00149
naphthalene		128.17	62	0.00000
cumene		120.19	62	0.00006

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

		$P_i = P_{VAi}(X_i)$	P_{VA}	y_i
hexane		0.025362	8.462	0.00300
benzene		0.031274	8.462	0.00370
2,2,4 TMP		0.024416	8.462	0.00289
toluene		0.029970	8.462	0.00354
ethylbenzene		0.001682	8.462	0.00020
xylenes		0.007343	8.462	0.00087
naphthalene		0.000010	8.462	0.00000
cumene		0.000250	8.462	0.00003

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

		Z_{Li}	M_L	M_i	X_i
hexane		0.01	92	86.18	0.01068
benzene		0.018	92	78.11	0.02120
2,2,4 TMP		0.04	92	114.23	0.03222
toluene		0.07	92	92.14	0.06989
ethylbenzene		0.014	92	106.17	0.01213
xylenes		0.07	92	106.17	0.06066
naphthalene		0.00415	92	128.17	0.00298
cumene		0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

		A	B	C	P_{VAi}
hexane		6.878	1171.5	224.37	2.3757
benzene		6.906	1211	220.79	1.4751
2,2,4 TMP		6.812	1257.8	220.74	0.7579
toluene		7.017	1377.6	222.64	0.4288
ethylbenzene		6.95	1419.3	212.61	0.1387
xylenes		7.009	1462.3	215.11	0.1211
naphthalene		7.146	1831.6	211.82	0.0035
cumene		6.929	1455.8	207.2	0.0654

MONTH October

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,163.35**	lb/month
		0.58	tons/month
Product Type		**Gasoline - RVP 13.5**	
Monthly Throughput (only change if actual is known)	Q_{month}	147,043.02	barrels/month
Vapor Molecular weight	M_v	**62.00**	
Vapor Pressure Equation Constant A	A	11.63	
Vapor Pressure Equation Constant B	B	5015.72	^oR
Daily total solar insolation on a horizontal surface	**I**	948.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**514.75**	^oR
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	522.40	^oR
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	507.10	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	515.46	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**516.20**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.790	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.154	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**170.42**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**9.73**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**583.58**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	LD	**399.62**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		23.937	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		4.4990	lb/month
benzene		4.9970	lb/month
2,2,4 TMP		5.8243	lb/month
toluene		5.9213	lb/month
ethylbenzene		0.4602	lb/month
xylenes		2.0907	lb/month
naphthalene		0.0425	lb/month
cumene		0.1015	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}	
hexane	86.18	62	0.00382	
benzene	78.11	62	0.00418	
2,2,4 TMP	114.23	62	0.00471	
toluene	92.14	62	0.00454	
ethylbenzene	106.17	62	0.00028	
xylenes	106.17	62	0.00122	
naphthalene	128.17	62	0.00000	
cumene	120.19	62	0.00005	

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i	
hexane	0.018638	6.790	0.00275	
benzene	0.022527	6.790	0.00332	
2,2,4 TMP	0.017363	6.790	0.00256	
toluene	0.020754	6.790	0.00306	
ethylbenzene	0.001114	6.790	0.00016	
xylenes	0.004845	6.790	0.00071	
naphthalene	0.000006	6.790	0.00000	
cumene	0.000161	6.790	0.00002	

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	92	86.18	0.01068
benzene	0.018	92	78.11	0.02120
2,2,4 TMP	0.04	92	114.23	0.03222
toluene	0.07	92	92.14	0.06989
ethylbenzene	0.014	92	106.17	0.01213
xylenes	0.07	92	106.17	0.06066
naphthalene	0.00415	92	128.17	0.00298
cumene	0.005	92	120.19	0.00383

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.7459
benzene	6.906	1211	220.79	1.0625
2,2,4 TMP	6.812	1257.8	220.74	0.5390
toluene	7.017	1377.6	222.64	0.2969
ethylbenzene	6.95	1419.3	212.61	0.0918
xylenes	7.009	1462.3	215.11	0.0799
naphthalene	7.146	1831.6	211.82	0.0020
cumene	6.929	1455.8	207.2	0.0420

MONTH November

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**1,030.33**	lb/month
		0.52	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	147,043.02	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	^oR
Daily total solar insolation on a horizontal surface	**I**	621.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**505.35**	^oR
Average daily maximum ambient temperature, Table 7.1-7	T_{AX}	512.10	^oR
Average daily minimum ambient temperature, Table 7.1-7	T_{AN}	498.60	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	505.82	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**506.30**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	6.340	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.140	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**150.77**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**9.73**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**516.29**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	LD	**353.55**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		18.635	lb/month
Individual HAP Monthly Emissions Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		3.5282	lb/month
benzene		3.8677	lb/month
2,2,4 TMP		4.5052	lb/month
toluene		4.5592	lb/month
ethylbenzene		0.3666	lb/month
xylenes		1.6807	lb/month
naphthalene		0.0417	lb/month
cumene		0.0852	lb/month

Vapor Weight Concentrations Eq. 40-6 $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}	
hexane	86.18	60	0.00336	
benzene	78.11	60	0.00362	
2,2,4 TMP	114.23	60	0.00403	
toluene	92.14	60	0.00380	
ethylbenzene	106.17	60	0.00023	
xylenes	106.17	60	0.00098	
naphthalene	128.17	60	0.00000	
cumene	120.19	60	0.00004	

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i	
hexane	0.014875	6.340	0.00235	
benzene	0.017664	6.340	0.00279	
2,2,4 TMP	0.013463	6.340	0.00212	
toluene	0.015726	6.340	0.00248	
ethylbenzene	0.000811	6.340	0.00013	
xylenes	0.003518	6.340	0.00055	
naphthalene	0.000004	6.340	0.00000	
cumene	0.000114	6.340	0.00002	

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.3354
benzene	6.906	1211	220.79	0.7984
2,2,4 TMP	6.812	1257.8	220.74	0.4005
toluene	7.017	1377.6	222.64	0.2156
ethylbenzene	6.95	1419.3	212.61	0.0641
xylenes	7.009	1462.3	215.11	0.0556
naphthalene	7.146	1831.6	211.82	0.0013
cumene	6.929	1455.8	207.2	0.0285

MONTH December

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Total VOC Losses (Eq.2-1 & 2-2: $L_T = L_R+L_W+L_F+L_D$)	**LT**	**802.24**	lb/month
		0.40	tons/month
Product Type		**Gasoline - RVP 15**	
Monthly Throughput (only change if actual is known)	Q_{month}	147,043.02	barrels/month
Vapor Molecular weight	M_v	**60.15**	
Vapor Pressure Equation Constant A	A	11.60	
Vapor Pressure Equation Constant B	B	4937.93	^oR
Daily total solar insolation on a horizontal surface	**I**	501.0	Btu/ft^2-day
Average Daily Ambient Temperature Eq. 1-30			
TAA = ((TAX+TAN)/2)	T_{AA}	**495.50**	^oR
Average daily maximum ambient temperature, Table 7.1	T_{AX}	501.80	^oR
Average daily minimum ambient temperature, Table 7.1	T_{AN}	489.20	^oR
Liquid Bulk Temperature Eq 1-31:			
TB = TAA + 0.003 αs I	T_B	495.88	
Average Daily Liquid Surface Temperature Eq. 1-28			
TLA = 0.3*TAA + 0.7*TB + 0.004*α*I	T_{LA}	**496.26**	^oR
True Vapor Pressure Eq. 1-25:			
PvA = exp(A-(B/TLA))	P_{vA}	5.205	psia
Vapor pressure function Eq. 2-4:			
$P^*=P_{vA}/P_A/(1+(1-(P_{vA}/P_A))^{0.5})^2$	**P***	0.109	NA
Rim Seal Losses Eq. 2-3:			
$L_R = ((K_{Ra} + K_{Rb}v^n)DP^*M_vK_c)/12$ months	L_R	**117.07**	lb/month
Withdrawal losses Eq. 2-19:			
$L_W=[(0.943)QCsW_v)/D]^*[1+(N_cF_c/D)]$	L_W	**9.73**	lb/month
Deck Fitting Losses Eq.2-13:			
$L_F = F_F P^*M_vK_c)$	LF	**400.91**	lb/month
Deck Seam Losses Eq. 2-18:			
$L_D = K_DS_DD^2P^*M_vK_c)/12$ months	LD	**274.53**	lb/month
HAPS Speciation			
Product - same as January		Gasoline	
Total HAP Monthly Emissions		13.529	lb/month
Individual HAP Monthly Em Eq. 40-2 $L_{Ti} =Z_{Vi}(L_R + L_F + L_D) + Z_{Li}L_W$			
		L_{Ti}	
hexane		2.5375	lb/month
benzene		2.7520	lb/month
TMP		3.2276	lb/month
toluene		3.2911	lb/month
ethylbenzene		0.2847	lb/month
xylenes		1.3236	lb/month
naphthalene		0.0412	lb/month
cumene		0.0715	lb/month

Vapor Weight Concentratio $Z_{Vi} = y_iM_i / M_v$

	M_i	M_v	Z_{Vi}	
hexane	86.18	60	0.00308	
benzene	78.11	60	0.00325	
2,2,4 TMP	114.23	60	0.00358	
toluene	92.14	60	0.00329	
ethylbenzene	106.17	60	0.00019	
xylenes	106.17	60	0.00081	
naphthalene	128.17	60	0.00000	
cumene	120.19	60	0.00003	

Vapor Mole Fraction Eq. 40-5 $y_i = P_i / P_{VA}$

	$P_i = P_{VAi}(x_i)$	P_{VA}	y_i	
hexane	0.011186	5.205	0.00215	
benzene	0.013033	5.205	0.00250	
2,2,4 TMP	0.009817	5.205	0.00189	
toluene	0.011191	5.205	0.00215	
ethylbenzene	0.000553	5.205	0.00011	
xylenes	0.002391	5.205	0.00046	
naphthalene	0.000002	5.205	0.00000	
cumene	0.000075	5.205	0.00001	

Liquid Mole Fraction Eq. 40-4 $x_i = (Z_{Li}M_L)/M_i$

	Z_{Li}	M_L	M_i	X_i
hexane	0.01	96	86.18	0.01114
benzene	0.018	96	78.11	0.02212
2,2,4 TMP	0.04	96	114.23	0.03362
toluene	0.07	96	92.14	0.07293
ethylbenzene	0.014	96	106.17	0.01266
xylenes	0.07	96	106.17	0.06329
naphthalene	0.00415	96	128.17	0.00311
cumene	0.005	96	120.19	0.00399

Component Vapor pressure $P_{VAi}=(0.019337)10^{(A-(B/(TLA+C)))}$

	A	B	C	P_{VAi}
hexane	6.878	1171.5	224.37	1.0042
benzene	6.906	1211	220.79	0.5891
2,2,4 TMP	6.812	1257.8	220.74	0.2920
toluene	7.017	1377.6	222.64	0.1534
ethylbenzene	6.95	1419.3	212.61	0.0436
xylenes	7.009	1462.3	215.11	0.0378
naphthalene	7.146	1831.6	211.82	0.0008
cumene	6.929	1455.8	207.2	0.0188

Monthly Calculations - JANUARY

Tank No.		17413						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**9.14**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**192.30**	lb/month	Vapor Space Volume	Vv	206626.8	ft3
		9.62E-02	ton/month	Stock Vapor Density	Wv	0.0001	lb/ft3
Time Period		**January**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.024	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**560.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**183.17**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	12,829,821	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2393	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0001	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0024	psia
				Vapor Space Outage	Hvo	19.22	ft
Tank design data							
Shell height	Hs	**36.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0240**	**per day**
Diameter	D	**117.00**	ft	Average Daily Vapor Temperature Range	ΔTv	11.76	°R
Throughput	Q	**95,983,697**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0005	psi
Turnovers	N	**413.25**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0024	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	491.45	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**35.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**18.00**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN	ΔTA	12.8	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.76**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.48**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00053**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.00270	psia
	PBV	**-0.03**		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp	PVN	0.00217	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	494.39	°R
Not Insulated	P_{VA}	0.002422766		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	488.51	°R
Partially Insulated	P_{VA}	0.002426522					
Fully Insulated	P_{VA}	0.002375646		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00047**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.00267	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**490.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0022019	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	496.90	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	494.11	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	484.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	488.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	490.92	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**206,626.84**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**491.45**	°R	Tank diameter	D	117.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**491.49**	°R	Vapor Space Outage; see Equation 1-16	Hvo	19.22	ft
Fully Insulated: TLA = TB	**TLA**	**490.9**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**19.22**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	36.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**491.89**	**°R**	Liquid Height	HL	18.00	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**492.07**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	1.22	ft
Fully Insulated; Tv = TB	**Tv**	**490.92**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**1.22**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	5.967E-05		Tank shell radius	Rs	58.50	ft
Partially Insulated	Wv	5.974E-05					
Fully Insulated	Wv	5.862E-05		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**8.03**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	117.00	ft
				Tank shell radius	Rs	58.50	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**16.404**

	Vapor Weight Concentrations				Vapor Mole Fraction			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.1000	86.18	130	0.00052	0.000002	0.002	**0.00078**
benzene	0.5813	78.11	130	0.00302	0.000012	0.002	**0.00503**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.002	**-**
toluene	4.7588	92.14	130	0.02475	0.000085	0.002	**0.03491**
ethylbenzene	0.5380	106.17	130	0.00280	0.000008	0.002	**0.00343**
xylenes	10.3736	106.17	130	0.05394	0.000160	0.002	**0.06605**
naphthalene	0.0524	128.17	130	2.72E-04	6.69E-07	0.002	**2.76E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.002	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	0.8715
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.5064
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.2495
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.1296
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0361
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0312
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0006
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0153

Monthly Calculations (continued) FEBRUARY

Tank No.		17413						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**10.15**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**201.87**	lb/month	Vapor Space Volume	Vv	206626.8	ft3
		1.01E-01	ton/month	Stock Vapor Density	Wv	0.0001	lb/ft3
Time Period		**February**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.027	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**847.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	28	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**191.72**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	12,829,821	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2322	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0001	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0026	psia
				Vapor Space Outage	Hvo	19.22	ft
Tank design data							
Shell height	Hs	**36.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0273**	**per day**
Diameter	D	**117.00**	ft	Average Daily Vapor Temperature Range	ΔTv	13.48	°R
Throughput	Q	**95,983,697**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0006	psi
Turnovers	N	**457.53**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0026	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	493.64	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**35.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**18.00**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN	ΔTA	13.2	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**13.48**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**12.16**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00065**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.00297	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp	PVN	0.00232	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	497.01	°R
Not Insulated	P_{VA}	0.002625413		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	490.27	°R
Partially Insulated	P_{VA}	0.002631515					
Fully Insulated	P_{VA}	0.002549197		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00059**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.00294	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**492.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0023533	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	498.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	496.74	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	485.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	490.66	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	492.84	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**206,626.84**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**493.64**	°R	Tank diameter	D	117.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**493.70**	°R	Vapor Space Outage; see Equation 1-16	Hvo	19.22	ft
Fully Insulated: TLA = TB	**TLA**	**492.8**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**19.22**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	36.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**494.30**	**°R**	Liquid Height	HL	18.00	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**494.57**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	1.22	ft
Fully Insulated; Tv = TB	**Tv**	**492.84**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**1.22**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	6.434E-05		Tank shell radius	Rs	58.50	ft
Partially Insulated	Wv	6.446E-05					
Fully Insulated	Wv	6.266E-05		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**8.03**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	117.00	ft
				Tank shell radius	Rs	58.50	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**17.288**

	Vapor Weight Concentrations				Vapor Mole Fraction			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.1034	86.18	130	0.00051	0.000002	0.003	**0.00077**
benzene	0.6035	78.11	130	0.00299	0.000013	0.003	**0.00498**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.003	**-**
toluene	4.9811	92.14	130	0.02467	0.000091	0.003	**0.03481**
ethylbenzene	0.5689	106.17	130	0.00282	0.000009	0.003	**0.00345**
xylenes	10.9741	106.17	130	0.05436	0.000175	0.003	**0.06656**
naphthalene	0.0569	128.17	130	2.82E-04	7.50E-07	0.003	**2.86E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.003	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	0.9299
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.5427
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.2682
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.1400
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0394
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0340
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0007
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0168

Monthly Calculations (continued) **MARCH**

Tank No.		17413						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**16.51**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**268.94**	lb/month	Vapor Space Volume	Vv	206626.8	ft3
		1.34E-01	ton/month	Stock Vapor Density	Wv	0.0001	lb/ft3
Time Period		**March**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.031	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1156.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**252.43**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	12,829,821	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2393	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0001	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0034	psia
				Vapor Space Outage	Hvo	19.22	ft
Tank design data							
Shell height	Hs	**36.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0315**	**per day**
Diameter	D	**117.00**	ft	Average Daily Vapor Temperature Range	ΔTv	15.72	°R
Throughput	Q	**95,983,697**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0010	psi
Turnovers	N	**413.25**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0034	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	500.87	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**35.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**18.00**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔTA	14.2	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.72**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**14.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00095**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.00391	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp(	PVN	0.00296	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	504.80	°R
Not Insulated	P_{VA}	0.003405962		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	496.94	°R
Partially Insulated	P_{VA}	0.003416461					
Fully Insulated	P_{VA}	0.003275433		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00087**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.00388	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**498.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0030066	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	506.00	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	504.53	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	491.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	497.38	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	499.77	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**206,626.84**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**500.87**	°R	Tank diameter	D	117.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**500.95**	°R	Vapor Space Outage; see Equation 1-16	Hvo	19.22	ft
Fully Insulated: TLA = TB	**TLA**	**499.8**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**19.22**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	36.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**501.76**	**°R**	Liquid Height	HL	18.00	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**502.14**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	1.22	ft
Fully Insulated; Tv = TB	**Tv**	**499.77**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**1.22**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	8.223E-05		Tank shell radius	Rs	58.50	ft
Partially Insulated	Wv	8.242E-05					
Fully Insulated	Wv	7.940E-05		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**8.03**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	117.00	ft
				Tank shell radius	Rs	58.50	ft

HAPS Speciation	**lb/month**							
Product	Diesel							
Total HAP Emissions =	**23.301**	**Vapor Weight Concentrations**				**Vapor Mole Fraction**		
		Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$				Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA
Individual HAPS	L_{Ti} **(lb/yr)**	M_i	M_V	Z_{Vi}		$P_i = P_{VA}(x_i)$	P_{VA}	y_i
hexane	0.1309	86.18	130	0.00049		0.000003	0.003	**0.00073**
benzene	0.7748	78.11	130	0.00288		0.000016	0.003	**0.00479**
2,2,4 TMP	0.0000	114.23	130	0.00000		0.000000	0.003	-
toluene	6.5673	92.14	130	0.02442		0.000117	0.003	**0.03445**
ethylbenzene	0.7744	106.17	130	0.00288		0.000012	0.003	**0.00353**
xylenes	14.9689	106.17	130	0.05566		0.000232	0.003	**0.06815**
naphthalene	0.0842	128.17	130	3.13E-04		1.08E-06	0.003	**3.18E-04**
cumene	0.0000	120.19	130	0.00E+00		0.00E+00	0.003	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	Z_{Li}	M_L	M_i	X_i	**A**	**B**	**C**	P_{VAi}
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	1.1464
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.6785
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.3382
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.1797
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0522
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0452
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0010
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0228

Monthly Calculations (continued) **APRIL**

Tank No.		17413						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**25.72**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**381.90**	lb/month	Vapor Space Volume	Vv	206626.8	ft3
		1.91E-01	ton/month	Stock Vapor Density	Wv	0.0001	lb/ft3
Time Period		**April**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.036	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	0.99	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1490.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**356.18**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	12,829,821	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2369	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0001	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**0.99**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0050	psia
				Vapor Space Outage	Hvo	19.22	ft
Tank design data							
Shell height	Hs	**36.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0356**	**per day**
Diameter	D	**117.00**	ft	Average Daily Vapor Temperature Range	ΔTv	18.16	°R
Throughput	Q	**95,983,697**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0015	psi
Turnovers	N	**427.02**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0050	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	511.68	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**35.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**18.00**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.16**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.63**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00154**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.00578	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp(	PVN	0.00424	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	516.22	°R
Not Insulated	P_{VA}	0.004960435		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	507.14	°R
Partially Insulated	P_{VA}	0.004979324					
Fully Insulated	P_{VA}	0.004726595		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00141**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.00573	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**509.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0043179	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	516.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	515.95	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	501.50	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	507.64	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	510.27	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**206,626.84**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**511.68**	°R	Tank diameter	D	117.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**511.79**	°R	Vapor Space Outage; see Equation 1-16	Hvo	19.22	ft
Fully Insulated: TLA = TB	**TLA**	**510.3**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**19.22**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	36.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**512.84**	**°R**	Liquid Height	HL	18.00	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**513.32**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	1.22	ft
Fully Insulated; Tv = TB	**Tv**	**510.27**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**1.22**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	1.172E-04		Tank shell radius	Rs	58.50	ft
Partially Insulated	Wv	1.175E-04					
Fully Insulated	Wv	1.122E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**8.03**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	117.00	ft
				Tank shell radius	Rs	58.50	ft

HAPS Speciation	**lb/month**							
Product	Diesel							
Total HAP Emissions =	**33.550**	**Vapor Weight Concentrations**				**Vapor Mole Fraction**		
		Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$				Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA
Individual HAPS	L_{Ti} **(lb/yr)**	M_i	M_V	Z_{Vi}		$P_i = P_{VA}(x_i)$	P_{VA}	y_i
hexane	0.1723	86.18	130	0.00045		0.000003	0.005	**0.00068**
benzene	1.0403	78.11	130	0.00272		0.000022	0.005	**0.00453**
2,2,4 TMP	0.0000	114.23	130	0.00000		0.000000	0.005	-
toluene	9.1605	92.14	130	0.02399		0.000168	0.005	**0.03384**
ethylbenzene	1.1301	106.17	130	0.00296		0.000018	0.005	**0.00362**
xylenes	21.9084	106.17	130	0.05737		0.000348	0.005	**0.07024**
naphthalene	0.1387	128.17	130	3.63E-04		1.83E-06	0.005	**3.68E-04**
cumene	0.0000	120.19	130	0.00E+00		0.00E+00	0.005	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	Z_{Li}	M_L	M_i	X_i	**A**	**B**	**C**	P_{VAi}
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	1.5475
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.9343
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.4715
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.2571
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0781
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0679
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0016
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0352

Monthly Calculations (continued) **MAY**

Tank No.		17413						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**38.70**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**530.19**	lb/month	Vapor Space Volume	Vv	206626.8	ft3
		2.65E-01	ton/month	Stock Vapor Density	Wv	0.0002	lb/ft3
Time Period		**May**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.038	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	0.99	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1750.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**491.50**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	12,829,821	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2393	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0002	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**0.99**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0069	psia
				Vapor Space Outage	Hvo	19.22	ft
Tank design data							
Shell height	Hs	**36.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0380**	**per day**
Diameter	D	**117.00**	ft	Average Daily Vapor Temperature Range	ΔTv	19.74	°R
Throughput	Q	**95,983,697**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0022	psi
Turnovers	N	**413.25**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0069	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	521.63	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**35.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**18.00**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔTA	15.7	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.74**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.17**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00224**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.00811	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp(	PVN	0.00587	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	526.56	°R
Not Insulated	P_{VA}	0.006912076		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	516.69	°R
Partially Insulated	P_{VA}	0.00694183					
Fully Insulated	P_{VA}	0.006544819		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00207**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.00804	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**518.65**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0059753	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	526.50	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	526.30	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	510.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	517.21	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	519.96	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**206,626.84**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**521.63**	°R	Tank diameter	D	117.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**521.76**	°R	Vapor Space Outage; see Equation 1-16	Hvo	19.22	ft
Fully Insulated: TLA = TB	**TLA**	**520.0**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**19.22**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	36.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**522.98**	**°R**	Liquid Height	HL	18.00	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**523.55**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	1.22	ft
Fully Insulated; Tv = TB	**Tv**	**519.96**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**1.22**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	1.601E-04		Tank shell radius	Rs	58.50	ft
Partially Insulated	Wv	1.606E-04					
Fully Insulated	Wv	1.525E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**8.03**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	117.00	ft
				Tank shell radius	Rs	58.50	ft

HAPS Speciation	lb/month						
Product	Diesel						
Total HAP Emissions =	**47.018**	**Vapor Weight Concentrations**			**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.2232	86.18	130	0.00042	0.000004	0.007	**0.00063**
benzene	1.3709	78.11	130	0.00259	0.000030	0.007	**0.00430**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.007	-
toluene	12.4838	92.14	130	0.02355	0.000230	0.007	**0.03322**
ethylbenzene	1.6009	106.17	130	0.00302	0.000026	0.007	**0.00370**
xylenes	31.1211	106.17	130	0.05870	0.000497	0.007	**0.07187**
naphthalene	0.2183	128.17	130	4.12E-04	2.89E-06	0.007	**4.18E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.007	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000	6.878	1171.5	224.37	2.0120
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.2359
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.6306
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.3517
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1110
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0967
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0026
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0515

Monthly Calculations (continued) **JUNE**

Tank No.		17413						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**50.01**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**711.09**	lb/month	Vapor Space Volume	Vv	206626.8	ft3
		3.56E-01	ton/month	Stock Vapor Density	Wv	0.0002	lb/ft3
Time Period		**June**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.037	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	0.99	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1862.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**661.08**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	12,829,821	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2369	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0002	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**0.99**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0096	psia
				Vapor Space Outage	Hvo	19.22	ft
Tank design data							
Shell height	Hs	**36.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0375**	**per day**
Diameter	D	**117.00**	ft	Average Daily Vapor Temperature Range	ΔTv	19.81	°R
Throughput	Q	**95,983,697**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0030	psi
Turnovers	N	**427.02**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0096	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	531.77	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**35.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**18.00**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔTA	15.0	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.81**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.31**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00299**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.01117	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp(	PVN	0.00818	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	536.72	°R
Not Insulated	P_{VA}	0.009572436		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	526.81	°R
Partially Insulated	P_{VA}	0.009614625					
Fully Insulated	P_{VA}	0.009051984		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00278**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.01109	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**528.60**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0083139	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	536.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	536.48	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	521.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	527.33	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	530.00	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**206,626.84**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**531.77**	°R	Tank diameter	D	117.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**531.91**	°R	Vapor Space Outage; see Equation 1-16	Hvo	19.22	ft
Fully Insulated: TLA = TB	**TLA**	**530.0**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**19.22**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	36.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**533.21**	**°R**	Liquid Height	HL	18.00	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**533.81**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	1.22	ft
Fully Insulated; Tv = TB	**Tv**	**530.00**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**1.22**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	2.175E-04		Tank shell radius	Rs	58.50	ft
Partially Insulated	Wv	2.182E-04					
Fully Insulated	Wv	2.069E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**8.03**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	117.00	ft
				Tank shell radius	Rs	58.50	ft

HAPS Speciation	lb/month						
Product	Diesel						
Total HAP Emissions =	**63.482**	**Vapor Weight Concentrations**			**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.2791	86.18	130	0.00039	0.000006	0.010	**0.00059**
benzene	1.7430	78.11	130	0.00245	0.000039	0.010	**0.00408**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.010	-
toluene	16.4002	92.14	130	0.02306	0.000311	0.010	**0.03254**
ethylbenzene	2.1823	106.17	130	0.00307	0.000036	0.010	**0.00376**
xylenes	42.5473	106.17	130	0.05983	0.000701	0.010	**0.07326**
naphthalene	0.3297	128.17	130	4.64E-04	4.50E-06	0.010	**4.70E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.010	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000	6.878	1171.5	224.37	2.5981
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.6225
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.8367
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.4771
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1563
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.1366
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0041
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0744

Monthly Calculations (continued) **JULY**

Tank No.		17413						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**59.20**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**840.62**	lb/month	Vapor Space Volume	Vv	206626.8	ft3
		4.20E-01	ton/month	Stock Vapor Density	Wv	0.0003	lb/ft3
Time Period		**July**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.037	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	0.99	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1904.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**781.43**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	12,829,821	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2393	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0003	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**0.99**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0113	psia
				Vapor Space Outage	Hvo	19.22	ft
Tank design data							
Shell height	Hs	**36.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0367**	**per day**
Diameter	D	**117.00**	ft	Average Daily Vapor Temperature Range	ΔTv	19.60	°R
Throughput	Q	**95,983,697**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0034	psi
Turnovers	N	**413.25**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0113	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	537.14	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**35.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**18.00**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔTA	14.4	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.60**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.16**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00343**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.01315	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp(	PVN	0.00972	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	542.04	°R
Not Insulated	P_{VA}	0.011317921		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	532.24	°R
Partially Insulated	P_{VA}	0.011367913					
Fully Insulated	P_{VA}	0.010701221		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00319**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.01306	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**533.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0098702	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	541.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	541.82	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.70	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	532.74	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	535.33	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**206,626.84**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**537.14**	°R	Tank diameter	D	117.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**537.28**	°R	Vapor Space Outage; see Equation 1-16	Hvo	19.22	ft
Fully Insulated: TLA = TB	**TLA**	**535.3**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**19.22**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	36.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**538.61**	**°R**	Liquid Height	HL	18.00	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**539.23**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	1.22	ft
Fully Insulated; Tv = TB	**Tv**	**535.33**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**1.22**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	2.546E-04		Tank shell radius	Rs	58.50	ft
Partially Insulated	Wv	2.554E-04					
Fully Insulated	Wv	2.422E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**8.03**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	117.00	ft
				Tank shell radius	Rs	58.50	ft

HAPS Speciation	**lb/month**							
Product	Diesel							
Total HAP Emissions =	**75.229**	**Vapor Weight Concentrations**				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV				Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**		**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.3180	86.18	130	0.00038		0.000006	0.011	**0.00057**
benzene	2.0029	78.11	130	0.00238		0.000045	0.011	**0.00397**
2,2,4 TMP	0.0000	114.23	130	0.00000		0.000000	0.011	-
toluene	19.1644	92.14	130	0.02280		0.000364	0.011	**0.03217**
ethylbenzene	2.5981	106.17	130	0.00309		0.000043	0.011	**0.00378**
xylenes	50.7321	106.17	130	0.06035		0.000836	0.011	**0.07390**
naphthalene	0.4136	128.17	130	4.92E-04		5.65E-06	0.011	**4.99E-04**
cumene	0.0000	120.19	130	0.00E+00		0.00E+00	0.011	**0.00E+00**
	Liquid Mole Fraction					**Component Vapor Pressure**		
	Eq. 40-4 xi = (ZLiML)/Mi					PVAi=(0.019337)10^(A-(B/(TLA+C)))		
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**		**A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000		6.878	1171.5	224.37	2.9609
benzene	0.00001	188	78.11	0.00002		6.906	1211	220.79	1.8647
2,2,4 TMP	0.00000	188	114.23	0.00000		6.812	1257.8	220.74	0.9669
toluene	0.00032	188	92.14	0.00065		7.017	1377.6	222.64	0.5576
ethylbenzene	0.00013	188	106.17	0.00023		6.95	1419.3	212.61	0.1861
xylenes	0.00290	188	106.17	0.00514		7.009	1462.3	215.11	0.1629
naphthalene	0.00076	188	128.17	0.00111		7.146	1831.6	211.82	0.0051
cumene	0.00000	188	120.19	0.00000		6.929	1455.8	207.2	0.0897

Monthly Calculations (continued) **AUGUST**

Tank No.		17413						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**53.08**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**810.76**	lb/month	Vapor Space Volume	Vv	206626.8	ft3
		4.05E-01	ton/month	Stock Vapor Density	Wv	0.0002	lb/ft3
Time Period		**August**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.034	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	0.99	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1685.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**757.68**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	12,829,821	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2393	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0002	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**0.99**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0109	psia
				Vapor Space Outage	Hvo	19.22	ft
Tank design data							
Shell height	Hs	**36.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0339**	**per day**
Diameter	D	**117.00**	ft	Average Daily Vapor Temperature Range	ΔTv	18.09	°R
Throughput	Q	**95,983,697**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0031	psi
Turnovers	N	**413.25**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0109	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	536.06	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**35.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**18.00**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)	ΔTA	13.8	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.09**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.71**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00308**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.01258	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp(	PVN	0.00951	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	540.59	°R
Not Insulated	P_{VA}	0.010948664		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	531.54	°R
Partially Insulated	P_{VA}	0.010991624					
Fully Insulated	P_{VA}	0.010417144		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00285**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.01250	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**533.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0096478	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	540.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	540.37	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.30	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	532.01	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	534.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**206,626.84**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**536.06**	°R	Tank diameter	D	117.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**536.19**	°R	Vapor Space Outage; see Equation 1-16	Hvo	19.22	ft
Fully Insulated: TLA = TB	**TLA**	**534.5**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**19.22**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	36.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**537.37**	**°R**	Liquid Height	HL	18.00	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**537.92**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	1.22	ft
Fully Insulated; Tv = TB	**Tv**	**534.46**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**1.22**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	2.468E-04		Tank shell radius	Rs	58.50	ft
Partially Insulated	Wv	2.475E-04					
Fully Insulated	Wv	2.361E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**8.03**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	117.00	ft
				Tank shell radius	Rs	58.50	ft

HAPS Speciation	**lb/month**							
Product	Diesel							
Total HAP Emissions =	**72.525**	**Vapor Weight Concentrations**				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV				Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**		**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.3090	86.18	130	0.00038		0.000006	0.011	**0.00057**
benzene	1.9427	78.11	130	0.00240		0.000044	0.011	**0.00399**
2,2,4 TMP	0.0000	114.23	130	0.00000		0.000000	0.011	-
toluene	18.5269	92.14	130	0.02285		0.000353	0.011	**0.03224**
ethylbenzene	2.5025	106.17	130	0.00309		0.000041	0.011	**0.00378**
xylenes	48.8497	106.17	130	0.06025		0.000808	0.011	**0.07378**
naphthalene	0.3943	128.17	130	4.86E-04		5.40E-06	0.011	**4.93E-04**
cumene	0.0000	120.19	130	0.00E+00		0.00E+00	0.011	**0.00E+00**
	Liquid Mole Fraction					**Component Vapor Pressure**		
	Eq. 40-4 xi = (ZLiML)/Mi					PVAi=(0.019337)10^(A-(B/(TLA+C)))		
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**		**A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000		6.878	1171.5	224.37	2.8854
benzene	0.00001	188	78.11	0.00002		6.906	1211	220.79	1.8141
2,2,4 TMP	0.00000	188	114.23	0.00000		6.812	1257.8	220.74	0.9396
toluene	0.00032	188	92.14	0.00065		7.017	1377.6	222.64	0.5406
ethylbenzene	0.00013	188	106.17	0.00023		6.95	1419.3	212.61	0.1798
xylenes	0.00290	188	106.17	0.00514		7.009	1462.3	215.11	0.1573
naphthalene	0.00076	188	128.17	0.00111		7.146	1831.6	211.82	0.0049
cumene	0.00000	188	120.19	0.00000		6.929	1455.8	207.2	0.0864

Monthly Calculations (continued) **SEPTEMBER**

Tank No.		17413							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**		**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)		**Ls**	**38.53**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**636.86**	lb/month	Vapor Space Volume		Vv	206626.8	ft3
			3.18E-01	ton/month	Stock Vapor Density		Wv	0.0002	lb/ft3
		Time Period	**September**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5		KE	0.032	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor		Ks	0.99	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**1320.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year		365	30	days/month
Absolute Pressure		P_A	14.69	psi					
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB		**Lw**	**598.32**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)		VQ	12,829,821	ft3/month
Product Type			**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=		KN	0.2369	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor		Kp	1.00	
Average organic liquid density		WL	**7.10**	lb/gal	Stock Vapor Density		Wv	0.0002	lb/ft3
Average Reid Vapor Pressure		RVP	**0.02**		Vent Setting Correction Factor		KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**						
Vapor Pressure Equation Constant A		A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))		**Ks**	**0.99**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0086	psia
					Vapor Space Outage		Hvo	19.22	ft
Tank design data									
Shell height		Hs	**36.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**		**KE**	**0.0319**	**per day**
Diameter		D	**117.00**	ft	Average Daily Vapor Temperature Range		ΔTv	16.75	°R
Throughput		Q	**95,983,697**	gal/month	Average Daily Vapor Pressure Range		ΔPv	0.0023	psi
Turnovers		N	**427.02**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)		ΔPB	0.0000	psi
Roof Type:			**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0086	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature		TLA	528.39	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure		P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)		HLX	**35.00**	ft					
Minimum Filling Height (use 1 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**				
Liquid height (assume 1/2 Hs)		HL	**18.00**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)		ΔTA	14.5	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**		**ΔTv**	**16.75**	**°R**
Tank Construction (pick from drop down list)			**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**		**ΔTv**	**15.30**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**		**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**						
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**				
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**		ΔPv	**0.00230**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp		PVX	0.00982	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp(		PVN	0.00752	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV		TLX	532.58	°R
Not Insulated		P_{VA}	0.008602181		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV		TLN	524.21	°R
Partially Insulated		P_{VA}	0.008629387						
Fully Insulated		P_{VA}	0.008264058		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**		**ΔPv**	**0.00211**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi		PVX	0.00974	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA		**TAA**	**526.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir		PVN	0.0076317	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	533.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.		TLX	532.32	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	518.90	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2		TLN	524.67	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	527.14	°R	**Fully Insulated (ΔPv = 0)**		**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**		**Vv**	**206,626.84**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**528.39**	°R	Tank diameter		D	117.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I		**TLA**	**528.49**	°R	Vapor Space Outage; see Equation 1-16		Hvo	19.22	ft
Fully Insulated: TLA = TB		**TLA**	**527.1**						
					Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)		**Hvo**	**19.22**	ft
Average Vapor Temperature (Tv)					Tank shell height		Hs	36.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**529.42**	**°R**	Liquid Height		HL	18.00	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**529.85**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)		HRO	1.22	ft
Fully Insulated; Tv = TB		**Tv**	**527.14**	**°R**					
					Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)		**HRO**	**1.22**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)					Tank cone roof slope (If unknown, use 0.0625)		SR	0.0625	ft/ft
Not Insulated		Wv	1.968E-04		Tank shell radius		Rs	58.50	ft
Partially Insulated		Wv	1.973E-04						
Fully Insulated		Wv	1.899E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**		**HRO**	**8.03**	ft
					Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))		RR	117.00	ft
					Tank shell radius		Rs	58.50	ft

HAPS Speciation	**lb/month**							
Product	Diesel							
Total HAP Emissions =	**56.747**	**Vapor Weight Concentrations**			**Vapor Mole Fraction**			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**	
hexane	0.2558	86.18	130	0.00040	0.000005	0.009	**0.00061**	
benzene	1.5891	78.11	130	0.00250	0.000036	0.009	**0.00415**	
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.009	-	
toluene	14.7923	92.14	130	0.02323	0.000282	0.009	**0.03277**	
ethylbenzene	1.9448	106.17	130	0.00305	0.000032	0.009	**0.00374**	
xylenes	37.8805	106.17	130	0.05948	0.000627	0.009	**0.07283**	
naphthalene	0.2842	128.17	130	4.46E-04	3.89E-06	0.009	**4.53E-04**	
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.009	**0.00E+00**	

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000	6.878	1171.5	224.37	2.3895
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.4842
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.7627
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.4318
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1397
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.1220
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0035
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0659

Monthly Calculations (continued) **OCTOBER**

Tank No.		17413							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**		**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)		**Ls**	**26.01**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**443.69**	lb/month	Vapor Space Volume		Vv	206626.8	ft3
			2.22E-01	ton/month	Stock Vapor Density		Wv	0.0001	lb/ft3
		Time Period	**October**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5		KE	0.030	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor		Ks	0.99	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**948.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year		365	31	days/month
Absolute Pressure		P_A	14.69	psi					
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB		**Lw**	**417.68**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)		VQ	12,829,821	ft3/month
Product Type			**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=		KN	0.2393	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor		Kp	1.00	
Average organic liquid density		WL	**7.10**	lb/gal	Stock Vapor Density		Wv	0.0001	lb/ft3
Average Reid Vapor Pressure		RVP	**0.02**		Vent Setting Correction Factor		KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**						
Vapor Pressure Equation Constant A		A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))		**Ks**	**0.99**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0058	psia
					Vapor Space Outage		Hvo	19.22	ft
Tank design data									
Shell height		Hs	**36.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**		**KE**	**0.0300**	**per day**
Diameter		D	**117.00**	ft	Average Daily Vapor Temperature Range		ΔTv	15.45	°R
Throughput		Q	**95,983,697**	gal/month	Average Daily Vapor Pressure Range		ΔPv	0.0015	psi
Turnovers		N	**413.25**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)		ΔPB	0.0000	psi
Roof Type:			**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0058	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature		TLA	516.36	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure		P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)		HLX	**35.00**	ft					
Minimum Filling Height (use 1 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**				
Liquid height (assume 1/2 Hs)		HL	**18.00**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)		ΔTA	15.3	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**		**ΔTv**	**15.45**	**°R**
Tank Construction (pick from drop down list)			**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**		**ΔTv**	**13.92**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**		**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**						
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**				
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**		ΔPv	**0.00150**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp		PVX	0.00660	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp(		PVN	0.00510	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV		TLX	520.22	°R
Not Insulated		P_{VA}	0.005807879		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV		TLN	512.50	°R
Partially Insulated		P_{VA}	0.005821688						
Fully Insulated		P_{VA}	0.005635453		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**		**ΔPv**	**0.00136**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi		PVX	0.00653	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA		**TAA**	**514.75**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir		PVN	0.0051788	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	522.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.		TLX	519.91	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	507.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2		TLN	512.95	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	515.46	°R	**Fully Insulated (ΔPv = 0)**		**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**		**Vv**	**206,626.84**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**516.36**	°R	Tank diameter		D	117.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I		**TLA**	**516.43**	°R	Vapor Space Outage; see Equation 1-16		Hvo	19.22	ft
Fully Insulated: TLA = TB		**TLA**	**515.5**						
					Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)		**Hvo**	**19.22**	ft
Average Vapor Temperature (Tv)					Tank shell height		Hs	36.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**517.10**	**°R**	Liquid Height		HL	18.00	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**517.40**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)		HRO	1.22	ft
Fully Insulated; Tv = TB		**Tv**	**515.46**	**°R**					
					Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)		**HRO**	**1.22**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)					Tank cone roof slope (If unknown, use 0.0625)		SR	0.0625	ft/ft
Not Insulated		Wv	1.361E-04		Tank shell radius		Rs	58.50	ft
Partially Insulated		Wv	1.363E-04						
Fully Insulated		Wv	1.324E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**		**HRO**	**8.03**	ft
					Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))		RR	117.00	ft
					Tank shell radius		Rs	58.50	ft

HAPS Speciation	**lb/month**							
Product	Diesel							
Total HAP Emissions =	**39.167**	**Vapor Weight Concentrations**			**Vapor Mole Fraction**			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**	
hexane	0.1937	86.18	130	0.00044	0.000004	0.006	**0.00066**	
benzene	1.1794	78.11	130	0.00266	0.000026	0.006	**0.00442**	
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.006	-	
toluene	10.5526	92.14	130	0.02378	0.000195	0.006	**0.03356**	
ethylbenzene	1.3262	106.17	130	0.00299	0.000021	0.006	**0.00366**	
xylenes	25.7434	106.17	130	0.05802	0.000413	0.006	**0.07104**	
naphthalene	0.1712	128.17	130	3.86E-04	2.27E-06	0.006	**3.91E-04**	
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.006	**0.00E+00**	

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000	6.878	1171.5	224.37	1.7536
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.0675
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.5416
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.2985
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0923
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0804
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0020
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0422

Monthly Calculations (continued) **NOVEMBER**

Tank No.		17413							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**		**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)		**Ls**	**15.17**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**315.75**	lb/month	Vapor Space Volume		Vv	206626.8	ft3
			1.58E-01	ton/month	Stock Vapor Density		Wv	0.0001	lb/ft3
		Time Period	**November**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5		KE	0.025	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor		Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**621.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year		365	30	days/month
Absolute Pressure		P_A	14.69	psi					
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB		**Lw**	**300.57**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)		VQ	12,829,821	ft3/month
Product Type			**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=		KN	0.2369	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor		Kp	1.00	
Average organic liquid density		WL	**7.10**	lb/gal	Stock Vapor Density		Wv	0.0001	lb/ft3
Average Reid Vapor Pressure		RVP	**0.02**		Vent Setting Correction Factor		KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**						
Vapor Pressure Equation Constant A		A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))		**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0041	psia
					Vapor Space Outage		Hvo	19.22	ft
Tank design data									
Shell height		Hs	**36.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**		**KE**	**0.0249**	**per day**
Diameter		D	**117.00**	ft	Average Daily Vapor Temperature Range		ΔTv	12.56	°R
Throughput		Q	**95,983,697**	gal/month	Average Daily Vapor Pressure Range		ΔPv	0.0009	psi
Turnovers		N	**427.02**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)		ΔPB	0.0000	psi
Roof Type:			**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0041	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature		TLA	506.41	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure		P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)		HLX	**35.00**	ft					
Minimum Filling Height (use 1 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**				
Liquid height (assume 1/2 Hs)		HL	**18.00**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)		ΔTA	13.5	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**		**ΔTv**	**12.56**	**°R**
Tank Construction (pick from drop down list)			**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**		**ΔTv**	**11.21**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**		**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**						
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**				
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**		ΔPv	**0.00090**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp		PVX	0.00461	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp(		PVN	0.00371	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV		TLX	509.54	°R
Not Insulated		P_{VA}	0.004137496		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV		TLN	503.27	°R
Partially Insulated		P_{VA}	0.004144194						
Fully Insulated		P_{VA}	0.004053483		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**		**ΔPv**	**0.00081**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi		PVX	0.00457	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA		**TAA**	**505.35**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir		PVN	0.0037580	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	512.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.		TLX	509.25	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	498.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2		TLN	503.65	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	505.82	°R	**Fully Insulated (ΔPv = 0)**		**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**		**Vv**	**206,626.84**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**506.41**	°R	Tank diameter		D	117.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I		**TLA**	**506.45**	°R	Vapor Space Outage; see Equation 1-16		Hvo	19.22	ft
Fully Insulated: TLA = TB		**TLA**	**505.8**						
					Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)		**Hvo**	**19.22**	ft
Average Vapor Temperature (Tv)					Tank shell height		Hs	36.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**506.89**	**°R**	Liquid Height		HL	18.00	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**507.09**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)		HRO	1.22	ft
Fully Insulated; Tv = TB		**Tv**	**505.82**	**°R**					
					Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)		**HRO**	**1.22**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)					Tank cone roof slope (If unknown, use 0.0625)		SR	0.0625	ft/ft
Not Insulated		Wv	9.888E-05		Tank shell radius		Rs	58.50	ft
Partially Insulated		Wv	9.901E-05						
Fully Insulated		Wv	9.708E-05		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**		**HRO**	**8.03**	ft
					Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))		RR	117.00	ft
					Tank shell radius		Rs	58.50	ft

HAPS Speciation	**lb/month**							
Product	Diesel							
Total HAP Emissions =	**27.565**	**Vapor Weight Concentrations**				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV				Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**		**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.1478	86.18	130	0.00047		0.000003	0.004	**0.00071**
benzene	0.8840	78.11	130	0.00280		0.000019	0.004	**0.00466**
2,2,4 TMP	0.0000	114.23	130	0.00000		0.000000	0.004	-
toluene	7.6425	92.14	130	0.02420		0.000141	0.004	**0.03415**
ethylbenzene	0.9227	106.17	130	0.00292		0.000015	0.004	**0.00358**
xylenes	17.8611	106.17	130	0.05657		0.000287	0.004	**0.06926**
naphthalene	0.1069	128.17	130	3.38E-04		1.42E-06	0.004	**3.43E-04**
cumene	0.0000	120.19	130	0.00E+00		0.00E+00	0.004	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000	6.878	1171.5	224.37	1.3394
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.8010
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.4018
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.2164
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0643
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0558
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0013
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0286

Monthly Calculations (continued) **DECEMBER**

Tank No.		17413							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**		**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)		**Ls**	**10.32**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**227.22**	lb/month	Vapor Space Volume		Vv	206626.8	ft3
			1.14E-01	ton/month	Stock Vapor Density		Wv	0.0001	lb/ft3
		Time Period	**December**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5		KE	0.023	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor		Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**501.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year		365	31	days/month
Absolute Pressure		P_A	14.69	psi					
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB		**Lw**	**216.91**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)		VQ	12,829,821	ft3/month
Product Type			**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=		KN	0.2393	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor		Kp	1.00	
Average organic liquid density		WL	**7.10**	lb/gal	Stock Vapor Density		Wv	0.0001	lb/ft3
Average Reid Vapor Pressure		RVP	**0.02**		Vent Setting Correction Factor		KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**						
Vapor Pressure Equation Constant A		A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))		**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0029	psia
					Vapor Space Outage		Hvo	19.22	ft
Tank design data									
Shell height		Hs	**36.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**		**KE**	**0.0229**	**per day**
Diameter		D	**117.00**	ft	Average Daily Vapor Temperature Range		ΔTv	11.33	°R
Throughput		Q	**95,983,697**	gal/month	Average Daily Vapor Pressure Range		ΔPv	0.0006	psi
Turnovers		N	**413.25**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)		ΔPB	0.0000	psi
Roof Type:			**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0029	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature		TLA	496.35	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure		P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)		HLX	**35.00**	ft					
Minimum Filling Height (use 1 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**				
Liquid height (assume 1/2 Hs)		HL	**18.00**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN)		ΔTA	12.6	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**		**ΔTv**	**11.33**	**°R**
Tank Construction (pick from drop down list)			**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**		**ΔTv**	**10.07**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**		**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**						
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**				
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**		ΔPv	**0.00059**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp		PVX	0.00321	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp(		PVN	0.00261	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV		TLX	499.18	°R
Not Insulated		P_{VA}	0.002897413		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV		TLN	493.52	°R
Partially Insulated		P_{VA}	0.002901351						
Fully Insulated		P_{VA}	0.002847936		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**		**ΔPv**	**0.00053**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi		PVX	0.00318	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA		**TAA**	**495.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir		PVN	0.0026479	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	501.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.		TLX	498.91	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	489.20	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2		TLN	493.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	495.88	°R	**Fully Insulated (ΔPv = 0)**		**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**		**Vv**	**206,626.84**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**496.35**	°R	Tank diameter		D	117.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I		**TLA**	**496.39**	°R	Vapor Space Outage; see Equation 1-16		Hvo	19.22	ft
Fully Insulated: TLA = TB		**TLA**	**495.9**						
					Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)		**Hvo**	**19.22**	ft
Average Vapor Temperature (Tv)					Tank shell height		Hs	36.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**496.74**	**°R**	Liquid Height		HL	18.00	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**496.90**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)		HRO	1.22	ft
Fully Insulated; Tv = TB		**Tv**	**495.88**	**°R**					
					Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)		**HRO**	**1.22**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)					Tank cone roof slope (If unknown, use 0.0625)		SR	0.0625	ft/ft
Not Insulated		Wv	7.066E-05		Tank shell radius		Rs	58.50	ft
Partially Insulated		Wv	7.073E-05						
Fully Insulated		Wv	6.958E-05		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**		**HRO**	**8.03**	ft
					Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))		RR	117.00	ft
					Tank shell radius		Rs	58.50	ft

HAPS Speciation	**lb/month**							
Product	Diesel							
Total HAP Emissions =	**19.549**	**Vapor Weight Concentrations**				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV				Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**		**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.1142	86.18	130	0.00050		0.000002	0.003	**0.00076**
benzene	0.6700	78.11	130	0.00295		0.000014	0.003	**0.00491**
2,2,4 TMP	0.0000	114.23	130	0.00000		0.000000	0.003	-
toluene	5.5858	92.14	130	0.02458		0.000100	0.003	**0.03468**
ethylbenzene	0.6458	106.17	130	0.00284		0.000010	0.003	**0.00348**
xylenes	12.4665	106.17	130	0.05486		0.000195	0.003	**0.06718**
naphthalene	0.0666	128.17	130	2.93E-04		8.62E-07	0.003	**2.97E-04**
cumene	0.0000	120.19	130	0.00E+00		0.00E+00	0.003	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000	6.878	1171.5	224.37	1.0068
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.5907
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.2928
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.1539
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0438
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0379
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0008
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0189

Monthly Calculations - JANUARY

Tank No.		17415						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**3.24**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**68.18**	lb/month	Vapor Space Volume	Vv	73168.7	ft3
		3.41E-02	ton/month	Stock Vapor Density	Wv	0.0001	lb/ft3
Time Period		**January**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.024	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**560.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**64.94**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	4,558,096	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2388	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0001	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0024	psia
				Vapor Space Outage	Hvo	15.31	ft
Tank design data							
Shell height	Hs	**29.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0240**	**per day**
Diameter	D	**78.00**	ft	Average Daily Vapor Temperature Range	ΔTv	11.76	°R
Throughput	Q	**34,100,469**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0005	psi
Turnovers	N	**415.98**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0024	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	491.45	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**28.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**14.50**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN	ΔTA	12.8	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.76**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.48**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00053**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.00270	psia
	PBV	**-0.03**		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp[	PVN	0.00217	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	494.39	°R
Not Insulated	P_{VA}	0.002422766		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	488.51	°R
Partially Insulated	P_{VA}	0.002426522					
Fully Insulated	P_{VA}	0.002375646		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00047**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.00267	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**490.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0022019	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	496.90	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	494.11	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	484.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	488.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	490.92	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**73,168.67**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**491.45**	°R	Tank diameter	D	78.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**491.49**	°R	Vapor Space Outage; see Equation 1-16	Hvo	15.31	ft
Fully Insulated: TLA = TB	**TLA**	**490.9**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**15.31**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	29.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**491.89**	**°R**	Liquid Height	HL	14.50	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**492.07**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	0.81	ft
Fully Insulated; Tv = TB	**Tv**	**490.92**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**0.81**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	5.967E-05		Tank shell radius	Rs	39.00	ft
Partially Insulated	Wv	5.974E-05					
Fully Insulated	Wv	5.862E-05		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**5.35**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	78.00	ft
				Tank shell radius	Rs	39.00	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**5.816**

		Vapor Weight Concentrations			Vapor Mole Fraction		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0355	86.18	130	0.00052	0.000002	0.002	**0.00078**
benzene	0.2061	78.11	130	0.00302	0.000012	0.002	**0.00503**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.002	**-**
toluene	1.6872	92.14	130	0.02475	0.000085	0.002	**0.03491**
ethylbenzene	0.1908	106.17	130	0.00280	0.000008	0.002	**0.00343**
xylenes	3.6780	106.17	130	0.05394	0.000160	0.002	**0.06605**
naphthalene	0.0186	128.17	130	2.72E-04	6.69E-07	0.002	**2.76E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.002	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	0.8715
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.5064
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.2495
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.1296
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0361
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0312
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0006
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0153

Monthly Calculations (continued) FEBRUARY

Tank No.		17415						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**3.60**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**71.58**	lb/month	Vapor Space Volume	Vv	73168.7	ft3
		3.58E-02	ton/month	Stock Vapor Density	Wv	0.0001	lb/ft3
Time Period		**February**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.027	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**847.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	28	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**67.99**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	4,558,096	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2318	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0001	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0026	psia
				Vapor Space Outage	Hvo	15.31	ft
Tank design data							
Shell height	Hs	**29.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0273**	**per day**
Diameter	D	**78.00**	ft	Average Daily Vapor Temperature Range	ΔTv	13.48	°R
Throughput	Q	**34,100,469**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0006	psi
Turnovers	N	**460.55**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0026	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	493.64	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**28.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**14.50**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN	ΔTA	13.2	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**13.48**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**12.16**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00065**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.00297	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp[	PVN	0.00232	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	497.01	°R
Not Insulated	P_{VA}	0.002625413		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	490.27	°R
Partially Insulated	P_{VA}	0.002631515					
Fully Insulated	P_{VA}	0.002549197		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00059**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.00294	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**492.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0023533	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	498.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	496.74	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	485.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	490.66	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	492.84	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**73,168.67**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**493.64**	°R	Tank diameter	D	78.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**493.70**	°R	Vapor Space Outage; see Equation 1-16	Hvo	15.31	ft
Fully Insulated: TLA = TB	**TLA**	**492.8**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**15.31**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	29.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**494.30**	**°R**	Liquid Height	HL	14.50	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**494.57**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	0.81	ft
Fully Insulated; Tv = TB	**Tv**	**492.84**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**0.81**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	6.434E-05		Tank shell radius	Rs	39.00	ft
Partially Insulated	Wv	6.446E-05					
Fully Insulated	Wv	6.266E-05		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**5.35**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	78.00	ft
				Tank shell radius	Rs	39.00	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**6.130**

		Vapor Weight Concentrations			Vapor Mole Fraction		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0367	86.18	130	0.00051	0.000002	0.003	**0.00077**
benzene	0.2140	78.11	130	0.00299	0.000013	0.003	**0.00498**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.003	**-**
toluene	1.7663	92.14	130	0.02467	0.000091	0.003	**0.03481**
ethylbenzene	0.2017	106.17	130	0.00282	0.000009	0.003	**0.00345**
xylenes	3.8914	106.17	130	0.05436	0.000175	0.003	**0.06656**
naphthalene	0.0202	128.17	130	2.82E-04	7.50E-07	0.003	**2.86E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.003	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	0.9299
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.5427
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.2682
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.1400
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0394
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0340
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0007
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0168

Monthly Calculations (continued) **MARCH**

Tank No.		17415							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**		**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)		**Ls**	**5.85**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**95.35**	lb/month	Vapor Space Volume		Vv	73168.7	ft3
			4.77E-02	ton/month	Stock Vapor Density		Wv	0.0001	lb/ft3
		Time Period	**March**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5		KE	0.031	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor		Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**1156.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year		365	31	days/month
Absolute Pressure		P_A	14.69	psi					
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB		**Lw**	**89.50**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)		VQ	4,558,096	ft3/month
Product Type		**Distillate Fuel Oil No.2**			Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=		KN	0.2388	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor		Kp	1.00	
Average organic liquid density		WL	**7.10**	lb/gal	Stock Vapor Density		Wv	0.0001	lb/ft3
Average Reid Vapor Pressure		RVP	**0.02**		Vent Setting Correction Factor		KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**						
Vapor Pressure Equation Constant A		A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))		**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0034	psia
					Vapor Space Outage		Hvo	15.31	ft
Tank design data									
Shell height		Hs	**29.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**		**KE**	**0.0315**	**per day**
Diameter		D	**78.00**	ft	Average Daily Vapor Temperature Range		ΔTv	15.72	°R
Throughput		Q	**34,100,469**	gal/month	Average Daily Vapor Pressure Range		ΔPv	0.0010	psi
Turnovers		N	**415.98**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)		ΔPB	0.0000	psi
Roof Type:			**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0034	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature		TLA	500.87	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure		P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)		HLX	**28.00**	ft					
Minimum Filling Height (use 1 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**				
Liquid height (assume 1/2 Hs)		HL	**14.50**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN		ΔTA	14.2	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**		**ΔTv**	**15.72**	**°R**
Tank Construction (pick from drop down list)			**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**		**ΔTv**	**14.30**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**		**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**						
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**				
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**		ΔPv	**0.00095**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp		PVX	0.00391	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp		PVN	0.00296	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV		TLX	504.80	°R
Not Insulated		P_{VA}	0.003405962		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV		TLN	496.94	°R
Partially Insulated		P_{VA}	0.003416461						
Fully Insulated		P_{VA}	0.003275433		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**		**ΔPv**	**0.00087**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi		PVX	0.00388	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA		**TAA**	**498.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir		PVN	0.0030066	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	506.00	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.		TLX	504.53	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	491.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2		TLN	497.38	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	499.77	°R	**Fully Insulated (ΔPv = 0)**		**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**		**Vv**	**73,168.67**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**500.87**	°R	Tank diameter		D	78.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I		**TLA**	**500.95**	°R	Vapor Space Outage; see Equation 1-16		Hvo	15.31	ft
Fully Insulated: TLA = TB		**TLA**	**499.8**						
					Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)		**Hvo**	**15.31**	ft
Average Vapor Temperature (Tv)					Tank shell height		Hs	29.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**501.76**	**°R**	Liquid Height		HL	14.50	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**502.14**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)		HRO	0.81	ft
Fully Insulated; Tv = TB		**Tv**	**499.77**	**°R**					
					Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)		**HRO**	**0.81**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)					Tank cone roof slope (If unknown, use 0.0625)		SR	0.0625	ft/ft
Not Insulated		Wv	8.223E-05		Tank shell radius		Rs	39.00	ft
Partially Insulated		Wv	8.242E-05						
Fully Insulated		Wv	7.940E-05		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**		**HRO**	**5.35**	ft
					Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))		RR	78.00	ft
					Tank shell radius		Rs	39.00	ft

HAPS Speciation	**lb/month**							
Product	Diesel							
Total HAP Emissions =	**8.261**	**Vapor Weight Concentrations**				**Vapor Mole Fraction**			
Eq. 40-2 L_{Ti} =Z_{Vi}(L_T)		Eq. 40-6 ZVi = yiMi / MV				Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**		**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**	
hexane	0.0464	86.18	130	0.00049		0.000003	0.003	**0.00073**	
benzene	0.2747	78.11	130	0.00288		0.000016	0.003	**0.00479**	
2,2,4 TMP	0.0000	114.23	130	0.00000		0.000000	0.003	-	
toluene	2.3285	92.14	130	0.02442		0.000117	0.003	**0.03445**	
ethylbenzene	0.2746	106.17	130	0.00288		0.000012	0.003	**0.00353**	
xylenes	5.3073	106.17	130	0.05566		0.000232	0.003	**0.06815**	
naphthalene	0.0299	128.17	130	3.13E-04		1.08E-06	0.003	**3.18E-04**	
cumene	0.0000	120.19	130	0.00E+00		0.00E+00	0.003	**0.00E+00**	
	Liquid Mole Fraction					**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi					PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**		**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000		6.878	1171.5	224.37	1.1464
benzene	0.00001	188	78.11	0.00002		6.906	1211	220.79	0.6785
2,2,4 TMP	0.00000	188	114.23	0.00000		6.812	1257.8	220.74	0.3382
toluene	0.00032	188	92.14	0.00065		7.017	1377.6	222.64	0.1797
ethylbenzene	0.00013	188	106.17	0.00023		6.95	1419.3	212.61	0.0522
xylenes	0.00290	188	106.17	0.00514		7.009	1462.3	215.11	0.0452
naphthalene	0.00076	188	128.17	0.00111		7.146	1831.6	211.82	0.0010
cumene	0.00000	188	120.19	0.00000		6.929	1455.8	207.2	0.0228

Monthly Calculations (continued) **APRIL**

Tank No.		17415							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**		**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)		**Ls**	**9.12**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**135.41**	lb/month	Vapor Space Volume		Vv	73168.7	ft3
			6.77E-02	ton/month	Stock Vapor Density		Wv	0.0001	lb/ft3
		Time Period	**April**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5		KE	0.036	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor		Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**1490.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year		365	30	days/month
Absolute Pressure		P_A	14.69	psi					
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB		**Lw**	**126.29**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)		VQ	4,558,096	ft3/month
Product Type		**Distillate Fuel Oil No.2**			Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=		KN	0.2365	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor		Kp	1.00	
Average organic liquid density		WL	**7.10**	lb/gal	Stock Vapor Density		Wv	0.0001	lb/ft3
Average Reid Vapor Pressure		RVP	**0.02**		Vent Setting Correction Factor		KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**						
Vapor Pressure Equation Constant A		A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))		**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0050	psia
					Vapor Space Outage		Hvo	15.31	ft
Tank design data									
Shell height		Hs	**29.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**		**KE**	**0.0356**	**per day**
Diameter		D	**78.00**	ft	Average Daily Vapor Temperature Range		ΔTv	18.16	°R
Throughput		Q	**34,100,469**	gal/month	Average Daily Vapor Pressure Range		ΔPv	0.0015	psi
Turnovers		N	**429.85**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)		ΔPB	0.0000	psi
Roof Type:			**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0050	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature		TLA	511.68	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure		P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)		HLX	**28.00**	ft					
Minimum Filling Height (use 1 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**				
Liquid height (assume 1/2 Hs)		HL	**14.50**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN		ΔTA	15.3	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**		**ΔTv**	**18.16**	**°R**
Tank Construction (pick from drop down list)			**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**		**ΔTv**	**16.63**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**		**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**						
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**				
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**		ΔPv	**0.00154**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp		PVX	0.00578	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp		PVN	0.00424	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV		TLX	516.22	°R
Not Insulated		P_{VA}	0.004960435		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV		TLN	507.14	°R
Partially Insulated		P_{VA}	0.004979324						
Fully Insulated		P_{VA}	0.004726595		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**		**ΔPv**	**0.00141**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi		PVX	0.00573	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA		**TAA**	**509.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir		PVN	0.0043179	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	516.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.		TLX	515.95	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	501.50	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2		TLN	507.64	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	510.27	°R	**Fully Insulated (ΔPv = 0)**		**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**		**Vv**	**73,168.67**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**511.68**	°R	Tank diameter		D	78.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I		**TLA**	**511.79**	°R	Vapor Space Outage; see Equation 1-16		Hvo	15.31	ft
Fully Insulated: TLA = TB		**TLA**	**510.3**						
					Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)		**Hvo**	**15.31**	ft
Average Vapor Temperature (Tv)					Tank shell height		Hs	29.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**512.84**	**°R**	Liquid Height		HL	14.50	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**513.32**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)		HRO	0.81	ft
Fully Insulated; Tv = TB		**Tv**	**510.27**	**°R**					
					Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)		**HRO**	**0.81**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)					Tank cone roof slope (If unknown, use 0.0625)		SR	0.0625	ft/ft
Not Insulated		Wv	1.172E-04		Tank shell radius		Rs	39.00	ft
Partially Insulated		Wv	1.175E-04						
Fully Insulated		Wv	1.122E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**		**HRO**	**5.35**	ft
					Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))		RR	78.00	ft
					Tank shell radius		Rs	39.00	ft

HAPS Speciation	**lb/month**							
Product	Diesel							
Total HAP Emissions =	**11.896**	**Vapor Weight Concentrations**				**Vapor Mole Fraction**			
Eq. 40-2 L_{Ti} =Z_{Vi}(L_T)		Eq. 40-6 ZVi = yiMi / MV				Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**		**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**	
hexane	0.0611	86.18	130	0.00045		0.000003	0.005	**0.00068**	
benzene	0.3689	78.11	130	0.00272		0.000022	0.005	**0.00453**	
2,2,4 TMP	0.0000	114.23	130	0.00000		0.000000	0.005	-	
toluene	3.2481	92.14	130	0.02399		0.000168	0.005	**0.03384**	
ethylbenzene	0.4007	106.17	130	0.00296		0.000018	0.005	**0.00362**	
xylenes	7.7682	106.17	130	0.05737		0.000348	0.005	**0.07024**	
naphthalene	0.0492	128.17	130	3.63E-04		1.83E-06	0.005	**3.68E-04**	
cumene	0.0000	120.19	130	0.00E+00		0.00E+00	0.005	**0.00E+00**	
	Liquid Mole Fraction					**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi					PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**		**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000		6.878	1171.5	224.37	1.5475
benzene	0.00001	188	78.11	0.00002		6.906	1211	220.79	0.9343
2,2,4 TMP	0.00000	188	114.23	0.00000		6.812	1257.8	220.74	0.4715
toluene	0.00032	188	92.14	0.00065		7.017	1377.6	222.64	0.2571
ethylbenzene	0.00013	188	106.17	0.00023		6.95	1419.3	212.61	0.0781
xylenes	0.00290	188	106.17	0.00514		7.009	1462.3	215.11	0.0679
naphthalene	0.00076	188	128.17	0.00111		7.146	1831.6	211.82	0.0016
cumene	0.00000	188	120.19	0.00000		6.929	1455.8	207.2	0.0352

Monthly Calculations (continued) **MAY**

Tank No.		17415							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**		**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)		**Ls**	**13.72**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**187.99**	lb/month	Vapor Space Volume		Vv	73168.7	ft3
			9.40E-02	ton/month	Stock Vapor Density		Wv	0.0002	lb/ft3
	Time Period		**May**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5		KE	0.038	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor		Ks	0.99	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**1750.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year		365	31	days/month
Absolute Pressure		P_A	14.69	psi					
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB		**Lw**	**174.27**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)		VQ	4,558,096	ft3/month
Product Type		**Distillate Fuel Oil No.2**			Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=		KN	0.2388	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor		Kp	1.00	
Average organic liquid density		WL	**7.10**	lb/gal	Stock Vapor Density		Wv	0.0002	lb/ft3
Average Reid Vapor Pressure		RVP	**0.02**		Vent Setting Correction Factor		KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**						
Vapor Pressure Equation Constant A		A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))		**Ks**	**0.99**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0069	psia
					Vapor Space Outage		Hvo	15.31	ft
Tank design data									
Shell height		Hs	**29.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**		**KE**	**0.0380**	**per day**
Diameter		D	**78.00**	ft	Average Daily Vapor Temperature Range		ΔTv	19.74	°R
Throughput		Q	**34,100,469**	gal/month	Average Daily Vapor Pressure Range		ΔPv	0.0022	psi
Turnovers		N	**415.98**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)		ΔPB	0.0000	psi
Roof Type:			**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0069	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature		TLA	521.63	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure		P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)		HLX	**28.00**	ft					
Minimum Filling Height (use 1 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**				
Liquid height (assume 1/2 Hs)		HL	**14.50**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN		ΔTA	15.7	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**		**ΔTv**	**19.74**	**°R**
Tank Construction (pick from drop down list)			**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**		**ΔTv**	**18.17**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**		**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**						
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**				
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**		ΔPv	**0.00224**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp		PVX	0.00811	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp		PVN	0.00587	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV		TLX	526.56	°R
Not Insulated		P_{VA}	0.006912076		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV		TLN	516.69	°R
Partially Insulated		P_{VA}	0.00694183						
Fully Insulated		P_{VA}	0.006544819		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**		**ΔPv**	**0.00207**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi		PVX	0.00804	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA		**TAA**	**518.65**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir		PVN	0.0059753	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	526.50	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.		TLX	526.30	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	510.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2		TLN	517.21	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	519.96	°R	**Fully Insulated (ΔPv = 0)**		**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**		**Vv**	**73,168.67**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**521.63**	°R	Tank diameter		D	78.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I		**TLA**	**521.76**	°R	Vapor Space Outage; see Equation 1-16		Hvo	15.31	ft
Fully Insulated: TLA = TB		**TLA**	**520.0**						
					Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)		**Hvo**	**15.31**	ft
Average Vapor Temperature (Tv)					Tank shell height		Hs	29.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**522.98**	**°R**	Liquid Height		HL	14.50	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**523.55**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)		HRO	0.81	ft
Fully Insulated; Tv = TB		**Tv**	**519.96**	**°R**					
					Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)		**HRO**	**0.81**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)					Tank cone roof slope (If unknown, use 0.0625)		SR	0.0625	ft/ft
Not Insulated		Wv	1.601E-04		Tank shell radius		Rs	39.00	ft
Partially Insulated		Wv	1.606E-04						
Fully Insulated		Wv	1.525E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**		**HRO**	**5.35**	ft
					Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))		RR	78.00	ft
					Tank shell radius		Rs	39.00	ft

HAPS Speciation	**lb/month**							
Product	Diesel							
Total HAP Emissions =	**16.671**	**Vapor Weight Concentrations**				**Vapor Mole Fraction**			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV				Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**		**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**	
hexane	0.0791	86.18	130	0.00042		0.000004	0.007	**0.00063**	
benzene	0.4861	78.11	130	0.00259		0.000030	0.007	**0.00430**	
2,2,4 TMP	0.0000	114.23	130	0.00000		0.000000	0.007	-	
toluene	4.4264	92.14	130	0.02355		0.000230	0.007	**0.03322**	
ethylbenzene	0.5676	106.17	130	0.00302		0.000026	0.007	**0.00370**	
xylenes	11.0346	106.17	130	0.05870		0.000497	0.007	**0.07187**	
naphthalene	0.0774	128.17	130	4.12E-04		2.89E-06	0.007	**4.18E-04**	
cumene	0.0000	120.19	130	0.00E+00		0.00E+00	0.007	**0.00E+00**	
	Liquid Mole Fraction					**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi					PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**		**A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000		6.878	1171.5	224.37	2.0120
benzene	0.00001	188	78.11	0.00002		6.906	1211	220.79	1.2359
2,2,4 TMP	0.00000	188	114.23	0.00000		6.812	1257.8	220.74	0.6306
toluene	0.00032	188	92.14	0.00065		7.017	1377.6	222.64	0.3517
ethylbenzene	0.00013	188	106.17	0.00023		6.95	1419.3	212.61	0.1110
xylenes	0.00290	188	106.17	0.00514		7.009	1462.3	215.11	0.0967
naphthalene	0.00076	188	128.17	0.00111		7.146	1831.6	211.82	0.0026
cumene	0.00000	188	120.19	0.00000		6.929	1455.8	207.2	0.0515

Monthly Calculations (continued) **JUNE**

Tank No.		17415							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**		**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)		**Ls**	**17.74**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**252.15**	lb/month	Vapor Space Volume		Vv	73168.7	ft3
			1.26E-01	ton/month	Stock Vapor Density		Wv	0.0002	lb/ft3
	Time Period		**June**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5		KE	0.037	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor		Ks	0.99	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**1862.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year		365	30	days/month
Absolute Pressure		P_A	14.69	psi					
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB		**Lw**	**234.41**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)		VQ	4,558,096	ft3/month
Product Type		**Distillate Fuel Oil No.2**			Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=		KN	0.2365	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor		Kp	1.00	
Average organic liquid density		WL	**7.10**	lb/gal	Stock Vapor Density		Wv	0.0002	lb/ft3
Average Reid Vapor Pressure		RVP	**0.02**		Vent Setting Correction Factor		KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**						
Vapor Pressure Equation Constant A		A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))		**Ks**	**0.99**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0096	psia
					Vapor Space Outage		Hvo	15.31	ft
Tank design data									
Shell height		Hs	**29.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**		**KE**	**0.0375**	**per day**
Diameter		D	**78.00**	ft	Average Daily Vapor Temperature Range		ΔTv	19.81	°R
Throughput		Q	**34,100,469**	gal/month	Average Daily Vapor Pressure Range		ΔPv	0.0030	psi
Turnovers		N	**429.85**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)		ΔPB	0.0000	psi
Roof Type:			**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp		PvA	0.0096	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature		TLA	531.77	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure		P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)		HLX	**28.00**	ft					
Minimum Filling Height (use 1 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**				
Liquid height (assume 1/2 Hs)		HL	**14.50**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN		ΔTA	15.0	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**		**ΔTv**	**19.81**	**°R**
Tank Construction (pick from drop down list)			**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**		**ΔTv**	**18.31**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**		**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**						
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**				
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**		ΔPv	**0.00299**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp		PVX	0.01117	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp		PVN	0.00818	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV		TLX	536.72	°R
Not Insulated		P_{VA}	0.009572436		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV		TLN	526.81	°R
Partially Insulated		P_{VA}	0.009614625						
Fully Insulated		P_{VA}	0.009051984		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**		**ΔPv**	**0.00278**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi		PVX	0.01109	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA		**TAA**	**528.60**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir		PVN	0.0083139	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	536.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.		TLX	536.48	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	521.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2		TLN	527.33	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	530.00	°R	**Fully Insulated (ΔPv = 0)**		**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**		**Vv**	**73,168.67**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**531.77**	°R	Tank diameter		D	78.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I		**TLA**	**531.91**	°R	Vapor Space Outage; see Equation 1-16		Hvo	15.31	ft
Fully Insulated: TLA = TB		**TLA**	**530.0**						
					Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)		**Hvo**	**15.31**	ft
Average Vapor Temperature (Tv)					Tank shell height		Hs	29.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**533.21**	**°R**	Liquid Height		HL	14.50	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**533.81**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)		HRO	0.81	ft
Fully Insulated; Tv = TB		**Tv**	**530.00**	**°R**					
					Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)		**HRO**	**0.81**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)					Tank cone roof slope (If unknown, use 0.0625)		SR	0.0625	ft/ft
Not Insulated		Wv	2.175E-04		Tank shell radius		Rs	39.00	ft
Partially Insulated		Wv	2.182E-04						
Fully Insulated		Wv	2.069E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**		**HRO**	**5.35**	ft
					Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))		RR	78.00	ft
					Tank shell radius		Rs	39.00	ft

HAPS Speciation	**lb/month**							
Product	Diesel							
Total HAP Emissions =	**22.510**	**Vapor Weight Concentrations**				**Vapor Mole Fraction**			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV				Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**		**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**	
hexane	0.0990	86.18	130	0.00039		0.000006	0.010	**0.00059**	
benzene	0.6181	78.11	130	0.00245		0.000039	0.010	**0.00408**	
2,2,4 TMP	0.0000	114.23	130	0.00000		0.000000	0.010	-	
toluene	5.8155	92.14	130	0.02306		0.000311	0.010	**0.03254**	
ethylbenzene	0.7739	106.17	130	0.00307		0.000036	0.010	**0.00376**	
xylenes	15.0872	106.17	130	0.05983		0.000701	0.010	**0.07326**	
naphthalene	0.1169	128.17	130	4.64E-04		4.50E-06	0.010	**4.70E-04**	
cumene	0.0000	120.19	130	0.00E+00		0.00E+00	0.010	**0.00E+00**	
	Liquid Mole Fraction					**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi					PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**		**A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000		6.878	1171.5	224.37	2.5981
benzene	0.00001	188	78.11	0.00002		6.906	1211	220.79	1.6225
2,2,4 TMP	0.00000	188	114.23	0.00000		6.812	1257.8	220.74	0.8367
toluene	0.00032	188	92.14	0.00065		7.017	1377.6	222.64	0.4771
ethylbenzene	0.00013	188	106.17	0.00023		6.95	1419.3	212.61	0.1563
xylenes	0.00290	188	106.17	0.00514		7.009	1462.3	215.11	0.1366
naphthalene	0.00076	188	128.17	0.00111		7.146	1831.6	211.82	0.0041
cumene	0.00000	188	120.19	0.00000		6.929	1455.8	207.2	0.0744

Monthly Calculations (continued) **JULY**

Tank No.	17415							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**21.01**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**298.08**	lb/month	Vapor Space Volume	Vv	73168.7	ft3
		1.49E-01	ton/month	Stock Vapor Density	Wv	0.0003	lb/ft3
Time Period		**July**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.037	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	0.99	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1904.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**277.07**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	4,558,096	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2388	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0003	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**0.99**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0113	psia
				Vapor Space Outage	Hvo	15.31	ft
Tank design data							
Shell height	Hs	**29.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0367**	**per day**
Diameter	D	**78.00**	ft	Average Daily Vapor Temperature Range	ΔTv	19.60	°R
Throughput	Q	**34,100,469**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0034	psi
Turnovers	N	**415.98**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0113	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	537.14	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**28.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**14.50**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN	ΔTA	14.4	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.60**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.16**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00343**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.01315	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp	PVN	0.00972	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	542.04	°R
Not Insulated	P_{VA}	0.011317921		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	532.24	°R
Partially Insulated	P_{VA}	0.011367913					
Fully Insulated	P_{VA}	0.010701221		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00319**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.01306	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**533.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0098702	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	541.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	541.82	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.70	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	532.74	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	535.33	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**73,168.67**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**537.14**	°R	Tank diameter	D	78.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**537.28**	°R	Vapor Space Outage; see Equation 1-16	Hvo	15.31	ft
Fully Insulated: TLA = TB	**TLA**	**535.3**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**15.31**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	29.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**538.61**	**°R**	Liquid Height	HL	14.50	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**539.23**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	0.81	ft
Fully Insulated; Tv = TB	**Tv**	**535.33**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**0.81**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	2.546E-04		Tank shell radius	Rs	39.00	ft
Partially Insulated	Wv	2.554E-04					
Fully Insulated	Wv	2.422E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**5.35**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	78.00	ft
				Tank shell radius	Rs	39.00	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**26.676**

		Vapor Weight Concentrations			Vapor Mole Fraction		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.1128	86.18	130	0.00038	0.000006	0.011	**0.00057**
benzene	0.7102	78.11	130	0.00238	0.000045	0.011	**0.00397**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.011	**-**
toluene	6.7955	92.14	130	0.02280	0.000364	0.011	**0.03217**
ethylbenzene	0.9213	106.17	130	0.00309	0.000043	0.011	**0.00378**
xylenes	17.9892	106.17	130	0.06035	0.000836	0.011	**0.07390**
naphthalene	0.1467	128.17	130	4.92E-04	5.65E-06	0.011	**4.99E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.011	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000	6.878	1171.5	224.37	2.9609
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.8647
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.9669
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.5576
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1861
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.1629
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0051
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0897

Monthly Calculations (continued) **AUGUST**

Tank No.	17415							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**18.84**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**287.48**	lb/month	Vapor Space Volume	Vv	73168.7	ft3
		1.44E-01	ton/month	Stock Vapor Density	Wv	0.0002	lb/ft3
Time Period		**August**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.034	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	0.99	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1685.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**268.65**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	4,558,096	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2388	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0002	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**0.99**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0109	psia
				Vapor Space Outage	Hvo	15.31	ft
Tank design data							
Shell height	Hs	**29.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0339**	**per day**
Diameter	D	**78.00**	ft	Average Daily Vapor Temperature Range	ΔTv	18.09	°R
Throughput	Q	**34,100,469**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0031	psi
Turnovers	N	**415.98**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0109	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	536.06	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**28.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**14.50**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN	ΔTA	13.8	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.09**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.71**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00308**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.01258	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp	PVN	0.00951	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	540.59	°R
Not Insulated	P_{VA}	0.010948664		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	531.54	°R
Partially Insulated	P_{VA}	0.010991624					
Fully Insulated	P_{VA}	0.010417144		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00285**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.01250	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**533.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0096478	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	540.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	540.37	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.30	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	532.01	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	534.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**73,168.67**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**536.06**	°R	Tank diameter	D	78.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**536.19**	°R	Vapor Space Outage; see Equation 1-16	Hvo	15.31	ft
Fully Insulated: TLA = TB	**TLA**	**534.5**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**15.31**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	29.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**537.37**	**°R**	Liquid Height	HL	14.50	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**537.92**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	0.81	ft
Fully Insulated; Tv = TB	**Tv**	**534.46**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**0.81**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	2.468E-04		Tank shell radius	Rs	39.00	ft
Partially Insulated	Wv	2.475E-04					
Fully Insulated	Wv	2.361E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**5.35**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	78.00	ft
				Tank shell radius	Rs	39.00	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**25.717**

		Vapor Weight Concentrations			Vapor Mole Fraction		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/yr)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.1096	86.18	130	0.00038	0.000006	0.011	**0.00057**
benzene	0.6889	78.11	130	0.00240	0.000044	0.011	**0.00399**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.011	**-**
toluene	6.5694	92.14	130	0.02285	0.000353	0.011	**0.03224**
ethylbenzene	0.8874	106.17	130	0.00309	0.000041	0.011	**0.00378**
xylenes	17.3215	106.17	130	0.06025	0.000808	0.011	**0.07378**
naphthalene	0.1398	128.17	130	4.86E-04	5.40E-06	0.011	**4.93E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.011	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000	6.878	1171.5	224.37	2.8854
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.8141
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.9396
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.5406
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1798
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.1573
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0049
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0864

Monthly Calculations (continued) **SEPTEMBER**

Tank No.	17415							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**13.67**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**225.82**	lb/month	Vapor Space Volume	Vv	73168.7	ft3
		1.13E-01	ton/month	Stock Vapor Density	Wv	0.0002	lb/ft3
Time Period		**September**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.032	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	0.99	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1320.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**212.16**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	4,558,096	ft3/month
Product Type	**Distillate Fuel Oil No.2**			Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2365	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0002	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**0.99**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0086	psia
				Vapor Space Outage	Hvo	15.31	ft
Tank design data							
Shell height	Hs	**29.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0319**	**per day**
Diameter	D	**78.00**	ft	Average Daily Vapor Temperature Range	ΔTv	16.75	°R
Throughput	Q	**34,100,469**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0023	psi
Turnovers	N	**429.85**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0086	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	528.39	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**28.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**14.50**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN	ΔTA	14.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**16.75**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**15.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00230**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.00982	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp	PVN	0.00752	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	532.58	°R
Not Insulated	P_{VA}	0.008602181		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	524.21	°R
Partially Insulated	P_{VA}	0.008629387					
Fully Insulated	P_{VA}	0.008264058		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00211**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.00974	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**526.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0076317	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	533.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	532.32	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	518.90	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	524.67	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	527.14	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**73,168.67**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**528.39**	°R	Tank diameter	D	78.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**528.49**	°R	Vapor Space Outage; see Equation 1-16	Hvo	15.31	ft
Fully Insulated: TLA = TB	**TLA**	**527.1**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**15.31**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	29.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**529.42**	**°R**	Liquid Height	HL	14.50	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**529.85**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	0.81	ft
Fully Insulated; Tv = TB	**Tv**	**527.14**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**0.81**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	1.968E-04		Tank shell radius	Rs	39.00	ft
Partially Insulated	Wv	1.973E-04					
Fully Insulated	Wv	1.899E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**5.35**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	78.00	ft
				Tank shell radius	Rs	39.00	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**20.122**

Individual HAPS	**L_{Ti} (lb/yr)**	**M_L**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0907	86.18	130	0.00040	0.000005	0.009	**0.00061**
benzene	0.5635	78.11	130	0.00250	0.000036	0.009	**0.00415**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.009	-
toluene	5.2452	92.14	130	0.02323	0.000282	0.009	**0.03277**
ethylbenzene	0.6896	106.17	130	0.00305	0.000032	0.009	**0.00374**
xylenes	13.4321	106.17	130	0.05948	0.000627	0.009	**0.07283**
naphthalene	0.1008	128.17	130	4.46E-04	3.89E-06	0.009	**4.53E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.009	**0.00E+00**

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
	Liquid Mole Fraction: Eq. 40-4 xi = (ZLiML)/Mi				Component Vapor Pressure: PVAi=(0.019337)10^(A-(B/(TLA+C)))			
hexane	0.000001	188	86.18	0.00000	6.878	1171.5	224.37	2.3895
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.4842
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.7627
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.4318
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1397
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.1220
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0035
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0659

Monthly Calculations (continued) **OCTOBER**

Tank No.	17415							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**9.22**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**157.32**	lb/month	Vapor Space Volume	Vv	73168.7	ft3
		7.87E-02	ton/month	Stock Vapor Density	Wv	0.0001	lb/ft3
Time Period		**October**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.030	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**948.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**148.10**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	4,558,096	ft3/month
Product Type	**Distillate Fuel Oil No.2**			Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2388	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0001	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0058	psia
				Vapor Space Outage	Hvo	15.31	ft
Tank design data							
Shell height	Hs	**29.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0300**	**per day**
Diameter	D	**78.00**	ft	Average Daily Vapor Temperature Range	ΔTv	15.45	°R
Throughput	Q	**34,100,469**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0015	psi
Turnovers	N	**415.98**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0058	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	516.36	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**28.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**14.50**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.45**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**13.92**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00150**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.00660	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp	PVN	0.00510	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	520.22	°R
Not Insulated	P_{VA}	0.005807879		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	512.50	°R
Partially Insulated	P_{VA}	0.005821688					
Fully Insulated	P_{VA}	0.005635453		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00136**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.00653	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**514.75**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0051788	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	522.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	519.91	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	507.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	512.95	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	515.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**73,168.67**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**516.36**	°R	Tank diameter	D	78.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**516.43**	°R	Vapor Space Outage; see Equation 1-16	Hvo	15.31	ft
Fully Insulated: TLA = TB	**TLA**	**515.5**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**15.31**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	29.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**517.10**	**°R**	Liquid Height	HL	14.50	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**517.40**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	0.81	ft
Fully Insulated; Tv = TB	**Tv**	**515.46**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**0.81**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	1.361E-04		Tank shell radius	Rs	39.00	ft
Partially Insulated	Wv	1.363E-04					
Fully Insulated	Wv	1.324E-04		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**5.35**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	78.00	ft
				Tank shell radius	Rs	39.00	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**13.887**

Individual HAPS	**L_{Ti} (lb/yr)**	**M_L**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0687	86.18	130	0.00044	0.000004	0.006	**0.00066**
benzene	0.4182	78.11	130	0.00266	0.000026	0.006	**0.00442**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.006	-
toluene	3.7416	92.14	130	0.02378	0.000195	0.006	**0.03356**
ethylbenzene	0.4702	106.17	130	0.00299	0.000021	0.006	**0.00366**
xylenes	9.1277	106.17	130	0.05802	0.000413	0.006	**0.07104**
naphthalene	0.0607	128.17	130	3.86E-04	2.27E-06	0.006	**3.91E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.006	**0.00E+00**

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
	Liquid Mole Fraction: Eq. 40-4 xi = (ZLiML)/Mi				Component Vapor Pressure: PVAi=(0.019337)10^(A-(B/(TLA+C)))			
hexane	0.000001	188	86.18	0.00000	6.878	1171.5	224.37	1.7536
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.0675
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.5416
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.2985
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0923
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0804
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0020
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0422

Monthly Calculations (continued) **NOVEMBER**

Tank No.	17415							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**5.38**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**111.96**	lb/month	Vapor Space Volume	Vv	73168.7	ft3
		5.60E-02	ton/month	Stock Vapor Density	Wv	0.0001	lb/ft3
Time Period		**November**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.025	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**621.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**106.58**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	4,558,096	ft3/month
Product Type	**Distillate Fuel Oil No.2**			Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2365	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0001	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0041	psia
				Vapor Space Outage	Hvo	15.31	ft
Tank design data							
Shell height	Hs	**29.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0249**	**per day**
Diameter	D	**78.00**	ft	Average Daily Vapor Temperature Range	ΔTv	12.56	°R
Throughput	Q	**34,100,469**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0009	psi
Turnovers	N	**429.85**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0041	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	506.41	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**28.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**14.50**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN	ΔTA	13.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**12.56**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**11.21**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00090**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.00461	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp	PVN	0.00371	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	509.54	°R
Not Insulated	P_{VA}	0.004137496		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	503.27	°R
Partially Insulated	P_{VA}	0.004144194					
Fully Insulated	P_{VA}	0.004053483		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00081**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.00457	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**505.35**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0037580	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	512.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	509.25	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	498.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	503.65	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	505.82	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**73,168.67**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**506.41**	°R	Tank diameter	D	78.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**506.45**	°R	Vapor Space Outage; see Equation 1-16	Hvo	15.31	ft
Fully Insulated: TLA = TB	**TLA**	**505.8**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**15.31**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	29.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**506.89**	**°R**	Liquid Height	HL	14.50	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**507.09**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	0.81	ft
Fully Insulated; Tv = TB	**Tv**	**505.82**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**0.81**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	9.888E-05		Tank shell radius	Rs	39.00	ft
Partially Insulated	Wv	9.901E-05					
Fully Insulated	Wv	9.708E-05		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**5.35**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	78.00	ft
				Tank shell radius	Rs	39.00	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**9.774**

Individual HAPS	**L_{Ti} (lb/yr)**	**Vapor Weight Concentrations** Eq. 40-6 ZVi = yiMi / MV **M_i**	**M_V**	**Z_{Vi}**	**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA **$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0524	86.18	130	0.00047	0.000003	0.004	**0.00071**
benzene	0.3134	78.11	130	0.00280	0.000019	0.004	**0.00466**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.004	-
toluene	2.7098	92.14	130	0.02420	0.000141	0.004	**0.03415**
ethylbenzene	0.3272	106.17	130	0.00292	0.000015	0.004	**0.00358**
xylenes	6.3331	106.17	130	0.05657	0.000287	0.004	**0.06926**
naphthalene	0.0379	128.17	130	3.38E-04	1.42E-06	0.004	**3.43E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.004	**0.00E+00**

Individual HAPS	**Liquid Mole Fraction** Eq. 40-4 xi = (ZLiML)/Mi **Z_{Li}**	**M_L**	**M_i**	**X_i**	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000	6.878	1171.5	224.37	1.3394
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.8010
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.4018
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.2164
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0643
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0558
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0013
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0286

Monthly Calculations (continued) **DECEMBER**

Tank No.	17415							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**3.65**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**80.56**	lb/month	Vapor Space Volume	Vv	73168.7	ft3
		4.03E-02	ton/month	Stock Vapor Density	Wv	0.0001	lb/ft3
Time Period		**December**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.023	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**501.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**76.91**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	4,558,096	ft3/month
Product Type	**Distillate Fuel Oil No.2**			Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	0.2388	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0001	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo))	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0029	psia
				Vapor Space Outage	Hvo	15.31	ft
Tank design data							
Shell height	Hs	**29.00**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)]**	**KE**	**0.0229**	**per day**
Diameter	D	**78.00**	ft	Average Daily Vapor Temperature Range	ΔTv	11.33	°R
Throughput	Q	**34,100,469**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0006	psi
Turnovers	N	**415.98**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0000	psi
Roof Type:		**Cone**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0029	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	496.35	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height (use Hs-1 if unknown)	HLX	**28.00**	ft				
Minimum Filling Height (use 1 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 Hs)	HL	**14.50**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAN	ΔTA	12.6	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.33**	**°R**
Tank Construction (pick from drop down list)		**Riveted**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.07**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00059**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = exp	PVX	0.00321	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp	PVN	0.00261	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔTV	TLX	499.18	°R
Not Insulated	P_{VA}	0.002897413		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	493.52	°R
Partially Insulated	P_{VA}	0.002901351					
Fully Insulated	P_{VA}	0.002847936		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00053**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 usi	PVX	0.00318	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+TA	**TAA**	**495.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 usir	PVN	0.0026479	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	501.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA + 0.	TLX	498.91	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	489.20	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0.2	TLN	493.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	495.88	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**73,168.67**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**496.35**	°R	Tank diameter	D	78.00	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*I	**TLA**	**496.39**	°R	Vapor Space Outage; see Equation 1-16	Hvo	15.31	ft
Fully Insulated: TLA = TB	**TLA**	**495.9**					
				Vapor Space Outage (Eq. 1-16: Hvo=Hs-HL+HRO)	**Hvo**	**15.31**	ft
Average Vapor Temperature (Tv)				Tank shell height	Hs	29.00	ft
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**496.74**	**°R**	Liquid Height	HL	14.50	ft
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**496.90**	**°R**	Roof Outage (for a Cone Roof vs Dome Roof)	HRO	0.81	ft
Fully Insulated; Tv = TB	**Tv**	**495.88**	**°R**				
				Roof Outage - Cone Roof (Eq. 1-17 & 1-18: HRO=(1/3)SR*Rs)	**HRO**	**0.81**	ft
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				Tank cone roof slope (If unknown, use 0.0625)	SR	0.0625	ft/ft
Not Insulated	Wv	7.066E-05		Tank shell radius	Rs	39.00	ft
Partially Insulated	Wv	7.073E-05					
Fully Insulated	Wv	6.958E-05		**Roof Outage - Dome Roof (Eq. 1-19 & 1-20: HRO=(RR-(RR^2-Rs^2)^0.5)*(0.5+0.166**	**HRO**	**5.35**	ft
				Tank dome roof radius (If unknown, use tank diameter (D) or (2Rs))	RR	78.00	ft
				Tank shell radius	Rs	39.00	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**6.931**

Individual HAPS	**L_{Ti} (lb/yr)**	**Vapor Weight Concentrations** Eq. 40-6 ZVi = yiMi / MV **M_i**	**M_V**	**Z_{Vi}**	**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA **$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0405	86.18	130	0.00050	0.000002	0.003	**0.00076**
benzene	0.2375	78.11	130	0.00295	0.000014	0.003	**0.00491**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.003	-
toluene	1.9805	92.14	130	0.02458	0.000100	0.003	**0.03468**
ethylbenzene	0.2290	106.17	130	0.00284	0.000010	0.003	**0.00348**
xylenes	4.4200	106.17	130	0.05486	0.000195	0.003	**0.06718**
naphthalene	0.0236	128.17	130	2.93E-04	8.62E-07	0.003	**2.97E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.003	**0.00E+00**

Individual HAPS	**Liquid Mole Fraction** Eq. 40-4 xi = (ZLiML)/Mi **Z_{Li}**	**M_L**	**M_i**	**X_i**	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	**P_{VAi}**
hexane	0.000001	188	86.18	0.00000	6.878	1171.5	224.37	1.0068
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.5907
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.2928
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.1539
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0438
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0379
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0008
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0189

Monthly Calculations - JANUARY

Tank No.		10454A		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.95**	lb/month	
		4.77E-04	ton/month	
	Time Period	**January**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**560.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**7.85**	ft	
Diameter	D	**13.35**	ft	
Throughput	Q	**6,400**	gal/month	
Turnovers	N	**9.16**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
	PBV	**-0.03**		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.032455		
Partially Insulated	P_{VA}	0.0325101		
Fully Insulated	P_{VA}	0.031764		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**490.50**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	496.90	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	484.10	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	490.92	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**491.45**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**491.49**	°R	
Fully Insulated: TLA = TB	**TLA**	**490.9**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**491.89**	**°R**	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**492.07**	**°R**	
Fully Insulated; Tv = TB	**Tv**	**490.92**	**°R**	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	7.993E-04		
Partially Insulated	Wv	8.004E-04		
Fully Insulated	Wv	7.838E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.27**	lb/month
Vapor Space Volume	Vv	549.8	ft3
Stock Vapor Density	Wv	0.0008	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.020	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.68**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0008	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0198**	**per day**
Average Daily Vapor Temperature Range	ΔTv	11.76	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
Average Daily Liquid Surface Temperature	TLA	491.45	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.8	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**11.76**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**10.48**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	494.39	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	488.51	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	494.11	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	488.87	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**549.78**	ft3
Effective Tank diameter	D_E	13.35	ft
Effective Tank Height	H_E	7.85	ft
Vapor Space Outage Hvo = 1/2 H_E	Hvo	3.93	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.954**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	

Vapor Weight Concentration				Eq. 40-6 ZVi = yiMi / MV
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**
hexane	0.0000	86.18	130	0.00000
benzene	0.0000	78.11	130	0.00000
2,2,4 TMP	0.0000	114.23	130	0.00000
toluene	0.0000	92.14	130	0.00000
ethylbenzene	0.2798	106.17	130	0.29329
xylenes	0.6742	106.17	130	0.70671
naphthalene	0.0000	128.17	130	0.00E+00
cumene	0.0000	120.19	130	0.00E+00

Vapor Mole Fraction			Eq. 40-5 yi = Pi / PVA
$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**	
0.000000	0.032	-	
0.000000	0.032	-	
0.000000	0.032	-	
0.000000	0.032	-	
0.011655	0.032	**0.35912**	
0.028084	0.032	**0.86533**	
0.00E+00	0.032	**0.00E+00**	
0.00E+00	0.032	**0.00E+00**	

	Liquid Mole Fraction			Eq. 40-4 xi = (ZLiML)/Mi	**Component Vapor Pressure**			PVAi=(0.019337)10^(A-(B/(TLA+C)))
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.8715
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5064
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2495
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1296
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0361
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0312
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0006
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0153

Monthly Calculations (continued) FEBRUARY

Tank No.		10454A		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.05**	lb/month	
		5.27E-04	ton/month	
	Time Period	**February**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**847.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**7.85**	ft	
Diameter	D	**13.35**	ft	
Throughput	Q	**6,400**	gal/month	
Turnovers	N	**10.14**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0354363		
Partially Insulated	P_{VA}	0.0355263		
Fully Insulated	P_{VA}	0.0343132		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**492.20**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	498.80	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	485.60	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	492.84	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**493.64**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**493.70**	°R	
Fully Insulated: TLA = TB	**TLA**	**492.8**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**494.30**	**°R**	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**494.57**	**°R**	
Fully Insulated; Tv = TB	**Tv**	**492.84**	**°R**	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	8.685E-04		
Partially Insulated	Wv	8.702E-04		
Fully Insulated	Wv	8.435E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.31**	lb/month
Vapor Space Volume	Vv	549.8	ft3
Stock Vapor Density	Wv	0.0009	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.023	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	28	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.74**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0009	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0232**	**per day**
Average Daily Vapor Temperature Range	ΔTv	13.48	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
Average Daily Liquid Surface Temperature	TLA	493.64	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.2	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**13.48**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**12.16**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	497.01	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	490.27	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	496.74	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	490.66	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**549.78**	ft3
Effective Tank diameter	D_E	13.35	ft
Effective Tank Height	H_E	7.85	ft
Vapor Space Outage Hvo = 1/2 H_E	Hvo	3.93	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.053**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	

Vapor Weight Concentration				Eq. 40-6 ZVi = yiMi / MV
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**
hexane	0.0000	86.18	130	0.00000
benzene	0.0000	78.11	130	0.00000
2,2,4 TMP	0.0000	114.23	130	0.00000
toluene	0.0000	92.14	130	0.00000
ethylbenzene	0.3088	106.17	130	0.29318
xylenes	0.7444	106.17	130	0.70682
naphthalene	0.0000	128.17	130	0.00E+00
cumene	0.0000	120.19	130	0.00E+00

Vapor Mole Fraction			Eq. 40-5 yi = Pi / PVA
$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**	
0.000000	0.035	-	
0.000000	0.035	-	
0.000000	0.035	-	
0.000000	0.035	-	
0.012721	0.035	**0.35898**	
0.030669	0.035	**0.86547**	
0.00E+00	0.035	**0.00E+00**	
0.00E+00	0.035	**0.00E+00**	

	Liquid Mole Fraction			Eq. 40-4 xi = (ZLiML)/Mi	**Component Vapor Pressure**			PVAi=(0.019337)10^(A-(B/(TLA+C)))
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.9299
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5427
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2682
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1400
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0394
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0340
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0007
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0168

Monthly Calculations (continued) **MARCH**

Tank No.	10454A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.53**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.50**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		7.50E-04	ton/month	Stock Vapor Density	Wv	0.0011	lb/ft3
	Time Period	**March**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.027	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1156.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.97**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0011	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0273**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	15.72	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	500.87	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.2	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.72**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**14.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	504.80	°R
Not Insulated	P_{VA}	0.047042		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	496.94	°R
Partially Insulated	P_{VA}	0.0471992					
Fully Insulated	P_{VA}	0.0450895		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**498.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	506.00	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	504.53	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	491.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	497.38	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	499.77	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**500.87**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**500.95**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**499.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**501.76**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**502.14**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**499.77**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.136E-03					
Partially Insulated	Wv	1.139E-03					
Fully Insulated	Wv	1.093E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.500**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	
Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0000
ethylbenzene	0.4391
xylenes	1.0607
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration			
Eq. 40-6 ZVi = yiMi / MV			
M_i	**M_V**	**Z_{Vi}**	
86.18	130	0.00000	
78.11	130	0.00000	
114.23	130	0.00000	
92.14	130	0.00000	
106.17	130	0.29278	
106.17	130	0.70722	
128.17	130	0.00E+00	
120.19	130	0.00E+00	

Vapor Mole Fraction		
Eq. 40-5 yi = Pi / PVA		
$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.000000	0.047	-
0.000000	0.047	-
0.000000	0.047	-
0.000000	0.047	-
0.016864	0.047	**0.35849**
0.040736	0.047	**0.86596**
0.00E+00	0.047	**0.00E+00**
0.00E+00	0.047	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.1464
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.6785
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.3382
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1797
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0522
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0452
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0010
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0228

Monthly Calculations (continued) **APRIL**

Tank No.	10454A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.86**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**2.29**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		1.14E-03	ton/month	Stock Vapor Density	Wv	0.0017	lb/ft3
	Time Period	**April**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.031	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1490.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.43**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0017	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0314**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	18.16	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	511.68	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.16**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.63**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	516.22	°R
Not Insulated	P_{VA}	0.0705523		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	507.14	°R
Partially Insulated	P_{VA}	0.0708403					
Fully Insulated	P_{VA}	0.0669906		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**509.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	516.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	515.95	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	501.50	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	507.64	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	510.27	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**511.68**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**511.79**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**510.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**512.84**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**513.32**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**510.27**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.667E-03					
Partially Insulated	Wv	1.672E-03					
Fully Insulated	Wv	1.590E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.288**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	
Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0000
ethylbenzene	0.6686
xylenes	1.6199
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration			
Eq. 40-6 ZVi = yiMi / MV			
M_i	**M_V**	**Z_{Vi}**	
86.18	130	0.00000	
78.11	130	0.00000	
114.23	130	0.00000	
92.14	130	0.00000	
106.17	130	0.29216	
106.17	130	0.70784	
128.17	130	0.00E+00	
120.19	130	0.00E+00	

Vapor Mole Fraction		
Eq. 40-5 yi = Pi / PVA		
$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.000000	0.071	-
0.000000	0.071	-
0.000000	0.071	-
0.000000	0.071	-
0.025239	0.071	**0.35774**
0.061148	0.071	**0.86671**
0.00E+00	0.071	**0.00E+00**
0.00E+00	0.071	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.5475
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.9343
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4715
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2571
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0781
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0679
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0016
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0352

Monthly Calculations (continued) **MAY**

Tank No.	10454A		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**3.33**	lb/month
		1.67E-03	ton/month
	Time Period	**May**	
Nearest US Location		**Bridgeport, CT**	
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1750.0**	Btu/ft^2-day
Absolute Pressure	P_A	14.69	psi
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R
Product Information			
Product Type		**Diesel Additive**	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole
Average organic liquid density	WL	**6.10**	lb/gal
Average Reid Vapor Pressure	RVP	**0.00**	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**	
Vapor Pressure Equation Constant A	A	**0.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R
Tank design data			
Shell height	Hs	**7.85**	ft
Diameter	D	**13.35**	ft
Throughput	Q	**6,400**	gal/month
Turnovers	N	**9.47**	per year
Roof Type:		**0.00**	
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft
Tank Insulation (pick from drop down list)		**Not Insulated**	
Tank Construction (pick from drop down list)		**Welded**	
Tank Shell Color (pick from drop down list)		**White**	
Tank Shell Condition (pick from drop down list)		**Average**	
Tank Interior Condition (pick from drop down list)		**Light Rust**	
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**	
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi
		-0.03	
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))			
Not Insulated	P_{VA}	0.1005102	
Partially Insulated	P_{VA}	0.1009694	
Fully Insulated	P_{VA}	0.0948467	
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**518.65**	°R
Average daily maximum ambient temperature, Table 7.1-7	TAX	526.50	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	510.80	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	519.96	°R
Average Daily Liquid Surface Temperature (TLA)			
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**521.63**	°R
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**521.76**	°R
Fully Insulated: TLA = TB	**TLA**	**520.0**	
Average Vapor Temperature (Tv)			
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**522.98**	**°R**
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**523.55**	**°R**
Fully Insulated; Tv = TB	**Tv**	**519.96**	**°R**
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)			
Not Insulated	Wv	2.328E-03	
Partially Insulated	Wv	2.336E-03	
Fully Insulated	Wv	2.210E-03	

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.34**	lb/month
Vapor Space Volume	Vv	549.8	ft3
Stock Vapor Density	Wv	0.0023	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.034	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.99**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0023	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0337**	**per day**
Average Daily Vapor Temperature Range	ΔTv	19.74	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
Average Daily Liquid Surface Temperature	TLA	521.63	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.7	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**19.74**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**18.17**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	526.56	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	516.69	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	526.30	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	517.21	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**549.78**	ft3
Effective Tank diameter	D_E	13.35	ft
Effective Tank Height	H_E	7.85	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft

HAPS Speciation	lb/month
Product	additive
Total HAP Emissions =	**3.330**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	

Vapor Weight Concentration			
Eq. 40-6 ZVi = yiMi / MV			
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**
hexane	0.0000	86.18	130	0.00000
benzene	0.0000	78.11	130	0.00000
2,2,4 TMP	0.0000	114.23	130	0.00000
toluene	0.0000	92.14	130	0.00000
ethylbenzene	0.9710	106.17	130	0.29159
xylenes	2.3591	106.17	130	0.70841
naphthalene	0.0000	128.17	130	0.00E+00
cumene	0.0000	120.19	130	0.00E+00

Vapor Mole Fraction			
Eq. 40-5 yi = Pi / PVA			
$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.000000	0.101	-
0.000000	0.101	-
0.000000	0.101	-
0.000000	0.101	-
0.035886	0.101	**0.35704**
0.087184	0.101	**0.86742**
0.00E+00	0.101	**0.00E+00**
0.00E+00	0.101	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.0120
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.2359
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.6306
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.3517
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1110
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0967
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0026
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0515

Monthly Calculations (continued) **JUNE**

Tank No.	10454A		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**4.52**	lb/month
		2.26E-03	ton/month
	Time Period	**June**	
Nearest US Location		**Bridgeport, CT**	
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1862.0**	Btu/ft^2-day
Absolute Pressure	P_A	14.69	psi
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R
Product Information			
Product Type		**Diesel Additive**	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole
Average organic liquid density	WL	**6.10**	lb/gal
Average Reid Vapor Pressure	RVP	**0.00**	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**	
Vapor Pressure Equation Constant A	A	**0.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R
Tank design data			
Shell height	Hs	**7.85**	ft
Diameter	D	**13.35**	ft
Throughput	Q	**6,400**	gal/month
Turnovers	N	**9.47**	per year
Roof Type:		**0.00**	
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft
Tank Insulation (pick from drop down list)		**Not Insulated**	
Tank Construction (pick from drop down list)		**Welded**	
Tank Shell Color (pick from drop down list)		**White**	
Tank Shell Condition (pick from drop down list)		**Average**	
Tank Interior Condition (pick from drop down list)		**Light Rust**	
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**	
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi
		-0.03	
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))			
Not Insulated	P_{VA}	0.1417706	
Partially Insulated	P_{VA}	0.1424275	
Fully Insulated	P_{VA}	0.1336728	
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**528.60**	°R
Average daily maximum ambient temperature, Table 7.1-7	TAX	536.10	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	521.10	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	530.00	°R
Average Daily Liquid Surface Temperature (TLA)			
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**531.77**	°R
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**531.91**	°R
Fully Insulated: TLA = TB	**TLA**	**530.0**	
Average Vapor Temperature (Tv)			
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**533.21**	**°R**
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**533.81**	**°R**
Fully Insulated; Tv = TB	**Tv**	**530.00**	**°R**
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)			
Not Insulated	Wv	3.221E-03	
Partially Insulated	Wv	3.232E-03	
Fully Insulated	Wv	3.055E-03	

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.76**	lb/month
Vapor Space Volume	Vv	549.8	ft3
Stock Vapor Density	Wv	0.0032	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.033	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	30	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.76**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0032	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0331**	**per day**
Average Daily Vapor Temperature Range	ΔTv	19.81	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
Average Daily Liquid Surface Temperature	TLA	531.77	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.0	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**19.81**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**18.31**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	536.72	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	526.81	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	536.48	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	527.33	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**549.78**	ft3
Effective Tank diameter	D_E	13.35	ft
Effective Tank Height	H_E	7.85	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft

HAPS Speciation	lb/month
Product	additive
Total HAP Emissions =	**4.515**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	

Vapor Weight Concentration			
Eq. 40-6 ZVi = yiMi / MV			
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**
hexane	0.0000	86.18	130	0.00000
benzene	0.0000	78.11	130	0.00000
2,2,4 TMP	0.0000	114.23	130	0.00000
toluene	0.0000	92.14	130	0.00000
ethylbenzene	1.3140	106.17	130	0.29099
xylenes	3.2015	106.17	130	0.70901
naphthalene	0.0000	128.17	130	0.00E+00
cumene	0.0000	120.19	130	0.00E+00

Vapor Mole Fraction			
Eq. 40-5 yi = Pi / PVA			
$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.050514	0.142	**0.35631**
0.123078	0.142	**0.86815**
0.00E+00	0.142	**0.00E+00**
0.00E+00	0.142	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.5981
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.6225
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.8367
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4771
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1563
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1366
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0041
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0744

Monthly Calculations (continued) **JULY**

Tank No.	10454A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**2.10**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**5.35**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		2.67E-03	ton/month	Stock Vapor Density	Wv	0.0038	lb/ft3
	Time Period	**July**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.032	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1904.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**3.25**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0038	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0324**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	19.60	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	537.14	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.4	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.60**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.16**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	542.04	°R
Not Insulated	P_{VA}	0.168992		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	532.24	°R
Partially Insulated	P_{VA}	0.1697728					
Fully Insulated	P_{VA}	0.1593647		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	541.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	541.82	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.70	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.74	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	535.33	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**537.14**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**537.28**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**535.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**538.61**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**539.23**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**535.33**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.801E-03					
Partially Insulated	Wv	3.814E-03					
Fully Insulated	Wv	3.606E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**5.348**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	

Individual HAPS	L_{Ti} **(lb/month)**	M_l	M_v	Z_{Vi}	$P_i = P_{VA}(x_i)$	P_{VA}	y_i
hexane	0.0000	86.18	130	0.00000	0.000000	0.169	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.169	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.169	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.169	-
ethylbenzene	1.5544	106.17	130	0.29067	0.060147	0.169	**0.35592**
xylenes	3.7933	106.17	130	0.70933	0.146776	0.169	**0.86854**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.169	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.169	**0.00E+00**

Vapor Weight Concentration Eq. 40-6 ZVi = yiMi / MV

Vapor Mole Fraction Eq. 40-5 yi = Pi / PVA

Individual HAPS	**Liquid Mole Fraction** Eq. 40-4 xi = (ZLiML)/Mi Z_{Li}	M_L	M_i	X_i	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	P_{VAi}
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.9609
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8647
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9669
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5576
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1861
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1629
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0051
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0897

Monthly Calculations (continued) **AUGUST**

Tank No.	10454A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.86**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**5.00**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		2.50E-03	ton/month	Stock Vapor Density	Wv	0.0037	lb/ft3
	Time Period	**August**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.030	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1685.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**3.15**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0037	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0296**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	18.09	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	536.06	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.8	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.09**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.71**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	540.59	°R
Not Insulated	P_{VA}	0.1632264		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	531.54	°R
Partially Insulated	P_{VA}	0.163897					
Fully Insulated	P_{VA}	0.1549333		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	540.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	540.37	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.30	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.01	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	534.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**536.06**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**536.19**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**534.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**537.37**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**537.92**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**534.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.680E-03					
Partially Insulated	Wv	3.691E-03					
Fully Insulated	Wv	3.512E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**5.005**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	

Individual HAPS	L_{Ti} **(lb/month)**	M_l	M_v	Z_{Vi}	$P_i = P_{VA}(x_i)$	P_{VA}	y_i
hexane	0.0000	86.18	130	0.00000	0.000000	0.163	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.163	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.163	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.163	-
ethylbenzene	1.4550	106.17	130	0.29074	0.058108	0.163	**0.35599**
xylenes	3.5496	106.17	130	0.70926	0.141755	0.163	**0.86846**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.163	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.163	**0.00E+00**

Vapor Weight Concentration Eq. 40-6 ZVi = yiMi / MV

Vapor Mole Fraction Eq. 40-5 yi = Pi / PVA

Individual HAPS	**Liquid Mole Fraction** Eq. 40-4 xi = (ZLiML)/Mi Z_{Li}	M_L	M_i	X_i	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	P_{VAi}
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.8854
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8141
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9396
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5406
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1798
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1573
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0049
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0864

Monthly Calculations (continued) **SEPTEMBER**

Tank No.	10454A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.32**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**3.80**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		1.90E-03	ton/month	Stock Vapor Density	Wv	0.0029	lb/ft3
	Time Period	**September**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.028	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1320.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.48**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0029	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0276**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	16.75	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	528.39	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**16.75**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**15.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	532.58	°R
Not Insulated	P_{VA}	0.1266829		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	524.21	°R
Partially Insulated	P_{VA}	0.1271055					
Fully Insulated	P_{VA}	0.1214345		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**526.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	533.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	532.32	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	518.90	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	524.67	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	527.14	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**528.39**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**528.49**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**527.1**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**529.42**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**529.85**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**527.14**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	2.899E-03					
Partially Insulated	Wv	2.906E-03					
Fully Insulated	Wv	2.791E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.798**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	

Individual HAPS	**L_{Ti} (lb/month)**	**Vapor Weight Concentration** M_i	M_v	Z_{Vi}	**Vapor Mole Fraction** $P_i = P_{VA}(x_i)$	P_{VA}	y_i
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
hexane	0.0000	86.18	130	0.00000	0.000000	0.127	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.127	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.127	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.127	-
ethylbenzene	1.1061	106.17	130	0.29119	0.045169	0.127	**0.35655**
xylenes	2.6924	106.17	130	0.70881	0.109948	0.127	**0.86790**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.127	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.127	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	Z_{Li}	M_L	M_i	X_i	**A**	**B**	**C**	P_{VAi}
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.3895
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.4842
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.7627
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4318
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1397
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1220
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0035
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0659

Monthly Calculations (continued) **OCTOBER**

Tank No.	10454A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.86**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**2.53**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		1.27E-03	ton/month	Stock Vapor Density	Wv	0.0020	lb/ft3
	Time Period	**October**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.026	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**948.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.67**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0020	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0258**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	15.45	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	516.36	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.45**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**13.92**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	520.22	°R
Not Insulated	P_{VA}	0.0835155		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	512.50	°R
Partially Insulated	P_{VA}	0.0837274					
Fully Insulated	P_{VA}	0.0808716		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**514.75**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	522.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	519.91	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	507.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	512.95	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	515.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**516.36**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**516.43**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**515.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**517.10**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**517.40**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**515.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.957E-03					
Partially Insulated	Wv	1.960E-03					
Fully Insulated	Wv	1.901E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.535**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	

Individual HAPS	**L_{Ti} (lb/month)**	**Vapor Weight Concentration** M_i	M_v	Z_{Vi}	**Vapor Mole Fraction** $P_i = P_{VA}(x_i)$	P_{VA}	y_i
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
hexane	0.0000	86.18	130	0.00000	0.000000	0.084	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.084	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.084	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.084	-
ethylbenzene	0.7398	106.17	130	0.29189	0.029849	0.084	**0.35741**
xylenes	1.7947	106.17	130	0.70811	0.072411	0.084	**0.86704**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.084	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.084	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	Z_{Li}	M_L	M_i	X_i	**A**	**B**	**C**	P_{VAi}
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.7536
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.0675
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.5416
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2985
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0923
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0804
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0020
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0422

Monthly Calculations (continued) **NOVEMBER**

Tank No.	10454A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.47**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.66**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		8.30E-04	ton/month	Stock Vapor Density	Wv	0.0014	lb/ft3
	Time Period	**November**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.021	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**621.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.19**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0014	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0207**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	12.56	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	506.41	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**12.56**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**11.21**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	509.54	°R
Not Insulated	P_{VA}	0.0580534		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	503.27	°R
Partially Insulated	P_{VA}	0.0581547					
Fully Insulated	P_{VA}	0.0567834		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**505.35**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	512.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	509.25	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	498.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	503.65	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	505.82	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**506.41**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**506.45**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**505.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**506.89**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**507.09**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**505.82**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.387E-03					
Partially Insulated	Wv	1.389E-03					
Fully Insulated	Wv	1.360E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.660**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	

Individual HAPS	**L_{Ti} (lb/month)**	**Vapor Weight Concentration** M_I	M_V	Z_{VI}	**Vapor Mole Fraction** $P_I = P_{VA}(x_I)$	P_{VA}	y_I
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
hexane	0.0000	86.18	130	0.00000	0.000000	0.058	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.058	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.058	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.058	-
ethylbenzene	0.4856	106.17	130	0.29247	0.020789	0.058	**0.35811**
xylenes	1.1748	106.17	130	0.70753	0.050294	0.058	**0.86634**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.058	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.058	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	Z_{Li}	M_L	M_I	X_I	**A**	**B**	**C**	P_{VAI}
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.3394
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.8010
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4018
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2164
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0643
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0558
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0013
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0286

Monthly Calculations (continued) **DECEMBER**

Tank No.	10454A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.31**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.13**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		5.65E-04	ton/month	Stock Vapor Density	Wv	0.0010	lb/ft3
	Time Period	**December**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.019	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**501.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.82**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0010	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0187**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	11.33	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	496.35	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.6	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.33**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.07**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	499.18	°R
Not Insulated	P_{VA}	0.0394603		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	493.52	°R
Partially Insulated	P_{VA}	0.0395187					
Fully Insulated	P_{VA}	0.0387265		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**495.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	501.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	498.91	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	489.20	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	493.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	495.88	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**496.35**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**496.39**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**495.9**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**496.74**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**496.90**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**495.88**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	9.624E-04					
Partially Insulated	Wv	9.635E-04					
Fully Insulated	Wv	9.461E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.130**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	

Individual HAPS	**L_{Ti} (lb/month)**	**Vapor Weight Concentration** M_I	M_V	Z_{VI}	**Vapor Mole Fraction** $P_I = P_{VA}(x_I)$	P_{VA}	y_I
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
hexane	0.0000	86.18	130	0.00000	0.000000	0.039	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.039	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.039	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.039	-
ethylbenzene	0.3312	106.17	130	0.29303	0.014158	0.039	**0.35880**
xylenes	0.7991	106.17	130	0.70697	0.034159	0.039	**0.86565**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.039	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.039	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	Z_{Li}	M_L	M_I	X_I	**A**	**B**	**C**	P_{VAI}
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.0068
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5907
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2928
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1539
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0438
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0379
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0008
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0189

Monthly Calculations - JANUARY

Tank No.		10455A						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.27**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**0.95**	lb/month	Vapor Space Volume	Vv	549.8	ft3
			4.77E-04	ton/month	Stock Vapor Density	Wv	0.0008	lb/ft3
		Time Period	**January**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.020	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**560.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.68**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0008	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0198**	**per day**
Diameter		D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	11.76	°R
Throughput		Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	491.45	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.8	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.76**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.48**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		PBV	**-0.03**		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	494.39	°R
Not Insulated		P_{VA}	0.032455		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	488.51	°R
Partially Insulated		P_{VA}	0.0325101					
Fully Insulated		P_{VA}	0.031764		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**490.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	496.90	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	494.11	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	484.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	488.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	490.92	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**491.45**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**491.49**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB		**TLA**	**490.9**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**491.89**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**492.07**	**°R**				
Fully Insulated; Tv = TB		**Tv**	**490.92**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	7.993E-04					
Partially Insulated		Wv	8.004E-04					
Fully Insulated		Wv	7.838E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.954**

	Vapor Weight Concentration				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{vi}(L_T)$		Eq. 40-6 Zvi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.032	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.032	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.032	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.032	-
ethylbenzene	0.2798	106.17	130	0.29329	0.011655	0.032	**0.35912**
xylenes	0.6742	106.17	130	0.70671	0.028084	0.032	**0.86533**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.032	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.032	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.8715
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5064
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2495
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1296
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0361
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0312
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0006
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0153

Monthly Calculations (continued) FEBRUARY

Tank No.		10455A						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.31**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**1.05**	lb/month	Vapor Space Volume	Vv	549.8	ft3
			5.27E-04	ton/month	Stock Vapor Density	Wv	0.0009	lb/ft3
		Time Period	**February**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.023	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**847.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	28	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.74**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0009	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0232**	**per day**
Diameter		D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	13.48	°R
Throughput		Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**10.14**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	493.64	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.2	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**13.48**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**12.16**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	497.01	°R
Not Insulated		P_{VA}	0.0354363		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	490.27	°R
Partially Insulated		P_{VA}	0.0355263					
Fully Insulated		P_{VA}	0.0343132		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**492.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	498.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	496.74	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	485.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	490.66	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	492.84	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**493.64**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**493.70**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB		**TLA**	**492.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**494.30**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**494.57**	**°R**				
Fully Insulated; Tv = TB		**Tv**	**492.84**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	8.685E-04					
Partially Insulated		Wv	8.702E-04					
Fully Insulated		Wv	8.435E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.053**

	Vapor Weight Concentration				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{vi}(L_T)$		Eq. 40-6 Zvi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.035	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.035	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.035	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.035	-
ethylbenzene	0.3088	106.17	130	0.29318	0.012721	0.035	**0.35898**
xylenes	0.7444	106.17	130	0.70682	0.030669	0.035	**0.86547**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.035	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.035	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.9299
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5427
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2682
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1400
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0394
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0340
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0007
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0168

Monthly Calculations (continued) — MARCH

Tank No.		10455A						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.53**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**1.50**	lb/month	Vapor Space Volume	Vv	549.8	ft3
			7.50E-04	ton/month	Stock Vapor Density	Wv	0.0011	lb/ft3
		Time Period	**March**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.027	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**1156.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.97**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0011	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0273**	**per day**
Diameter		D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	15.72	°R
Throughput		Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	500.87	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.2	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.72**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**14.30**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	504.80	°R
Not Insulated		P_{VA}	0.047042		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	496.94	°R
Partially Insulated		P_{VA}	0.0471992					
Fully Insulated		P_{VA}	0.0450895		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**498.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	506.00	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	504.53	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	491.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	497.38	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	499.77	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**500.87**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**500.95**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB		**TLA**	**499.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**501.76**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**502.14**	**°R**				
Fully Insulated; Tv = TB		**Tv**	**499.77**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	1.136E-03					
Partially Insulated		Wv	1.139E-03					
Fully Insulated		Wv	1.093E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.500**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.047	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.047	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.047	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.047	-
ethylbenzene	0.4391	106.17	130	0.29278	0.016864	0.047	**0.35849**
xylenes	1.0607	106.17	130	0.70722	0.040736	0.047	**0.86596**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.047	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.047	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.1464
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.6785
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.3382
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1797
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0522
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0452
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0010
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0228

Monthly Calculations (continued) — APRIL

Tank No.		10455A						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.86**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**2.29**	lb/month	Vapor Space Volume	Vv	549.8	ft3
			1.14E-03	ton/month	Stock Vapor Density	Wv	0.0017	lb/ft3
		Time Period	**April**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.031	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**1490.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.43**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0017	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0314**	**per day**
Diameter		D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	18.16	°R
Throughput		Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	511.68	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.16**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.63**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	516.22	°R
Not Insulated		P_{VA}	0.0705523		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	507.14	°R
Partially Insulated		P_{VA}	0.0708403					
Fully Insulated		P_{VA}	0.0669906		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**509.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	516.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	515.95	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	501.50	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	507.64	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	510.27	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**511.68**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**511.79**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB		**TLA**	**510.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**512.84**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**513.32**	**°R**				
Fully Insulated; Tv = TB		**Tv**	**510.27**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	1.667E-03					
Partially Insulated		Wv	1.672E-03					
Fully Insulated		Wv	1.590E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.288**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.071	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.071	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.071	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.071	-
ethylbenzene	0.6686	106.17	130	0.29216	0.025239	0.071	**0.35774**
xylenes	1.6199	106.17	130	0.70784	0.061148	0.071	**0.86671**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.071	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.071	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.5475
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.9343
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4715
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2571
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0781
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0679
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0016
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0352

Monthly Calculations (continued) **MAY**

Tank No.		10455A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.34**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**3.33**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		1.67E-03	ton/month	Stock Vapor Density	Wv	0.0023	lb/ft3
Time Period		**May**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.034	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1750.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.99**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0023	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0337**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	19.74	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	521.63	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA)	ΔTA	15.7	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.74**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.17**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	526.56	°R
Not Insulated	P_{VA}	0.1005102		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	516.69	°R
Partially Insulated	P_{VA}	0.1009694					
Fully Insulated	P_{VA}	0.0948467		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**518.65**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	526.50	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	526.30	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	510.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	517.21	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	519.96	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**521.63**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**521.76**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**520.0**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**522.98**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**523.55**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**519.96**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	2.328E-03					
Partially Insulated	Wv	2.336E-03					
Fully Insulated	Wv	2.210E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.330**

	Vapor Weight Concentration				Vapor Mole Fraction			
	Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.101	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.101	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.101	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.101	-
ethylbenzene	0.9710	106.17	130	0.29159	0.035886	0.101	**0.35704**
xylenes	2.3591	106.17	130	0.70841	0.087184	0.101	**0.86742**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.101	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.101	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.0120
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.2359
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.6306
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.3517
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1110
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0967
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0026
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0515

Monthly Calculations (continued) **JUNE**

Tank No.		10455A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.76**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**4.52**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		2.26E-03	ton/month	Stock Vapor Density	Wv	0.0032	lb/ft3
Time Period		**June**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.033	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1862.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.76**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0032	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0331**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	19.81	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	531.77	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA)	ΔTA	15.0	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.81**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.31**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	536.72	°R
Not Insulated	P_{VA}	0.1417706		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	526.81	°R
Partially Insulated	P_{VA}	0.1424275					
Fully Insulated	P_{VA}	0.1336728		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**528.60**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	536.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	536.48	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	521.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	527.33	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	530.00	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**531.77**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**531.91**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**530.0**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**533.21**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**533.81**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**530.00**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.221E-03					
Partially Insulated	Wv	3.232E-03					
Fully Insulated	Wv	3.055E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**4.515**

	Vapor Weight Concentration				Vapor Mole Fraction			
	Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.142	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.142	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.142	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.142	-
ethylbenzene	1.3140	106.17	130	0.29099	0.050514	0.142	**0.35631**
xylenes	3.2015	106.17	130	0.70901	0.123078	0.142	**0.86815**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.142	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.142	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.5981
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.6225
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.8367
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4771
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1563
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1366
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0041
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0744

Monthly Calculations (continued) **JULY**

Tank No.		10455A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**2.10**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**5.35**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		2.67E-03	ton/month	Stock Vapor Density	Wv	0.0038	lb/ft3
Time Period		**July**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.032	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1904.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**3.25**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0038	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0324**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	19.60	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	537.14	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.4	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.60**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.16**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	542.04	°R
Not Insulated	P_{VA}	0.168992		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	532.24	°R
Partially Insulated	P_{VA}	0.1697728					
Fully Insulated	P_{VA}	0.1593647		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	541.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	541.82	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.70	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.74	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	535.33	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αs*I	**TLA**	**537.14**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**537.28**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**535.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*αs*I	**Tv**	**538.61**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**539.23**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**535.33**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.801E-03					
Partially Insulated	Wv	3.814E-03					
Fully Insulated	Wv	3.606E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**5.348**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.169	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.169	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.169	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.169	-
ethylbenzene	1.5544	106.17	130	0.29067	0.060147	0.169	**0.35592**
xylenes	3.7933	106.17	130	0.70933	0.146776	0.169	**0.86854**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.169	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.169	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.9609
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8647
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9669
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5576
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1861
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1629
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0051
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0897

Monthly Calculations (continued) **AUGUST**

Tank No.		10455A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.86**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**5.00**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		2.50E-03	ton/month	Stock Vapor Density	Wv	0.0037	lb/ft3
Time Period		**August**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.030	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1685.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**3.15**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0037	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0296**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	18.09	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	536.06	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.8	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.09**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.71**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	540.59	°R
Not Insulated	P_{VA}	0.1632264		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	531.54	°R
Partially Insulated	P_{VA}	0.163897					
Fully Insulated	P_{VA}	0.1549333		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	540.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	540.37	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.30	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.01	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	534.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αs*I	**TLA**	**536.06**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**536.19**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**534.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*αs*I	**Tv**	**537.37**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**537.92**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**534.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.680E-03					
Partially Insulated	Wv	3.691E-03					
Fully Insulated	Wv	3.512E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**5.005**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.163	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.163	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.163	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.163	-
ethylbenzene	1.4550	106.17	130	0.29074	0.058108	0.163	**0.35599**
xylenes	3.5496	106.17	130	0.70926	0.141755	0.163	**0.86846**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.163	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.163	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.8854
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8141
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9396
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5406
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1798
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1573
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0049
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0864

Monthly Calculations (continued) **SEPTEMBER**

Tank No.		10455A						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.32**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**3.80**	lb/month	Vapor Space Volume	Vv	549.8	ft3
			1.90E-03	ton/month	Stock Vapor Density	Wv	0.0029	lb/ft3
		Time Period	**September**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.028	per day
	Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
	Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1320.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
	Absolute Pressure	P_A	14.69	psi				
	Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.48**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
	Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
	Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
	Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0029	lb/ft3
	Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
	Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
	Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
	Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
	Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0276**	**per day**
	Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	16.75	°R
	Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
	Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
	Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
	Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	528.39	°R
	Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
	Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
	Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
	Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.5	°R
	Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**16.75**	**°R**
	Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**15.30**	°R
	Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
	Tank Shell Condition (pick from drop down list)		**Average**					
	Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
	Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
	Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	532.58	°R
	Not Insulated	P_{VA}	0.1266829		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	524.21	°R
	Partially Insulated	P_{VA}	0.1271055					
	Fully Insulated	P_{VA}	0.1214345		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**526.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
	Average daily maximum ambient temperature, Table 7.1-7	TAX	533.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	532.32	°R
	Average daily minimum ambient temperature, Table 7.1-7	TAN	518.90	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	524.67	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	527.14	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
	Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**528.39**	°R	Effective Tank diameter	D_E	13.35	ft
	Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**528.49**	°R	Effective Tank Height	H_E	7.85	ft
	Fully Insulated: TLA = TB	**TLA**	**527.1**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)								
	Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**529.42**	**°R**				
	Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**529.85**	**°R**				
	Fully Insulated; Tv = TB	**Tv**	**527.14**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
	Not Insulated	Wv	2.899E-03					
	Partially Insulated	Wv	2.906E-03					
	Fully Insulated	Wv	2.791E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.798**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.127	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.127	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.127	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.127	-
ethylbenzene	1.1061	106.17	130	0.29119	0.045169	0.127	**0.35655**
xylenes	2.6924	106.17	130	0.70881	0.109948	0.127	**0.86790**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.127	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.127	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.3895
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.4842
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.7627
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4318
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1397
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1220
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0035
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0659

Monthly Calculations (continued) **OCTOBER**

Tank No.		10455A						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.86**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**2.53**	lb/month	Vapor Space Volume	Vv	549.8	ft3
			1.27E-03	ton/month	Stock Vapor Density	Wv	0.0020	lb/ft3
		Time Period	**October**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.026	per day
	Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
	Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**948.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
	Absolute Pressure	P_A	14.69	psi				
	Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.67**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
	Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
	Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
	Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0020	lb/ft3
	Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
	Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
	Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
	Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
	Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0258**	**per day**
	Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	15.45	°R
	Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
	Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
	Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
	Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	516.36	°R
	Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
	Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
	Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
	Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
	Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.45**	**°R**
	Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**13.92**	°R
	Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
	Tank Shell Condition (pick from drop down list)		**Average**					
	Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
	Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
	Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	520.22	°R
	Not Insulated	P_{VA}	0.0835155		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	512.50	°R
	Partially Insulated	P_{VA}	0.0837274					
	Fully Insulated	P_{VA}	0.0808716		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**514.75**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
	Average daily maximum ambient temperature, Table 7.1-7	TAX	522.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	519.91	°R
	Average daily minimum ambient temperature, Table 7.1-7	TAN	507.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	512.95	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	515.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
	Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**516.36**	°R	Effective Tank diameter	D_E	13.35	ft
	Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**516.43**	°R	Effective Tank Height	H_E	7.85	ft
	Fully Insulated: TLA = TB	**TLA**	**515.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)								
	Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**517.10**	**°R**				
	Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**517.40**	**°R**				
	Fully Insulated; Tv = TB	**Tv**	**515.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
	Not Insulated	Wv	1.957E-03					
	Partially Insulated	Wv	1.960E-03					
	Fully Insulated	Wv	1.901E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.535**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.084	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.084	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.084	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.084	-
ethylbenzene	0.7398	106.17	130	0.29189	0.029849	0.084	**0.35741**
xylenes	1.7947	106.17	130	0.70811	0.072411	0.084	**0.86704**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.084	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.084	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.7536
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.0675
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.5416
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2985
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0923
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0804
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0020
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0422

Monthly Calculations (continued) **NOVEMBER**

Tank No.		10455A						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.47**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**1.66**	lb/month	Vapor Space Volume	Vv	549.8	ft3
			8.30E-04	ton/month	Stock Vapor Density	Wv	0.0014	lb/ft3
		Time Period	**November**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.021	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**621.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.19**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0014	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0207**	**per day**
Diameter		D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	12.56	°R
Throughput		Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	506.41	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.5	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**12.56**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**11.21**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	509.54	°R
Not Insulated		P_{VA}	0.0580534		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	503.27	°R
Partially Insulated		P_{VA}	0.0581547					
Fully Insulated		P_{VA}	0.0567834		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 uI	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**505.35**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	512.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	509.25	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	498.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	503.65	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	505.82	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**506.41**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**506.45**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB		**TLA**	**505.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**506.89**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**507.09**	**°R**				
Fully Insulated; Tv = TB		**Tv**	**505.82**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	1.387E-03					
Partially Insulated		Wv	1.389E-03					
Fully Insulated		Wv	1.360E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.660**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.058	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.058	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.058	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.058	-
ethylbenzene	0.4856	106.17	130	0.29247	0.020789	0.058	**0.35811**
xylenes	1.1748	106.17	130	0.70753	0.050294	0.058	**0.86634**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.058	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.058	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.3394
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.8010
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4018
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2164
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0643
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0558
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0013
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0286

Monthly Calculations (continued) **DECEMBER**

Tank No.		10455A						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.31**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**1.13**	lb/month	Vapor Space Volume	Vv	549.8	ft3
			5.65E-04	ton/month	Stock Vapor Density	Wv	0.0010	lb/ft3
		Time Period	**December**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.019	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**501.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.82**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0010	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0187**	**per day**
Diameter		D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	11.33	°R
Throughput		Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	496.35	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.6	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.33**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.07**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	499.18	°R
Not Insulated		P_{VA}	0.0394603		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	493.52	°R
Partially Insulated		P_{VA}	0.0395187					
Fully Insulated		P_{VA}	0.0387265		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 uI	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**495.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	501.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	498.91	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	489.20	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	493.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	495.88	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**496.35**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**496.39**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB		**TLA**	**495.9**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**496.74**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**496.90**	**°R**				
Fully Insulated; Tv = TB		**Tv**	**495.88**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	9.624E-04					
Partially Insulated		Wv	9.635E-04					
Fully Insulated		Wv	9.461E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.130**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.039	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.039	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.039	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.039	-
ethylbenzene	0.3312	106.17	130	0.29303	0.014158	0.039	**0.35880**
xylenes	0.7991	106.17	130	0.70697	0.034159	0.039	**0.86565**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.039	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.039	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.0068
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5907
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2928
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1539
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0438
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0379
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0008
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0189

Monthly Calculations - JANUARY

Tank No.		13061A						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.27**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**0.95**	lb/month	Vapor Space Volume	Vv	549.8	ft3
			4.77E-04	ton/month	Stock Vapor Density	Wv	0.0008	lb/ft3
		Time Period	**January**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.020	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**560.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.68**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0008	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0198**	**per day**
Diameter		D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	11.76	°R
Throughput		Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	491.45	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.8	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.76**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.48**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		PBV	**-0.03**		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	494.39	°R
Not Insulated		P_{VA}	0.032455		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	488.51	°R
Partially Insulated		P_{VA}	0.0325101					
Fully Insulated		P_{VA}	0.031764		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**490.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	496.90	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	494.11	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	484.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	488.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	490.92	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**491.45**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**491.49**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB		**TLA**	**490.9**		Vapor Space Outage Hvo = 1/2 H_E	Hvo	3.93	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**491.89**	°R				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**492.07**	°R				
Fully Insulated; Tv = TB		**Tv**	**490.92**	°R				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	7.993E-04					
Partially Insulated		Wv	8.004E-04					
Fully Insulated		Wv	7.838E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.954**

Vapor Weight Concentration					**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$					Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.032	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.032	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.032	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.032	-
ethylbenzene	0.2798	106.17	130	0.29329	0.011655	0.032	**0.35912**
xylenes	0.6742	106.17	130	0.70671	0.028084	0.032	**0.86533**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.032	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.032	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.8715
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5064
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2495
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1296
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0361
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0312
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0006
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0153

Monthly Calculations (continued) FEBRUARY

Tank No.		13061A						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.31**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**1.05**	lb/month	Vapor Space Volume	Vv	549.8	ft3
			5.27E-04	ton/month	Stock Vapor Density	Wv	0.0009	lb/ft3
		Time Period	**February**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.023	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**847.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	28	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.74**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0009	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0232**	**per day**
Diameter		D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	13.48	°R
Throughput		Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**10.14**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	493.64	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.2	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**13.48**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**12.16**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	497.01	°R
Not Insulated		P_{VA}	0.0354363		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	490.27	°R
Partially Insulated		P_{VA}	0.0355263					
Fully Insulated		P_{VA}	0.0343132		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**492.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	498.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	496.74	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	485.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	490.66	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	492.84	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**493.64**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**493.70**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB		**TLA**	**492.8**		Vapor Space Outage Hvo = 1/2 H_E	Hvo	3.93	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**494.30**	°R				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**494.57**	°R				
Fully Insulated; Tv = TB		**Tv**	**492.84**	°R				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	8.685E-04					
Partially Insulated		Wv	8.702E-04					
Fully Insulated		Wv	8.435E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.053**

Vapor Weight Concentration					**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$					Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.035	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.035	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.035	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.035	-
ethylbenzene	0.3088	106.17	130	0.29318	0.012721	0.035	**0.35898**
xylenes	0.7444	106.17	130	0.70682	0.030669	0.035	**0.86547**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.035	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.035	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.9299
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5427
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2682
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1400
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0394
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0340
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0007
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0168

Monthly Calculations (continued) **MARCH**

Tank No.		13061A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.50**	lb/month	**Standing Losses;** Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.53**	lb/month
		7.50E-04	ton/month	Vapor Space Volume	Vv	549.8	ft3
Time Period		**March**		Stock Vapor Density	Wv	0.0011	lb/ft3
Nearest US Location		**Bridgeport, CT**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.027	per day
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1156.0**	Btu/ft^2-day	Vented Vapor Saturation Factor	Ks	1.00	NA
Absolute Pressure	P_A	14.69	psi	Constant; Number of Daily Events in a Year	365	31	days/month
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.97**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0011	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0273**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	15.72	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	500.87	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.2	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.72**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**14.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	504.80	°R
Not Insulated	P_{VA}	0.047042		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	496.94	°R
Partially Insulated	P_{VA}	0.0471992					
Fully Insulated	P_{VA}	0.0450895		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**498.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	506.00	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	504.53	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	491.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	497.38	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	499.77	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**500.87**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**500.95**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**499.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**501.76**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**502.14**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**499.77**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.136E-03					
Partially Insulated	Wv	1.139E-03					
Fully Insulated	Wv	1.093E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.500**

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_v**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.047	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.047	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.047	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.047	-
ethylbenzene	0.4391	106.17	130	0.29278	0.016864	0.047	**0.35849**
xylenes	1.0607	106.17	130	0.70722	0.040736	0.047	**0.86596**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.047	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.047	**0.00E+00**

Vapor Weight Concentration: Eq. 40-6 ZVi = yiMi / MV

Vapor Mole Fraction: Eq. 40-5 yi = Pi / PVA

Individual HAPS	**Liquid Mole Fraction** Eq. 40-4 xi = (ZLiML)/Mi **Z_{Li}**	**M_L**	**M_i**	**X_i**	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.1464
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.6785
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.3382
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1797
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0522
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0452
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0010
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0228

Monthly Calculations (continued) **APRIL**

Tank No.		13061A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**2.29**	lb/month	**Standing Losses;** Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.86**	lb/month
		1.14E-03	ton/month	Vapor Space Volume	Vv	549.8	ft3
Time Period		**April**		Stock Vapor Density	Wv	0.0017	lb/ft3
Nearest US Location		**Bridgeport, CT**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.031	per day
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1490.0**	Btu/ft^2-day	Vented Vapor Saturation Factor	Ks	1.00	NA
Absolute Pressure	P_A	14.69	psi	Constant; Number of Daily Events in a Year	365	30	days/month
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.43**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0017	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0314**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	18.16	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	511.68	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.16**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.63**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	516.22	°R
Not Insulated	P_{VA}	0.0705523		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	507.14	°R
Partially Insulated	P_{VA}	0.0708403					
Fully Insulated	P_{VA}	0.0669906		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**509.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	516.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	515.95	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	501.50	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	507.64	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	510.27	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**511.68**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**511.79**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**510.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**512.84**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**513.32**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**510.27**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.667E-03					
Partially Insulated	Wv	1.672E-03					
Fully Insulated	Wv	1.590E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.288**

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_v**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.071	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.071	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.071	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.071	-
ethylbenzene	0.6686	106.17	130	0.29216	0.025239	0.071	**0.35774**
xylenes	1.6199	106.17	130	0.70784	0.061148	0.071	**0.86671**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.071	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.071	**0.00E+00**

Vapor Weight Concentration: Eq. 40-6 ZVi = yiMi / MV

Vapor Mole Fraction: Eq. 40-5 yi = Pi / PVA

Individual HAPS	**Liquid Mole Fraction** Eq. 40-4 xi = (ZLiML)/Mi **Z_{Li}**	**M_L**	**M_i**	**X_i**	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.5475
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.9343
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4715
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2571
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0781
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0679
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0016
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0352

Monthly Calculations (continued) **MAY**

Tank No.		13061A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.34**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**3.33**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		1.67E-03	ton/month	Stock Vapor Density	Wv	0.0023	lb/ft3
Time Period		**May**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.034	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1750.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.99**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0023	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0337**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	19.74	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	521.63	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.7	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.74**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.17**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	526.56	°R
Not Insulated	P_{VA}	0.1005102		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	516.69	°R
Partially Insulated	P_{VA}	0.1009694					
Fully Insulated	P_{VA}	0.0948467		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**518.65**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	526.50	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	526.30	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	510.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	517.21	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	519.96	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**521.63**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**521.76**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**520.0**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**522.98**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**523.55**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**519.96**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	2.328E-03					
Partially Insulated	Wv	2.336E-03					
Fully Insulated	Wv	2.210E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.330**

Vapor Weight Concentration				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$				Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.101	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.101	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.101	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.101	-
ethylbenzene	0.9710	106.17	130	0.29159	0.035886	0.101	**0.35704**
xylenes	2.3591	106.17	130	0.70841	0.087184	0.101	**0.86742**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.101	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.101	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.0120
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.2359
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.6306
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.3517
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1110
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0967
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0026
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0515

Monthly Calculations (continued) **JUNE**

Tank No.		13061A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.76**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**4.52**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		2.26E-03	ton/month	Stock Vapor Density	Wv	0.0032	lb/ft3
Time Period		**June**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.033	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1862.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.76**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0032	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0331**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	19.81	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	531.77	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.0	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.81**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.31**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	536.72	°R
Not Insulated	P_{VA}	0.1417706		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	526.81	°R
Partially Insulated	P_{VA}	0.1424275					
Fully Insulated	P_{VA}	0.1336728		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**528.60**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	536.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	536.48	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	521.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	527.33	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	530.00	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**531.77**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**531.91**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**530.0**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**533.21**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**533.81**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**530.00**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.221E-03					
Partially Insulated	Wv	3.232E-03					
Fully Insulated	Wv	3.055E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**4.515**

Vapor Weight Concentration				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$				Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.142	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.142	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.142	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.142	-
ethylbenzene	1.3140	106.17	130	0.29099	0.050514	0.142	**0.35631**
xylenes	3.2015	106.17	130	0.70901	0.123078	0.142	**0.86815**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.142	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.142	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.5981
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.6225
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.8367
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4771
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1563
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1366
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0041
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0744

Monthly Calculations (continued) **JULY**

Tank No.	13061A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**2.10**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**5.35**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		2.67E-03	ton/month	Stock Vapor Density	Wv	0.0038	lb/ft3
Time Period		**July**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.032	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1904.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**3.25**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0038	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0324**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	19.60	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	537.14	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.4	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.60**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.16**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	542.04	°R
Not Insulated	P_{VA}	0.168992		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	532.24	°R
Partially Insulated	P_{VA}	0.1697728					
Fully Insulated	P_{VA}	0.1593647		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	541.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	541.82	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.70	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.74	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	535.33	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**537.14**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**537.28**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**535.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**538.61**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**539.23**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**535.33**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.801E-03					
Partially Insulated	Wv	3.814E-03					
Fully Insulated	Wv	3.606E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**5.348**

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_v**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.169	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.169	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.169	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.169	-
ethylbenzene	1.5544	106.17	130	0.29067	0.060147	0.169	**0.35592**
xylenes	3.7933	106.17	130	0.70933	0.146776	0.169	**0.86854**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.169	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.169	**0.00E+00**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$ — Eq. 40-6 ZVi = yiMi / MV — Eq. 40-5 yi = Pi / PVA

Individual HAPS	**Liquid Mole Fraction** Eq. 40-4 xi = (ZLiML)/Mi **Z_{Li}**	**M_L**	**M_i**	**X_i**	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.9609
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8647
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9669
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5576
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1861
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1629
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0051
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0897

Monthly Calculations (continued) **AUGUST**

Tank No.	13061A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.86**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**5.00**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		2.50E-03	ton/month	Stock Vapor Density	Wv	0.0037	lb/ft3
Time Period		**August**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.030	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1685.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**3.15**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0037	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0296**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	18.09	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	536.06	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.8	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.09**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.71**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	540.59	°R
Not Insulated	P_{VA}	0.1632264		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	531.54	°R
Partially Insulated	P_{VA}	0.163897					
Fully Insulated	P_{VA}	0.1549333		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	540.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	540.37	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.30	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.01	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	534.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**536.06**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**536.19**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**534.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**537.37**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**537.92**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**534.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.680E-03					
Partially Insulated	Wv	3.691E-03					
Fully Insulated	Wv	3.512E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**5.005**

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_v**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.163	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.163	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.163	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.163	-
ethylbenzene	1.4550	106.17	130	0.29074	0.058108	0.163	**0.35599**
xylenes	3.5496	106.17	130	0.70926	0.141755	0.163	**0.86846**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.163	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.163	**0.00E+00**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$ — Eq. 40-6 ZVi = yiMi / MV — Eq. 40-5 yi = Pi / PVA

Individual HAPS	**Liquid Mole Fraction** Eq. 40-4 xi = (ZLiML)/Mi **Z_{Li}**	**M_L**	**M_i**	**X_i**	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.8854
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8141
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9396
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5406
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1798
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1573
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0049
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0864

Monthly Calculations (continued) **SEPTEMBER**

Tank No.	13061A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.32**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**3.80**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		1.90E-03	ton/month	Stock Vapor Density	Wv	0.0029	lb/ft3
Time Period		**September**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.028	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1320.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.48**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0029	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0276**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	16.75	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	528.39	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**16.75**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**15.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	532.58	°R
Not Insulated	P_{VA}	0.1266829		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	524.21	°R
Partially Insulated	P_{VA}	0.1271055					
Fully Insulated	P_{VA}	0.1214345		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**526.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	533.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	532.32	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	518.90	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	524.67	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	527.14	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**528.39**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**528.49**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**527.1**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**529.42**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**529.85**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**527.14**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	2.899E-03					
Partially Insulated	Wv	2.906E-03					
Fully Insulated	Wv	2.791E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.798**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.127	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.127	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.127	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.127	-
ethylbenzene	1.1061	106.17	130	0.29119	0.045169	0.127	**0.35655**
xylenes	2.6924	106.17	130	0.70881	0.109948	0.127	**0.86790**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.127	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.127	**0.00E+00**

Vapor Weight Concentration: Eq. 40-6 ZVi = yiMi / MV

Vapor Mole Fraction: Eq. 40-5 yi = Pi / PVA

Individual HAPS	**Liquid Mole Fraction Z_{Li}** Eq. 40-4 xi = (ZLiML)/Mi	**M_L**	**M_i**	**X_i**	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.3895
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.4842
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.7627
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4318
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1397
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1220
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0035
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0659

Monthly Calculations (continued) **OCTOBER**

Tank No.	13061A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.86**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**2.53**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		1.27E-03	ton/month	Stock Vapor Density	Wv	0.0020	lb/ft3
Time Period		**October**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.026	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**948.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.67**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0020	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0258**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	15.45	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	516.36	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.45**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**13.92**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	520.22	°R
Not Insulated	P_{VA}	0.0835155		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	512.50	°R
Partially Insulated	P_{VA}	0.0837274					
Fully Insulated	P_{VA}	0.0808716		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**514.75**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	522.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	519.91	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	507.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	512.95	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	515.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**516.36**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**516.43**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**515.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**517.10**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**517.40**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**515.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.957E-03					
Partially Insulated	Wv	1.960E-03					
Fully Insulated	Wv	1.901E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.535**
Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$	

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.084	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.084	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.084	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.084	-
ethylbenzene	0.7398	106.17	130	0.29189	0.029849	0.084	**0.35741**
xylenes	1.7947	106.17	130	0.70811	0.072411	0.084	**0.86704**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.084	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.084	**0.00E+00**

Vapor Weight Concentration: Eq. 40-6 ZVi = yiMi / MV

Vapor Mole Fraction: Eq. 40-5 yi = Pi / PVA

Individual HAPS	**Liquid Mole Fraction Z_{Li}** Eq. 40-4 xi = (ZLiML)/Mi	**M_L**	**M_i**	**X_i**	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.7536
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.0675
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.5416
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2985
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0923
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0804
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0020
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0422

Monthly Calculations (continued) **NOVEMBER**

Tank No.	13061A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.47**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.66**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		8.30E-04	ton/month	Stock Vapor Density	Wv	0.0014	lb/ft3
	Time Period	**November**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.021	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**621.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.19**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0014	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0207**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	12.56	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	506.41	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**12.56**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**11.21**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	509.54	°R
Not Insulated	P_{VA}	0.0580534		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	503.27	°R
Partially Insulated	P_{VA}	0.0581547					
Fully Insulated	P_{VA}	0.0567834		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**505.35**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	512.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	509.25	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	498.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	503.65	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	505.82	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**506.41**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**506.45**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**505.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**506.89**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**507.09**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**505.82**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.387E-03					
Partially Insulated	Wv	1.389E-03					
Fully Insulated	Wv	1.360E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.660**

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.058	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.058	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.058	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.058	-
ethylbenzene	0.4856	106.17	130	0.29247	0.020789	0.058	**0.35811**
xylenes	1.1748	106.17	130	0.70753	0.050294	0.058	**0.86634**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.058	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.058	**0.00E+00**

Individual HAPS	**Liquid Mole Fraction** Eq. 40-4 xi = (ZLiML)/Mi **Z_{Li}**	**M_L**	**M_i**	**X_i**	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.3394
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.8010
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4018
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2164
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0643
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0558
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0013
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0286

Monthly Calculations (continued) **DECEMBER**

Tank No.	13061A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.31**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.13**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		5.65E-04	ton/month	Stock Vapor Density	Wv	0.0010	lb/ft3
	Time Period	**December**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.019	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**501.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.82**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0010	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0187**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	11.33	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	496.35	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.6	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.33**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.07**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	499.18	°R
Not Insulated	P_{VA}	0.0394603		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	493.52	°R
Partially Insulated	P_{VA}	0.0395187					
Fully Insulated	P_{VA}	0.0387265		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**495.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	501.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	498.91	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	489.20	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	493.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	495.88	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**496.35**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**496.39**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**495.9**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**496.74**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**496.90**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**495.88**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	9.624E-04					
Partially Insulated	Wv	9.635E-04					
Fully Insulated	Wv	9.461E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.130**

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.039	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.039	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.039	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.039	-
ethylbenzene	0.3312	106.17	130	0.29303	0.014158	0.039	**0.35880**
xylenes	0.7991	106.17	130	0.70697	0.034159	0.039	**0.86565**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.039	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.039	**0.00E+00**

Individual HAPS	**Liquid Mole Fraction** Eq. 40-4 xi = (ZLiML)/Mi **Z_{Li}**	**M_L**	**M_i**	**X_i**	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.0068
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5907
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2928
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1539
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0438
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0379
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0008
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0189

Monthly Calculations - JANUARY

Tank No.		13316A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.27**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.95**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		4.77E-04	ton/month	Stock Vapor Density	Wv	0.0008	lb/ft3
Time Period		**January**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.020	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**560.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.68**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0008	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	^oR	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0198**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	11.76	^oR
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	491.45	^oR
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.8	^oR
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.76**	**^oR**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.48**	^oR
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	^oR
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
	PBV	**-0.03**		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	494.39	^oR
Not Insulated	P_{VA}	0.032455		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	488.51	^oR
Partially Insulated	P_{VA}	0.0325101					
Fully Insulated	P_{VA}	0.031764		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**490.50**	^oR	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	496.90	^oR	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	494.11	^oR
Average daily minimum ambient temperature, Table 7.1-7	TAN	484.10	^oR	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	488.87	^oR
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	490.92	^oR	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**491.45**	^oR	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**491.49**	^oR	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**490.9**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**491.89**	**^oR**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**492.07**	**^oR**				
Fully Insulated; Tv = TB	**Tv**	**490.92**	**^oR**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	7.993E-04					
Partially Insulated	Wv	8.004E-04					
Fully Insulated	Wv	7.838E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.954**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.032	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.032	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.032	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.032	-
ethylbenzene	0.2798	106.17	130	0.29329	0.011655	0.032	**0.35912**
xylenes	0.6742	106.17	130	0.70671	0.028084	0.032	**0.86533**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.032	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.032	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.8715
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5064
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2495
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1296
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0361
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0312
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0006
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0153

Monthly Calculations (continued) **FEBRUARY**

Tank No.		13316A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.31**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.05**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		5.27E-04	ton/month	Stock Vapor Density	Wv	0.0009	lb/ft3
Time Period		**February**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.023	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**847.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	28	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.74**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0009	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	^oR	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0232**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	13.48	^oR
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**10.14**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	493.64	^oR
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.2	^oR
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**13.48**	**^oR**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**12.16**	^oR
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	^oR
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	497.01	^oR
Not Insulated	P_{VA}	0.0354363		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	490.27	^oR
Partially Insulated	P_{VA}	0.0355263					
Fully Insulated	P_{VA}	0.0343132		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**492.20**	^oR	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	498.80	^oR	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	496.74	^oR
Average daily minimum ambient temperature, Table 7.1-7	TAN	485.60	^oR	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	490.66	^oR
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	492.84	^oR	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**493.64**	^oR	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**493.70**	^oR	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**492.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**494.30**	**^oR**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**494.57**	**^oR**				
Fully Insulated; Tv = TB	**Tv**	**492.84**	**^oR**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	8.685E-04					
Partially Insulated	Wv	8.702E-04					
Fully Insulated	Wv	8.435E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.053**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.035	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.035	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.035	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.035	-
ethylbenzene	0.3088	106.17	130	0.29318	0.012721	0.035	**0.35898**
xylenes	0.7444	106.17	130	0.70682	0.030669	0.035	**0.86547**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.035	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.035	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.9299
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5427
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2682
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1400
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0340
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0340
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0007
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0168

Monthly Calculations (continued) **MARCH**

Tank No.		13316A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.53**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.50**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		7.50E-04	ton/month	Stock Vapor Density	Wv	0.0011	lb/ft3
Time Period		**March**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.027	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1156.0**	Btu/ft²-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.97**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0011	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0273**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	15.72	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	500.87	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.2	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.72**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**14.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	504.80	°R
Not Insulated	P_{VA}	0.047042		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	496.94	°R
Partially Insulated	P_{VA}	0.0471992					
Fully Insulated	P_{VA}	0.0450895		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**498.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	506.00	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	504.53	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	491.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	497.38	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	499.77	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αs*I	**TLA**	**500.87**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**500.95**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**499.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**501.76**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**502.14**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**499.77**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.136E-03					
Partially Insulated	Wv	1.139E-03					
Fully Insulated	Wv	1.093E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.500**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.047	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.047	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.047	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.047	-
ethylbenzene	0.4391	106.17	130	0.29278	0.016864	0.047	**0.35849**
xylenes	1.0607	106.17	130	0.70722	0.040736	0.047	**0.86596**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.047	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.047	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.1464
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.6785
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.3382
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1797
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0522
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0452
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0010
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0228

Monthly Calculations (continued) **APRIL**

Tank No.		13316A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.86**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**2.29**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		1.14E-03	ton/month	Stock Vapor Density	Wv	0.0017	lb/ft3
Time Period		**April**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.031	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1490.0**	Btu/ft²-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.43**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0017	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0314**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	18.16	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	511.68	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.16**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.63**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	516.22	°R
Not Insulated	P_{VA}	0.0705523		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	507.14	°R
Partially Insulated	P_{VA}	0.0708403					
Fully Insulated	P_{VA}	0.0669906		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**509.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	516.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	515.95	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	501.50	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	507.64	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	510.27	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**511.68**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**511.79**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**510.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**512.84**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**513.32**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**510.27**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.667E-03					
Partially Insulated	Wv	1.672E-03					
Fully Insulated	Wv	1.590E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.288**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.071	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.071	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.071	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.071	-
ethylbenzene	0.6686	106.17	130	0.29216	0.025239	0.071	**0.35774**
xylenes	1.6199	106.17	130	0.70784	0.061148	0.071	**0.86671**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.071	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.071	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.5475
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.9343
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4715
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2571
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0781
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0679
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0016
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0352

Monthly Calculations (continued) **MAY**

Tank No.	13316A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.34**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**3.33**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		1.67E-03	ton/month	Stock Vapor Density	Wv	0.0023	lb/ft3
Time Period		**May**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.034	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1750.0**	Btu/ft²-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.99**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0023	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0337**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	19.74	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	521.63	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAI	ΔTA	15.7	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.74**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.17**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	526.56	°R
Not Insulated	P_{VA}	0.1005102		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	516.69	°R
Partially Insulated	P_{VA}	0.1009694					
Fully Insulated	P_{VA}	0.0948467		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**518.65**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	526.50	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	526.30	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	510.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	517.21	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	519.96	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αR*I	**TLA**	**521.63**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**521.76**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**520.0**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**522.98**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**523.55**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**519.96**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	2.328E-03					
Partially Insulated	Wv	2.336E-03					
Fully Insulated	Wv	2.210E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.330**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.101	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.101	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.101	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.101	-
ethylbenzene	0.9710	106.17	130	0.29159	0.035886	0.101	**0.35704**
xylenes	2.3591	106.17	130	0.70841	0.087184	0.101	**0.86742**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.101	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.101	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.0120
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.2359
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.6306
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.3517
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1110
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0967
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0026
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0515

Monthly Calculations (continued) **JUNE**

Tank No.	13316A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.76**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**4.52**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		2.26E-03	ton/month	Stock Vapor Density	Wv	0.0032	lb/ft3
Time Period		**June**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.033	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1862.0**	Btu/ft²-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.76**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0032	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0331**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	19.81	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	531.77	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TAI	ΔTA	15.0	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.81**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.31**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	536.72	°R
Not Insulated	P_{VA}	0.1417706		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	526.81	°R
Partially Insulated	P_{VA}	0.1424275					
Fully Insulated	P_{VA}	0.1336728		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**528.60**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	536.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	536.48	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	521.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	527.33	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	530.00	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αR*I	**TLA**	**531.77**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**531.91**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**530.0**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**533.21**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**533.81**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**530.00**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.221E-03					
Partially Insulated	Wv	3.232E-03					
Fully Insulated	Wv	3.055E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**4.515**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.142	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.142	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.142	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.142	-
ethylbenzene	1.3140	106.17	130	0.29099	0.050514	0.142	**0.35631**
xylenes	3.2015	106.17	130	0.70901	0.123078	0.142	**0.86815**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.142	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.142	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.5981
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.6225
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.8367
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4771
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1563
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1366
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0041
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0744

Monthly Calculations (continued) **JULY**

Tank No.		13316A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**2.10**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**5.35**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		2.67E-03	ton/month	Stock Vapor Density	Wv	0.0038	lb/ft3
Time Period		**July**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.032	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1904.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**3.25**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0038	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0324**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	19.60	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	537.14	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.4	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.60**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.16**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	542.04	°R
Not Insulated	P_{VA}	0.168992		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	532.24	°R
Partially Insulated	P_{VA}	0.1697728					
Fully Insulated	P_{VA}	0.1593647		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	541.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	541.82	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.70	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.74	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	535.33	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αR*I	**TLA**	**537.14**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**537.28**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**535.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**538.61**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**539.23**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**535.33**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.801E-03					
Partially Insulated	Wv	3.814E-03					
Fully Insulated	Wv	3.606E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**5.348**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.169	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.169	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.169	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.169	-
ethylbenzene	1.5544	106.17	130	0.29067	0.060147	0.169	**0.35592**
xylenes	3.7933	106.17	130	0.70933	0.146776	0.169	**0.86854**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.169	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.169	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.9609
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8647
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9669
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5576
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1861
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1629
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0051
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0897

Monthly Calculations (continued) **AUGUST**

Tank No.		13316A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.86**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**5.00**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		2.50E-03	ton/month	Stock Vapor Density	Wv	0.0037	lb/ft3
Time Period		**August**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.030	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1685.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**3.15**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0037	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0296**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	18.09	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	536.06	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.8	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.09**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.71**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	540.59	°R
Not Insulated	P_{VA}	0.1632264		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	531.54	°R
Partially Insulated	P_{VA}	0.163897					
Fully Insulated	P_{VA}	0.1549333		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	540.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	540.37	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.30	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.01	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	534.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**536.06**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**536.19**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**534.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**537.37**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**537.92**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**534.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.680E-03					
Partially Insulated	Wv	3.691E-03					
Fully Insulated	Wv	3.512E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**5.005**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.163	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.163	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.163	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.163	-
ethylbenzene	1.4550	106.17	130	0.29074	0.058108	0.163	**0.35599**
xylenes	3.5496	106.17	130	0.70926	0.141755	0.163	**0.86846**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.163	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.163	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.8854
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8141
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9396
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5406
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1798
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1573
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0049
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0864

Monthly Calculations (continued) **SEPTEMBER**

Tank No.	13316A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.32**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**3.80**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		1.90E-03	ton/month	Stock Vapor Density	Wv	0.0029	lb/ft3
Time Period		**September**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.028	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1320.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.48**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0029	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0276**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	16.75	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	528.39	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**16.75**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**15.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	532.58	°R
Not Insulated	P_{VA}	0.1266829		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	524.21	°R
Partially Insulated	P_{VA}	0.1271055					
Fully Insulated	P_{VA}	0.1214345		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**526.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	533.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	532.32	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	518.90	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	524.67	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	527.14	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αs*I	**TLA**	**528.39**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**528.49**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**527.1**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**529.42**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**529.85**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**527.14**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	2.899E-03					
Partially Insulated	Wv	2.906E-03					
Fully Insulated	Wv	2.791E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.798**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.127	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.127	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.127	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.127	-
ethylbenzene	1.1061	106.17	130	0.29119	0.045169	0.127	**0.35655**
xylenes	2.6924	106.17	130	0.70881	0.109948	0.127	**0.86790**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.127	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.127	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.3895
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.4842
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.7627
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4318
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1397
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1220
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0035
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0659

Monthly Calculations (continued) **OCTOBER**

Tank No.	13316A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.86**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**2.53**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		1.27E-03	ton/month	Stock Vapor Density	Wv	0.0020	lb/ft3
Time Period		**October**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.026	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**948.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.67**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0020	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0258**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	15.45	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	516.36	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.45**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**13.92**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	520.22	°R
Not Insulated	P_{VA}	0.0835155		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	512.50	°R
Partially Insulated	P_{VA}	0.0837274					
Fully Insulated	P_{VA}	0.0808716		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**514.75**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	522.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	519.91	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	507.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	512.95	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	515.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αs*I	**TLA**	**516.36**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**516.43**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**515.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**517.10**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**517.40**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**515.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.957E-03					
Partially Insulated	Wv	1.960E-03					
Fully Insulated	Wv	1.901E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.535**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.084	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.084	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.084	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.084	-
ethylbenzene	0.7398	106.17	130	0.29189	0.029849	0.084	**0.35741**
xylenes	1.7947	106.17	130	0.70811	0.072411	0.084	**0.86704**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.084	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.084	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.7536
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.0675
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.5416
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2985
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0923
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0804
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0020
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0422

Monthly Calculations (continued) **NOVEMBER**

Tank No.	13316A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.47**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.66**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		8.30E-04	ton/month	Stock Vapor Density	Wv	0.0014	lb/ft3
Time Period		**November**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.021	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**621.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.19**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0014	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0207**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	12.56	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	506.41	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_E)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**12.56**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**11.21**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	509.54	°R
Not Insulated	P_{VA}	0.0580534		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	503.27	°R
Partially Insulated	P_{VA}	0.0581547					
Fully Insulated	P_{VA}	0.0567834		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**505.35**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	512.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	509.25	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	498.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	503.65	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	505.82	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**506.41**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**506.45**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**505.8**		Vapor Space Outage Hvo = 1/2 H_E	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**506.89**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**507.09**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**505.82**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.387E-03					
Partially Insulated	Wv	1.389E-03					
Fully Insulated	Wv	1.360E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.660**

Individual HAPS	**L_{Ti} (lb/month)**	**Vapor Weight Concentration** M_i	M_V	Z_{Vi}	**Vapor Mole Fraction** $P_i = P_{VA}(X_i)$	P_{VA}	y_i
	Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA		
hexane	0.0000	86.18	130	0.00000	0.000000	0.058	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.058	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.058	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.058	-
ethylbenzene	0.4856	106.17	130	0.29247	0.020789	0.058	**0.35811**
xylenes	1.1748	106.17	130	0.70753	0.050294	0.058	**0.86634**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.058	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.058	**0.00E+00**

Individual HAPS	**Liquid Mole Fraction** Eq. 40-4 xi = (ZLiML)/Mi Z_{Li}	M_L	M_i	X_i	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	P_{VAi}
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.3394
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.8010
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4018
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2164
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0643
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0558
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0013
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0286

Monthly Calculations (continued) **DECEMBER**

Tank No.	13316A						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.31**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.13**	lb/month	Vapor Space Volume	Vv	549.8	ft3
		5.65E-04	ton/month	Stock Vapor Density	Wv	0.0010	lb/ft3
Time Period		**December**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.019	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**501.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.82**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	855	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0010	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**7.85**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0187**	**per day**
Diameter	D	**13.35**	ft	Average Daily Vapor Temperature Range	ΔTv	11.33	°R
Throughput	Q	**6,400**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.16**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	496.35	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**6.85**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_E)	HL	**3.93**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.6	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.33**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.07**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	499.18	°R
Not Insulated	P_{VA}	0.0394603		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	493.52	°R
Partially Insulated	P_{VA}	0.0395187					
Fully Insulated	P_{VA}	0.0387265		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**495.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	501.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	498.91	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	489.20	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	493.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	495.88	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**549.78**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**496.35**	°R	Effective Tank diameter	D_E	13.35	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**496.39**	°R	Effective Tank Height	H_E	7.85	ft
Fully Insulated: TLA = TB	**TLA**	**495.9**		Vapor Space Outage Hvo = 1/2 H_E	Hvo	3.93	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**496.74**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**496.90**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**495.88**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	9.624E-04					
Partially Insulated	Wv	9.635E-04					
Fully Insulated	Wv	9.461E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.130**

Individual HAPS	**L_{Ti} (lb/month)**	**Vapor Weight Concentration** M_i	M_V	Z_{Vi}	**Vapor Mole Fraction** $P_i = P_{VA}(X_i)$	P_{VA}	y_i
	Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA		
hexane	0.0000	86.18	130	0.00000	0.000000	0.039	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.039	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.039	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.039	-
ethylbenzene	0.3312	106.17	130	0.29303	0.014158	0.039	**0.35880**
xylenes	0.7991	106.17	130	0.70697	0.034159	0.039	**0.86565**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.039	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.039	**0.00E+00**

Individual HAPS	**Liquid Mole Fraction** Eq. 40-4 xi = (ZLiML)/Mi Z_{Li}	M_L	M_i	X_i	**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C))) **A**	**B**	**C**	P_{VAi}
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.0068
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5907
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2928
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1539
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0438
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0379
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0008
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0189

Monthly Calculations - JANUARY

Tank No.		10456		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.00**	lb/month	
		2.33E-06	ton/month	
Time Period		**January**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**560.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**7.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	^oR	
Tank design data				
Shell height	Hs	**3.14**	ft	
Diameter	D	**5.53**	ft	
Throughput	Q	**410**	gal/month	
Turnovers	N	**8.56**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**2.14**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**1.57**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
	PBV	**-0.03**		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0024228		
Partially Insulated	P_{VA}	0.0024265		
Fully Insulated	P_{VA}	0.0023756		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**490.50**	^oR	
Average daily maximum ambient temperature, Table 7.1-7	TAX	496.90	^oR	
Average daily minimum ambient temperature, Table 7.1-7	TAN	484.10	^oR	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	490.92	^oR	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**491.45**	^oR	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**491.49**	^oR	
Fully Insulated: TLA = TB	**TLA**	**490.9**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**491.89**	^oR	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**492.07**	^oR	
Fully Insulated; Tv = TB	**Tv**	**490.92**	^oR	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	5.967E-05		
Partially Insulated	Wv	5.974E-05		
Fully Insulated	Wv	5.862E-05		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.00**	lb/month
Vapor Space Volume	Vv	37.7	ft3
Stock Vapor Density	Wv	0.0001	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.020	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.00**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0001	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0024	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0199**	**per day**
Average Daily Vapor Temperature Range	ΔTv	11.76	^oR
Average Daily Vapor Pressure Range	ΔPv	0.0005	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0024	psia
Average Daily Liquid Surface Temperature	TLA	491.45	^oR
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.8	^oR
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**11.76**	**^oR**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**10.48**	^oR
Fully Insulated, constant temperature	**ΔTv**	**0.00**	^oR
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00053**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00270	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00217	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	494.39	^oR
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	488.51	^oR
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00047**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00267	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0022019	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	494.11	^oR
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	488.87	^oR
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**37.70**	ft3
Effective Tank diameter	D_E	5.53	ft
Effective Tank Height	H_E	3.14	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.57	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.000**

Individual HAPS	**L_{Ti} (lb/month)**	**M_L**	**M_V**	**Z_{Vi}**	**$P_i = P_{VAi}(x_i)$**	**P_{VA}**	**y_i**
					Vapor Weight Concentration Eq. 40-6 ZVi = yiMi / MV		**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA
hexane	0.0000	86.18	130	0.00052	0.000002	0.002	**0.00078**
benzene	0.0000	78.11	130	0.00302	0.000012	0.002	**0.00503**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.002	**-**
toluene	0.0001	92.14	130	0.02475	0.000085	0.002	**0.03491**
ethylbenzene	0.0000	106.17	130	0.00280	0.000008	0.002	**0.00343**
xylenes	0.0003	106.17	130	0.05394	0.000160	0.002	**0.06605**
naphthalene	0.0000	128.17	130	2.72E-04	6.69E-07	0.002	**2.76E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.002	**0.00E+00**

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	0.8715
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.5064
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.2495
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.1296
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0361
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0312
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0006
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0153

Monthly Calculations (continued) FEBRUARY

Tank No.		10456		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.01**	lb/month	
		2.55E-06	ton/month	
Time Period		**February**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**847.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**7.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	^oR	
Tank design data				
Shell height	Hs	**3.14**	ft	
Diameter	D	**5.53**	ft	
Throughput	Q	**410**	gal/month	
Turnovers	N	**9.48**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**2.14**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**1.57**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0026254		
Partially Insulated	P_{VA}	0.0026315		
Fully Insulated	P_{VA}	0.0025492		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**492.20**	^oR	
Average daily maximum ambient temperature, Table 7.1-7	TAX	498.80	^oR	
Average daily minimum ambient temperature, Table 7.1-7	TAN	485.60	^oR	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	492.84	^oR	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**493.64**	^oR	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**493.70**	^oR	
Fully Insulated: TLA = TB	**TLA**	**492.8**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**494.30**	^oR	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**494.57**	^oR	
Fully Insulated; Tv = TB	**Tv**	**492.84**	^oR	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	6.434E-05		
Partially Insulated	Wv	6.446E-05		
Fully Insulated	Wv	6.266E-05		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.00**	lb/month
Vapor Space Volume	Vv	37.7	ft3
Stock Vapor Density	Wv	0.0001	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.023	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	28	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.00**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0001	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0026	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0233**	**per day**
Average Daily Vapor Temperature Range	ΔTv	13.48	^oR
Average Daily Vapor Pressure Range	ΔPv	0.0006	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0026	psia
Average Daily Liquid Surface Temperature	TLA	493.64	^oR
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.2	^oR
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**13.48**	**^oR**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**12.16**	^oR
Fully Insulated, constant temperature	**ΔTv**	**0.00**	^oR
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00065**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00297	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00232	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	497.01	^oR
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	490.27	^oR
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00059**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00294	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0023533	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	496.74	^oR
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	490.66	^oR
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**37.70**	ft3
Effective Tank diameter	D_E	5.53	ft
Effective Tank Height	H_E	3.14	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.57	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.000**

Individual HAPS	**L_{Ti} (lb/month)**	**M_L**	**M_V**	**Z_{Vi}**	**$P_i = P_{VAi}(x_i)$**	**P_{VA}**	**y_i**
					Vapor Weight Concentration Eq. 40-6 ZVi = yiMi / MV		**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA
hexane	0.0000	86.18	130	0.00051	0.000002	0.003	**0.00077**
benzene	0.0000	78.11	130	0.00299	0.000013	0.003	**0.00498**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.003	**-**
toluene	0.0001	92.14	130	0.02467	0.000091	0.003	**0.03481**
ethylbenzene	0.0000	106.17	130	0.00282	0.000009	0.003	**0.00345**
xylenes	0.0003	106.17	130	0.05436	0.000175	0.003	**0.06656**
naphthalene	0.0000	128.17	130	2.82E-04	7.50E-07	0.003	**2.86E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.003	**0.00E+00**

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	0.9299
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.5427
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.2682
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.1400
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0394
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0340
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0007
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0168

Monthly Calculations (continued) **MARCH**

Tank No.		10456		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.01**		lb/month
		3.57E-06		ton/month
Time Period		**March**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1156.0**		Btu/ft^2-day
Absolute Pressure	P_A	14.69		psi
Ideal Gas Constant	R	10.73		piai ft3/lb-mole R
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**		Lb/lb-mole
Average organic liquid density	WL	**7.10**		lb/gal
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**		^oR
Tank design data				
Shell height	Hs	**3.14**		ft
Diameter	D	**5.53**		ft
Throughput	Q	**410**		gal/month
Turnovers	N	**8.56**		per year
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**		ft/ft
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**		ft
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**2.14**		ft
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**		ft
Liquid height (assume 1/2 H_S)	HL	**1.57**		ft
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**		psi
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.003406		
Partially Insulated	P_{VA}	0.0034165		
Fully Insulated	P_{VA}	0.0032754		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**498.90**		^oR
Average daily maximum ambient temperature, Table 7.1-7	TAX	506.00		^oR
Average daily minimum ambient temperature, Table 7.1-7	TAN	491.80		^oR
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	499.77		^oR
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**500.87**		^oR
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**500.95**		^oR
Fully Insulated: TLA = TB	**TLA**	**499.8**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**501.76**		^oR
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**502.14**		^oR
Fully Insulated; Tv = TB	**Tv**	**499.77**		^oR
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	8.223E-05		
Partially Insulated	Wv	8.242E-05		
Fully Insulated	Wv	7.940E-05		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.00**	lb/month
Vapor Space Volume	Vv	37.7	ft3
Stock Vapor Density	Wv	0.0001	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.027	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.00**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0001	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0034	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0274**	**per day**
Average Daily Vapor Temperature Range	ΔTv	15.72	^oR
Average Daily Vapor Pressure Range	ΔPv	0.0010	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0034	psia
Average Daily Liquid Surface Temperature	TLA	500.87	^oR
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.2	^oR
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**15.72**	**^oR**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**14.30**	^oR
Fully Insulated, constant temperature	**ΔTv**	**0.00**	^oR
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00095**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00391	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00296	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	504.80	^oR
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	496.94	^oR
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00087**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	0.00388	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0030066	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	504.53	^oR
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	497.38	^oR
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**37.70**	ft3
Effective Tank diameter	D_E	5.53	ft
Effective Tank Height	H_E	3.14	ft
Vapor Space Outage Hvo = 1/2 H_E	Hvo	1.57	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.001**

Vapor Weight Concentration				**Vapor Mole Fraction**			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$				Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00049	0.000003	0.003	**0.00073**
benzene	0.0000	78.11	130	0.00288	0.000016	0.003	**0.00479**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.003	**-**
toluene	0.0002	92.14	130	0.02442	0.000117	0.003	**0.03445**
ethylbenzene	0.0000	106.17	130	0.00288	0.000012	0.003	**0.00353**
xylenes	0.0004	106.17	130	0.05566	0.000232	0.003	**0.06815**
naphthalene	0.0000	128.17	130	3.13E-04	1.08E-06	0.003	**3.18E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.003	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	1.1464
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.6785
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.3382
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.1797
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0522
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0452
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0010
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0228

Monthly Calculations (continued) **APRIL**

Tank No.		10456		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.01**		lb/month
		5.30E-06		ton/month
Time Period		**April**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1490.0**		Btu/ft^2-day
Absolute Pressure	P_A	14.69		psi
Ideal Gas Constant	R	10.73		piai ft3/lb-mole R
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**		Lb/lb-mole
Average organic liquid density	WL	**7.10**		lb/gal
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**		^oR
Tank design data				
Shell height	Hs	**3.14**		ft
Diameter	D	**5.53**		ft
Throughput	Q	**410**		gal/month
Turnovers	N	**8.84**		per year
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**		ft/ft
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**		ft
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**2.14**		ft
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**		ft
Liquid height (assume 1/2 H_S)	HL	**1.57**		ft
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**		psi
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0049604		
Partially Insulated	P_{VA}	0.0049793		
Fully Insulated	P_{VA}	0.0047266		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**509.15**		^oR
Average daily maximum ambient temperature, Table 7.1-7	TAX	516.80		^oR
Average daily minimum ambient temperature, Table 7.1-7	TAN	501.50		^oR
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	510.27		^oR
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**511.68**		^oR
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**511.79**		^oR
Fully Insulated: TLA = TB	**TLA**	**510.3**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**512.84**		^oR
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**513.32**		^oR
Fully Insulated; Tv = TB	**Tv**	**510.27**		^oR
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	1.172E-04		
Partially Insulated	Wv	1.175E-04		
Fully Insulated	Wv	1.122E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.00**	lb/month
Vapor Space Volume	Vv	37.7	ft3
Stock Vapor Density	Wv	0.0001	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.032	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	30	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0001	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0050	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0315**	**per day**
Average Daily Vapor Temperature Range	ΔTv	18.16	^oR
Average Daily Vapor Pressure Range	ΔPv	0.0015	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0050	psia
Average Daily Liquid Surface Temperature	TLA	511.68	^oR
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	^oR
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**18.16**	**^oR**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**16.63**	^oR
Fully Insulated, constant temperature	**ΔTv**	**0.00**	^oR
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00154**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00578	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00424	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	516.22	^oR
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	507.14	^oR
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00141**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00573	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0043179	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	515.95	^oR
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	507.64	^oR
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**37.70**	ft3
Effective Tank diameter	D_E	5.53	ft
Effective Tank Height	H_E	3.14	ft
Vapor Space Outage Hvo = 1/2 H_E	Hvo	1.57	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.001**

Vapor Weight Concentration				**Vapor Mole Fraction**			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$				Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00045	0.000003	0.005	**0.00068**
benzene	0.0000	78.11	130	0.00272	0.000022	0.005	**0.00453**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.005	**-**
toluene	0.0003	92.14	130	0.02399	0.000168	0.005	**0.03384**
ethylbenzene	0.0000	106.17	130	0.00296	0.000018	0.005	**0.00362**
xylenes	0.0006	106.17	130	0.05737	0.000348	0.005	**0.07024**
naphthalene	0.0000	128.17	130	3.63E-04	1.83E-06	0.005	**3.68E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.005	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	1.5475
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.9343
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.4715
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.2571
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0781
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0679
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0016
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0352

Monthly Calculations (continued) **MAY**

Tank No.		10456		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.02**		lb/month
		7.56E-06		ton/month
Time Period		**May**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1750.0**		Btu/ft^2-day
Absolute Pressure	P_A	14.69		psi
Ideal Gas Constant	R	10.73		piai ft3/lb-mole R
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**		Lb/lb-mole
Average organic liquid density	WL	**7.10**		lb/gal
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**		°R
Tank design data				
Shell height	Hs	**3.14**		ft
Diameter	D	**5.53**		ft
Throughput	Q	**410**		gal/month
Turnovers	N	**8.56**		per year
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**		ft/ft
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**		ft
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**2.14**		ft
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**		ft
Liquid height (assume 1/2 H_S)	HL	**1.57**		ft
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**		psi
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0069121		
Partially Insulated	P_{VA}	0.0069418		
Fully Insulated	P_{VA}	0.0065448		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**518.65**		°R
Average daily maximum ambient temperature, Table 7.1-7	TAX	526.50		°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	510.80		°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	519.96		°R
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**521.63**		°R
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**521.76**		°R
Fully Insulated: TLA = TB	**TLA**	**520.0**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**522.98**		°R
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**523.55**		°R
Fully Insulated; Tv = TB	**Tv**	**519.96**		°R
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	1.601E-04		
Partially Insulated	Wv	1.606E-04		
Fully Insulated	Wv	1.525E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Vapor Space Volume	Vv	37.7	ft3
Stock Vapor Density	Wv	0.0002	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.034	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0002	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0069	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0339**	**per day**
Average Daily Vapor Temperature Range	ΔTv	19.74	°R
Average Daily Vapor Pressure Range	ΔPv	0.0022	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0069	psia
Average Daily Liquid Surface Temperature	TLA	521.63	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.7	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**19.74**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**18.17**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00224**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00811	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00587	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	526.56	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	516.69	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00207**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00804	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0059753	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	526.30	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	517.21	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**37.70**	ft3
Effective Tank diameter	D_E	5.53	ft
Effective Tank Height	H_E	3.14	ft
Vapor Space Outage Hvo = 1/2 H_E	Hvo	1.57	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.001**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$

Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0004
ethylbenzene	0.0000
xylenes	0.0009
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration
Eq. 40-6 ZVi = yiMi / MV

M_i	**M_V**	**Z_{Vi}**
86.18	130	0.00042
78.11	130	0.00259
114.23	130	0.00000
92.14	130	0.02355
106.17	130	0.00302
106.17	130	0.05870
128.17	130	4.12E-04
120.19	130	0.00E+00

Vapor Mole Fraction
Eq. 40-5 yi = Pi / PVA

$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.000004	0.007	**0.00063**
0.000030	0.007	**0.00430**
0.000000	0.007	**-**
0.000230	0.007	**0.03322**
0.000026	0.007	**0.00370**
0.000497	0.007	**0.07187**
2.89E-06	0.007	**4.18E-04**
0.00E+00	0.007	**0.00E+00**

Liquid Mole Fraction
Eq. 40-4 xi = (ZLiML)/Mi

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	188	86.18	0.00000
benzene	0.00001	188	78.11	0.00002
2,2,4 TMP	0.00000	188	114.23	0.00000
toluene	0.00032	188	92.14	0.00065
ethylbenzene	0.00013	188	106.17	0.00023
xylenes	0.00290	188	106.17	0.00514
naphthalene	0.00076	188	128.17	0.00111
cumene	0.00000	188	120.19	0.00000

Component Vapor Pressure
PVAi=(0.019337)10^(A-(B/(TLA+C)))

A	**B**	**C**	**P_{VAi}**
6.878	1171.5	224.37	2.0120
6.906	1211	220.79	1.2359
6.812	1257.8	220.74	0.6306
7.017	1377.6	222.64	0.3517
6.95	1419.3	212.61	0.1110
7.009	1462.3	215.11	0.0967
7.146	1831.6	211.82	0.0026
6.929	1455.8	207.2	0.0515

Monthly Calculations (continued) **JUNE**

Tank No.		10456		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.02**		lb/month
		1.01E-05		ton/month
Time Period		**June**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1862.0**		Btu/ft^2-day
Absolute Pressure	P_A	14.69		psi
Ideal Gas Constant	R	10.73		piai ft3/lb-mole R
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**		Lb/lb-mole
Average organic liquid density	WL	**7.10**		lb/gal
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**		°R
Tank design data				
Shell height	Hs	**3.14**		ft
Diameter	D	**5.53**		ft
Throughput	Q	**410**		gal/month
Turnovers	N	**8.84**		per year
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**		ft/ft
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**		ft
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**2.14**		ft
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**		ft
Liquid height (assume 1/2 H_S)	HL	**1.57**		ft
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**		psi
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0095724		
Partially Insulated	P_{VA}	0.0096146		
Fully Insulated	P_{VA}	0.009052		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**528.60**		°R
Average daily maximum ambient temperature, Table 7.1-7	TAX	536.10		°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	521.10		°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	530.00		°R
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**531.77**		°R
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**531.91**		°R
Fully Insulated: TLA = TB	**TLA**	**530.0**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**533.21**		°R
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**533.81**		°R
Fully Insulated; Tv = TB	**Tv**	**530.00**		°R
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	2.175E-04		
Partially Insulated	Wv	2.182E-04		
Fully Insulated	Wv	2.069E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Vapor Space Volume	Vv	37.7	ft3
Stock Vapor Density	Wv	0.0002	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.033	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	30	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0002	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0096	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0334**	**per day**
Average Daily Vapor Temperature Range	ΔTv	19.81	°R
Average Daily Vapor Pressure Range	ΔPv	0.0030	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0096	psia
Average Daily Liquid Surface Temperature	TLA	531.77	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.0	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**19.81**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**18.31**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00299**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.01117	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00818	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	536.72	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	526.81	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00278**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.01109	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0083139	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	536.48	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	527.33	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**37.70**	ft3
Effective Tank diameter	D_E	5.53	ft
Effective Tank Height	H_E	3.14	ft
Vapor Space Outage Hvo = 1/2 H_E	Hvo	1.57	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.002**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$

Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0005
ethylbenzene	0.0001
xylenes	0.0012
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration
Eq. 40-6 ZVi = yiMi / MV

M_i	**M_V**	**Z_{Vi}**
86.18	130	0.00039
78.11	130	0.00245
114.23	130	0.00000
92.14	130	0.02306
106.17	130	0.00307
106.17	130	0.05983
128.17	130	4.64E-04
120.19	130	0.00E+00

Vapor Mole Fraction
Eq. 40-5 yi = Pi / PVA

$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.000006	0.010	**0.00059**
0.000039	0.010	**0.00408**
0.000000	0.010	**-**
0.000311	0.010	**0.03254**
0.000036	0.010	**0.00376**
0.000701	0.010	**0.07326**
4.50E-06	0.010	**4.70E-04**
0.00E+00	0.010	**0.00E+00**

Liquid Mole Fraction
Eq. 40-4 xi = (ZLiML)/Mi

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	188	86.18	0.00000
benzene	0.00001	188	78.11	0.00002
2,2,4 TMP	0.00000	188	114.23	0.00000
toluene	0.00032	188	92.14	0.00065
ethylbenzene	0.00013	188	106.17	0.00023
xylenes	0.00290	188	106.17	0.00514
naphthalene	0.00076	188	128.17	0.00111
cumene	0.00000	188	120.19	0.00000

Component Vapor Pressure
PVAi=(0.019337)10^(A-(B/(TLA+C)))

A	**B**	**C**	**P_{VAi}**
6.878	1171.5	224.37	2.5981
6.906	1211	220.79	1.6225
6.812	1257.8	220.74	0.8367
7.017	1377.6	222.64	0.4771
6.95	1419.3	212.61	0.1563
7.009	1462.3	215.11	0.1366
7.146	1831.6	211.82	0.0041
6.929	1455.8	207.2	0.0744

Monthly Calculations (continued) **JULY**

Tank No.		10456		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.02**		lb/month
		1.18E-05		ton/month
Time Period		**July**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1904.0**		Btu/ft^2-day
Absolute Pressure	P_A	14.69		psi
Ideal Gas Constant	R	10.73		piai ft3/lb-mole R
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**		Lb/lb-mole
Average organic liquid density	WL	**7.10**		lb/gal
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**		^oR
Tank design data				
Shell height	Hs	**3.14**		ft
Diameter	D	**5.53**		ft
Throughput	Q	**410**		gal/month
Turnovers	N	**8.56**		per year
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**		ft/ft
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**		ft
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**2.14**		ft
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**		ft
Liquid height (assume 1/2 H_S)	HL	**1.57**		ft
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**		psi
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0113179		
Partially Insulated	P_{VA}	0.0113679		
Fully Insulated	P_{VA}	0.0107012		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.90**		^oR
Average daily maximum ambient temperature, Table 7.1-7	TAX	541.10		^oR
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.70		^oR
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	535.33		^oR
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**537.14**		^oR
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**537.28**		^oR
Fully Insulated: TLA = TB	**TLA**	**535.3**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**538.61**		^oR
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**539.23**		^oR
Fully Insulated; Tv = TB	**Tv**	**535.33**		^oR
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	2.546E-04		
Partially Insulated	Wv	2.554E-04		
Fully Insulated	Wv	2.422E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Vapor Space Volume	Vv	37.7	ft3
Stock Vapor Density	Wv	0.0003	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.033	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0003	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0113	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0326**	**per day**
Average Daily Vapor Temperature Range	ΔTv	19.60	^oR
Average Daily Vapor Pressure Range	ΔPv	0.0034	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0113	psia
Average Daily Liquid Surface Temperature	TLA	537.14	^oR
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.4	^oR
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**19.60**	**^oR**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**18.16**	^oR
Fully Insulated, constant temperature	**ΔTv**	**0.00**	^oR
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00343**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.01315	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00972	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	542.04	^oR
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	532.24	^oR
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00319**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	0.01306	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0098702	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	541.82	^oR
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.74	^oR
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**37.70**	ft3
Effective Tank diameter	D_E	5.53	ft
Effective Tank Height	H_E	3.14	ft
Vapor Space Outage Hvo = 1/2 H_E	Hvo	1.57	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.002**

Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		**Vapor Weight Concentration** Eq. 40-6 ZVi = yiMi / MV			**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00038	0.000006	0.011	**0.00057**
benzene	0.0001	78.11	130	0.00238	0.000045	0.011	**0.00397**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.011	**-**
toluene	0.0005	92.14	130	0.02280	0.000364	0.011	**0.03217**
ethylbenzene	0.0001	106.17	130	0.00309	0.000043	0.011	**0.00378**
xylenes	0.0014	106.17	130	0.06035	0.000836	0.011	**0.07390**
naphthalene	0.0000	128.17	130	4.92E-04	5.65E-06	0.011	**4.99E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.011	**0.00E+00**

Eq. 40-4 xi = (ZLiML)/Mi					**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	2.9609
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.8647
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.9669
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.5576
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1861
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.1629
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0051
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0897

Monthly Calculations (continued) **AUGUST**

Tank No.		10456		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.02**		lb/month
		1.11E-05		ton/month
Time Period		**August**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1685.0**		Btu/ft^2-day
Absolute Pressure	P_A	14.69		psi
Ideal Gas Constant	R	10.73		piai ft3/lb-mole R
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**		Lb/lb-mole
Average organic liquid density	WL	**7.10**		lb/gal
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**		^oR
Tank design data				
Shell height	Hs	**3.14**		ft
Diameter	D	**5.53**		ft
Throughput	Q	**410**		gal/month
Turnovers	N	**8.56**		per year
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**		ft/ft
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**		ft
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**2.14**		ft
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**		ft
Liquid height (assume 1/2 H_S)	HL	**1.57**		ft
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**		psi
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0109487		
Partially Insulated	P_{VA}	0.0109916		
Fully Insulated	P_{VA}	0.0104171		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.20**		^oR
Average daily maximum ambient temperature, Table 7.1-7	TAX	540.10		^oR
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.30		^oR
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	534.46		^oR
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**536.06**		^oR
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**536.19**		^oR
Fully Insulated: TLA = TB	**TLA**	**534.5**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**537.37**		^oR
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**537.92**		^oR
Fully Insulated; Tv = TB	**Tv**	**534.46**		^oR
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	2.468E-04		
Partially Insulated	Wv	2.475E-04		
Fully Insulated	Wv	2.361E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Vapor Space Volume	Vv	37.7	ft3
Stock Vapor Density	Wv	0.0002	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.030	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0002	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0109	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0299**	**per day**
Average Daily Vapor Temperature Range	ΔTv	18.09	^oR
Average Daily Vapor Pressure Range	ΔPv	0.0031	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0109	psia
Average Daily Liquid Surface Temperature	TLA	536.06	^oR
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.8	^oR
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**18.09**	**^oR**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**16.71**	^oR
Fully Insulated, constant temperature	**ΔTv**	**0.00**	^oR
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00308**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.01258	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00951	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	540.59	^oR
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	531.54	^oR
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00285**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.01250	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0096478	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	540.37	^oR
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.01	^oR
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**37.70**	ft3
Effective Tank diameter	D_E	5.53	ft
Effective Tank Height	H_E	3.14	ft
Vapor Space Outage Hvo = 1/2 H_E	Hvo	1.57	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.002**

Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		**Vapor Weight Concentration** Eq. 40-6 ZVi = yiMi / MV			**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00038	0.000006	0.011	**0.00057**
benzene	0.0001	78.11	130	0.00240	0.000044	0.011	**0.00399**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.011	**-**
toluene	0.0005	92.14	130	0.02285	0.000353	0.011	**0.03224**
ethylbenzene	0.0001	106.17	130	0.00309	0.000041	0.011	**0.00378**
xylenes	0.0013	106.17	130	0.06025	0.000808	0.011	**0.07378**
naphthalene	0.0000	128.17	130	4.86E-04	5.40E-06	0.011	**4.93E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.011	**0.00E+00**

Eq. 40-4 xi = (ZLiML)/Mi					**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	2.8854
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.8141
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.9396
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.5406
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1798
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.1573
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0049
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0864

Monthly Calculations (continued) **SEPTEMBER**

Tank No.		10456		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.02**	lb/month	
		8.48E-06	ton/month	
Time Period		**September**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1320.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**7.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	
Tank design data				
Shell height	Hs	**3.14**	ft	
Diameter	D	**5.53**	ft	
Throughput	Q	**410**	gal/month	
Turnovers	N	**8.84**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**2.14**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**1.57**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0086022		
Partially Insulated	P_{VA}	0.0086294		
Fully Insulated	P_{VA}	0.0082641		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**526.15**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	533.40	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	518.90	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	527.14	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**528.39**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**528.49**	°R	
Fully Insulated: TLA = TB	**TLA**	**527.1**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**529.42**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**529.85**	°R	
Fully Insulated; Tv = TB	**Tv**	**527.14**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	1.968E-04		
Partially Insulated	Wv	1.973E-04		
Fully Insulated	Wv	1.899E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Vapor Space Volume	Vv	37.7	ft3
Stock Vapor Density	Wv	0.0002	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.028	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	30	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0002	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0086	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0278**	**per day**
Average Daily Vapor Temperature Range	ΔTv	16.75	°R
Average Daily Vapor Pressure Range	ΔPv	0.0023	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0086	psia
Average Daily Liquid Surface Temperature	TLA	528.39	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.5	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**16.75**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**15.30**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00230**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00982	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00752	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	532.58	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	524.21	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00211**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00974	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0076317	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	532.32	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	524.67	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**37.70**	ft3
Effective Tank diameter	D_E	5.53	ft
Effective Tank Height	H_E	3.14	ft
Vapor Space Outage Hvo = 1/2 H_E	Hvo	1.57	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.002**

	Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$	**Vapor Weight Concentration** Eq. 40-6 ZVi = yiMi / MV			**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00040	0.000005	0.009	**0.00061**
benzene	0.0000	78.11	130	0.00250	0.000036	0.009	**0.00415**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.009	**-**
toluene	0.0004	92.14	130	0.02323	0.000282	0.009	**0.03277**
ethylbenzene	0.0001	106.17	130	0.00305	0.000032	0.009	**0.00374**
xylenes	0.0010	106.17	130	0.05948	0.000627	0.009	**0.07283**
naphthalene	0.0000	128.17	130	4.46E-04	3.89E-06	0.009	**4.53E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.009	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	2.3895
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.4842
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.7627
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.4318
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1397
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.1220
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0035
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0659

Monthly Calculations (continued) **OCTOBER**

Tank No.		10456		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.01**	lb/month	
		5.79E-06	ton/month	
Time Period		**October**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**948.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**7.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	
Tank design data				
Shell height	Hs	**3.14**	ft	
Diameter	D	**5.53**	ft	
Throughput	Q	**410**	gal/month	
Turnovers	N	**8.56**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**2.14**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**1.57**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0058079		
Partially Insulated	P_{VA}	0.0058217		
Fully Insulated	P_{VA}	0.0056355		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**514.75**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	522.40	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	507.10	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	515.46	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**516.36**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**516.43**	°R	
Fully Insulated: TLA = TB	**TLA**	**515.5**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**517.10**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**517.40**	°R	
Fully Insulated; Tv = TB	**Tv**	**515.46**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	1.361E-04		
Partially Insulated	Wv	1.363E-04		
Fully Insulated	Wv	1.324E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.00**	lb/month
Vapor Space Volume	Vv	37.7	ft3
Stock Vapor Density	Wv	0.0001	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.026	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0001	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0058	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0259**	**per day**
Average Daily Vapor Temperature Range	ΔTv	15.45	°R
Average Daily Vapor Pressure Range	ΔPv	0.0015	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0058	psia
Average Daily Liquid Surface Temperature	TLA	516.36	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**15.45**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**13.92**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00150**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00660	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00510	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	520.22	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	512.50	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00136**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00653	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0051788	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	519.91	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	512.95	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**37.70**	ft3
Effective Tank diameter	D_E	5.53	ft
Effective Tank Height	H_E	3.14	ft
Vapor Space Outage Hvo = 1/2 H_E	Hvo	1.57	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.001**

	Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$	**Vapor Weight Concentration** Eq. 40-6 ZVi = yiMi / MV			**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00044	0.000004	0.006	**0.00066**
benzene	0.0000	78.11	130	0.00266	0.000026	0.006	**0.00442**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.006	**-**
toluene	0.0003	92.14	130	0.02378	0.000195	0.006	**0.03356**
ethylbenzene	0.0000	106.17	130	0.00299	0.000021	0.006	**0.00366**
xylenes	0.0007	106.17	130	0.05802	0.000413	0.006	**0.07104**
naphthalene	0.0000	128.17	130	3.86E-04	2.27E-06	0.006	**3.91E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.006	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	1.7536
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.0675
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.5416
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.2985
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0923
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0804
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0020
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0422

Monthly Calculations (continued) **NOVEMBER**

Tank No.		10456		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.01**		lb/month
		3.87E-06		ton/month
Time Period		**November**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**621.0**		Btu/ft^2-day
Absolute Pressure	P_A	14.69		psi
Ideal Gas Constant	R	10.73		piai ft3/lb-mole R
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**		Lb/lb-mole
Average organic liquid density	WL	**7.10**		lb/gal
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**		°R
Tank design data				
Shell height	Hs	**3.14**		ft
Diameter	D	**5.53**		ft
Throughput	Q	**410**		gal/month
Turnovers	N	**8.84**		per year
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**		ft/ft
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**		ft
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**2.14**		ft
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**		ft
Liquid height (assume 1/2 H_S)	HL	**1.57**		ft
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**		psi
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0041375		
Partially Insulated	P_{VA}	0.0041442		
Fully Insulated	P_{VA}	0.0040535		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**505.35**		°R
Average daily maximum ambient temperature, Table 7.1-7	TAX	512.10		°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	498.60		°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	505.82		°R
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**506.41**		°R
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**506.45**		°R
Fully Insulated: TLA = TB	**TLA**	**505.8**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**506.89**		°R
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**507.09**		°R
Fully Insulated; Tv = TB	**Tv**	**505.82**		°R
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	9.888E-05		
Partially Insulated	Wv	9.901E-05		
Fully Insulated	Wv	9.708E-05		

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.00**	lb/month
Vapor Space Volume	Vv	37.7	ft3
Stock Vapor Density	Wv	0.0001	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.021	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	30	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0001	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0041	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0208**	**per day**
Average Daily Vapor Temperature Range	ΔTv	12.56	°R
Average Daily Vapor Pressure Range	ΔPv	0.0009	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0041	psia
Average Daily Liquid Surface Temperature	TLA	506.41	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.5	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**12.56**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**11.21**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00090**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00461	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00371	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	509.54	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	503.27	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00081**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	0.00457	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0037580	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	509.25	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	503.65	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**37.70**	ft3
Effective Tank diameter	D_E	5.53	ft
Effective Tank Height	H_E	3.14	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.57	ft

HAPS Speciation	lb/month
Product	Diesel
Total HAP Emissions =	**0.001**

	Vapor Weight Concentration				Vapor Mole Fraction		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00047	0.000003	0.004	**0.00071**
benzene	0.0000	78.11	130	0.00280	0.000019	0.004	**0.00466**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.004	**-**
toluene	0.0002	92.14	130	0.02420	0.000141	0.004	**0.03415**
ethylbenzene	0.0000	106.17	130	0.00292	0.000015	0.004	**0.00358**
xylenes	0.0004	106.17	130	0.05657	0.000287	0.004	**0.06926**
naphthalene	0.0000	128.17	130	3.38E-04	1.42E-06	0.004	**3.43E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.004	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	1.3394
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.8010
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.4018
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.2164
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0643
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0558
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0013
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0286

Monthly Calculations (continued) **DECEMBER**

Tank No.		10456		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.01**		lb/month
		2.71E-06		ton/month
Time Period		**December**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**501.0**		Btu/ft^2-day
Absolute Pressure	P_A	14.69		psi
Ideal Gas Constant	R	10.73		piai ft3/lb-mole R
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**		Lb/lb-mole
Average organic liquid density	WL	**7.10**		lb/gal
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**		°R
Tank design data				
Shell height	Hs	**3.14**		ft
Diameter	D	**5.53**		ft
Throughput	Q	**410**		gal/month
Turnovers	N	**8.56**		per year
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**		ft/ft
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**		ft
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**2.14**		ft
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**		ft
Liquid height (assume 1/2 H_S)	HL	**1.57**		ft
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**		psi
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0028974		
Partially Insulated	P_{VA}	0.0029014		
Fully Insulated	P_{VA}	0.0028479		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**495.50**		°R
Average daily maximum ambient temperature, Table 7.1-7	TAX	501.80		°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	489.20		°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	495.88		°R
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**496.35**		°R
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**496.39**		°R
Fully Insulated: TLA = TB	**TLA**	**495.9**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**496.74**		°R
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**496.90**		°R
Fully Insulated; Tv = TB	**Tv**	**495.88**		°R
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	7.066E-05		
Partially Insulated	Wv	7.073E-05		
Fully Insulated	Wv	6.958E-05		

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.00**	lb/month
Vapor Space Volume	Vv	37.7	ft3
Stock Vapor Density	Wv	0.0001	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.019	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.00**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0001	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0029	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0188**	**per day**
Average Daily Vapor Temperature Range	ΔTv	11.33	°R
Average Daily Vapor Pressure Range	ΔPv	0.0006	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0029	psia
Average Daily Liquid Surface Temperature	TLA	496.35	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.6	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**11.33**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**10.07**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00059**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00321	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00261	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	499.18	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	493.52	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00053**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00318	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0026479	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	498.91	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	493.87	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**37.70**	ft3
Effective Tank diameter	D_E	5.53	ft
Effective Tank Height	H_E	3.14	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.57	ft

HAPS Speciation	lb/month
Product	Diesel
Total HAP Emissions =	**0.000**

	Vapor Weight Concentration				Vapor Mole Fraction		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00050	0.000002	0.003	**0.00076**
benzene	0.0000	78.11	130	0.00295	0.000014	0.003	**0.00491**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.003	**-**
toluene	0.0001	92.14	130	0.02458	0.000100	0.003	**0.03468**
ethylbenzene	0.0000	106.17	130	0.00284	0.000010	0.003	**0.00348**
xylenes	0.0003	106.17	130	0.05486	0.000195	0.003	**0.06718**
naphthalene	0.0000	128.17	130	2.93E-04	8.62E-07	0.003	**2.97E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.003	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	1.0068
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.5907
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.2928
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.1539
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0438
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0379
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0008
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0189

Monthly Calculations - JANUARY

Tank No.		10457		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.95**	lb/month	
		4.76E-04	ton/month	
	Time Period	**January**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**560.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**6.28**	ft	
Diameter	D	**14.74**	ft	
Throughput	Q	**6,450**	gal/month	
Turnovers	N	**10.48**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
	PBV	**-0.03**		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.032455		
Partially Insulated	P_{VA}	0.0325101		
Fully Insulated	P_{VA}	0.031764		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**490.50**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	496.90	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	484.10	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	490.92	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**491.45**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**491.49**	°R	
Fully Insulated: TLA = TB	**TLA**	**490.9**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**491.89**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**492.07**	°R	
Fully Insulated; Tv = TB	**Tv**	**490.92**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	7.993E-04		
Partially Insulated	Wv	8.004E-04		
Fully Insulated	Wv	7.838E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.26**	lb/month
Vapor Space Volume	Vv	536.2	ft3
Stock Vapor Density	Wv	0.0008	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.020	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.69**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0008	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0198**	**per day**
Average Daily Vapor Temperature Range	ΔTv	11.76	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
Average Daily Liquid Surface Temperature	TLA	491.45	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.8	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**11.76**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**10.48**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	494.39	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	488.51	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	494.11	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	488.87	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**536.17**	ft3
Effective Tank diameter	D_E	14.74	ft
Effective Tank Height	H_E	6.28	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.953**

Individual HAPS	**L_{Ti} (lb/month)**	**M_L**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.032	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.032	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.032	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.032	-
ethylbenzene	0.2794	106.17	130	0.29329	0.011655	0.032	**0.35912**
xylenes	0.6733	106.17	130	0.70671	0.028084	0.032	**0.86533**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.032	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.032	**0.00E+00**

Vapor Weight Concentration: Eq. 40-6 ZVi = yiMi / MV

Vapor Mole Fraction: Eq. 40-5 yi = Pi / PVA

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.8715
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5064
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2495
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1296
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0361
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0312
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0006
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0153

Liquid Mole Fraction: Eq. 40-4 xi = (ZLiML)/Mi

Component Vapor Pressure: PVAi=(0.019337)10^(A-(B/(TLA+C)))

Monthly Calculations (continued) FEBRUARY

Tank No.		10457		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.05**	lb/month	
		5.26E-04	ton/month	
	Time Period	**February**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**847.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**6.28**	ft	
Diameter	D	**14.74**	ft	
Throughput	Q	**6,450**	gal/month	
Turnovers	N	**10.48**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0354363		
Partially Insulated	P_{VA}	0.0355263		
Fully Insulated	P_{VA}	0.0343132		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**492.20**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	498.80	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	485.60	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	492.84	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**493.64**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**493.70**	°R	
Fully Insulated: TLA = TB	**TLA**	**492.8**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**494.30**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**494.57**	°R	
Fully Insulated; Tv = TB	**Tv**	**492.84**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	8.685E-04		
Partially Insulated	Wv	8.702E-04		
Fully Insulated	Wv	8.435E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.30**	lb/month
Vapor Space Volume	Vv	536.2	ft3
Stock Vapor Density	Wv	0.0009	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.023	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	28	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.75**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0009	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0232**	**per day**
Average Daily Vapor Temperature Range	ΔTv	13.48	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
Average Daily Liquid Surface Temperature	TLA	493.64	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.2	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**13.48**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**12.16**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	497.01	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	490.27	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 ut	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	496.74	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	490.66	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**536.17**	ft3
Effective Tank diameter	D_E	14.74	ft
Effective Tank Height	H_E	6.28	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.051**

Individual HAPS	**L_{Ti} (lb/month)**	**M_L**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.035	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.035	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.035	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.035	-
ethylbenzene	0.3082	106.17	130	0.29318	0.012721	0.035	**0.35898**
xylenes	0.7431	106.17	130	0.70682	0.030669	0.035	**0.86547**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.035	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.035	**0.00E+00**

Vapor Weight Concentration: Eq. 40-6 ZVi = yiMi / MV

Vapor Mole Fraction: Eq. 40-5 yi = Pi / PVA

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.9299
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5427
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2682
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1400
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0394
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0340
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0007
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0168

Liquid Mole Fraction: Eq. 40-4 xi = (ZLiML)/Mi

Component Vapor Pressure: PVAi=(0.019337)10^(A-(B/(TLA+C)))

Monthly Calculations (continued) **MARCH**

Tank No.		10457						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.52**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.49**	lb/month	Vapor Space Volume	Vv	536.2	ft3
		7.47E-04	ton/month	Stock Vapor Density	Wv	0.0011	lb/ft3
Time Period		**March**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.027	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1156.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.98**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0011	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0273**	**per day**
Diameter	D	**14.74**	ft	Average Daily Vapor Temperature Range	ΔTv	15.72	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	500.87	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.2	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.72**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**14.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	504.80	°R
Not Insulated	P_{VA}	0.047042		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	496.94	°R
Partially Insulated	P_{VA}	0.0471992					
Fully Insulated	P_{VA}	0.0450895		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**498.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	506.00	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	504.53	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	491.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	497.38	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	499.77	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**536.17**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**500.87**	°R	Effective Tank diameter	D_E	14.74	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**500.95**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**499.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**501.76**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**502.14**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**499.77**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.136E-03					
Partially Insulated	Wv	1.139E-03					
Fully Insulated	Wv	1.093E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.494**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.047	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.047	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.047	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.047	-
ethylbenzene	0.4375	106.17	130	0.29278	0.016864	0.047	**0.35849**
xylenes	1.0568	106.17	130	0.70722	0.040736	0.047	**0.86596**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.047	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.047	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.1464
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.6785
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.3382
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1797
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0522
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0452
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0010
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0228

Monthly Calculations (continued) **APRIL**

Tank No.		10457						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.84**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**2.28**	lb/month	Vapor Space Volume	Vv	536.2	ft3
		1.14E-03	ton/month	Stock Vapor Density	Wv	0.0017	lb/ft3
Time Period		**April**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.031	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1490.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.44**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0017	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0314**	**per day**
Diameter	D	**14.74**	ft	Average Daily Vapor Temperature Range	ΔTv	18.16	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.78**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	511.68	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.16**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.63**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	516.22	°R
Not Insulated	P_{VA}	0.0705523		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	507.14	°R
Partially Insulated	P_{VA}	0.0708403					
Fully Insulated	P_{VA}	0.0669906		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 ut	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**509.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	516.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	515.95	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	501.50	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	507.64	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	510.27	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**536.17**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**511.68**	°R	Effective Tank diameter	D_E	14.74	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**511.79**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**510.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**512.84**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**513.32**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**510.27**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.667E-03					
Partially Insulated	Wv	1.672E-03					
Fully Insulated	Wv	1.590E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.278**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.071	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.071	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.071	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.071	-
ethylbenzene	0.6656	106.17	130	0.29216	0.025239	0.071	**0.35774**
xylenes	1.6126	106.17	130	0.70784	0.061148	0.071	**0.86671**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.071	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.071	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.5475
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.9343
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4715
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2571
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0781
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0679
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0016
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0352

Monthly Calculations (continued) — MAY

Tank No.		10457		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**3.31**	lb/month	
		1.66E-03	ton/month	
Time Period		**May**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1750.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**6.28**	ft	
Diameter	D	**14.74**	ft	
Throughput	Q	**6,450**	gal/month	
Turnovers	N	**9.47**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.1005102		
Partially Insulated	P_{VA}	0.1009694		
Fully Insulated	P_{VA}	0.0948467		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**518.65**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	526.50	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	510.80	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	519.96	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**521.63**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**521.76**	°R	
Fully Insulated: TLA = TB	**TLA**	**520.0**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**522.98**	**°R**	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**523.55**	**°R**	
Fully Insulated; Tv = TB	**Tv**	**519.96**	**°R**	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	2.328E-03		
Partially Insulated	Wv	2.336E-03		
Fully Insulated	Wv	2.210E-03		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.31**	lb/month
Vapor Space Volume	Vv	536.2	ft3
Stock Vapor Density	Wv	0.0023	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.034	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.01**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0023	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0337**	**per day**
Average Daily Vapor Temperature Range	ΔTv	19.74	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
Average Daily Liquid Surface Temperature	TLA	521.63	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.7	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**19.74**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**18.17**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	526.56	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	516.69	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	526.30	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	517.21	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**536.17**	ft3
Effective Tank diameter	D_E	14.74	ft
Effective Tank Height	H_E	6.28	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.313**

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.101	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.101	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.101	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.101	-
ethylbenzene	0.9659	106.17	130	0.29159	0.035886	0.101	**0.35704**
xylenes	2.3467	106.17	130	0.70841	0.087184	0.101	**0.86742**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.101	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.101	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.0120
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.2359
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.6306
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.3517
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1110
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0967
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0026
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0515

Monthly Calculations (continued) — JUNE

Tank No.		10457		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**4.49**	lb/month	
		2.25E-03	ton/month	
Time Period		**June**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1862.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**6.28**	ft	
Diameter	D	**14.74**	ft	
Throughput	Q	**6,450**	gal/month	
Turnovers	N	**9.78**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.1417706		
Partially Insulated	P_{VA}	0.1424275		
Fully Insulated	P_{VA}	0.1336728		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**528.60**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	536.10	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	521.10	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	530.00	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**531.77**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**531.91**	°R	
Fully Insulated: TLA = TB	**TLA**	**530.0**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**533.21**	**°R**	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**533.81**	**°R**	
Fully Insulated; Tv = TB	**Tv**	**530.00**	**°R**	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	3.221E-03		
Partially Insulated	Wv	3.232E-03		
Fully Insulated	Wv	3.055E-03		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.72**	lb/month
Vapor Space Volume	Vv	536.2	ft3
Stock Vapor Density	Wv	0.0032	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.033	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	30	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.78**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0032	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0331**	**per day**
Average Daily Vapor Temperature Range	ΔTv	19.81	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
Average Daily Liquid Surface Temperature	TLA	531.77	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.0	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**19.81**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**18.31**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	536.72	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	526.81	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 ut	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	536.48	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	527.33	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**536.17**	ft3
Effective Tank diameter	D_E	14.74	ft
Effective Tank Height	H_E	6.28	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**4.493**

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.142	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.142	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.142	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.142	-
ethylbenzene	1.3075	106.17	130	0.29099	0.050514	0.142	**0.35631**
xylenes	3.1859	106.17	130	0.70901	0.123078	0.142	**0.86815**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.142	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.142	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.5981
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.6225
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.8367
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4771
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1563
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1366
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0041
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0744

Monthly Calculations (continued) **JULY**

Tank No.		10457						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**2.04**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**5.32**	lb/month	Vapor Space Volume	Vv	536.2	ft3
		2.66E-03	ton/month	Stock Vapor Density	Wv	0.0038	lb/ft3
Time Period		**July**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.032	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1904.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**3.28**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0038	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0324**	**per day**
Diameter	D	**14.74**	ft	Average Daily Vapor Temperature Range	ΔTv	19.60	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	537.14	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.4	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.60**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.16**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	542.04	°R
Not Insulated	P_{VA}	0.168992		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	532.24	°R
Partially Insulated	P_{VA}	0.1697728					
Fully Insulated	P_{VA}	0.1593647		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	541.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	541.82	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.70	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.74	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	535.33	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**536.17**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**537.14**	°R	Effective Tank diameter	D_E	14.74	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**537.28**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**535.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**538.61**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**539.23**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**535.33**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.801E-03					
Partially Insulated	Wv	3.814E-03					
Fully Insulated	Wv	3.606E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**5.321**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.169	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.169	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.169	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.169	-
ethylbenzene	1.5467	106.17	130	0.29067	0.060147	0.169	**0.35592**
xylenes	3.7745	106.17	130	0.70933	0.146776	0.169	**0.86854**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.169	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.169	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.9609
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8647
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9669
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5576
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1861
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1629
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0051
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0897

Monthly Calculations (continued) **AUGUST**

Tank No.		10457						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.81**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**4.98**	lb/month	Vapor Space Volume	Vv	536.2	ft3
		2.49E-03	ton/month	Stock Vapor Density	Wv	0.0037	lb/ft3
Time Period		**August**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.030	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1685.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**3.17**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0037	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0296**	**per day**
Diameter	D	**14.74**	ft	Average Daily Vapor Temperature Range	ΔTv	18.09	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	536.06	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.8	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.09**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.71**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	540.59	°R
Not Insulated	P_{VA}	0.1632264		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	531.54	°R
Partially Insulated	P_{VA}	0.163897					
Fully Insulated	P_{VA}	0.1549333		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 ut	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	540.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	540.37	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.30	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.01	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	534.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**536.17**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**536.06**	°R	Effective Tank diameter	D_E	14.74	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**536.19**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**534.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**537.37**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**537.92**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**534.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.680E-03					
Partially Insulated	Wv	3.691E-03					
Fully Insulated	Wv	3.512E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**4.983**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.163	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.163	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.163	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.163	-
ethylbenzene	1.4488	106.17	130	0.29074	0.058108	0.163	**0.35599**
xylenes	3.5345	106.17	130	0.70926	0.141755	0.163	**0.86846**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.163	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.163	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.8854
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8141
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9396
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5406
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1798
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1573
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0049
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0864

Monthly Calculations (continued) **SEPTEMBER**

Tank No.		10457						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.29**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**3.79**	lb/month	Vapor Space Volume	Vv	536.2	ft3
		1.89E-03	ton/month	Stock Vapor Density	Wv	0.0029	lb/ft3
Time Period		**September**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.028	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1320.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.50**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0029	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0276**	**per day**
Diameter	D	**14.74**	ft	Average Daily Vapor Temperature Range	ΔTv	16.75	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.78**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	528.39	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**16.75**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**15.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	532.58	°R
Not Insulated	P_{VA}	0.1266829		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	524.21	°R
Partially Insulated	P_{VA}	0.1271055					
Fully Insulated	P_{VA}	0.1214345		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**526.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	533.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	532.32	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	518.90	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	524.67	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	527.14	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**536.17**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**528.39**	°R	Effective Tank diameter	D_E	14.74	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**528.49**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**527.1**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**529.42**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**529.85**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**527.14**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	2.899E-03					
Partially Insulated	Wv	2.906E-03					
Fully Insulated	Wv	2.791E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.785**

	Vapor Weight Concentration				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$					Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.127	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.127	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.127	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.127	-
ethylbenzene	1.1022	106.17	130	0.29119	0.045169	0.127	**0.35655**
xylenes	2.6830	106.17	130	0.70881	0.109948	0.127	**0.86790**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.127	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.127	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.3895
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.4842
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.7627
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4318
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1397
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1220
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0035
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0659

Monthly Calculations (continued) **OCTOBER**

Tank No.		10457						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.84**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**2.53**	lb/month	Vapor Space Volume	Vv	536.2	ft3
		1.26E-03	ton/month	Stock Vapor Density	Wv	0.0020	lb/ft3
Time Period		**October**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.026	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**948.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.69**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0020	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0258**	**per day**
Diameter	D	**14.74**	ft	Average Daily Vapor Temperature Range	ΔTv	15.45	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	516.36	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.45**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**13.92**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	520.22	°R
Not Insulated	P_{VA}	0.0835155		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	512.50	°R
Partially Insulated	P_{VA}	0.0837274					
Fully Insulated	P_{VA}	0.0808716		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 ut	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**514.75**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	522.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	519.91	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	507.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	512.95	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	515.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**536.17**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**516.36**	°R	Effective Tank diameter	D_E	14.74	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**516.43**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**515.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**517.10**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**517.40**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**515.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.957E-03					
Partially Insulated	Wv	1.960E-03					
Fully Insulated	Wv	1.901E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.526**

	Vapor Weight Concentration				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$					Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.084	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.084	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.084	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.084	-
ethylbenzene	0.7374	106.17	130	0.29189	0.029849	0.084	**0.35741**
xylenes	1.7889	106.17	130	0.70811	0.072411	0.084	**0.86704**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.084	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.084	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.7536
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.0675
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.5416
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2985
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0923
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0804
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0020
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0422

Monthly Calculations (continued) **NOVEMBER**

Tank No.		10457						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.46**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.66**	lb/month	Vapor Space Volume	Vv	536.2	ft3
		8.29E-04	ton/month	Stock Vapor Density	Wv	0.0014	lb/ft3
Time Period		**November**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.021	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**621.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.20**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0014	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0207**	**per day**
Diameter	D	**14.74**	ft	Average Daily Vapor Temperature Range	ΔTv	12.56	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.78**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	506.41	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**12.56**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**11.21**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	509.54	°R
Not Insulated	P_{VA}	0.0580534		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	503.27	°R
Partially Insulated	P_{VA}	0.0581547					
Fully Insulated	P_{VA}	0.0567834		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**505.35**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	512.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	509.25	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	498.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	503.65	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	505.82	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**536.17**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**506.41**	°R	Effective Tank diameter	D_E	14.74	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**506.45**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**505.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**506.89**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**507.09**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**505.82**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.387E-03					
Partially Insulated	Wv	1.389E-03					
Fully Insulated	Wv	1.360E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.658**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.058	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.058	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.058	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.058	-
ethylbenzene	0.4849	106.17	130	0.29247	0.020789	0.058	**0.35811**
xylenes	1.1731	106.17	130	0.70753	0.050294	0.058	**0.86634**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.058	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.058	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.3394
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.8010
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4018
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2164
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0643
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0558
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0013
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0286

Monthly Calculations (continued) **DECEMBER**

Tank No.		10457						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.30**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.13**	lb/month	Vapor Space Volume	Vv	536.2	ft3
		5.65E-04	ton/month	Stock Vapor Density	Wv	0.0010	lb/ft3
Time Period		**December**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.019	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**501.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.83**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0010	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0187**	**per day**
Diameter	D	**14.74**	ft	Average Daily Vapor Temperature Range	ΔTv	11.33	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.47**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	496.35	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.6	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.33**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.07**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	499.18	°R
Not Insulated	P_{VA}	0.0394603		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	493.52	°R
Partially Insulated	P_{VA}	0.0395187					
Fully Insulated	P_{VA}	0.0387265		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**495.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	501.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	498.91	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	489.20	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	493.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	495.88	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**536.17**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**495.50**	°R	Effective Tank diameter	D_E	14.74	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**496.39**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**495.9**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**496.74**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**496.90**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**495.88**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	9.624E-04					
Partially Insulated	Wv	9.635E-04					
Fully Insulated	Wv	9.461E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.129**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.039	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.039	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.039	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.039	-
ethylbenzene	0.3309	106.17	130	0.29303	0.014158	0.039	**0.35880**
xylenes	0.7983	106.17	130	0.70697	0.034159	0.039	**0.86565**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.039	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.039	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.0068
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5907
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2928
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1539
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0438
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0379
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0008
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0189

Monthly Calculations - JANUARY

Tank No.		10458		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.95**	lb/month	
		4.76E-04	ton/month	
Time Period		**January**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**560.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**6.28**	ft	
Diameter	D	**14.73**	ft	
Throughput	Q	**6,450**	gal/month	
Turnovers	N	**9.48**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
	PBV	**-0.03**		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.032455		
Partially Insulated	P_{VA}	0.0325101		
Fully Insulated	P_{VA}	0.031764		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**490.50**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	496.90	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	484.10	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	490.92	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**491.45**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**491.49**	°R	
Fully Insulated: TLA = TB	**TLA**	**490.9**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**491.89**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**492.07**	°R	
Fully Insulated; Tv = TB	**Tv**	**490.92**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	7.993E-04		
Partially Insulated	Wv	8.004E-04		
Fully Insulated	Wv	7.838E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.26**	lb/month
Vapor Space Volume	Vv	535.3	ft3
Stock Vapor Density	Wv	0.0008	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.020	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.69**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0008	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0198**	**per day**
Average Daily Vapor Temperature Range	ΔTv	11.76	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
Average Daily Liquid Surface Temperature	TLA	491.45	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.8	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**11.76**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**10.48**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	494.39	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	488.51	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	494.11	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	488.87	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**535.33**	ft3
Effective Tank diameter	D_E	14.73	ft
Effective Tank Height	H_E	6.28	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.952**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$ | Eq. 40-6 ZVi = yiMi / MV | Eq. 40-5 yi = Pi / PVA

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.032	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.032	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.032	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.032	-
ethylbenzene	0.2793	106.17	130	0.29329	0.011655	0.032	**0.35912**
xylenes	0.6730	106.17	130	0.70671	0.028084	0.032	**0.86533**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.032	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.032	**0.00E+00**

Eq. 40-4 xi = (ZLiML)/Mi | PVAi=(0.019337)10^(A-(B/(TLA+C)))

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.8715
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5064
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2495
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1296
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0361
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0312
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0006
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0153

Monthly Calculations (continued) FEBRUARY

Tank No.		10458		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.05**	lb/month	
		5.25E-04	ton/month	
Time Period		**February**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**847.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**6.28**	ft	
Diameter	D	**14.73**	ft	
Throughput	Q	**6,450**	gal/month	
Turnovers	N	**10.50**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0354363		
Partially Insulated	P_{VA}	0.0355263		
Fully Insulated	P_{VA}	0.0343132		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**492.20**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	498.80	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	485.60	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	492.84	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**493.64**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**493.70**	°R	
Fully Insulated: TLA = TB	**TLA**	**492.8**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**494.30**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**494.57**	°R	
Fully Insulated; Tv = TB	**Tv**	**492.84**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	8.685E-04		
Partially Insulated	Wv	8.702E-04		
Fully Insulated	Wv	8.435E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.30**	lb/month
Vapor Space Volume	Vv	535.3	ft3
Stock Vapor Density	Wv	0.0009	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.023	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	28	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.75**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0009	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0232**	**per day**
Average Daily Vapor Temperature Range	ΔTv	13.48	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
Average Daily Liquid Surface Temperature	TLA	493.64	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.2	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**13.48**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**12.16**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	497.01	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	490.27	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 ut	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	496.74	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	490.66	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**535.33**	ft3
Effective Tank diameter	D_E	14.73	ft
Effective Tank Height	H_E	6.28	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.051**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$ | Eq. 40-6 ZVi = yiMi / MV | Eq. 40-5 yi = Pi / PVA

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(X_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.035	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.035	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.035	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.035	-
ethylbenzene	0.3081	106.17	130	0.29318	0.012721	0.035	**0.35898**
xylenes	0.7427	106.17	130	0.70682	0.030669	0.035	**0.86547**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.035	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.035	**0.00E+00**

Eq. 40-4 xi = (ZLiML)/Mi | PVAi=(0.019337)10^(A-(B/(TLA+C)))

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.9299
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5427
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2682
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1400
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0394
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0340
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0007
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0168

Monthly Calculations (continued) **MARCH**

Tank No.		10458						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.51**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.49**	lb/month	Vapor Space Volume	Vv	535.3	ft3
		7.47E-04	ton/month	Stock Vapor Density	Wv	0.0011	lb/ft3
Time Period		**March**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.027	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1156.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.98**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0011	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0273**	**per day**
Diameter	D	**14.73**	ft	Average Daily Vapor Temperature Range	ΔTv	15.72	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.48**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	500.87	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.2	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.72**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**14.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	504.80	°R
Not Insulated	P_{VA}	0.047042		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	496.94	°R
Partially Insulated	P_{VA}	0.0471992					
Fully Insulated	P_{VA}	0.0450895		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**498.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	506.00	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	504.53	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	491.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	497.38	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	499.77	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**535.33**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**500.87**	°R	Effective Tank diameter	D_E	14.73	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**500.95**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**499.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**501.76**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**502.14**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**499.77**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.136E-03					
Partially Insulated	Wv	1.139E-03					
Fully Insulated	Wv	1.093E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.494**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.047	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.047	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.047	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.047	-
ethylbenzene	0.4373	106.17	130	0.29278	0.016864	0.047	**0.35849**
xylenes	1.0563	106.17	130	0.70722	0.040736	0.047	**0.86596**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.047	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.047	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.1464
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.6785
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.3382
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1797
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0522
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0452
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0010
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0228

Monthly Calculations (continued) **APRIL**

Tank No.		10458						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.84**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**2.28**	lb/month	Vapor Space Volume	Vv	535.3	ft3
		1.14E-03	ton/month	Stock Vapor Density	Wv	0.0017	lb/ft3
Time Period		**April**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.031	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1490.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.44**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0017	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0314**	**per day**
Diameter	D	**14.73**	ft	Average Daily Vapor Temperature Range	ΔTv	18.16	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.80**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	511.68	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.16**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.63**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	516.22	°R
Not Insulated	P_{VA}	0.0705523		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	507.14	°R
Partially Insulated	P_{VA}	0.0708403					
Fully Insulated	P_{VA}	0.0669906		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 ut	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**509.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	516.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	515.95	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	501.50	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	507.64	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	510.27	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**535.33**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**511.68**	°R	Effective Tank diameter	D_E	14.73	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**511.79**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**510.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**512.84**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**513.32**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**510.27**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.667E-03					
Partially Insulated	Wv	1.672E-03					
Fully Insulated	Wv	1.590E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.277**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.071	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.071	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.071	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.071	-
ethylbenzene	0.6652	106.17	130	0.29216	0.025239	0.071	**0.35774**
xylenes	1.6117	106.17	130	0.70784	0.061148	0.071	**0.86671**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.071	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.071	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.5475
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.9343
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4715
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2571
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0781
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0679
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0016
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0352

Monthly Calculations (continued) — MAY

Tank No.		10458		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**3.31**	lb/month	
		1.66E-03	ton/month	
Time Period		**May**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1750.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**6.28**	ft	
Diameter	D	**14.73**	ft	
Throughput	Q	**6,450**	gal/month	
Turnovers	N	**9.48**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.1005102		
Partially Insulated	P_{VA}	0.1009694		
Fully Insulated	P_{VA}	0.0948467		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**518.65**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	526.50	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	510.80	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	519.96	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**521.63**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**521.76**	°R	
Fully Insulated: TLA = TB	**TLA**	**520.0**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**522.98**	**°R**	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**523.55**	**°R**	
Fully Insulated; Tv = TB	**Tv**	**519.96**	**°R**	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	2.328E-03		
Partially Insulated	Wv	2.336E-03		
Fully Insulated	Wv	2.210E-03		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.30**	lb/month
Vapor Space Volume	Vv	535.3	ft3
Stock Vapor Density	Wv	0.0023	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.034	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.01**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0023	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0337**	**per day**
Average Daily Vapor Temperature Range	ΔTv	19.74	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
Average Daily Liquid Surface Temperature	TLA	521.63	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.7	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**19.74**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**18.17**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	526.56	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	516.69	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	526.30	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	517.21	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**535.33**	ft3
Effective Tank diameter	D_E	14.73	ft
Effective Tank Height	H_E	6.28	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.311**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.101	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.101	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.101	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.101	-
ethylbenzene	0.9653	106.17	130	0.29159	0.035886	0.101	**0.35704**
xylenes	2.3452	106.17	130	0.70841	0.087184	0.101	**0.86742**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.101	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.101	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				Component Vapor Pressure PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.0120
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.2359
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.6306
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.3517
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1110
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0967
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0026
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0515

Monthly Calculations (continued) — JUNE

Tank No.		10458		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**4.49**	lb/month	
		2.25E-03	ton/month	
Time Period		**June**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1862.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**6.28**	ft	
Diameter	D	**14.73**	ft	
Throughput	Q	**6,450**	gal/month	
Turnovers	N	**9.80**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.1417706		
Partially Insulated	P_{VA}	0.1424275		
Fully Insulated	P_{VA}	0.1336728		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**528.60**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	536.10	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	521.10	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	530.00	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**531.77**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**531.91**	°R	
Fully Insulated: TLA = TB	**TLA**	**530.0**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**533.21**	**°R**	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**533.81**	**°R**	
Fully Insulated; Tv = TB	**Tv**	**530.00**	**°R**	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	3.221E-03		
Partially Insulated	Wv	3.232E-03		
Fully Insulated	Wv	3.055E-03		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.71**	lb/month
Vapor Space Volume	Vv	535.3	ft3
Stock Vapor Density	Wv	0.0032	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.033	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	30	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.78**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0032	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0331**	**per day**
Average Daily Vapor Temperature Range	ΔTv	19.81	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
Average Daily Liquid Surface Temperature	TLA	531.77	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.0	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**19.81**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**18.31**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	536.72	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	526.81	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 ut	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	536.48	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	527.33	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**535.33**	ft3
Effective Tank diameter	D_E	14.73	ft
Effective Tank Height	H_E	6.28	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**4.491**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.142	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.142	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.142	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.142	-
ethylbenzene	1.3068	106.17	130	0.29099	0.050514	0.142	**0.35631**
xylenes	3.1840	106.17	130	0.70901	0.123078	0.142	**0.86815**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.142	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.142	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				Component Vapor Pressure PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.5981
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.6225
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.8367
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4771
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1563
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1366
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0041
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0744

Monthly Calculations (continued) **JULY**

Tank No.		10458						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**2.04**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**5.32**	lb/month	Vapor Space Volume	Vv	535.3	ft3
		2.66E-03	ton/month	Stock Vapor Density	Wv	0.0038	lb/ft3
Time Period		**July**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.032	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1904.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**3.28**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0038	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0324**	**per day**
Diameter	D	**14.73**	ft	Average Daily Vapor Temperature Range	ΔTv	19.60	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.48**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	537.14	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.4	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.60**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.16**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	542.04	°R
Not Insulated	P_{VA}	0.168992		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	532.24	°R
Partially Insulated	P_{VA}	0.1697728					
Fully Insulated	P_{VA}	0.1593647		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	541.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	541.82	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.70	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.74	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	535.33	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**535.33**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**537.14**	°R	Effective Tank diameter	D_E	14.73	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**537.28**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**535.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**538.61**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**539.23**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**535.33**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.801E-03					
Partially Insulated	Wv	3.814E-03					
Fully Insulated	Wv	3.606E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**5.318**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.169	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.169	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.169	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.169	-
ethylbenzene	1.5458	106.17	130	0.29067	0.060147	0.169	**0.35592**
xylenes	3.7722	106.17	130	0.70933	0.146776	0.169	**0.86854**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.169	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.169	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.9609
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8647
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9669
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5576
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1861
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1629
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0051
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0897

Monthly Calculations (continued) **AUGUST**

Tank No.		10458						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.81**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**4.98**	lb/month	Vapor Space Volume	Vv	535.3	ft3
		2.49E-03	ton/month	Stock Vapor Density	Wv	0.0037	lb/ft3
Time Period		**August**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.030	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1685.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**3.17**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0037	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0296**	**per day**
Diameter	D	**14.73**	ft	Average Daily Vapor Temperature Range	ΔTv	18.09	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.48**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	536.06	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.8	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.09**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.71**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	540.59	°R
Not Insulated	P_{VA}	0.1632264		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	531.54	°R
Partially Insulated	P_{VA}	0.163897					
Fully Insulated	P_{VA}	0.1549333		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 ut	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	540.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	540.37	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.30	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.01	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	534.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**535.33**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**536.06**	°R	Effective Tank diameter	D_E	14.73	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**536.19**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**534.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**537.37**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**537.92**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**534.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.680E-03					
Partially Insulated	Wv	3.691E-03					
Fully Insulated	Wv	3.512E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**4.980**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.163	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.163	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.163	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.163	-
ethylbenzene	1.4480	106.17	130	0.29074	0.058108	0.163	**0.35599**
xylenes	3.5324	106.17	130	0.70926	0.141755	0.163	**0.86846**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.163	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.163	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.8854
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8141
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9396
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5406
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1798
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1573
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0049
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0864

Monthly Calculations (continued) **SEPTEMBER**

Tank No.		10458						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.28**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**3.78**	lb/month	Vapor Space Volume	Vv	535.3	ft3
		1.89E-03	ton/month	Stock Vapor Density	Wv	0.0029	lb/ft3
Time Period		**September**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.028	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1320.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**2.50**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0029	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0276**	**per day**
Diameter	D	**14.73**	ft	Average Daily Vapor Temperature Range	ΔTv	16.75	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.80**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	528.39	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**16.75**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**15.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	532.58	°R
Not Insulated	P_{VA}	0.1266829		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	524.21	°R
Partially Insulated	P_{VA}	0.1271055					
Fully Insulated	P_{VA}	0.1214345		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**526.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	533.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	532.32	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	518.90	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	524.67	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	527.14	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**535.33**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**528.39**	°R	Effective Tank diameter	D_E	14.73	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**528.49**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**527.1**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**529.42**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**529.85**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**527.14**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	2.899E-03					
Partially Insulated	Wv	2.906E-03					
Fully Insulated	Wv	2.791E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.783**

	Vapor Weight Concentration				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$					Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.127	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.127	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.127	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.127	-
ethylbenzene	1.1016	106.17	130	0.29119	0.045169	0.127	**0.35655**
xylenes	2.6816	106.17	130	0.70881	0.109948	0.127	**0.86790**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.127	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.127	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.3895
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.4842
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.7627
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4318
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1397
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1220
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0035
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0659

Monthly Calculations (continued) **OCTOBER**

Tank No.		10458						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.84**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**2.53**	lb/month	Vapor Space Volume	Vv	535.3	ft3
		1.26E-03	ton/month	Stock Vapor Density	Wv	0.0020	lb/ft3
Time Period		**October**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.026	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**948.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.69**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0020	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0258**	**per day**
Diameter	D	**14.73**	ft	Average Daily Vapor Temperature Range	ΔTv	15.45	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.48**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	516.36	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.45**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**13.92**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	520.22	°R
Not Insulated	P_{VA}	0.0835155		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	512.50	°R
Partially Insulated	P_{VA}	0.0837274					
Fully Insulated	P_{VA}	0.0808716		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 ut	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**514.75**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	522.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	519.91	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	507.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	512.95	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	515.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**535.33**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**516.36**	°R	Effective Tank diameter	D_E	14.73	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**516.43**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**515.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**517.10**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**517.40**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**515.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.957E-03					
Partially Insulated	Wv	1.960E-03					
Fully Insulated	Wv	1.901E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.525**

	Vapor Weight Concentration				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$					Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.084	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.084	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.084	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.084	-
ethylbenzene	0.7370	106.17	130	0.29189	0.029849	0.084	**0.35741**
xylenes	1.7880	106.17	130	0.70811	0.072411	0.084	**0.86704**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.084	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.084	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.7536
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.0675
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.5416
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2985
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0923
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0804
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0020
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0422

Monthly Calculations (continued) — NOVEMBER

Tank No.		10458						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.46**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.66**	lb/month	Vapor Space Volume	Vv	535.3	ft3
		8.29E-04	ton/month	Stock Vapor Density	Wv	0.0014	lb/ft3
Time Period		**November**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.021	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**621.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**1.20**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0014	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0207**	**per day**
Diameter	D	**14.73**	ft	Average Daily Vapor Temperature Range	ΔTv	12.56	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.48**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	506.41	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**12.56**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**11.21**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	509.54	°R
Not Insulated	P_{VA}	0.0580534		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTv	TLN	503.27	°R
Partially Insulated	P_{VA}	0.0581547					
Fully Insulated	P_{VA}	0.0567834		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**505.35**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	512.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	509.25	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	498.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	503.65	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	505.82	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**535.33**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**506.41**	°R	Effective Tank diameter	D_E	14.73	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**506.45**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**505.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**506.89**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**507.09**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**505.82**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.387E-03					
Partially Insulated	Wv	1.389E-03					
Fully Insulated	Wv	1.360E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.657**

		Vapor Weight Concentration			Vapor Mole Fraction		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.058	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.058	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.058	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.058	-
ethylbenzene	0.4847	106.17	130	0.29247	0.020789	0.058	**0.35811**
xylenes	1.1726	106.17	130	0.70753	0.050294	0.058	**0.86634**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.058	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.058	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.3394
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.8010
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4018
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2164
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0643
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0558
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0013
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0286

Monthly Calculations (continued) — DECEMBER

Tank No.		10458						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.30**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.13**	lb/month	Vapor Space Volume	Vv	535.3	ft3
		5.64E-04	ton/month	Stock Vapor Density	Wv	0.0010	lb/ft3
Time Period		**December**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.019	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**501.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.83**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	862	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0010	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**6.28**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0187**	**per day**
Diameter	D	**14.73**	ft	Average Daily Vapor Temperature Range	ΔTv	11.33	°R
Throughput	Q	**6,450**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.48**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	496.35	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**5.28**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**3.14**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.6	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.33**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.07**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	499.18	°R
Not Insulated	P_{VA}	0.0394603		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTv	TLN	493.52	°R
Partially Insulated	P_{VA}	0.0395187					
Fully Insulated	P_{VA}	0.0387265		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**495.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	501.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	498.91	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	489.20	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	493.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	495.88	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**535.33**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**496.35**	°R	Effective Tank diameter	D_E	14.73	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**496.39**	°R	Effective Tank Height	H_E	6.28	ft
Fully Insulated: TLA = TB	**TLA**	**495.9**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	3.14	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**496.74**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**496.90**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**495.88**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	9.624E-04					
Partially Insulated	Wv	9.635E-04					
Fully Insulated	Wv	9.461E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.129**

		Vapor Weight Concentration			Vapor Mole Fraction		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.039	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.039	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.039	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.039	-
ethylbenzene	0.3307	106.17	130	0.29303	0.014158	0.039	**0.35880**
xylenes	0.7979	106.17	130	0.70697	0.034159	0.039	**0.86565**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.039	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.039	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.0068
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5907
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2928
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1539
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0438
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0379
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0008
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0189

Monthly Calculations - JANUARY

Tank No.		10459B						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.04**	lb/month	Vapor Space Volume	Vv	19.7	ft3
		1.82E-05	ton/month	Stock Vapor Density	Wv	0.0008	lb/ft3
	Time Period	**January**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.020	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**560.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.03**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	33	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0008	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**2.49**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0198**	**per day**
Diameter	D	**4.49**	ft	Average Daily Vapor Temperature Range	ΔTv	11.76	°R
Throughput	Q	**250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.99**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0325	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	491.45	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (PI/4)D if unknown	HLX	**1.49**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**1.24**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.8	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.76**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.48**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
	PBV	**-0.03**		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	494.39	°R
Not Insulated	P_{VA}	0.032455		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	488.51	°R
Partially Insulated	P_{VA}	0.0325101					
Fully Insulated	P_{VA}	0.031764		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**490.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	496.90	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	494.11	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	484.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	488.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	490.92	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**19.69**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**491.45**	°R	Effective Tank diameter	D_E	4.49	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**491.49**	°R	Effective Tank Height	H_E	2.49	ft
Fully Insulated: TLA = TB	**TLA**	**490.9**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.24	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**491.89**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**492.07**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**490.92**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	7.993E-04					
Partially Insulated	Wv	8.004E-04					
Fully Insulated	Wv	7.838E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.036**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_v**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.032	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.032	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.032	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.032	-
ethylbenzene	0.0107	106.17	130	0.29329	0.011655	0.032	**0.35912**
xylenes	0.0257	106.17	130	0.70671	0.028084	0.032	**0.86533**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.032	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.032	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.8715
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5064
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2495
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1296
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0361
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0312
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0007
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0153

Monthly Calculations (continued) FEBRUARY

Tank No.		10459B						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.04**	lb/month	Vapor Space Volume	Vv	19.7	ft3
		2.01E-05	ton/month	Stock Vapor Density	Wv	0.0009	lb/ft3
	Time Period	**February**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.023	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**847.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	28	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.03**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	33	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0009	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**2.49**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0232**	**per day**
Diameter	D	**4.49**	ft	Average Daily Vapor Temperature Range	ΔTv	13.48	°R
Throughput	Q	**250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**11.06**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0354	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	493.64	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (PI/4)D if unknown	HLX	**1.49**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**1.24**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.2	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**13.48**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**12.16**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	497.01	°R
Not Insulated	P_{VA}	0.0354363		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	490.27	°R
Partially Insulated	P_{VA}	0.0355263					
Fully Insulated	P_{VA}	0.0343132		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**492.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	498.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	496.74	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	485.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	490.66	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	492.84	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**19.69**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**493.64**	°R	Effective Tank diameter	D_E	4.49	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**493.70**	°R	Effective Tank Height	H_E	2.49	ft
Fully Insulated: TLA = TB	**TLA**	**492.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.24	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**494.30**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**494.57**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**492.84**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	8.685E-04					
Partially Insulated	Wv	8.702E-04					
Fully Insulated	Wv	8.435E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.040**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_v**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.035	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.035	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.035	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.035	-
ethylbenzene	0.0118	106.17	130	0.29318	0.012721	0.035	**0.35898**
xylenes	0.0284	106.17	130	0.70682	0.030669	0.035	**0.86547**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.035	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.035	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.9299
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5427
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2682
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1400
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0394
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0340
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0007
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0168

Monthly Calculations (continued) **MARCH**

Tank No.		10459B						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.02**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**0.06**	lb/month	Vapor Space Volume	Vv	19.7	ft3
			2.84E-05	ton/month	Stock Vapor Density	Wv	0.0011	lb/ft3
		Time Period	**March**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.027	per day
	Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
	Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1156.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
	Absolute Pressure	P_A	14.69	psi				
	Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.04**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	33	ft3/month
	Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
	Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
	Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0011	lb/ft3
	Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
	Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
	Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
	Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
	Shell height	Hs	**2.49**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0273**	**per day**
	Diameter	D	**4.49**	ft	Average Daily Vapor Temperature Range	ΔTv	15.72	°R
	Throughput	Q	**250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
	Turnovers	N	**9.99**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
	Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0470	psia
	Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	500.87	°R
	Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
	Maximum Filling Height -use (Pi/4)D if unknown	HLX	**1.49**	ft				
	Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
	Liquid height (assume 1/2 H_S)	HL	**1.24**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.2	°R
	Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.72**	**°R**
	Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**14.30**	°R
	Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
	Tank Shell Condition (pick from drop down list)		**Average**					
	Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
	Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
	Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	504.80	°R
	Not Insulated	P_{VA}	0.047042		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	496.94	°R
	Partially Insulated	P_{VA}	0.0471992					
	Fully Insulated	P_{VA}	0.0450895		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**498.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
	Average daily maximum ambient temperature, Table 7.1-7	TAX	506.00	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	504.53	°R
	Average daily minimum ambient temperature, Table 7.1-7	TAN	491.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	497.38	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	499.77	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**19.69**	ft3
	Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αR*I	**TLA**	**500.87**	°R	Effective Tank diameter	D_E	4.49	ft
	Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**500.95**	°R	Effective Tank Height	H_E	2.49	ft
	Fully Insulated: TLA = TB	**TLA**	**499.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.24	ft
Average Vapor Temperature (Tv)								
	Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**501.76**	**°R**				
	Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**502.14**	**°R**				
	Fully Insulated; Tv = TB	**Tv**	**499.77**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
	Not Insulated	Wv	1.136E-03					
	Partially Insulated	Wv	1.139E-03					
	Fully Insulated	Wv	1.093E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.057**

	Vapor Weight Concentration			Vapor Mole Fraction		
	Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	86.18	130	0.00000	0.000000	0.047	-
benzene	78.11	130	0.00000	0.000000	0.047	-
2,2,4 TMP	114.23	130	0.00000	0.000000	0.047	-
toluene	92.14	130	0.00000	0.000000	0.047	-
ethylbenzene	106.17	130	0.29278	0.016864	0.047	**0.35849**
xylenes	106.17	130	0.70722	0.040736	0.047	**0.86596**
naphthalene	128.17	130	0.00E+00	0.00E+00	0.047	**0.00E+00**
cumene	120.19	130	0.00E+00	0.00E+00	0.047	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.1464
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.6785
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.3382
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1797
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0522
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0452
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0010
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0228

Monthly Calculations (continued) **APRIL**

Tank No.		10459B						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.03**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**0.09**	lb/month	Vapor Space Volume	Vv	19.7	ft3
			4.33E-05	ton/month	Stock Vapor Density	Wv	0.0017	lb/ft3
		Time Period	**April**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.031	per day
	Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
	Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1490.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
	Absolute Pressure	P_A	14.69	psi				
	Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.06**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	33	ft3/month
	Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
	Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
	Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0017	lb/ft3
	Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
	Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
	Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
	Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
	Shell height	Hs	**2.49**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0314**	**per day**
	Diameter	D	**4.49**	ft	Average Daily Vapor Temperature Range	ΔTv	18.16	°R
	Throughput	Q	**250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
	Turnovers	N	**10.32**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
	Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0706	psia
	Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	511.68	°R
	Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
	Maximum Filling Height -use (Pi/4)D if unknown	HLX	**1.49**	ft				
	Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
	Liquid height (assume 1/2 H_S)	HL	**1.24**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
	Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.16**	**°R**
	Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.63**	°R
	Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
	Tank Shell Condition (pick from drop down list)		**Average**					
	Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
	Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
	Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	516.22	°R
	Not Insulated	P_{VA}	0.0705523		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	507.14	°R
	Partially Insulated	P_{VA}	0.0708403					
	Fully Insulated	P_{VA}	0.0669906		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**509.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
	Average daily maximum ambient temperature, Table 7.1-7	TAX	516.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	515.95	°R
	Average daily minimum ambient temperature, Table 7.1-7	TAN	501.50	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	507.64	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	510.27	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**19.69**	ft3
	Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**511.68**	°R	Effective Tank diameter	D_E	4.49	ft
	Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**511.79**	°R	Effective Tank Height	H_E	2.49	ft
	Fully Insulated: TLA = TB	**TLA**	**510.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.24	ft
Average Vapor Temperature (Tv)								
	Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**512.84**	**°R**				
	Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**513.32**	**°R**				
	Fully Insulated; Tv = TB	**Tv**	**510.27**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
	Not Insulated	Wv	1.667E-03					
	Partially Insulated	Wv	1.672E-03					
	Fully Insulated	Wv	1.590E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.087**

	Vapor Weight Concentration			Vapor Mole Fraction		
	Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	86.18	130	0.00000	0.000000	0.071	-
benzene	78.11	130	0.00000	0.000000	0.071	-
2,2,4 TMP	114.23	130	0.00000	0.000000	0.071	-
toluene	92.14	130	0.00000	0.000000	0.071	-
ethylbenzene	106.17	130	0.29216	0.025239	0.071	**0.35774**
xylenes	106.17	130	0.70784	0.061148	0.071	**0.86671**
naphthalene	128.17	130	0.00E+00	0.00E+00	0.071	**0.00E+00**
cumene	120.19	130	0.00E+00	0.00E+00	0.071	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.5475
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.9343
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4715
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2571
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0781
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0679
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0016
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0352

Monthly Calculations (continued) — MAY

Tank No.		10459B						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.05**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.13**	lb/month	Vapor Space Volume	Vv	19.7	ft3
		6.29E-05	ton/month	Stock Vapor Density	Wv	0.0023	lb/ft3
Time Period		**May**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.034	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1750.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.08**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	33	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0023	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**2.49**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0337**	**per day**
Diameter	D	**4.49**	ft	Average Daily Vapor Temperature Range	ΔTv	19.74	°R
Throughput	Q	**250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**9.99**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1005	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	521.63	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**1.49**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**1.24**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.7	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.74**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.17**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	526.56	°R
Not Insulated	P_{VA}	0.1005102		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	516.69	°R
Partially Insulated	P_{VA}	0.1009694					
Fully Insulated	P_{VA}	0.0948467		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**518.65**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	526.50	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	526.30	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	510.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	517.21	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	519.96	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**19.69**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αR*I	**TLA**	**521.63**	°R	Effective Tank diameter	D_E	4.49	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**521.76**	°R	Effective Tank Height	H_E	2.49	ft
Fully Insulated: TLA = TB	**TLA**	**520.0**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.24	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**522.98**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**523.55**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**519.96**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	2.328E-03					
Partially Insulated	Wv	2.336E-03					
Fully Insulated	Wv	2.210E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.126**

	Vapor Weight Concentration			Vapor Mole Fraction		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$	Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.101	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.101	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.101	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.101	-
ethylbenzene	0.0367	106.17	130	0.29159	0.035886	0.101	**0.35704**
xylenes	0.0891	106.17	130	0.70841	0.087184	0.101	**0.86742**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.101	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.101	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.0120
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.2359
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.6306
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.3517
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1110
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0967
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0026
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0515

Monthly Calculations (continued) — JUNE

Tank No.		10459B						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.06**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.17**	lb/month	Vapor Space Volume	Vv	19.7	ft3
		8.53E-05	ton/month	Stock Vapor Density	Wv	0.0032	lb/ft3
Time Period		**June**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.033	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1862.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.11**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	33	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0032	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**2.49**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0331**	**per day**
Diameter	D	**4.49**	ft	Average Daily Vapor Temperature Range	ΔTv	19.81	°R
Throughput	Q	**250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**10.32**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1418	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	531.77	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**1.49**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**1.24**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.0	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.81**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.31**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	536.72	°R
Not Insulated	P_{VA}	0.1417706		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	526.81	°R
Partially Insulated	P_{VA}	0.1424275					
Fully Insulated	P_{VA}	0.1336728		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**528.60**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	536.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	536.48	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	521.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	527.33	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	530.00	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**19.69**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**531.77**	°R	Effective Tank diameter	D_E	4.49	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**531.91**	°R	Effective Tank Height	H_E	2.49	ft
Fully Insulated: TLA = TB	**TLA**	**530.0**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.24	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**533.21**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**533.81**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**530.00**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.221E-03					
Partially Insulated	Wv	3.232E-03					
Fully Insulated	Wv	3.055E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.171**

	Vapor Weight Concentration			Vapor Mole Fraction		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$	Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.142	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.142	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.142	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.142	-
ethylbenzene	0.0497	106.17	130	0.29099	0.050514	0.142	**0.35631**
xylenes	0.1210	106.17	130	0.70901	0.123078	0.142	**0.86815**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.142	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.142	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.5981
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.6225
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.8367
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4771
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1563
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1366
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0041
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0744

Monthly Calculations (continued) **JULY**

Tank No.		10459B						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.08**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**0.20**	lb/month	Vapor Space Volume	Vv	19.7	ft3
			1.01E-04	ton/month	Stock Vapor Density	Wv	0.0038	lb/ft3
		Time Period	**July**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.032	per day
	Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
	Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1904.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
	Absolute Pressure	P_A	14.69	psi				
	Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.13**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	33	ft3/month
	Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
	Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
	Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0038	lb/ft3
	Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
	Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
	Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
	Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
	Shell height	Hs	**2.49**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0324**	**per day**
	Diameter	D	**4.49**	ft	Average Daily Vapor Temperature Range	ΔTv	19.60	°R
	Throughput	Q	**250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
	Turnovers	N	**9.99**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
	Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1690	psia
	Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	537.14	°R
	Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
	Maximum Filling Height -use (Pi/4)D if unknown	HLX	**1.49**	ft				
	Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
	Liquid height (assume 1/2 H_S)	HL	**1.24**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.4	°R
	Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.60**	**°R**
	Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.16**	°R
	Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
	Tank Shell Condition (pick from drop down list)		**Average**					
	Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
	Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
	Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	542.04	°R
	Not Insulated	P_{VA}	0.168992		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	532.24	°R
	Partially Insulated	P_{VA}	0.1697728					
	Fully Insulated	P_{VA}	0.1593647		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**533.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
	Average daily maximum ambient temperature, Table 7.1-7	TAX	541.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	541.82	°R
	Average daily minimum ambient temperature, Table 7.1-7	TAN	526.70	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.74	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	535.33	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**19.69**	ft3
	Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αR*I	**TLA**	**537.14**	°R	Effective Tank diameter	D_E	4.49	ft
	Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**537.28**	°R	Effective Tank Height	H_E	2.49	ft
	Fully Insulated: TLA = TB	**TLA**	**535.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.24	ft
Average Vapor Temperature (Tv)								
	Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**538.61**	**°R**				
	Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**539.23**	**°R**				
	Fully Insulated; Tv = TB	**Tv**	**535.33**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
	Not Insulated	Wv	3.801E-03					
	Partially Insulated	Wv	3.814E-03					
	Fully Insulated	Wv	3.606E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.202**

	Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.169	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.169	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.169	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.169	-
ethylbenzene	0.0587	106.17	130	0.29067	0.060147	0.169	**0.35592**
xylenes	0.1433	106.17	130	0.70933	0.146776	0.169	**0.86854**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.169	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.169	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				Component Vapor Pressure PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.9609
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8647
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9669
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5576
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1861
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1629
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0051
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0897

Monthly Calculations (continued) **AUGUST**

Tank No.		10459B						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.07**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**0.19**	lb/month	Vapor Space Volume	Vv	19.7	ft3
			9.47E-05	ton/month	Stock Vapor Density	Wv	0.0037	lb/ft3
		Time Period	**August**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.030	per day
	Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
	Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1685.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
	Absolute Pressure	P_A	14.69	psi				
	Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.12**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	33	ft3/month
	Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
	Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
	Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0037	lb/ft3
	Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
	Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
	Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
	Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
	Shell height	Hs	**2.49**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0296**	**per day**
	Diameter	D	**4.49**	ft	Average Daily Vapor Temperature Range	ΔTv	18.09	°R
	Throughput	Q	**250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
	Turnovers	N	**9.99**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
	Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1632	psia
	Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	536.06	°R
	Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
	Maximum Filling Height -use (Pi/4)D if unknown	HLX	**1.49**	ft				
	Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
	Liquid height (assume 1/2 H_S)	HL	**1.24**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.8	°R
	Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.09**	**°R**
	Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.71**	°R
	Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
	Tank Shell Condition (pick from drop down list)		**Average**					
	Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
	Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
	Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	540.59	°R
	Not Insulated	P_{VA}	0.1632264		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	531.54	°R
	Partially Insulated	P_{VA}	0.163897					
	Fully Insulated	P_{VA}	0.1549333		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**533.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
	Average daily maximum ambient temperature, Table 7.1-7	TAX	540.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	540.37	°R
	Average daily minimum ambient temperature, Table 7.1-7	TAN	526.30	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.01	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	534.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**19.69**	ft3
	Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**536.06**	°R	Effective Tank diameter	D_E	4.49	ft
	Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**536.19**	°R	Effective Tank Height	H_E	2.49	ft
	Fully Insulated: TLA = TB	**TLA**	**534.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.24	ft
Average Vapor Temperature (Tv)								
	Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**537.37**	**°R**				
	Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**537.92**	**°R**				
	Fully Insulated; Tv = TB	**Tv**	**534.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
	Not Insulated	Wv	3.680E-03					
	Partially Insulated	Wv	3.691E-03					
	Fully Insulated	Wv	3.512E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.189**

	Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.163	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.163	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.163	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.163	-
ethylbenzene	0.0551	106.17	130	0.29074	0.058108	0.163	**0.35599**
xylenes	0.1344	106.17	130	0.70926	0.141755	0.163	**0.86846**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.163	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.163	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				Component Vapor Pressure PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.8854
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.8141
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9396
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5406
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1798
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1573
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0049
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0864

Monthly Calculations (continued) **SEPTEMBER**

Tank No.		10459B						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.05**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**0.14**	lb/month	Vapor Space Volume	Vv	19.7	ft3
			7.20E-05	ton/month	Stock Vapor Density	Wv	0.0029	lb/ft3
		Time Period	**September**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.028	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**1320.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.10**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	33	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0029	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**2.49**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0276**	**per day**
Diameter		D	**4.49**	ft	Average Daily Vapor Temperature Range	ΔTv	16.75	°R
Throughput		Q	**250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**10.32**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1267	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	528.39	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**1.49**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**1.24**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.5	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**16.75**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**15.30**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	532.58	°R
Not Insulated		P_{VA}	0.1266829		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	524.21	°R
Partially Insulated		P_{VA}	0.1271055					
Fully Insulated		P_{VA}	0.1214345		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**526.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	533.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	532.32	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	518.90	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	524.67	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	527.14	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**19.69**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αR*I		**TLA**	**528.39**	°R	Effective Tank diameter	D_E	4.49	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**528.49**	°R	Effective Tank Height	H_E	2.49	ft
Fully Insulated: TLA = TB		**TLA**	**527.1**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.24	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**529.42**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**529.85**	**°R**				
Fully Insulated; Tv = TB		**Tv**	**527.14**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	2.899E-03					
Partially Insulated		Wv	2.906E-03					
Fully Insulated		Wv	2.791E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.144**

	Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$	Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.127	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.127	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.127	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.127	-
ethylbenzene	0.0420	106.17	130	0.29119	0.045169	0.127	**0.35655**
xylenes	0.1021	106.17	130	0.70881	0.109948	0.127	**0.86790**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.127	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.127	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				Component Vapor Pressure PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.3895
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.4842
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.7627
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4318
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1397
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1220
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0035
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0659

Monthly Calculations (continued) **OCTOBER**

Tank No.		10459B						
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.03**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**0.10**	lb/month	Vapor Space Volume	Vv	19.7	ft3
			4.81E-05	ton/month	Stock Vapor Density	Wv	0.0020	lb/ft3
		Time Period	**October**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.026	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**948.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.07**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	33	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0020	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**2.49**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0258**	**per day**
Diameter		D	**4.49**	ft	Average Daily Vapor Temperature Range	ΔTv	15.45	°R
Throughput		Q	**250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**9.99**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0835	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	516.36	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**1.49**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**1.24**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.45**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**13.92**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	520.22	°R
Not Insulated		P_{VA}	0.0835155		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	512.50	°R
Partially Insulated		P_{VA}	0.0837274					
Fully Insulated		P_{VA}	0.0808716		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**514.75**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	522.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	519.91	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	507.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	512.95	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	515.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**19.69**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αR*I		**TLA**	**516.36**	°R	Effective Tank diameter	D_E	4.49	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**516.43**	°R	Effective Tank Height	H_E	2.49	ft
Fully Insulated: TLA = TB		**TLA**	**515.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.24	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**517.10**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**517.40**	**°R**				
Fully Insulated; Tv = TB		**Tv**	**515.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	1.957E-03					
Partially Insulated		Wv	1.960E-03					
Fully Insulated		Wv	1.901E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.096**

	Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$	Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.084	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.084	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.084	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.084	-
ethylbenzene	0.0281	106.17	130	0.29189	0.029849	0.084	**0.35741**
xylenes	0.0681	106.17	130	0.70811	0.072411	0.084	**0.86704**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.084	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.084	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				Component Vapor Pressure PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.7536
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.0675
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.5416
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2985
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0923
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0804
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0020
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0422

Monthly Calculations (continued) — NOVEMBER

Tank No.		10459B							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.02**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**0.06**	lb/month	Vapor Space Volume	Vv	19.7	ft3
			3.17E-05	ton/month	Stock Vapor Density	Wv	0.0014	lb/ft3
		Time Period	**November**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.021	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**621.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.05**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	33	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0014	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**2.49**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0207**	**per day**
Diameter		D	**4.49**	ft	Average Daily Vapor Temperature Range	ΔTv	12.56	°R
Throughput		Q	**250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**10.32**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0581	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	506.41	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**1.49**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**1.24**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.5	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**12.56**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**11.21**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	509.54	°R
Not Insulated		P_{VA}	0.0580534		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	503.27	°R
Partially Insulated		P_{VA}	0.0581547					
Fully Insulated		P_{VA}	0.0567834		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**505.35**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	512.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	509.25	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	498.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	503.65	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	505.82	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**19.69**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**506.41**	°R	Effective Tank diameter	D_E	4.49	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**506.45**	°R	Effective Tank Height	H_E	2.49	ft
Fully Insulated: TLA = TB		**TLA**	**505.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.24	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**506.89**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**507.09**	**°R**				
Fully Insulated; Tv = TB		**Tv**	**505.82**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	1.387E-03					
Partially Insulated		Wv	1.389E-03					
Fully Insulated		Wv	1.360E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.063**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$

Individual HAPS	**L_{Ti} (lb/month)**	**Vapor Weight Concentration** Eq. 40-6 ZVi = yiMi / MV			**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA		
		M_i	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.058	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.058	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.058	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.058	-
ethylbenzene	0.0185	106.17	130	0.29247	0.020789	0.058	**0.35811**
xylenes	0.0448	106.17	130	0.70753	0.050294	0.058	**0.86634**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.058	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.058	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.3394
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.8010
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4018
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2164
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0643
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0558
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0013
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0286

Monthly Calculations (continued) — DECEMBER

Tank No.		10459B							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**0.04**	lb/month	Vapor Space Volume	Vv	19.7	ft3
			2.16E-05	ton/month	Stock Vapor Density	Wv	0.0010	lb/ft3
		Time Period	**December**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.019	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**501.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.03**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	33	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0010	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**2.49**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0187**	**per day**
Diameter		D	**4.49**	ft	Average Daily Vapor Temperature Range	ΔTv	11.33	°R
Throughput		Q	**250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**9.99**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0395	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	496.35	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**1.49**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**1.24**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.6	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**11.33**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**10.07**	°R
Tank Shell Color (pick from drop down list)			**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	499.18	°R
Not Insulated		P_{VA}	0.0394603		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	493.52	°R
Partially Insulated		P_{VA}	0.0395187					
Fully Insulated		P_{VA}	0.0387265		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**495.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	501.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	498.91	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	489.20	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	493.87	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	495.88	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**19.69**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**496.35**	°R	Effective Tank diameter	D_E	4.49	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**496.39**	°R	Effective Tank Height	H_E	2.49	ft
Fully Insulated: TLA = TB		**TLA**	**495.9**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	1.24	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**496.74**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**496.90**	**°R**				
Fully Insulated; Tv = TB		**Tv**	**495.88**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	9.624E-04					
Partially Insulated		Wv	9.635E-04					
Fully Insulated		Wv	9.461E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.043**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$

Individual HAPS	**L_{Ti} (lb/month)**	**Vapor Weight Concentration** Eq. 40-6 ZVi = yiMi / MV			**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA		
		M_i	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.039	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.039	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.039	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.039	-
ethylbenzene	0.0126	106.17	130	0.29303	0.014158	0.039	**0.35880**
xylenes	0.0305	106.17	130	0.70697	0.034159	0.039	**0.86565**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.039	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.039	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.0068
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5907
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2928
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1539
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0438
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0379
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0008
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0189

Monthly Calculations - JANUARY

Tank No.		10460		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.01**	lb/month	
		2.51E-06	ton/month	
Time Period		**January**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**560.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	psia ft3/lb-mole R	
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**7.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	
Tank design data				
Shell height	Hs	**4.32**	ft	
Diameter	D	**5.29**	ft	
Throughput	Q	**410**	gal/month	
Turnovers	N	**6.79**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (PI/4)D if unknown	HLX	**3.32**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**2.16**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
	PBV	**-0.03**		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0024228		
Partially Insulated	P_{VA}	0.0024265		
Fully Insulated	P_{VA}	0.0023756		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**490.50**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	496.90	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	484.10	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	490.92	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**491.45**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**491.49**	°R	
Fully Insulated: TLA = TB	**TLA**	**490.9**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**491.89**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**492.07**	°R	
Fully Insulated; Tv = TB	**Tv**	**490.92**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	5.967E-05		
Partially Insulated	Wv	5.974E-05		
Fully Insulated	Wv	5.862E-05		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.00**	lb/month
Vapor Space Volume	Vv	47.5	ft3
Stock Vapor Density	Wv	0.0001	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.020	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.00**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0001	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0024	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0199**	**per day**
Average Daily Vapor Temperature Range	ΔTv	11.76	°R
Average Daily Vapor Pressure Range	ΔPv	0.0005	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0024	psia
Average Daily Liquid Surface Temperature	TLA	491.45	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.8	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**11.76**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**10.48**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00053**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00270	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp	PVN	0.00217	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	494.39	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	488.51	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00047**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00267	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0022019	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	494.11	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	488.87	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**47.52**	ft3
Effective Tank diameter	D_E	5.29	ft
Effective Tank Height	H_E	4.32	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	2.16	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.000**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$

Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0001
ethylbenzene	0.0000
xylenes	0.0003
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration
Eq. 40-6 ZVi = yiMi / MV

M_i	**M_V**	**Z_{Vi}**
86.18	130	0.00052
78.11	130	0.00302
114.23	130	0.00000
92.14	130	0.02475
106.17	130	0.00280
106.17	130	0.05394
128.17	130	2.72E-04
120.19	130	0.00E+00

Vapor Mole Fraction
Eq. 40-5 yi = Pi / PVA

$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.000052	0.002	**0.00078**
0.000012	0.002	**0.00503**
0.000000	0.002	**-**
0.000085	0.002	**0.03491**
0.000008	0.002	**0.00343**
0.000160	0.002	**0.06605**
6.69E-07	0.002	**2.76E-04**
0.00E+00	0.002	**0.00E+00**

Liquid Mole Fraction
Eq. 40-4 xi = (ZLiML)/Mi

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	188	86.18	0.00000
benzene	0.00001	188	78.11	0.00002
2,2,4 TMP	0.00000	188	114.23	0.00000
toluene	0.00032	188	92.14	0.00065
ethylbenzene	0.00013	188	106.17	0.00023
xylenes	0.00290	188	106.17	0.00514
naphthalene	0.00076	188	128.17	0.00111
cumene	0.00000	188	120.19	0.00000

Component Vapor Pressure
PVAi=(0.019337)10^(A-(B/(TLA+C)))

A	**B**	**C**	**P_{VAi}**
6.878	1171.5	224.37	0.8715
6.906	1211	220.79	0.5064
6.812	1257.8	220.74	0.2495
7.017	1377.6	222.64	0.1296
6.95	1419.3	212.61	0.0361
7.009	1462.3	215.11	0.0312
7.146	1831.6	211.82	0.0006
6.929	1455.8	207.2	0.0153

Monthly Calculations (continued) FEBRUARY

Tank No.		10460		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.01**	lb/month	
		2.76E-06	ton/month	
Time Period		**February**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**847.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	psia ft3/lb-mole R	
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**7.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	
Tank design data				
Shell height	Hs	**4.32**	ft	
Diameter	D	**5.29**	ft	
Throughput	Q	**410**	gal/month	
Turnovers	N	**7.52**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (PI/4)D if unknown	HLX	**3.32**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**2.16**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0026254		
Partially Insulated	P_{VA}	0.0026315		
Fully Insulated	P_{VA}	0.0025492		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**492.20**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	498.80	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	485.60	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	492.84	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**493.64**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**493.70**	°R	
Fully Insulated: TLA = TB	**TLA**	**492.8**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**494.30**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**494.57**	°R	
Fully Insulated; Tv = TB	**Tv**	**492.84**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	6.434E-05		
Partially Insulated	Wv	6.446E-05		
Fully Insulated	Wv	6.266E-05		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.00**	lb/month
Vapor Space Volume	Vv	47.5	ft3
Stock Vapor Density	Wv	0.0001	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.023	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	28	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.00**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0001	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0026	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0233**	**per day**
Average Daily Vapor Temperature Range	ΔTv	13.48	°R
Average Daily Vapor Pressure Range	ΔPv	0.0006	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0026	psia
Average Daily Liquid Surface Temperature	TLA	493.64	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.2	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**13.48**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**12.16**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00065**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00297	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = exp	PVN	0.00232	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	497.01	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	490.27	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00059**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00294	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0023533	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	496.74	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	490.66	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**47.52**	ft3
Effective Tank diameter	D_E	5.29	ft
Effective Tank Height	H_E	4.32	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	2.16	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.000**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$

Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0001
ethylbenzene	0.0000
xylenes	0.0003
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration
Eq. 40-6 ZVi = yiMi / MV

M_i	**M_V**	**Z_{Vi}**
86.18	130	0.00051
78.11	130	0.00299
114.23	130	0.00000
92.14	130	0.02467
106.17	130	0.00282
106.17	130	0.05436
128.17	130	2.82E-04
120.19	130	0.00E+00

Vapor Mole Fraction
Eq. 40-5 yi = Pi / PVA

$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.000052	0.003	**0.00077**
0.000299	0.003	**0.00498**
0.000000	0.003	**-**
0.000091	0.003	**0.03481**
0.000009	0.003	**0.00345**
0.000175	0.003	**0.06656**
7.50E-07	0.003	**2.86E-04**
0.00E+00	0.003	**0.00E+00**

Liquid Mole Fraction
Eq. 40-4 xi = (ZLiML)/Mi

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	188	86.18	0.00000
benzene	0.00001	188	78.11	0.00002
2,2,4 TMP	0.00000	188	114.23	0.00000
toluene	0.00032	188	92.14	0.00065
ethylbenzene	0.00013	188	106.17	0.00023
xylenes	0.00290	188	106.17	0.00514
naphthalene	0.00076	188	128.17	0.00111
cumene	0.00000	188	120.19	0.00000

Component Vapor Pressure
PVAi=(0.019337)10^(A-(B/(TLA+C)))

A	**B**	**C**	**P_{VAi}**
6.878	1171.5	224.37	0.9299
6.906	1211	220.79	0.5427
6.812	1257.8	220.74	0.2682
7.017	1377.6	222.64	0.1400
6.95	1419.3	212.61	0.0394
7.009	1462.3	215.11	0.0340
7.146	1831.6	211.82	0.0007
6.929	1455.8	207.2	0.0168

Monthly Calculations (continued) **MARCH**

Tank No.		10460							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.00**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.01**	lb/month	Vapor Space Volume	Vv	47.5	ft3
		3.91E-06	ton/month	Stock Vapor Density	Wv	0.0001	lb/ft3
Time Period		**March**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.027	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1156.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.00**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0001	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0034	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**4.32**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)**	**KE**	**0.0274**	**per day**
Diameter	D	**5.29**	ft	Average Daily Vapor Temperature Range	ΔTv	15.72	°R
Throughput	Q	**410**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0010	psi
Turnovers	N	**6.79**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0034	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	500.87	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**3.32**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**2.16**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.2	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.72**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**14.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00095**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00391	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00296	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	504.80	°R
Not Insulated	P_{VA}	0.003406		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	496.94	°R
Partially Insulated	P_{VA}	0.0034165					
Fully Insulated	P_{VA}	0.0032754		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00087**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00388	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**498.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0030066	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	506.00	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	504.53	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	491.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	497.38	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	499.77	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**47.52**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**500.87**	°R	Effective Tank diameter	D_E	5.29	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**500.95**	°R	Effective Tank Height	H_E	4.32	ft
Fully Insulated: TLA = TB	**TLA**	**499.8**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	2.16	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**501.76**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**502.14**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**499.77**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	8.223E-05					
Partially Insulated	Wv	8.242E-05					
Fully Insulated	Wv	7.940E-05					

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.001**

	Vapor Weight Concentration				**Vapor Mole Fraction**			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00049	0.000003	0.003	**0.00073**
benzene	0.0000	78.11	130	0.00288	0.000016	0.003	**0.00479**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.003	**-**
toluene	0.0002	92.14	130	0.02442	0.000117	0.003	**0.03445**
ethylbenzene	0.0000	106.17	130	0.00288	0.000012	0.003	**0.00353**
xylenes	0.0004	106.17	130	0.05566	0.000232	0.003	**0.06815**
naphthalene	0.0000	128.17	130	3.13E-04	1.08E-06	0.003	**3.18E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.003	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	1.1464
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.6785
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.3382
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.1797
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0522
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0452
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0010
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0228

Monthly Calculations (continued) **APRIL**

Tank No.		10460							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.01**	lb/month	Vapor Space Volume	Vv	47.5	ft3
		5.84E-06	ton/month	Stock Vapor Density	Wv	0.0001	lb/ft3
Time Period		**April**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.032	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1490.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0001	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0050	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**4.32**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)**	**KE**	**0.0315**	**per day**
Diameter	D	**5.29**	ft	Average Daily Vapor Temperature Range	ΔTv	18.16	°R
Throughput	Q	**410**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0015	psi
Turnovers	N	**7.02**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0050	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	511.68	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**3.32**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**2.16**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.16**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.63**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00154**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00578	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00424	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	516.22	°R
Not Insulated	P_{VA}	0.0049604		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	507.14	°R
Partially Insulated	P_{VA}	0.0049793					
Fully Insulated	P_{VA}	0.0047266		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00141**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00573	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**509.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0043179	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	516.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	515.95	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	501.50	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	507.64	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	510.27	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**47.52**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**511.68**	°R	Effective Tank diameter	D_E	5.29	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**511.79**	°R	Effective Tank Height	H_E	4.32	ft
Fully Insulated: TLA = TB	**TLA**	**510.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	2.16	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**512.84**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**513.32**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**510.27**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.172E-04					
Partially Insulated	Wv	1.175E-04					
Fully Insulated	Wv	1.122E-04					

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.001**

	Vapor Weight Concentration				**Vapor Mole Fraction**			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00045	0.000003	0.005	**0.00068**
benzene	0.0000	78.11	130	0.00272	0.000022	0.005	**0.00453**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.005	**-**
toluene	0.0003	92.14	130	0.02399	0.000168	0.005	**0.03384**
ethylbenzene	0.0000	106.17	130	0.00296	0.000018	0.005	**0.00362**
xylenes	0.0007	106.17	130	0.05737	0.000348	0.005	**0.07024**
naphthalene	0.0000	128.17	130	3.63E-04	1.83E-06	0.005	**3.68E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.005	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	1.5475
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.9343
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.4715
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.2571
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0781
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0679
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0016
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0352

Monthly Calculations (continued) **MAY**

Tank No.		10460		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.02**	lb/month	
		8.39E-06	ton/month	
Time Period		**May**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1750.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**7.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	
Tank design data				
Shell height	Hs	**4.32**	ft	
Diameter	D	**5.29**	ft	
Throughput	Q	**410**	gal/month	
Turnovers	N	**6.79**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**3.32**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_E)	HL	**2.16**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0069121		
Partially Insulated	P_{VA}	0.0069418		
Fully Insulated	P_{VA}	0.0065448		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**518.65**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	526.50	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	510.80	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	519.96	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**521.63**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**521.76**	°R	
Fully Insulated: TLA = TB	**TLA**	**520.0**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**522.98**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**523.55**	°R	
Fully Insulated; Tv = TB	**Tv**	**519.96**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	1.601E-04		
Partially Insulated	Wv	1.606E-04		
Fully Insulated	Wv	1.525E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Vapor Space Volume	Vv	47.5	ft3
Stock Vapor Density	Wv	0.0002	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.034	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0002	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0069	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0339**	**per day**
Average Daily Vapor Temperature Range	ΔTv	19.74	°R
Average Daily Vapor Pressure Range	ΔPv	0.0022	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0069	psia
Average Daily Liquid Surface Temperature	TLA	521.63	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.7	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**19.74**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**18.17**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00224**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00811	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00587	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	526.56	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	516.69	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00207**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00804	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0059753	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	526.30	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	517.21	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**47.52**	ft3
Effective Tank diameter	D_E	5.29	ft
Effective Tank Height	H_E	4.32	ft
Vapor Space Outage Hvo = 1/2 H_E	Hvo	2.16	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.001**

	Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$	**Vapor Weight Concentration** Eq. 40-6 ZVi = yiMi / MV			**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_v**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00042	0.000004	0.007	**0.00063**
benzene	0.0000	78.11	130	0.00259	0.000030	0.007	**0.00430**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.007	**-**
toluene	0.0004	92.14	130	0.02355	0.000230	0.007	**0.03322**
ethylbenzene	0.0001	106.17	130	0.00302	0.000026	0.007	**0.00370**
xylenes	0.0010	106.17	130	0.05870	0.000497	0.007	**0.07187**
naphthalene	0.0000	128.17	130	4.12E-04	2.89E-06	0.007	**4.18E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.007	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	2.0120
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.2359
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.6306
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.3517
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1110
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0967
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0026
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0515

Monthly Calculations (continued) **JUNE**

Tank No.		10460		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.02**	lb/month	
		1.11E-05	ton/month	
Time Period		**June**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1862.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**7.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	
Tank design data				
Shell height	Hs	**4.32**	ft	
Diameter	D	**5.29**	ft	
Throughput	Q	**410**	gal/month	
Turnovers	N	**7.02**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**3.32**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_E)	HL	**2.16**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0095724		
Partially Insulated	P_{VA}	0.0096146		
Fully Insulated	P_{VA}	0.009052		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**528.60**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	536.10	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	521.10	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	530.00	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**531.77**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**531.91**	°R	
Fully Insulated: TLA = TB	**TLA**	**530.0**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**533.21**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**533.81**	°R	
Fully Insulated; Tv = TB	**Tv**	**530.00**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	2.175E-04		
Partially Insulated	Wv	2.182E-04		
Fully Insulated	Wv	2.069E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Vapor Space Volume	Vv	47.5	ft3
Stock Vapor Density	Wv	0.0002	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.033	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	30	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0002	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0096	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0334**	**per day**
Average Daily Vapor Temperature Range	ΔTv	19.81	°R
Average Daily Vapor Pressure Range	ΔPv	0.0030	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0096	psia
Average Daily Liquid Surface Temperature	TLA	531.77	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.0	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**19.81**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**18.31**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00299**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.01117	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00818	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	536.72	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	526.81	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00278**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.01109	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0083139	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	536.48	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	527.33	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**47.52**	ft3
Effective Tank diameter	D_E	5.29	ft
Effective Tank Height	H_E	4.32	ft
Vapor Space Outage Hvo = 1/2 H_E	Hvo	2.16	ft

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.002**

	Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$	**Vapor Weight Concentration** Eq. 40-6 ZVi = yiMi / MV			**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_v**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00039	0.000006	0.010	**0.00059**
benzene	0.0001	78.11	130	0.00245	0.000039	0.010	**0.00408**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.010	**-**
toluene	0.0005	92.14	130	0.02306	0.000311	0.010	**0.03254**
ethylbenzene	0.0001	106.17	130	0.00307	0.000036	0.010	**0.00376**
xylenes	0.0013	106.17	130	0.05983	0.000701	0.010	**0.07326**
naphthalene	0.0000	128.17	130	4.64E-04	4.50E-06	0.010	**4.70E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.010	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	2.5981
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.6225
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.8367
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.4771
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1563
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.1366
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0041
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0744

Monthly Calculations (continued) **JULY**

Tank No.		10460							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.03**	lb/month	Vapor Space Volume	Vv	47.5	ft3
		1.31E-05	ton/month	Stock Vapor Density	Wv	0.0003	lb/ft3
Time Period		**July**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.033	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1904.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0003	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0113	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**4.32**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)**	**KE**	**0.0326**	**per day**
Diameter	D	**5.29**	ft	Average Daily Vapor Temperature Range	ΔTv	19.60	°R
Throughput	Q	**410**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0034	psi
Turnovers	N	**6.79**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0113	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	537.14	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**3.32**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**2.16**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.4	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**19.60**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**18.16**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00343**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.01315	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00972	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	542.04	°R
Not Insulated	P_{VA}	0.0113179		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	532.24	°R
Partially Insulated	P_{VA}	0.0113679					
Fully Insulated	P_{VA}	0.0107012		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00319**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.01306	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0098702	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	541.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	541.82	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.70	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.74	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	535.33	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**47.52**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**537.14**	°R	Effective Tank diameter	D_E	5.29	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**537.28**	°R	Effective Tank Height	H_E	4.32	ft
Fully Insulated: TLA = TB	**TLA**	**535.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	2.16	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**538.61**	°R				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**539.23**	°R				
Fully Insulated; Tv = TB	**Tv**	**535.33**	°R				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	2.546E-04					
Partially Insulated	Wv	2.554E-04					
Fully Insulated	Wv	2.422E-04					

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.002**

	Vapor Weight Concentration				**Vapor Mole Fraction**			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00038	0.000006	0.011	**0.00057**
benzene	0.0001	78.11	130	0.00238	0.000045	0.011	**0.00397**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.011	**-**
toluene	0.0006	92.14	130	0.02280	0.000364	0.011	**0.03217**
ethylbenzene	0.0001	106.17	130	0.00309	0.000043	0.011	**0.00378**
xylenes	0.0016	106.17	130	0.06035	0.000836	0.011	**0.07390**
naphthalene	0.0000	128.17	130	4.92E-04	5.65E-06	0.011	**4.99E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.011	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	2.9609
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.8647
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.9669
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.5576
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1861
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.1629
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0051
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0897

Monthly Calculations (continued) **AUGUST**

Tank No.		10460							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.02**	lb/month	Vapor Space Volume	Vv	47.5	ft3
		1.22E-05	ton/month	Stock Vapor Density	Wv	0.0002	lb/ft3
Time Period		**August**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.030	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1685.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0002	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0109	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**4.32**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)**	**KE**	**0.0299**	**per day**
Diameter	D	**5.29**	ft	Average Daily Vapor Temperature Range	ΔTv	18.09	°R
Throughput	Q	**410**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0031	psi
Turnovers	N	**6.79**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0109	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	536.06	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**3.32**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**2.16**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.8	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.09**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**16.71**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00308**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.01258	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00951	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	540.59	°R
Not Insulated	P_{VA}	0.0109487		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	531.54	°R
Partially Insulated	P_{VA}	0.0109916					
Fully Insulated	P_{VA}	0.0104171		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00285**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.01250	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0096478	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	540.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	540.37	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.30	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	532.01	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	534.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**47.52**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**536.06**	°R	Effective Tank diameter	D_E	5.29	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**536.19**	°R	Effective Tank Height	H_E	4.32	ft
Fully Insulated: TLA = TB	**TLA**	**534.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	2.16	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**537.37**	°R				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**537.92**	°R				
Fully Insulated; Tv = TB	**Tv**	**534.46**	°R				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	2.468E-04					
Partially Insulated	Wv	2.475E-04					
Fully Insulated	Wv	2.361E-04					

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.002**

	Vapor Weight Concentration				**Vapor Mole Fraction**			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00038	0.000006	0.011	**0.00057**
benzene	0.0001	78.11	130	0.00240	0.000044	0.011	**0.00399**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.011	**-**
toluene	0.0006	92.14	130	0.02285	0.000353	0.011	**0.03224**
ethylbenzene	0.0001	106.17	130	0.00309	0.000041	0.011	**0.00378**
xylenes	0.0015	106.17	130	0.06025	0.000808	0.011	**0.07378**
naphthalene	0.0000	128.17	130	4.86E-04	5.40E-06	0.011	**4.93E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.011	**0.00E+00**

	Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	2.8854
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.8141
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.9396
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.5406
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1798
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.1573
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0049
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0864

Monthly Calculations (continued) **SEPTEMBER**

Tank No.		10460							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.02**	lb/month	Vapor Space Volume	Vv	47.5	ft3
		9.29E-06	ton/month	Stock Vapor Density	Wv	0.0002	lb/ft3
Time Period		**September**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.028	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1320.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0002	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0086	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**4.32**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)**	**KE**	**0.0278**	**per day**
Diameter	D	**5.29**	ft	Average Daily Vapor Temperature Range	ΔTv	16.75	°R
Throughput	Q	**410**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0023	psi
Turnovers	N	**7.02**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0086	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	528.39	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**3.32**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**2.16**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**16.75**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**15.30**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00230**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00982	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00752	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	532.58	°R
Not Insulated	P_{VA}	0.0086022		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	524.21	°R
Partially Insulated	P_{VA}	0.0086294					
Fully Insulated	P_{VA}	0.0082641		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00211**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00974	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**526.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0076317	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	533.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	532.32	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	518.90	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	524.67	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	527.14	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**47.52**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αR*I	**TLA**	**528.39**	°R	Effective Tank diameter	D_E	5.29	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**528.49**	°R	Effective Tank Height	H_E	4.32	ft
Fully Insulated: TLA = TB	**TLA**	**527.1**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	2.16	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**529.42**	°R				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**529.85**	°R				
Fully Insulated; Tv = TB	**Tv**	**527.14**	°R				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.968E-04					
Partially Insulated	Wv	1.973E-04					
Fully Insulated	Wv	1.899E-04					

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.002**

	Vapor Weight Concentration				**Vapor Mole Fraction**			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00040	0.000005	0.009	**0.00061**
benzene	0.0000	78.11	130	0.00250	0.000036	0.009	**0.00415**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.009	**-**
toluene	0.0004	92.14	130	0.02323	0.000282	0.009	**0.03277**
ethylbenzene	0.0001	106.17	130	0.00305	0.000032	0.009	**0.00374**
xylenes	0.0011	106.17	130	0.05948	0.000627	0.009	**0.07283**
naphthalene	0.0000	128.17	130	4.46E-04	3.89E-06	0.009	**4.53E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.009	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	2.3895
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.4842
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.7627
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.4318
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.1397
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.1220
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0035
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0659

Monthly Calculations (continued) **OCTOBER**

Tank No.		10460							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.01**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.01**	lb/month	Vapor Space Volume	Vv	47.5	ft3
		6.33E-06	ton/month	Stock Vapor Density	Wv	0.0001	lb/ft3
Time Period		**October**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.026	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**948.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Product Type		**Distillate Fuel Oil No.2**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**7.10**	lb/gal	Stock Vapor Density	Wv	0.0001	lb/ft3
Average Reid Vapor Pressure	RVP	**0.02**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**12.10**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0058	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**4.32**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)**	**KE**	**0.0259**	**per day**
Diameter	D	**5.29**	ft	Average Daily Vapor Temperature Range	ΔTv	15.45	°R
Throughput	Q	**410**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0015	psi
Turnovers	N	**6.79**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0058	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	516.36	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**3.32**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**2.16**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**15.45**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**13.92**	°R
Tank Shell Color (pick from drop down list)		**White**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00150**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00660	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00510	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	520.22	°R
Not Insulated	P_{VA}	0.0058079		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	512.50	°R
Partially Insulated	P_{VA}	0.0058217					
Fully Insulated	P_{VA}	0.0056355		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00136**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00653	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**514.75**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0051788	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	522.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	519.91	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	507.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	512.95	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	515.46	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**47.52**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αR*I	**TLA**	**516.36**	°R	Effective Tank diameter	D_E	5.29	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**516.43**	°R	Effective Tank Height	H_E	4.32	ft
Fully Insulated: TLA = TB	**TLA**	**515.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	2.16	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**517.10**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**517.40**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**515.46**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.361E-04					
Partially Insulated	Wv	1.363E-04					
Fully Insulated	Wv	1.324E-04					

HAPS Speciation	**lb/month**
Product	Diesel
Total HAP Emissions =	**0.001**

	Vapor Weight Concentration				**Vapor Mole Fraction**			
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA			
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00044	0.000004	0.006	**0.00066**
benzene	0.0000	78.11	130	0.00266	0.000026	0.006	**0.00442**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.006	**-**
toluene	0.0003	92.14	130	0.02378	0.000195	0.006	**0.03356**
ethylbenzene	0.0000	106.17	130	0.00299	0.000021	0.006	**0.00366**
xylenes	0.0007	106.17	130	0.05802	0.000413	0.006	**0.07104**
naphthalene	0.0000	128.17	130	3.86E-04	2.27E-06	0.006	**3.91E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.006	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	1.7536
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	1.0675
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.5416
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.2985
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0923
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0804
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0020
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0422

Monthly Calculations (continued) **NOVEMBER**

Tank No.		10460		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.01**	lb/month	
		4.17E-06	ton/month	
Time Period		**November**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**621.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**7.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	
Tank design data				
Shell height	Hs	**4.32**	ft	
Diameter	D	**5.29**	ft	
Throughput	Q	**410**	gal/month	
Turnovers	N	**7.02**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**3.32**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**2.16**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0041375		
Partially Insulated	P_{VA}	0.0041442		
Fully Insulated	P_{VA}	0.0040535		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**505.35**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	512.10	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	498.60	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	505.82	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**506.41**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**506.45**	°R	
Fully Insulated: TLA = TB	**TLA**	**505.8**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**506.89**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**507.09**	°R	
Fully Insulated; Tv = TB	**Tv**	**505.82**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	9.888E-05		
Partially Insulated	Wv	9.901E-05		
Fully Insulated	Wv	9.708E-05		

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.00**	lb/month
Vapor Space Volume	Vv	47.5	ft3
Stock Vapor Density	Wv	0.0001	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.021	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	30	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.01**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0001	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0041	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)	**KE**	**0.0208**	**per day**
Average Daily Vapor Temperature Range	ΔTv	12.56	°R
Average Daily Vapor Pressure Range	ΔPv	0.0009	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0041	psia
Average Daily Liquid Surface Temperature	TLA	506.41	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.5	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**12.56**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**11.21**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00090**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00461	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00371	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	509.54	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	503.27	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00081**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00457	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0037580	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	509.25	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	503.65	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**47.52**	ft3
Effective Tank diameter	D_E	5.29	ft
Effective Tank Height	H_E	4.32	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	2.16	ft

HAPS Speciation	lb/month
Product	Diesel
Total HAP Emissions =	**0.001**

	Vapor Weight Concentration				Vapor Mole Fraction		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	L_{Ti} **(lb/month)**	M_i	M_V	Z_{Vi}	$P_i = P_{VA}(x_i)$	P_{VA}	y_i
hexane	0.0000	86.18	130	0.00047	0.000003	0.004	**0.00071**
benzene	0.0000	78.11	130	0.00280	0.000019	0.004	**0.00466**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.004	**-**
toluene	0.0002	92.14	130	0.02420	0.000141	0.004	**0.03415**
ethylbenzene	0.0000	106.17	130	0.00292	0.000015	0.004	**0.00358**
xylenes	0.0005	106.17	130	0.05657	0.000287	0.004	**0.06926**
naphthalene	0.0000	128.17	130	3.38E-04	1.42E-06	0.004	**3.43E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.004	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	Z_{Li}	M_L	M_i	X_i	**A**	**B**	**C**	P_{VAi}
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	1.3394
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.8010
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.4018
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.2164
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0643
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0558
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0013
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0286

Monthly Calculations (continued) **DECEMBER**

Tank No.		10460		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.01**	lb/month	
		2.91E-06	ton/month	
Time Period		**December**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**501.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Distillate Fuel Oil No.2**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**7.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.02**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**12.10**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**8907.0**	°R	
Tank design data				
Shell height	Hs	**4.32**	ft	
Diameter	D	**5.29**	ft	
Throughput	Q	**410**	gal/month	
Turnovers	N	**6.79**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**3.32**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**2.16**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**White**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.25**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0028974		
Partially Insulated	P_{VA}	0.0029014		
Fully Insulated	P_{VA}	0.0028479		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**495.50**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	501.80	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	489.20	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	495.88	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**496.35**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**496.39**	°R	
Fully Insulated: TLA = TB	**TLA**	**495.9**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**496.74**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**496.90**	°R	
Fully Insulated; Tv = TB	**Tv**	**495.88**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	7.066E-05		
Partially Insulated	Wv	7.073E-05		
Fully Insulated	Wv	6.958E-05		

ROUTINE EMISSIONS CALCULATIONS	Symbol		Units
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.00**	lb/month
Vapor Space Volume	Vv	47.5	ft3
Stock Vapor Density	Wv	0.0001	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.019	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.00**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	55	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0001	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)'	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0029	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA)	**KE**	**0.0188**	**per day**
Average Daily Vapor Temperature Range	ΔTv	11.33	°R
Average Daily Vapor Pressure Range	ΔPv	0.0006	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0029	psia
Average Daily Liquid Surface Temperature	TLA	496.35	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.6	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**11.33**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**10.07**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00059**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	0.00321	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	0.00261	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	499.18	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	493.52	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00053**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	0.00318	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	0.0026479	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	498.91	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	493.87	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**47.52**	ft3
Effective Tank diameter	D_E	5.29	ft
Effective Tank Height	H_E	4.32	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	2.16	ft

HAPS Speciation	lb/month
Product	Diesel
Total HAP Emissions =	**0.001**

	Vapor Weight Concentration				Vapor Mole Fraction		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	L_{Ti} **(lb/month)**	M_i	M_V	Z_{Vi}	$P_i = P_{VA}(x_i)$	P_{VA}	y_i
hexane	0.0000	86.18	130	0.00050	0.000002	0.003	**0.00076**
benzene	0.0000	78.11	130	0.00295	0.000014	0.003	**0.00491**
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.003	**-**
toluene	0.0001	92.14	130	0.02458	0.000100	0.003	**0.03468**
ethylbenzene	0.0000	106.17	130	0.00284	0.000010	0.003	**0.00348**
xylenes	0.0003	106.17	130	0.05486	0.000195	0.003	**0.06718**
naphthalene	0.0000	128.17	130	2.93E-04	8.62E-07	0.003	**2.97E-04**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.003	**0.00E+00**

	Liquid Mole Fraction				Component Vapor Pressure			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	Z_{Li}	M_L	M_i	X_i	**A**	**B**	**C**	P_{VAi}
hexane	0.00000	188	86.18	0.00000	6.878	1171.5	224.37	1.0068
benzene	0.00001	188	78.11	0.00002	6.906	1211	220.79	0.5907
2,2,4 TMP	0.00000	188	114.23	0.00000	6.812	1257.8	220.74	0.2928
toluene	0.00032	188	92.14	0.00065	7.017	1377.6	222.64	0.1539
ethylbenzene	0.00013	188	106.17	0.00023	6.95	1419.3	212.61	0.0438
xylenes	0.00290	188	106.17	0.00514	7.009	1462.3	215.11	0.0379
naphthalene	0.00076	188	128.17	0.00111	7.146	1831.6	211.82	0.0008
cumene	0.00000	188	120.19	0.00000	6.929	1455.8	207.2	0.0189

Monthly Calculations - JANUARY

Tank No.		10470		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.58**	lb/month	
		2.92E-04	ton/month	
Time Period		**January**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**560.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**11.78**	ft	
Diameter	D	**9.77**	ft	
Throughput	Q	**1,250**	gal/month	
Turnovers	N	**2.47**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**10.78**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**5.89**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**Black**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
	PBV	**-0.03**		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0362278		
Partially Insulated	P_{VA}	0.0364635		
Fully Insulated	P_{VA}	0.033354		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**490.50**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	496.90	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	484.10	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	492.13	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**494.19**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**494.36**	°R	
Fully Insulated: TLA = TB	**TLA**	**492.1**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**495.88**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**496.58**	°R	
Fully Insulated; Tv = TB	**Tv**	**492.13**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	8.851E-04		
Partially Insulated	Wv	8.895E-04		
Fully Insulated	Wv	8.211E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.44**	lb/month
Vapor Space Volume	Vv	441.8	ft3
Stock Vapor Density	Wv	0.0009	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.036	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.15**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	167	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0009	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0362	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0360**	**per day**
Average Daily Vapor Temperature Range	ΔTv	19.82	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0362	psia
Average Daily Liquid Surface Temperature	TLA	494.19	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.8	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**19.82**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**18.54**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	499.15	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	489.24	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	498.99	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	489.72	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**441.79**	ft3
Effective Tank diameter	D_E	9.77	ft
Effective Tank Height	H_E	11.78	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.89	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.584**

Vapor Weight Concentration				
Eq. 40-6 ZVi = yiMi / MV				
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**
hexane	0.0000	86.18	130	0.00000
benzene	0.0000	78.11	130	0.00000
2,2,4 TMP	0.0000	114.23	130	0.00000
toluene	0.0000	92.14	130	0.00000
ethylbenzene	0.1713	106.17	130	0.29315
xylenes	0.4131	106.17	130	0.70685
naphthalene	0.0000	128.17	130	0.00E+00
cumene	0.0000	120.19	130	0.00E+00

Vapor Mole Fraction			
Eq. 40-5 yi = Pi / PVA			
$P_i = P_{VA}(X_i)$	**P_{VA}**	**y_i**	
0.000000	0.036	-	
0.000000	0.036	-	
0.000000	0.036	-	
0.000000	0.036	-	
0.013004	0.036	**0.35894**	
0.031355	0.036	**0.86551**	
0.00E+00	0.036	**0.00E+00**	
0.00E+00	0.036	**0.00E+00**	

Liquid Mole Fraction				
Eq. 40-4 xi = (ZLiML)/Mi				
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	130	86.18	0.00000
benzene	0.00000	130	78.11	0.00000
2,2,4 TMP	0.00000	130	114.23	0.00000
toluene	0.00000	130	92.14	0.00000
ethylbenzene	0.26400	130	106.17	0.32326
xylenes	0.73600	130	106.17	0.90120
naphthalene	0.00000	130	128.17	0.00000
cumene	0.00000	130	120.19	0.00000

Component Vapor Pressure				
PVAi=(0.019337)10^(A-(B/(TLA+C)))				
A	**B**	**C**	**P_{VAi}**	
6.878	1171.5	224.37	0.9452	
6.906	1211	220.79	0.5523	
6.812	1257.8	220.74	0.2731	
7.017	1377.6	222.64	0.1427	
6.95	1419.3	212.61	0.0402	
7.009	1462.3	215.11	0.0348	
7.146	1831.6	211.82	0.0008	
6.929	1455.8	207.2	0.0172	

Monthly Calculations (continued) FEBRUARY

Tank No.		10470		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**			**Units**
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.76**	lb/month	
		3.81E-04	ton/month	
Time Period		**February**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**847.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**11.78**	ft	
Diameter	D	**9.77**	ft	
Throughput	Q	**1,250**	gal/month	
Turnovers	N	**2.47**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**10.78**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**5.89**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**Black**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0417464		
Partially Insulated	P_{VA}	0.0421504		
Fully Insulated	P_{VA}	0.0369129		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**492.20**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	498.80	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	485.60	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	494.66	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**497.79**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**498.03**	°R	
Fully Insulated: TLA = TB	**TLA**	**494.7**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**500.33**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**501.40**	°R	
Fully Insulated; Tv = TB	**Tv**	**494.66**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	1.011E-03		
Partially Insulated	Wv	1.018E-03		
Fully Insulated	Wv	9.040E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.59**	lb/month
Vapor Space Volume	Vv	441.8	ft3
Stock Vapor Density	Wv	0.0010	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.047	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	28	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.17**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	167	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0010	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0417	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0475**	**per day**
Average Daily Vapor Temperature Range	ΔTv	25.67	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0417	psia
Average Daily Liquid Surface Temperature	TLA	497.79	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.2	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**25.67**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**24.35**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	504.20	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	491.37	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 ut	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	504.12	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	491.95	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**441.79**	ft3
Effective Tank diameter	D_E	9.77	ft
Effective Tank Height	H_E	11.78	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.89	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.763**

Vapor Weight Concentration				
Eq. 40-6 ZVi = yiMi / MV				
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**
hexane	0.0000	86.18	130	0.00000
benzene	0.0000	78.11	130	0.00000
2,2,4 TMP	0.0000	114.23	130	0.00000
toluene	0.0000	92.14	130	0.00000
ethylbenzene	0.2234	106.17	130	0.29295
xylenes	0.5391	106.17	130	0.70705
naphthalene	0.0000	128.17	130	0.00E+00
cumene	0.0000	120.19	130	0.00E+00

Vapor Mole Fraction			
Eq. 40-5 yi = Pi / PVA			
$P_i = P_{VA}(X_i)$	**P_{VA}**	**y_i**	
0.000000	0.042	-	
0.000000	0.042	-	
0.000000	0.042	-	
0.000000	0.042	-	
0.014974	0.042	**0.35870**	
0.036142	0.042	**0.86575**	
0.00E+00	0.042	**0.00E+00**	
0.00E+00	0.042	**0.00E+00**	

Liquid Mole Fraction				
Eq. 40-4 xi = (ZLiML)/Mi				
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	130	86.18	0.00000
benzene	0.00000	130	78.11	0.00000
2,2,4 TMP	0.00000	130	114.23	0.00000
toluene	0.00000	130	92.14	0.00000
ethylbenzene	0.26400	130	106.17	0.32326
xylenes	0.73600	130	106.17	0.90120
naphthalene	0.00000	130	128.17	0.00000
cumene	0.00000	130	120.19	0.00000

Component Vapor Pressure				
PVAi=(0.019337)10^(A-(B/(TLA+C)))				
A	**B**	**C**	**P_{VAi}**	
6.878	1171.5	224.37	1.0495	
6.906	1211	220.79	0.6176	
6.812	1257.8	220.74	0.3067	
7.017	1377.6	222.64	0.1618	
6.95	1419.3	212.61	0.0463	
7.009	1462.3	215.11	0.0401	
7.146	1831.6	211.82	0.0008	
6.929	1455.8	207.2	0.0201	

Monthly Calculations (continued) **MARCH**

Tank No.		10470						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.13**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.37**	lb/month	Vapor Space Volume	Vv	441.8	ft3
		6.83E-04	ton/month	Stock Vapor Density	Wv	0.0014	lb/ft3
Time Period		**March**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.060	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1156.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.23**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	167	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0014	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0583	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**11.78**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0598**	**per day**
Diameter	D	**9.77**	ft	Average Daily Vapor Temperature Range	ΔTv	32.37	°R
Throughput	Q	**1,250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**2.23**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0583	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	506.52	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**10.78**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**5.89**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.2	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**32.37**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**30.95**	°R
Tank Shell Color (pick from drop down list)		**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	514.62	°R
Not Insulated	P_{VA}	0.0583131		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	498.43	°R
Partially Insulated	P_{VA}	0.059051					
Fully Insulated	P_{VA}	0.0496349		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**498.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	506.00	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	514.60	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	491.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	499.12	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	502.26	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**441.79**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αR*I	**TLA**	**506.52**	°R	Effective Tank diameter	D_E	9.77	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**506.86**	°R	Effective Tank Height	H_E	11.78	ft
Fully Insulated: TLA = TB	**TLA**	**502.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.89	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**510.00**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**511.46**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**502.26**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.385E-03					
Partially Insulated	Wv	1.399E-03					
Fully Insulated	Wv	1.197E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.366**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.058	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.058	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.058	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.058	-
ethylbenzene	0.3994	106.17	130	0.29246	0.020882	0.058	**0.35810**
xylenes	0.9664	106.17	130	0.70754	0.050520	0.058	**0.86635**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.058	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.058	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.3438
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.8038
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4033
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2173
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0646
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0561
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0013
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0287

Monthly Calculations (continued) **APRIL**

Tank No.		10470						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**2.03**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**2.38**	lb/month	Vapor Space Volume	Vv	441.8	ft3
		1.19E-03	ton/month	Stock Vapor Density	Wv	0.0021	lb/ft3
Time Period		**April**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.072	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1490.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.35**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	167	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0021	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0916	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**11.78**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0722**	**per day**
Diameter	D	**9.77**	ft	Average Daily Vapor Temperature Range	ΔTv	39.62	°R
Throughput	Q	**1,250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**2.30**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0916	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	518.98	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**10.78**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**5.89**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**39.62**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**38.09**	°R
Tank Shell Color (pick from drop down list)		**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	528.88	°R
Not Insulated	P_{VA}	0.0916245		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	509.07	°R
Partially Insulated	P_{VA}	0.0930318					
Fully Insulated	P_{VA}	0.0753251		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 ut	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**509.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	516.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	528.93	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	501.50	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	509.89	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	513.49	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**441.79**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*αR*I	**TLA**	**518.98**	°R	Effective Tank diameter	D_E	9.77	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**519.41**	°R	Effective Tank Height	H_E	11.78	ft
Fully Insulated: TLA = TB	**TLA**	**513.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.89	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**523.46**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**525.34**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**513.49**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	2.120E-03					
Partially Insulated	Wv	2.145E-03					
Fully Insulated	Wv	1.777E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.384**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.092	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.092	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.092	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.092	-
ethylbenzene	0.6955	106.17	130	0.29174	0.032731	0.092	**0.35722**
xylenes	1.6885	106.17	130	0.70826	0.079459	0.092	**0.86723**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.092	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.092	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.8784
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.1487
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.5844
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.3240
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1013
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0882
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0023
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0466

Monthly Calculations (continued) **MAY**

Tank No.		10470						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**3.36**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**3.87**	lb/month	Vapor Space Volume	Vv	441.8	ft3
		1.94E-03	ton/month	Stock Vapor Density	Wv	0.0030	lb/ft3
Time Period		**May**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.081	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1750.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.51**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	167	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0030	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1346	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**11.78**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0806**	**per day**
Diameter	D	**9.77**	ft	Average Daily Vapor Temperature Range	ΔTv	44.94	°R
Throughput	Q	**1,250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**2.23**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1346	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	530.19	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**10.78**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**5.89**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.7	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**44.94**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**43.37**	°R
Tank Shell Color (pick from drop down list)		**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	541.43	°R
Not Insulated	P_{VA}	0.1345523		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	518.96	°R
Partially Insulated	P_{VA}	0.1368547					
Fully Insulated	P_{VA}	0.1081437		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 uI	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**518.65**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	526.50	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	541.54	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	510.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	519.86	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	523.74	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**441.79**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**530.19**	°R	Effective Tank diameter	D_E	9.77	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**530.70**	°R	Effective Tank Height	H_E	11.78	ft
Fully Insulated: TLA = TB	**TLA**	**523.7**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.89	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**535.46**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**537.66**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**523.74**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.044E-03					
Partially Insulated	Wv	3.084E-03					
Fully Insulated	Wv	2.501E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.871**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.135	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.135	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.135	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.135	-
ethylbenzene	1.1267	106.17	130	0.29108	0.047957	0.135	**0.35642**
xylenes	2.7439	106.17	130	0.70892	0.116796	0.135	**0.86803**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.135	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.135	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.4990
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.5567
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.8015
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.4555
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1484
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1296
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0038
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0703

Monthly Calculations (continued) **JUNE**

Tank No.		10470						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**4.59**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**5.30**	lb/month	Vapor Space Volume	Vv	441.8	ft3
		2.65E-03	ton/month	Stock Vapor Density	Wv	0.0042	lb/ft3
Time Period		**June**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.082	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1862.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.71**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	167	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0042	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1905	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**11.78**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0821**	**per day**
Diameter	D	**9.77**	ft	Average Daily Vapor Temperature Range	ΔTv	46.62	°R
Throughput	Q	**1,250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**2.30**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1905	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	540.88	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**10.78**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**5.89**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.0	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**46.62**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**45.12**	°R
Tank Shell Color (pick from drop down list)		**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	552.54	°R
Not Insulated	P_{VA}	0.1905173		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	529.23	°R
Partially Insulated	P_{VA}	0.1938179					
Fully Insulated	P_{VA}	0.1526914		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 uI	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**528.60**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	536.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	552.70	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	521.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	530.14	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	534.02	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**441.79**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**540.88**	°R	Effective Tank diameter	D_E	9.77	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**541.42**	°R	Effective Tank Height	H_E	11.78	ft
Fully Insulated: TLA = TB	**TLA**	**534.0**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.89	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**546.48**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**548.83**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**534.02**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	4.223E-03					
Partially Insulated	Wv	4.278E-03					
Fully Insulated	Wv	3.464E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**5.299**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.191	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.191	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.191	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.191	-
ethylbenzene	1.5391	106.17	130	0.29045	0.067756	0.191	**0.35564**
xylenes	3.7599	106.17	130	0.70955	0.165523	0.191	**0.86881**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.191	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.191	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	3.2376
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	2.0506
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	1.0672
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.6202
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.2096
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1837
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0059
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.1019

Monthly Calculations (continued) **JULY**

Tank No.		10470						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**5.58**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**6.41**	lb/month	Vapor Space Volume	Vv	441.8	ft3
		3.21E-03	ton/month	Stock Vapor Density	Wv	0.0050	lb/ft3
Time Period		**July**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.082	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1904.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.83**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	167	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0050	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.2269	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**11.78**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0819**	**per day**
Diameter	D	**9.77**	ft	Average Daily Vapor Temperature Range	ΔTv	47.02	°R
Throughput	Q	**1,250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**2.23**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.2269	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	546.46	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**10.78**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**5.89**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.4	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**47.02**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**45.58**	°R
Tank Shell Color (pick from drop down list)		**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	558.21	°R
Not Insulated	P_{VA}	0.2269004		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	534.70	°R
Partially Insulated	P_{VA}	0.2308187					
Fully Insulated	P_{VA}	0.1819718		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	541.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	558.41	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.70	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	535.62	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	539.44	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**441.79**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**546.46**	°R	Effective Tank diameter	D_E	9.77	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**547.01**	°R	Effective Tank Height	H_E	11.78	ft
Fully Insulated: TLA = TB	**TLA**	**539.4**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.89	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**552.18**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**554.59**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**539.44**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	4.978E-03					
Partially Insulated	Wv	5.042E-03					
Fully Insulated	Wv	4.087E-03					

HAPS Speciation	lb/month
Product	additive
Total HAP Emissions =	**6.415**
Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0000
ethylbenzene	1.8610
xylenes	4.5537
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$ Eq. 40-6 ZVi = yiMi / MV

Individual HAPS	**M_i**	**M_V**	**Z_{Vi}**
hexane	86.18	130	0.00000
benzene	78.11	130	0.00000
2,2,4 TMP	114.23	130	0.00000
toluene	92.14	130	0.00000
ethylbenzene	106.17	130	0.29012
xylenes	106.17	130	0.70988
naphthalene	128.17	130	0.00E+00
cumene	120.19	130	0.00E+00

Vapor Mole Fraction
Eq. 40-5 yi = Pi / PVA

Individual HAPS	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.000000	0.227	-
benzene	0.000000	0.227	-
2,2,4 TMP	0.000000	0.227	-
toluene	0.000000	0.227	-
ethylbenzene	0.080603	0.227	**0.35524**
xylenes	0.197225	0.227	**0.86922**
naphthalene	0.00E+00	0.227	**0.00E+00**
cumene	0.00E+00	0.227	**0.00E+00**

Liquid Mole Fraction
Eq. 40-4 xi = (ZLiML)/Mi

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	130	86.18	0.00000
benzene	0.00000	130	78.11	0.00000
2,2,4 TMP	0.00000	130	114.23	0.00000
toluene	0.00000	130	92.14	0.00000
ethylbenzene	0.26400	130	106.17	0.32326
xylenes	0.73600	130	106.17	0.90120
naphthalene	0.00000	130	128.17	0.00000
cumene	0.00000	130	120.19	0.00000

Component Vapor Pressure
PVAi=(0.019337)10^(A-(B/(TLA+C)))

Individual HAPS	**A**	**B**	**C**	**P_{VAi}**
hexane	6.878	1171.5	224.37	3.6882
benzene	6.906	1211	220.79	2.3554
2,2,4 TMP	6.812	1257.8	220.74	1.2325
toluene	7.017	1377.6	222.64	0.7245
ethylbenzene	6.95	1419.3	212.61	0.2493
xylenes	7.009	1462.3	215.11	0.2188
naphthalene	7.146	1831.6	211.82	0.0074
cumene	6.929	1455.8	207.2	0.1228

Monthly Calculations (continued) **AUGUST**

Tank No.		10470						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**4.72**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**5.50**	lb/month	Vapor Space Volume	Vv	441.8	ft3
		2.75E-03	ton/month	Stock Vapor Density	Wv	0.0047	lb/ft3
Time Period		**August**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.074	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1685.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.78**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	167	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0047	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.2123	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**11.78**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0737**	**per day**
Diameter	D	**9.77**	ft	Average Daily Vapor Temperature Range	ΔTv	42.35	°R
Throughput	Q	**1,250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**2.23**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.2123	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	544.31	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**10.78**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**5.89**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.8	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**42.35**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**40.97**	°R
Tank Shell Color (pick from drop down list)		**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	554.90	°R
Not Insulated	P_{VA}	0.2122647		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	533.73	°R
Partially Insulated	P_{VA}	0.2155379					
Fully Insulated	P_{VA}	0.1743376		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 ut	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**533.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	540.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	555.05	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	526.30	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	534.56	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	538.10	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**441.79**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**544.31**	°R	Effective Tank diameter	D_E	9.77	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**544.80**	°R	Effective Tank Height	H_E	11.78	ft
Fully Insulated: TLA = TB	**TLA**	**538.1**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.89	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**549.38**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**551.51**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**538.10**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	4.681E-03					
Partially Insulated	Wv	4.735E-03					
Fully Insulated	Wv	3.925E-03					

HAPS Speciation	lb/month
Product	additive
Total HAP Emissions =	**5.504**
Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0000
ethylbenzene	1.5975
xylenes	3.9063
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$ Eq. 40-6 ZVi = yiMi / MV

Individual HAPS	**M_i**	**M_V**	**Z_{Vi}**
hexane	86.18	130	0.00000
benzene	78.11	130	0.00000
2,2,4 TMP	114.23	130	0.00000
toluene	92.14	130	0.00000
ethylbenzene	106.17	130	0.29025
xylenes	106.17	130	0.70975
naphthalene	128.17	130	0.00E+00
cumene	120.19	130	0.00E+00

Vapor Mole Fraction
Eq. 40-5 yi = Pi / PVA

Individual HAPS	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.000000	0.212	-
benzene	0.000000	0.212	-
2,2,4 TMP	0.000000	0.212	-
toluene	0.000000	0.212	-
ethylbenzene	0.075437	0.212	**0.35539**
xylenes	0.184470	0.212	**0.86906**
naphthalene	0.00E+00	0.212	**0.00E+00**
cumene	0.00E+00	0.212	**0.00E+00**

Liquid Mole Fraction
Eq. 40-4 xi = (ZLiML)/Mi

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	130	86.18	0.00000
benzene	0.00000	130	78.11	0.00000
2,2,4 TMP	0.00000	130	114.23	0.00000
toluene	0.00000	130	92.14	0.00000
ethylbenzene	0.26400	130	106.17	0.32326
xylenes	0.73600	130	106.17	0.90120
naphthalene	0.00000	130	128.17	0.00000
cumene	0.00000	130	120.19	0.00000

Component Vapor Pressure
PVAi=(0.019337)10^(A-(B/(TLA+C)))

Individual HAPS	**A**	**B**	**C**	**P_{VAi}**
hexane	6.878	1171.5	224.37	3.5093
benzene	6.906	1211	220.79	2.2341
2,2,4 TMP	6.812	1257.8	220.74	1.1666
toluene	7.017	1377.6	222.64	0.6828
ethylbenzene	6.95	1419.3	212.61	0.2334
xylenes	7.009	1462.3	215.11	0.2047
naphthalene	7.146	1831.6	211.82	0.0068
cumene	6.929	1455.8	207.2	0.1144

Monthly Calculations (continued) **SEPTEMBER**

Tank No.		10470						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**2.93**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**3.52**	lb/month	Vapor Space Volume	Vv	441.8	ft3
		1.76E-03	ton/month	Stock Vapor Density	Wv	0.0035	lb/ft3
Time Period		**September**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.063	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1320.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.59**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	167	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0035	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1569	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**11.78**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0627**	**per day**
Diameter	D	**9.77**	ft	Average Daily Vapor Temperature Range	ΔTv	35.76	°R
Throughput	Q	**1,250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**2.23**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1569	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	534.86	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**10.78**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**5.89**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**35.76**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**34.31**	°R
Tank Shell Color (pick from drop down list)		**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	543.80	°R
Not Insulated	P_{VA}	0.1569349		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	525.92	°R
Partially Insulated	P_{VA}	0.1589129					
Fully Insulated	P_{VA}	0.1336491		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 uI	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**526.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	533.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	543.82	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	518.90	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	526.66	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	529.99	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**441.79**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**534.86**	°R	Effective Tank diameter	D_E	9.77	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**535.24**	°R	Effective Tank Height	H_E	11.78	ft
Fully Insulated: TLA = TB	**TLA**	**530.0**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.89	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**538.83**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**540.49**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**529.99**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	3.528E-03					
Partially Insulated	Wv	3.562E-03					
Fully Insulated	Wv	3.055E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.523**

	Vapor Weight Concentration				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$					Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.157	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.157	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.157	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.157	-
ethylbenzene	1.0245	106.17	130	0.29081	0.055882	0.157	**0.35608**
xylenes	2.4984	106.17	130	0.70919	0.136278	0.157	**0.86837**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.157	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.157	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.8022
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.7585
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9097
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5221
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1729
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1512
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0046
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0829

Monthly Calculations (continued) **OCTOBER**

Tank No.		10470						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.61**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.99**	lb/month	Vapor Space Volume	Vv	441.8	ft3
		9.96E-04	ton/month	Stock Vapor Density	Wv	0.0023	lb/ft3
Time Period		**October**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.052	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**948.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.38**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	167	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0023	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0984	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**11.78**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0517**	**per day**
Diameter	D	**9.77**	ft	Average Daily Vapor Temperature Range	ΔTv	29.10	°R
Throughput	Q	**1,250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**2.23**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0984	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	521.00	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**10.78**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**5.89**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**29.10**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**27.57**	°R
Tank Shell Color (pick from drop down list)		**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	528.28	°R
Not Insulated	P_{VA}	0.0983581		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	513.73	°R
Partially Insulated	P_{VA}	0.0993076					
Fully Insulated	P_{VA}	0.0869909		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 uI	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**514.75**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	522.40	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	528.17	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	507.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	514.39	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	517.51	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**441.79**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**521.00**	°R	Effective Tank diameter	D_E	9.77	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**521.28**	°R	Effective Tank Height	H_E	11.78	ft
Fully Insulated: TLA = TB	**TLA**	**517.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.89	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**523.85**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**525.05**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**517.51**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	2.275E-03					
Partially Insulated	Wv	2.291E-03					
Fully Insulated	Wv	2.036E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.992**

	Vapor Weight Concentration				**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$					Eq. 40-6 ZVi = yiMi / MV		Eq. 40-5 yi = Pi / PVA
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.098	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.098	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.098	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.098	-
ethylbenzene	0.5809	106.17	130	0.29162	0.035122	0.098	**0.35708**
xylenes	1.4110	106.17	130	0.70838	0.085313	0.098	**0.86737**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.098	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.098	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.9799
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.2149
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.6195
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.3450
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1087
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0947
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0025
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0503

Monthly Calculations (continued) **NOVEMBER**

Tank No.		10470						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.78**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.03**	lb/month	Vapor Space Volume	Vv	441.8	ft3
		5.17E-04	ton/month	Stock Vapor Density	Wv	0.0015	lb/ft3
Time Period		**November**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.038	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**621.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.26**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	167	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0015	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0650	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**11.78**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0381**	**per day**
Diameter	D	**9.77**	ft	Average Daily Vapor Temperature Range	ΔTv	21.50	°R
Throughput	Q	**1,250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**2.30**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0650	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	509.45	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**10.78**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**5.89**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.5	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**21.50**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**20.15**	°R
Tank Shell Color (pick from drop down list)		**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	514.82	°R
Not Insulated	P_{VA}	0.064996		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	504.07	°R
Partially Insulated	P_{VA}	0.0654304					
Fully Insulated	P_{VA}	0.0597064		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**505.35**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	512.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	514.66	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	498.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	504.59	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	507.16	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**441.79**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**509.45**	°R	Effective Tank diameter	D_E	9.77	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**509.63**	°R	Effective Tank Height	H_E	11.78	ft
Fully Insulated: TLA = TB	**TLA**	**507.2**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.89	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**511.31**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**512.10**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**507.16**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.540E-03					
Partially Insulated	Wv	1.548E-03					
Fully Insulated	Wv	1.426E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.035**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.065	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.065	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.065	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.065	-
ethylbenzene	0.3025	106.17	130	0.29229	0.023262	0.065	**0.35790**
xylenes	0.7323	106.17	130	0.70771	0.056323	0.065	**0.86655**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.065	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.065	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.4562
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.8757
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4409
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2391
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0720
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0625
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0015
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0323

Monthly Calculations (continued) **DECEMBER**

Tank No.		10470						
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.48**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.65**	lb/month	Vapor Space Volume	Vv	441.8	ft3
		3.26E-04	ton/month	Stock Vapor Density	Wv	0.0011	lb/ft3
Time Period		**December**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.033	per day
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**501.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure	P_A	14.69	psi				
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.18**	lb/month
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	167	ft3/month
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0011	lb/ft3
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**					
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0434	psia
				Vapor Space Outage	Hvo	0.00	ft
Tank design data							
Shell height	Hs	**11.78**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0331**	**per day**
Diameter	D	**9.77**	ft	Average Daily Vapor Temperature Range	ΔTv	18.54	°R
Throughput	Q	**1,250**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers	N	**2.23**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0434	psia
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	498.80	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**10.78**	ft				
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)	HL	**5.89**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.6	°R
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.54**	**°R**
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**17.28**	°R
Tank Shell Color (pick from drop down list)		**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)		**Average**					
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	503.44	°R
Not Insulated	P_{VA}	0.0434368		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	494.17	°R
Partially Insulated	P_{VA}	0.0436837					
Fully Insulated	P_{VA}	0.0404123		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 u	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**495.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7	TAX	501.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	503.27	°R
Average daily minimum ambient temperature, Table 7.1-7	TAN	489.20	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	494.63	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	496.96	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**441.79**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**498.80**	°R	Effective Tank diameter	D_E	9.77	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**498.95**	°R	Effective Tank Height	H_E	11.78	ft
Fully Insulated: TLA = TB	**TLA**	**497.0**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.89	ft
Average Vapor Temperature (Tv)							
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**500.31**	**°R**				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**500.94**	**°R**				
Fully Insulated; Tv = TB	**Tv**	**496.96**	**°R**				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)							
Not Insulated	Wv	1.052E-03					
Partially Insulated	Wv	1.056E-03					
Fully Insulated	Wv	9.851E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.652**

		Vapor Weight Concentration			**Vapor Mole Fraction**		
Eq. 40-2 $L_{Ti}=Z_{Vi}(L_T)$		Eq. 40-6 ZVi = yiMi / MV			Eq. 40-5 yi = Pi / PVA		
Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.043	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.043	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.043	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.043	-
ethylbenzene	0.1910	106.17	130	0.29289	0.015578	0.043	**0.35863**
xylenes	0.4611	106.17	130	0.70711	0.037608	0.043	**0.86582**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.043	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.043	**0.00E+00**

	Liquid Mole Fraction				**Component Vapor Pressure**			
	Eq. 40-4 xi = (ZLiML)/Mi				PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.0808
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.6372
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.3168
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1675
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0482
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0417
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0009
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0210

Monthly Calculations - JANUARY

Tank No.		10480		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.34**	lb/month	
		1.71E-04	ton/month	
Time Period		**January**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**560.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**10.60**	ft	
Diameter	D	**7.76**	ft	
Throughput	Q	**800**	gal/month	
Turnovers	N	**2.51**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (PI/4)D if unknown	HLX	**9.60**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**5.30**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**Black**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
	PBV	**-0.03**		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0362278		
Partially Insulated	P_{VA}	0.0364635		
Fully Insulated	P_{VA}	0.033354		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**490.50**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	496.90	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	484.10	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	492.13	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**494.19**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**494.36**	°R	
Fully Insulated: TLA = TB	**TLA**	**492.1**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**495.88**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**496.58**	°R	
Fully Insulated; Tv = TB	**Tv**	**492.13**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	8.851E-04		
Partially Insulated	Wv	8.895E-04		
Fully Insulated	Wv	8.211E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.25**	lb/month
Vapor Space Volume	Vv	250.5	ft3
Stock Vapor Density	Wv	0.0009	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.036	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.09**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	107	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0009	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0362	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0360**	**per day**
Average Daily Vapor Temperature Range	ΔTv	19.82	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0362	psia
Average Daily Liquid Surface Temperature	TLA	494.19	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.8	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**19.82**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**18.54**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	499.15	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	489.24	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	498.99	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	489.72	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**250.49**	ft3
Effective Tank diameter	D_E	7.76	ft
Effective Tank Height	H_E	10.60	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.30	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.342**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$ — Eq. 40-6 ZVi = yiMi / MV — Eq. 40-5 yi = Pi / PVA

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.036	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.036	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.036	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.036	-
ethylbenzene	0.1003	106.17	130	0.29315	0.013004	0.036	**0.35894**
xylenes	0.2419	106.17	130	0.70685	0.031355	0.036	**0.86551**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.036	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.036	**0.00E+00**

Liquid Mole Fraction: Eq. 40-4 xi = (ZLiML)/Mi — Component Vapor Pressure: PVAi=(0.019337)10^(A-(B/(TLA+C)))

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	0.9452
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.5523
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.2731
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1427
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0402
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0348
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0008
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0172

Monthly Calculations (continued) FEBRUARY

Tank No.		10480		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.44**	lb/month	
		2.22E-04	ton/month	
Time Period		**February**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**847.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**10.60**	ft	
Diameter	D	**7.76**	ft	
Throughput	Q	**800**	gal/month	
Turnovers	N	**2.78**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (PI/4)D if unknown	HLX	**9.60**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**5.30**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**Black**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0417464		
Partially Insulated	P_{VA}	0.0421504		
Fully Insulated	P_{VA}	0.0369129		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**492.20**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	498.80	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	485.60	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	494.66	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**497.79**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**498.03**	°R	
Fully Insulated: TLA = TB	**TLA**	**494.7**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**500.33**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**501.40**	°R	
Fully Insulated; Tv = TB	**Tv**	**494.66**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	1.011E-03		
Partially Insulated	Wv	1.018E-03		
Fully Insulated	Wv	9.040E-04		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.34**	lb/month
Vapor Space Volume	Vv	250.5	ft3
Stock Vapor Density	Wv	0.0010	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.047	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	28	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.11**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	107	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0010	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0417	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0475**	**per day**
Average Daily Vapor Temperature Range	ΔTv	25.67	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0417	psia
Average Daily Liquid Surface Temperature	TLA	497.79	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.2	°R
Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**25.67**	**°R**
Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**24.35**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	504.20	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	491.37	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	504.12	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	491.95	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**250.49**	ft3
Effective Tank diameter	D_E	7.76	ft
Effective Tank Height	H_E	10.60	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.30	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.445**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$ — Eq. 40-6 ZVi = yiMi / MV — Eq. 40-5 yi = Pi / PVA

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.042	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.042	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.042	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.042	-
ethylbenzene	0.1303	106.17	130	0.29295	0.014974	0.042	**0.35870**
xylenes	0.3144	106.17	130	0.70705	0.036142	0.042	**0.86575**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.042	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.042	**0.00E+00**

Liquid Mole Fraction: Eq. 40-4 xi = (ZLiML)/Mi — Component Vapor Pressure: PVAi=(0.019337)10^(A-(B/(TLA+C)))

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.0495
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	0.6176
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.3067
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.1618
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0463
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0401
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0008
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0201

Monthly Calculations (continued) **MARCH**

Tank No.		10480							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**	**HAPS Speciation**	**lb/month**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.64**	lb/month	**Product**	additive
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**0.79**	lb/month	Vapor Space Volume	Vv	250.5	ft3	**Total HAP Emissions =**	**0.791**
		3.96E-04	ton/month	Stock Vapor Density	Wv	0.0014	lb/ft3	Eq. 40-2 $L_{Ti} = Z_{vi}(L_T)$	
Time Period		**March**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.060	per day	**Individual HAPS**	**L_{Ti} (lb/month)**
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA	**hexane**	0.0000
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1156.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month	**benzene**	0.0000
Absolute Pressure	P_A	14.69	psi					**2,2,4 TMP**	0.0000
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.15**	lb/month	**toluene**	0.0000
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	107	ft3/month	**ethylbenzene**	0.2314
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000		**xylenes**	0.5599
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00		**naphthalene**	0.0000
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0014	lb/ft3	**cumene**	0.0000
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00			
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**							
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**			
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0583	psia		
				Vapor Space Outage	Hvo	0.00	ft		
Tank design data									
Shell height	Hs	**10.60**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0598**	**per day**		
Diameter	D	**7.76**	ft	Average Daily Vapor Temperature Range	ΔTv	32.37	°R		
Throughput	Q	**800**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi		
Turnovers	N	**2.51**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi		
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0583	psia		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	506.52	°R		
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia		
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**9.60**	ft						
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**					
Liquid height (assume 1/2 H_S)	HL	**5.30**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.2	°R		
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**32.37**	**°R**		
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**30.95**	°R		
Tank Shell Color (pick from drop down list)		**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R		
Tank Shell Condition (pick from drop down list)		**Average**							
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**					
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia		
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	514.62	°R		
Not Insulated	P_{VA}	0.0583131		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	498.43	°R		
Partially Insulated	P_{VA}	0.059051							
Fully Insulated	P_{VA}	0.0496349		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**		
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**498.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia		
Average daily maximum ambient temperature, Table 7.1-7	TAX	506.00	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	514.60	°R		
Average daily minimum ambient temperature, Table 7.1-7	TAN	491.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	499.12	°R		
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	502.26	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**		
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**250.49**	ft3		
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**506.52**	°R	Effective Tank diameter	D_E	7.76	ft		
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**506.86**	°R	Effective Tank Height	H_E	10.60	ft		
Fully Insulated: TLA = TB	**TLA**	**502.3**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.30	ft		
Average Vapor Temperature (Tv)									
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**510.00**	**°R**						
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**511.46**	**°R**						
Fully Insulated; Tv = TB	**Tv**	**502.26**	**°R**						
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)									
Not Insulated	Wv	1.385E-03							
Partially Insulated	Wv	1.399E-03							
Fully Insulated	Wv	1.197E-03							

Vapor Weight Concentration Eq. 40-6 ZVi = yiMi / MV				**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA		
M_i	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**	
86.18	130	0.00000	0.000000	0.058	-	
78.11	130	0.00000	0.000000	0.058	-	
114.23	130	0.00000	0.000000	0.058	-	
92.14	130	0.00000	0.000000	0.058	-	
106.17	130	0.29246	0.020882	0.058	**0.35810**	
106.17	130	0.70754	0.050520	0.058	**0.86635**	
128.17	130	0.00E+00	0.00E+00	0.058	**0.00E+00**	
120.19	130	0.00E+00	0.00E+00	0.058	**0.00E+00**	

Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Z_{Li}	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.3438
0.00000	130	78.11	0.00000	6.906	1211	220.79	0.8038
0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.4033
0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.2173
0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.0646
0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0561
0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0013
0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0287

Monthly Calculations (continued) **APRIL**

Tank No.		10480							
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**	**HAPS Speciation**	**lb/month**
				Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.15**	lb/month	**Product**	additive
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.38**	lb/month	Vapor Space Volume	Vv	250.5	ft3	**Total HAP Emissions =**	**1.378**
		6.89E-04	ton/month	Stock Vapor Density	Wv	0.0021	lb/ft3	Eq. 40-2 $L_{Ti} = Z_{vi}(L_T)$	
Time Period		**April**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.072	per day	**Individual HAPS**	**L_{Ti} (lb/month)**
Nearest US Location		**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA	**hexane**	0.0000
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1490.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month	**benzene**	0.0000
Absolute Pressure	P_A	14.69	psi					**2,2,4 TMP**	0.0000
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.23**	lb/month	**toluene**	0.0000
Product Information				Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	107	ft3/month	**ethylbenzene**	0.4019
Product Type		**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000		**xylenes**	0.9757
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00		**naphthalene**	0.0000
Average organic liquid density	WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0021	lb/ft3	**cumene**	0.0000
Average Reid Vapor Pressure	RVP	**0.00**		Vent Setting Correction Factor	KB	1.00			
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**							
Vapor Pressure Equation Constant A	A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**			
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0916	psia		
				Vapor Space Outage	Hvo	0.00	ft		
Tank design data									
Shell height	Hs	**10.60**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0722**	**per day**		
Diameter	D	**7.76**	ft	Average Daily Vapor Temperature Range	ΔTv	39.62	°R		
Throughput	Q	**800**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi		
Turnovers	N	**2.60**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi		
Roof Type:		**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0916	psia		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	518.98	°R		
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia		
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**9.60**	ft						
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**					
Liquid height (assume 1/2 H_S)	HL	**5.30**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R		
Tank Insulation (pick from drop down list)		**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**39.62**	**°R**		
Tank Construction (pick from drop down list)		**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**38.09**	°R		
Tank Shell Color (pick from drop down list)		**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R		
Tank Shell Condition (pick from drop down list)		**Average**							
Tank Interior Condition (pick from drop down list)		**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**					
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia		
		-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	528.88	°R		
Not Insulated	P_{VA}	0.0916245		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	509.07	°R		
Partially Insulated	P_{VA}	0.0930318							
Fully Insulated	P_{VA}	0.0753251		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**		
				Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**509.15**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia		
Average daily maximum ambient temperature, Table 7.1-7	TAX	516.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	528.93	°R		
Average daily minimum ambient temperature, Table 7.1-7	TAN	501.50	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	509.89	°R		
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	513.49	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**		
Average Daily Liquid Surface Temperature (TLA)				**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**250.49**	ft3		
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**518.98**	°R	Effective Tank diameter	D_E	7.76	ft		
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**519.41**	°R	Effective Tank Height	H_E	10.60	ft		
Fully Insulated: TLA = TB	**TLA**	**513.5**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.30	ft		
Average Vapor Temperature (Tv)									
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**523.46**	**°R**						
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**525.34**	**°R**						
Fully Insulated; Tv = TB	**Tv**	**513.49**	**°R**						
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)									
Not Insulated	Wv	2.120E-03							
Partially Insulated	Wv	2.145E-03							
Fully Insulated	Wv	1.777E-03							

Vapor Weight Concentration Eq. 40-6 ZVi = yiMi / MV				**Vapor Mole Fraction** Eq. 40-5 yi = Pi / PVA		
M_i	**M_V**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**	
86.18	130	0.00000	0.000000	0.092	-	
78.11	130	0.00000	0.000000	0.092	-	
114.23	130	0.00000	0.000000	0.092	-	
92.14	130	0.00000	0.000000	0.092	-	
106.17	130	0.29174	0.032731	0.092	**0.35722**	
106.17	130	0.70826	0.079459	0.092	**0.86723**	
128.17	130	0.00E+00	0.00E+00	0.092	**0.00E+00**	
120.19	130	0.00E+00	0.00E+00	0.092	**0.00E+00**	

Liquid Mole Fraction Eq. 40-4 xi = (ZLiML)/Mi				**Component Vapor Pressure** PVAi=(0.019337)10^(A-(B/(TLA+C)))			
Z_{Li}	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.8784
0.00000	130	78.11	0.00000	6.906	1211	220.79	1.1487
0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.5844
0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.3240
0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1013
0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0882
0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0023
0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0466

Monthly Calculations (continued) **MAY**

Tank No.		10480							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.91**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**2.23**	lb/month	Vapor Space Volume	Vv	250.5	ft3
			1.12E-03	ton/month	Stock Vapor Density	Wv	0.0030	lb/ft3
	Time Period		**May**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.081	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**1750.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	31	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.33**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	107	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0030	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1346	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**10.60**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0806**	**per day**
Diameter		D	**7.76**	ft	Average Daily Vapor Temperature Range	ΔTv	44.94	°R
Throughput		Q	**800**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**2.51**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1346	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	530.19	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**9.60**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**5.30**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.7	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTv = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**44.94**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTv = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**43.37**	°R
Tank Shell Color (pick from drop down list)			**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	541.43	°R
Not Insulated		P_{VA}	0.1345523		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	518.96	°R
Partially Insulated		P_{VA}	0.1368547					
Fully Insulated		P_{VA}	0.1081437		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**518.65**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	526.50	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	541.54	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	510.80	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	519.86	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	523.74	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**250.49**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**530.19**	°R	Effective Tank diameter	D_E	7.76	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**530.70**	°R	Effective Tank Height	H_E	10.60	ft
Fully Insulated: TLA = TB		**TLA**	**523.7**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.30	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**535.46**	°R				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**537.66**	°R				
Fully Insulated; Tv = TB		**Tv**	**523.74**	°R				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	3.044E-03					
Partially Insulated		Wv	3.084E-03					
Fully Insulated		Wv	2.501E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.232**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$

Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0000
ethylbenzene	0.6496
xylenes	1.5821
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration

Eq. 40-6 ZVi = yiMi / MV

M_i	**M_V**	**Z_{Vi}**
86.18	130	0.00000
78.11	130	0.00000
114.23	130	0.00000
92.14	130	0.00000
106.17	130	0.29108
106.17	130	0.70892
128.17	130	0.00E+00
120.19	130	0.00E+00

Vapor Mole Fraction

Eq. 40-5 yi = Pi / PVA

$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.000000	0.135	-
0.000000	0.135	-
0.000000	0.135	-
0.000000	0.135	-
0.047957	0.135	**0.35642**
0.116796	0.135	**0.86803**
0.00E+00	0.135	**0.00E+00**
0.00E+00	0.135	**0.00E+00**

Liquid Mole Fraction

Eq. 40-4 xi = (ZLiML)/Mi

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	130	86.18	0.00000
benzene	0.00000	130	78.11	0.00000
2,2,4 TMP	0.00000	130	114.23	0.00000
toluene	0.00000	130	92.14	0.00000
ethylbenzene	0.26400	130	106.17	0.32326
xylenes	0.73600	130	106.17	0.90120
naphthalene	0.00000	130	128.17	0.00000
cumene	0.00000	130	120.19	0.00000

Component Vapor Pressure

PVAi=(0.019337)10^(A-(B/(TLA+C)))

A	**B**	**C**	**P_{VAi}**
6.878	1171.5	224.37	2.4990
6.906	1211	220.79	1.5567
6.812	1257.8	220.74	0.8015
7.017	1377.6	222.64	0.4555
6.95	1419.3	212.61	0.1484
7.009	1462.3	215.11	0.1296
7.146	1831.6	211.82	0.0038
6.929	1455.8	207.2	0.0703

Monthly Calculations (continued) **JUNE**

Tank No.		10480							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
					Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**2.60**	lb/month
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**3.06**	lb/month	Vapor Space Volume	Vv	250.5	ft3
			1.53E-03	ton/month	Stock Vapor Density	Wv	0.0042	lb/ft3
	Time Period		**June**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.082	per day
Nearest US Location			**Bridgeport, CT**		Vented Vapor Saturation Factor	Ks	1.00	NA
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**1862.0**	Btu/ft^2-day	Constant; Number of Daily Events in a Year	365	30	days/month
Absolute Pressure		P_A	14.69	psi				
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.45**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	107	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0042	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1905	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**10.60**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0821**	**per day**
Diameter		D	**7.76**	ft	Average Daily Vapor Temperature Range	ΔTv	46.62	°R
Throughput		Q	**800**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**2.60**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1905	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	540.88	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**9.60**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**5.30**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.0	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTv = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**46.62**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTv = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**45.12**	°R
Tank Shell Color (pick from drop down list)			**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	552.54	°R
Not Insulated		P_{VA}	0.1905173		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	529.23	°R
Partially Insulated		P_{VA}	0.1938179					
Fully Insulated		P_{VA}	0.1526914		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**528.60**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	536.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	552.70	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	521.10	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	530.14	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	534.02	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**250.49**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**540.88**	°R	Effective Tank diameter	D_E	7.76	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**541.42**	°R	Effective Tank Height	H_E	10.60	ft
Fully Insulated: TLA = TB		**TLA**	**534.0**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.30	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**546.48**	°R				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**548.83**	°R				
Fully Insulated; Tv = TB		**Tv**	**534.02**	°R				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	4.223E-03					
Partially Insulated		Wv	4.278E-03					
Fully Insulated		Wv	3.464E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.056**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$

Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0000
ethylbenzene	0.8876
xylenes	2.1684
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration

Eq. 40-6 ZVi = yiMi / MV

M_i	**M_V**	**Z_{Vi}**
86.18	130	0.00000
78.11	130	0.00000
114.23	130	0.00000
92.14	130	0.00000
106.17	130	0.29045
106.17	130	0.70955
128.17	130	0.00E+00
120.19	130	0.00E+00

Vapor Mole Fraction

Eq. 40-5 yi = Pi / PVA

$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.000000	0.191	-
0.000000	0.191	-
0.000000	0.191	-
0.000000	0.191	-
0.067756	0.191	**0.35564**
0.165523	0.191	**0.86881**
0.00E+00	0.191	**0.00E+00**
0.00E+00	0.191	**0.00E+00**

Liquid Mole Fraction

Eq. 40-4 xi = (ZLiML)/Mi

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	130	86.18	0.00000
benzene	0.00000	130	78.11	0.00000
2,2,4 TMP	0.00000	130	114.23	0.00000
toluene	0.00000	130	92.14	0.00000
ethylbenzene	0.26400	130	106.17	0.32326
xylenes	0.73600	130	106.17	0.90120
naphthalene	0.00000	130	128.17	0.00000
cumene	0.00000	130	120.19	0.00000

Component Vapor Pressure

PVAi=(0.019337)10^(A-(B/(TLA+C)))

A	**B**	**C**	**P_{VAi}**
6.878	1171.5	224.37	3.2376
6.906	1211	220.79	2.0506
6.812	1257.8	220.74	1.0672
7.017	1377.6	222.64	0.6202
6.95	1419.3	212.61	0.2096
7.009	1462.3	215.11	0.1837
7.146	1831.6	211.82	0.0059
6.929	1455.8	207.2	0.1019

Monthly Calculations (continued) **JULY**

Tank No.		10480							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**3.70**	lb/month	**Standing Losses;** Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**3.17**	lb/month
			1.85E-03	ton/month	Vapor Space Volume	Vv	250.5	ft3
	Time Period		**July**		Stock Vapor Density	Wv	0.0050	lb/ft3
Nearest US Location			**Bridgeport, CT**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.082	per day
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**1904.0**	Btu/ft^2-day	Vented Vapor Saturation Factor	Ks	1.00	NA
Absolute Pressure		P_A	14.69	psi	Constant; Number of Daily Events in a Year	365	31	days/month
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.53**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	107	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0050	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.2269	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**10.60**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0819**	**per day**
Diameter		D	**7.76**	ft	Average Daily Vapor Temperature Range	ΔTv	47.02	°R
Throughput		Q	**800**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**2.51**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.2269	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	546.46	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**9.60**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**5.30**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.4	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**47.02**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**45.58**	°R
Tank Shell Color (pick from drop down list)			**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	558.21	°R
Not Insulated		P_{VA}	0.2269004		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	534.70	°R
Partially Insulated		P_{VA}	0.2308187					
Fully Insulated		P_{VA}	0.1819718		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**533.90**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	541.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	558.41	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	526.70	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	535.62	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	539.44	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**250.49**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**546.46**	°R	Effective Tank diameter	D_E	7.76	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**547.01**	°R	Effective Tank Height	H_E	10.60	ft
Fully Insulated: TLA = TB		**TLA**	**539.4**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.30	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**552.18**	°R				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**554.59**	°R				
Fully Insulated; Tv = TB		**Tv**	**539.44**	°R				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	4.978E-03					
Partially Insulated		Wv	5.042E-03					
Fully Insulated		Wv	4.087E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.698**

Eq. 40-2 $L_{Ti} = Z_{vi}(L_T)$

Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0000
ethylbenzene	1.0728
xylenes	2.6251
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration
Eq. 40-6 ZVi = yiMi / MV

M_i	**M_v**	**Z_{Vi}**
86.18	130	0.00000
78.11	130	0.00000
114.23	130	0.00000
92.14	130	0.00000
106.17	130	0.29012
106.17	130	0.70988
128.17	130	0.00E+00
120.19	130	0.00E+00

Vapor Mole Fraction
Eq. 40-5 yi = Pi / PVA

$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.000000	0.227	-
0.000000	0.227	-
0.000000	0.227	-
0.000000	0.227	-
0.080603	0.227	**0.35524**
0.197225	0.227	**0.86922**
0.00E+00	0.227	**0.00E+00**
0.00E+00	0.227	**0.00E+00**

Liquid Mole Fraction
Eq. 40-4 xi = (ZLiML)/Mi

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	130	86.18	0.00000
benzene	0.00000	130	78.11	0.00000
2,2,4 TMP	0.00000	130	114.23	0.00000
toluene	0.00000	130	92.14	0.00000
ethylbenzene	0.26400	130	106.17	0.32326
xylenes	0.73600	130	106.17	0.90120
naphthalene	0.00000	130	128.17	0.00000
cumene	0.00000	130	120.19	0.00000

Component Vapor Pressure
PVAi=(0.019337)10^(A-(B/(TLA+C)))

A	**B**	**C**	**P_{VAi}**
6.878	1171.5	224.37	3.6882
6.906	1211	220.79	2.3554
6.812	1257.8	220.74	1.2325
7.017	1377.6	222.64	0.7245
6.95	1419.3	212.61	0.2493
7.009	1462.3	215.11	0.2188
7.146	1831.6	211.82	0.0074
6.929	1455.8	207.2	0.1228

Monthly Calculations (continued) **AUGUST**

Tank No.		10480							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**3.18**	lb/month	**Standing Losses;** Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**2.68**	lb/month
			1.59E-03	ton/month	Vapor Space Volume	Vv	250.5	ft3
	Time Period		**August**		Stock Vapor Density	Wv	0.0047	lb/ft3
Nearest US Location			**Bridgeport, CT**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.074	per day
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**1685.0**	Btu/ft^2-day	Vented Vapor Saturation Factor	Ks	1.00	NA
Absolute Pressure		P_A	14.69	psi	Constant; Number of Daily Events in a Year	365	31	days/month
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.50**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	107	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0047	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.2123	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**10.60**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0737**	**per day**
Diameter		D	**7.76**	ft	Average Daily Vapor Temperature Range	ΔTv	42.35	°R
Throughput		Q	**800**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**2.51**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.2123	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	544.31	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**9.60**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**5.30**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.8	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTV = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**42.35**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTV = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**40.97**	°R
Tank Shell Color (pick from drop down list)			**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	554.90	°R
Not Insulated		P_{VA}	0.2122647		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	533.73	°R
Partially Insulated		P_{VA}	0.2155379					
Fully Insulated		P_{VA}	0.1743376		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**533.20**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	540.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	555.05	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	526.30	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	534.56	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	538.10	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**250.49**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**544.31**	°R	Effective Tank diameter	D_E	7.76	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**544.80**	°R	Effective Tank Height	H_E	10.60	ft
Fully Insulated: TLA = TB		**TLA**	**538.1**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.30	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**549.38**	°R				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**551.51**	°R				
Fully Insulated; Tv = TB		**Tv**	**538.10**	°R				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	4.681E-03					
Partially Insulated		Wv	4.735E-03					
Fully Insulated		Wv	3.925E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**3.178**

Eq. 40-2 $L_{Ti} = Z_{vi}(L_T)$

Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0000
ethylbenzene	0.9223
xylenes	2.2554
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration
Eq. 40-6 ZVi = yiMi / MV

M_i	**M_v**	**Z_{Vi}**
86.18	130	0.00000
78.11	130	0.00000
114.23	130	0.00000
92.14	130	0.00000
106.17	130	0.29025
106.17	130	0.70975
128.17	130	0.00E+00
120.19	130	0.00E+00

Vapor Mole Fraction
Eq. 40-5 yi = Pi / PVA

$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.000000	0.212	-
0.000000	0.212	-
0.000000	0.212	-
0.000000	0.212	-
0.075437	0.212	**0.35539**
0.184470	0.212	**0.86906**
0.00E+00	0.212	**0.00E+00**
0.00E+00	0.212	**0.00E+00**

Liquid Mole Fraction
Eq. 40-4 xi = (ZLiML)/Mi

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	130	86.18	0.00000
benzene	0.00000	130	78.11	0.00000
2,2,4 TMP	0.00000	130	114.23	0.00000
toluene	0.00000	130	92.14	0.00000
ethylbenzene	0.26400	130	106.17	0.32326
xylenes	0.73600	130	106.17	0.90120
naphthalene	0.00000	130	128.17	0.00000
cumene	0.00000	130	120.19	0.00000

Component Vapor Pressure
PVAi=(0.019337)10^(A-(B/(TLA+C)))

A	**B**	**C**	**P_{VAi}**
6.878	1171.5	224.37	3.5093
6.906	1211	220.79	2.2341
6.812	1257.8	220.74	1.1666
7.017	1377.6	222.64	0.6828
6.95	1419.3	212.61	0.2334
7.009	1462.3	215.11	0.2047
7.146	1831.6	211.82	0.0068
6.929	1455.8	207.2	0.1144

Monthly Calculations (continued) **SEPTEMBER**

Tank No.		10480		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**2.04**	lb/month	
		1.02E-03	ton/month	
Time Period		**September**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**1320.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**10.60**	ft	
Diameter	D	**7.76**	ft	
Throughput	Q	**800**	gal/month	
Turnovers	N	**2.51**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**9.60**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**5.30**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**Black**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.1569349		
Partially Insulated	P_{VA}	0.1589129		
Fully Insulated	P_{VA}	0.1336491		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**526.15**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	533.40	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	518.90	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	529.99	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**534.86**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**535.24**	°R	
Fully Insulated: TLA = TB	**TLA**	**530.0**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**538.83**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**540.49**	°R	
Fully Insulated; Tv = TB	**Tv**	**529.99**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	3.528E-03		
Partially Insulated	Wv	3.562E-03		
Fully Insulated	Wv	3.055E-03		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**1.66**	lb/month
Vapor Space Volume	Vv	250.5	ft3
Stock Vapor Density	Wv	0.0035	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.063	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	30	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.38**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	107	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0035	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1569	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0627**	**per day**
Average Daily Vapor Temperature Range	ΔTv	35.76	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.1569	psia
Average Daily Liquid Surface Temperature	TLA	534.86	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	14.5	°R
Not Insulated - Equation 1-7 (ΔTv = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**35.76**	**°R**
Partially Insulated - Equation 1-8 (ΔTv = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**34.31**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	543.80	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	525.92	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	543.82	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	526.66	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**250.49**	ft3
Effective Tank diameter	D_E	7.76	ft
Effective Tank Height	H_E	10.60	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.30	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**2.040**

Eq. 40-2 $L_{Ti} = Z_{vi}(L_T)$ | Eq. 40-6 ZVi = yiMi / MV | Eq. 40-5 yi = Pi / PVA

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_v**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.157	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.157	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.157	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.157	-
ethylbenzene	0.5934	106.17	130	0.29081	0.055882	0.157	**0.35608**
xylenes	1.4471	106.17	130	0.70919	0.136278	0.157	**0.86837**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.157	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.157	**0.00E+00**

Eq. 40-4 xi = (ZLiML)/Mi | PVAi=(0.019337)10^(A-(B/(TLA+C)))

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	2.8022
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.7585
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.9097
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.5221
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1729
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.1512
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0046
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0829

Monthly Calculations (continued) **OCTOBER**

Tank No.		10480		
ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**	
Total Losses (Eq.1-1: LT = LS+LW)	**LT**	**1.16**	lb/month	
		5.79E-04	ton/month	
Time Period		**October**		
Nearest US Location		**Bridgeport, CT**		
Daily total solar insolation on a horizontal surface; Table 7.1-7	I	**948.0**	Btu/ft^2-day	
Absolute Pressure	P_A	14.69	psi	
Ideal Gas Constant	R	10.73	piai ft3/lb-mole R	
Product Information				
Product Type		**Diesel Additive**		
Vapor Molecular weight	Mv	**130**	Lb/lb-mole	
Average organic liquid density	WL	**6.10**	lb/gal	
Average Reid Vapor Pressure	RVP	**0.00**		
Product factor; 0.4 for crude oils or 1 for other organic liquids	Kc	**1.00**		
Vapor Pressure Equation Constant A	A	**0.00**		
Vapor Pressure Equation Constant B (Table 7.1-2)	B	**0.0**	°R	
Tank design data				
Shell height	Hs	**10.60**	ft	
Diameter	D	**7.76**	ft	
Throughput	Q	**800**	gal/month	
Turnovers	N	**2.51**	per year	
Roof Type:		**0.00**		
Tank Cone Roof Slope (If unknown, use 0.0625)	SR	**0.0625**	ft/ft	
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))	RR	**NA**	ft	
Maximum Filling Height -use (Pi/4)D if unknown	HLX	**9.60**	ft	
Minimum Filling Height (use 0 if unknown)	HLN	**1.00**	ft	
Liquid height (assume 1/2 H_S)	HL	**5.30**	ft	
Tank Insulation (pick from drop down list)		**Not Insulated**		
Tank Construction (pick from drop down list)		**Welded**		
Tank Shell Color (pick from drop down list)		**Black**		
Tank Shell Condition (pick from drop down list)		**Average**		
Tank Interior Condition (pick from drop down list)		**Light Rust**		
Tank paint solar absorptance, dimensionless, Table 7.1-6	α	**0.97**		
Breather Vent Setting Range (Default Assumption: +/- 0.03)	PBP	**0.03**	psi	
		-0.03		
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))				
Not Insulated	P_{VA}	0.0983581		
Partially Insulated	P_{VA}	0.0993076		
Fully Insulated	P_{VA}	0.0869909		
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T	**TAA**	**514.75**	°R	
Average daily maximum ambient temperature, Table 7.1-7	TAX	522.40	°R	
Average daily minimum ambient temperature, Table 7.1-7	TAN	507.10	°R	
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I	TB	517.51	°R	
Average Daily Liquid Surface Temperature (TLA)				
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I	**TLA**	**521.00**	°R	
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*	**TLA**	**521.28**	°R	
Fully Insulated: TLA = TB	**TLA**	**517.5**		
Average Vapor Temperature (Tv)				
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I	**Tv**	**523.85**	°R	
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I	**Tv**	**525.05**	°R	
Fully Insulated; Tv = TB	**Tv**	**517.51**	°R	
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)				
Not Insulated	Wv	2.275E-03		
Partially Insulated	Wv	2.291E-03		
Fully Insulated	Wv	2.036E-03		

ROUTINE EMISSIONS CALCULATIONS	**Symbol**		**Units**
Standing Losses; Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.91**	lb/month
Vapor Space Volume	Vv	250.5	ft3
Stock Vapor Density	Wv	0.0023	lb/ft3
Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.052	per day
Vented Vapor Saturation Factor	Ks	1.00	NA
Constant; Number of Daily Events in a Year	365	31	days/month
Working Losses; Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.24**	lb/month
Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	107	ft3/month
Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Working Loss Product Factor	Kp	1.00	
Stock Vapor Density	Wv	0.0023	lb/ft3
Vent Setting Correction Factor	KB	1.00	
Vented Vapor Saturation Factor; Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0984	psia
Vapor Space Outage	Hvo	0.00	ft
Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA	**KE**	**0.0517**	**per day**
Average Daily Vapor Temperature Range	ΔTv	29.10	°R
Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0984	psia
Average Daily Liquid Surface Temperature	TLA	521.00	°R
Atmospheric Pressure	P_A	14.69	psia
Average Daily Vapor Temperature Range (ΔTv)			
Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	15.3	°R
Not Insulated - Equation 1-7 (ΔTv = 0.7 ΔTA + 0.02 α I)	**ΔTv**	**29.10**	**°R**
Partially Insulated - Equation 1-8 (ΔTv = 0.6 ΔTA + 0.02 αR I)	**ΔTv**	**27.57**	°R
Fully Insulated, constant temperature	**ΔTv**	**0.00**	°R
Average Daily Vapor Pressure Range (ΔPv)			
Not Insulated - Equation 1-9: ΔPV = PVX - PVN	ΔPv	**0.00000**	psia
Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	528.28	°R
Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	513.73	°R
Partially Insulated - Equation 1-9: ΔPV = PVX - PVN	**ΔPv**	**0.00000**	**psia**
Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	528.17	°R
Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	514.39	°R
Fully Insulated (ΔPv = 0)	**ΔPv**	**0.00**	**psia**
Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo	**Vv**	**250.49**	ft3
Effective Tank diameter	D_E	7.76	ft
Effective Tank Height	H_E	10.60	ft
Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.30	ft

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**1.157**

Eq. 40-2 $L_{Ti} = Z_{vi}(L_T)$ | Eq. 40-6 ZVi = yiMi / MV | Eq. 40-5 yi = Pi / PVA

Individual HAPS	**L_{Ti} (lb/month)**	**M_i**	**M_v**	**Z_{Vi}**	**$P_i = P_{VA}(x_i)$**	**P_{VA}**	**y_i**
hexane	0.0000	86.18	130	0.00000	0.000000	0.098	-
benzene	0.0000	78.11	130	0.00000	0.000000	0.098	-
2,2,4 TMP	0.0000	114.23	130	0.00000	0.000000	0.098	-
toluene	0.0000	92.14	130	0.00000	0.000000	0.098	-
ethylbenzene	0.3375	106.17	130	0.29162	0.035122	0.098	**0.35708**
xylenes	0.8197	106.17	130	0.70838	0.085313	0.098	**0.86737**
naphthalene	0.0000	128.17	130	0.00E+00	0.00E+00	0.098	**0.00E+00**
cumene	0.0000	120.19	130	0.00E+00	0.00E+00	0.098	**0.00E+00**

Eq. 40-4 xi = (ZLiML)/Mi | PVAi=(0.019337)10^(A-(B/(TLA+C)))

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**	**A**	**B**	**C**	**P_{VAi}**
hexane	0.00000	130	86.18	0.00000	6.878	1171.5	224.37	1.9799
benzene	0.00000	130	78.11	0.00000	6.906	1211	220.79	1.2149
2,2,4 TMP	0.00000	130	114.23	0.00000	6.812	1257.8	220.74	0.6195
toluene	0.00000	130	92.14	0.00000	7.017	1377.6	222.64	0.3450
ethylbenzene	0.26400	130	106.17	0.32326	6.95	1419.3	212.61	0.1087
xylenes	0.73600	130	106.17	0.90120	7.009	1462.3	215.11	0.0947
naphthalene	0.00000	130	128.17	0.00000	7.146	1831.6	211.82	0.0025
cumene	0.00000	130	120.19	0.00000	6.929	1455.8	207.2	0.0503

Monthly Calculations (continued) **NOVEMBER**

Tank No.		10480							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**0.61**	lb/month	**Standing Losses;** Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.44**	lb/month
			3.03E-04	ton/month	Vapor Space Volume	Vv	250.5	ft3
	Time Period		**November**		Stock Vapor Density	Wv	0.0015	lb/ft3
Nearest US Location			**Bridgeport, CT**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.038	per day
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**621.0**	Btu/ft^2-day	Vented Vapor Saturation Factor	Ks	1.00	NA
Absolute Pressure		P_A	14.69	psi	Constant; Number of Daily Events in a Year	365	30	days/month
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.16**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	107	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0015	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0650	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**10.60**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0381**	**per day**
Diameter		D	**7.76**	ft	Average Daily Vapor Temperature Range	ΔTv	21.50	°R
Throughput		Q	**800**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**2.51**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0650	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	509.45	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**9.60**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**5.30**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	13.5	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTv = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**21.50**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTv = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**20.15**	°R
Tank Shell Color (pick from drop down list)			**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	514.82	°R
Not Insulated		P_{VA}	0.064996		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	504.07	°R
Partially Insulated		P_{VA}	0.0654304					
Fully Insulated		P_{VA}	0.0597064		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**505.35**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	512.10	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	514.66	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	498.60	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	504.59	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	507.16	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**250.49**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**509.45**	°R	Effective Tank diameter	D_E	7.76	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**509.63**	°R	Effective Tank Height	H_E	10.60	ft
Fully Insulated: TLA = TB		**TLA**	**507.2**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.30	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**511.31**	°R				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**512.10**	°R				
Fully Insulated; Tv = TB		**Tv**	**507.16**	°R				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	1.540E-03					
Partially Insulated		Wv	1.548E-03					
Fully Insulated		Wv	1.426E-03					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.606**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$

Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0000
ethylbenzene	0.1770
xylenes	0.4285
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration

Eq. 40-6 ZVi = yiMi / MV

M_i	**M_V**	**Z_{Vi}**
86.18	130	0.00000
78.11	130	0.00000
114.23	130	0.00000
92.14	130	0.00000
106.17	130	0.29229
106.17	130	0.70771
128.17	130	0.00E+00
120.19	130	0.00E+00

Vapor Mole Fraction

Eq. 40-5 yi = Pi / PVA

$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.000000	0.065	-
0.000000	0.065	-
0.000000	0.065	-
0.000000	0.065	-
0.023262	0.065	**0.35790**
0.056323	0.065	**0.86655**
0.00E+00	0.065	**0.00E+00**
0.00E+00	0.065	**0.00E+00**

Liquid Mole Fraction

Eq. 40-4 xi = (ZLiML)/Mi

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	130	86.18	0.00000
benzene	0.00000	130	78.11	0.00000
2,2,4 TMP	0.00000	130	114.23	0.00000
toluene	0.00000	130	92.14	0.00000
ethylbenzene	0.26400	130	106.17	0.32326
xylenes	0.73600	130	106.17	0.90120
naphthalene	0.00000	130	128.17	0.00000
cumene	0.00000	130	120.19	0.00000

Component Vapor Pressure

PVAi=(0.019337)10^(A-(B/(TLA+C)))

A	**B**	**C**	**P_{VAi}**
6.878	1171.5	224.37	1.4562
6.906	1211	220.79	0.8757
6.812	1257.8	220.74	0.4409
7.017	1377.6	222.64	0.2391
6.95	1419.3	212.61	0.0720
7.009	1462.3	215.11	0.0625
7.146	1831.6	211.82	0.0015
6.929	1455.8	207.2	0.0323

Monthly Calculations (continued) **DECEMBER**

Tank No.		10480							
ROUTINE EMISSIONS CALCULATIONS		**Symbol**		**Units**	**ROUTINE EMISSIONS CALCULATIONS**	**Symbol**		**Units**
Total Losses (Eq.1-1: LT = LS+LW)		**LT**	**0.38**	lb/month	**Standing Losses;** Eq.1-2, Ls = 365 (Vv * Wv * KE * Ks)	**Ls**	**0.27**	lb/month
			1.91E-04	ton/month	Vapor Space Volume	Vv	250.5	ft3
	Time Period		**December**		Stock Vapor Density	Wv	0.0011	lb/ft3
Nearest US Location			**Bridgeport, CT**		Vapor Space Expansion Factor (0 < KE <= 1); Eq. 1-5	KE	0.033	per day
Daily total solar insolation on a horizontal surface; Table 7.1-7		I	**501.0**	Btu/ft^2-day	Vented Vapor Saturation Factor	Ks	1.00	NA
Absolute Pressure		P_A	14.69	psi	Constant; Number of Daily Events in a Year	365	31	days/month
Ideal Gas Constant		R	10.73	piai ft3/lb-mole R	**Working Losses;** Eq.1-35, Lw = VQ * KN * Kp * Wv * KB	**Lw**	**0.11**	lb/month
Product Information					Net Working Loss Throughput (Eq. 1-39: VQ=5.614*Q)	VQ	107	ft3/month
Product Type			**Diesel Additive**		Working Loss Turnover Factor Eq 1-35 K_N=(180+N)/6N for N>36, else K_N=	KN	1.0000	
Vapor Molecular weight		Mv	**130**	Lb/lb-mole	Working Loss Product Factor	Kp	1.00	
Average organic liquid density		WL	**6.10**	lb/gal	Stock Vapor Density	Wv	0.0011	lb/ft3
Average Reid Vapor Pressure		RVP	**0.00**		Vent Setting Correction Factor	KB	1.00	
Product factor; 0.4 for crude oils or 1 for other organic liquids		Kc	**1.00**					
Vapor Pressure Equation Constant A		A	**0.00**		**Vented Vapor Saturation Factor;** Eq. 1-21, Ks = 1/(1+0.053*PvA*Hvo)	**Ks**	**1.00**	
Vapor Pressure Equation Constant B (Table 7.1-2)		B	**0.0**	°R	Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0434	psia
					Vapor Space Outage	Hvo	0.00	ft
Tank design data								
Shell height		Hs	**10.60**	ft	**Vapor Space Expansion Factor (Eq. 1-5: (ΔTv/TLA)+[(ΔPv-ΔPB)/(PA-PvA**	**KE**	**0.0331**	**per day**
Diameter		D	**7.76**	ft	Average Daily Vapor Temperature Range	ΔTv	18.54	°R
Throughput		Q	**800**	gal/month	Average Daily Vapor Pressure Range	ΔPv	0.0000	psi
Turnovers		N	**2.51**	per year	Breather Vent Pressure Setting Range (Equation 1-10: ΔPB = PBP - PBV)	ΔPB	0.0600	psi
Roof Type:			**0.00**		Vapor Pressure at Avg Daily Liq Surface Temp	PvA	0.0434	psia
Tank Cone Roof Slope (If unknown, use 0.0625)		SR	**0.0625**	ft/ft	Average Daily Liquid Surface Temperature	TLA	498.80	°R
Dome Roof Radius (If unknown, use tank diameter (D) or (2Rs))		RR	**NA**	ft	Atmospheric Pressure	P_A	14.69	psia
Maximum Filling Height -use (Pi/4)D if unknown		HLX	**9.60**	ft				
Minimum Filling Height (use 0 if unknown)		HLN	**1.00**	ft	**Average Daily Vapor Temperature Range (ΔTv)**			
Liquid height (assume 1/2 H_S)		HL	**5.30**	ft	Average daily ambient temperature range - Equation 1-11 (ΔTA=TAX-TA	ΔTA	12.6	°R
Tank Insulation (pick from drop down list)			**Not Insulated**		**Not Insulated - Equation 1-7 (ΔTv = 0.7 ΔTA + 0.02 α I)**	**ΔTv**	**18.54**	**°R**
Tank Construction (pick from drop down list)			**Welded**		**Partially Insulated - Equation 1-8 (ΔTv = 0.6 ΔTA + 0.02 αR I)**	**ΔTv**	**17.28**	°R
Tank Shell Color (pick from drop down list)			**Black**		**Fully Insulated, constant temperature**	**ΔTv**	**0.00**	°R
Tank Shell Condition (pick from drop down list)			**Average**					
Tank Interior Condition (pick from drop down list)			**Light Rust**		**Average Daily Vapor Pressure Range (ΔPv)**			
Tank paint solar absorptance, dimensionless, Table 7.1-6		α	**0.97**		**Not Insulated - Equation 1-9: ΔPV = PVX - PVN**	ΔPv	**0.00000**	psia
Breather Vent Setting Range (Default Assumption: +/- 0.03)		PBP	**0.03**	psi	Vapor pressure at ave. daily max liquid surface temp, (Eq. 1-25 PVX = ex	PVX	1.00000	psia
			-0.03		Vapor pressure at ave daily min liquid surface temp, (Eq. 1-25 PVN = ex	PVN	1.00000	psia
True Vapor Pressure; Eq. 1-25, PvA = exp(A-(B/TLA))					Average daily max. liquid surface temp.; Fig. 7.1-17 TLX = TLA + 0.25ΔT	TLX	503.44	°R
Not Insulated		P_{VA}	0.0434368		Average daily min. liquid surface temp.; Fig. 7.1-17 TLN = TLA - 0.25ΔTV	TLN	494.17	°R
Partially Insulated		P_{VA}	0.0436837					
Fully Insulated		P_{VA}	0.0404123		**Partially Insulated - Equation 1-9: ΔPV = PVX - PVN**	**ΔPv**	**0.00000**	**psia**
					Vapor pressure at the average daily max liquid surface temp, (Eq. 1-25 us	PVX	1.00000	psia
Average Daily Ambient Temperature (TAA) Eq. 1-30 TAA = ((TAX+T		**TAA**	**495.50**	°R	Vapor pressure at the average daily min liquid surface temp, (Eq. 1-25 us	PVN	1.0000000	psia
Average daily maximum ambient temperature, Table 7.1-7		TAX	501.80	°R	Average daily maximum liquid surface temperature, deg R (TLX = TLA +	TLX	503.27	°R
Average daily minimum ambient temperature, Table 7.1-7		TAN	489.20	°R	Average daily minimum liquid surface temperature, deg R (TLN = TLA - 0	TLN	494.63	°R
Liquid Bulk Temperature; Eq 1-31: TB = TAA + 0.003 αs I		TB	496.96	°R	**Fully Insulated (ΔPv = 0)**	**ΔPv**	**0.00**	**psia**
Average Daily Liquid Surface Temperature (TLA)					**Vapor Space Volume (Eq.1-3: Vv = ((Pi / 4) D^2)Hvo**	**Vv**	**250.49**	ft3
Not Insulated: Eq. 1-28, TLA = 0.4*TAA + 0.6*TB + 0.005*α*I		**TLA**	**498.80**	°R	Effective Tank diameter	D_E	7.76	ft
Partially Insulated: Eq. 1-29, TLA = 0.3*TAA + 0.7*TB + 0.005*αR*		**TLA**	**498.95**	°R	Effective Tank Height	H_E	10.60	ft
Fully Insulated: TLA = TB		**TLA**	**497.0**		Vapor Space Outage Hvo = 1/2 H_S	Hvo	5.30	ft
Average Vapor Temperature (Tv)								
Not Insulated; Eq. 1-33, Tv = 0.7*TAA + 0.3*TB + 0.009*α*I		**Tv**	**500.31**	°R				
Partially Insulated; Eq. 1-34, Tv = 0.6*TAA + 0.4*TB + 0.01*αR*I		**Tv**	**500.94**	°R				
Fully Insulated; Tv = TB		**Tv**	**496.96**	°R				
Stock Vapor Density; Eq. 1-22, Wv = (Mv*PVA)/(R*Tv)								
Not Insulated		Wv	1.052E-03					
Partially Insulated		Wv	1.056E-03					
Fully Insulated		Wv	9.851E-04					

HAPS Speciation	**lb/month**
Product	additive
Total HAP Emissions =	**0.383**

Eq. 40-2 $L_{Ti} = Z_{Vi}(L_T)$

Individual HAPS	**L_{Ti} (lb/month)**
hexane	0.0000
benzene	0.0000
2,2,4 TMP	0.0000
toluene	0.0000
ethylbenzene	0.1121
xylenes	0.2705
naphthalene	0.0000
cumene	0.0000

Vapor Weight Concentration

Eq. 40-6 ZVi = yiMi / MV

M_i	**M_V**	**Z_{Vi}**
86.18	130	0.00000
78.11	130	0.00000
114.23	130	0.00000
92.14	130	0.00000
106.17	130	0.29289
106.17	130	0.70711
128.17	130	0.00E+00
120.19	130	0.00E+00

Vapor Mole Fraction

Eq. 40-5 yi = Pi / PVA

$P_i = P_{VA}(x_i)$	**P_{VA}**	**y_i**
0.000000	0.043	-
0.000000	0.043	-
0.000000	0.043	-
0.000000	0.043	-
0.015578	0.043	**0.35863**
0.037608	0.043	**0.86582**
0.00E+00	0.043	**0.00E+00**
0.00E+00	0.043	**0.00E+00**

Liquid Mole Fraction

Eq. 40-4 xi = (ZLiML)/Mi

Individual HAPS	**Z_{Li}**	**M_L**	**M_i**	**X_i**
hexane	0.00000	130	86.18	0.00000
benzene	0.00000	130	78.11	0.00000
2,2,4 TMP	0.00000	130	114.23	0.00000
toluene	0.00000	130	92.14	0.00000
ethylbenzene	0.26400	130	106.17	0.32326
xylenes	0.73600	130	106.17	0.90120
naphthalene	0.00000	130	128.17	0.00000
cumene	0.00000	130	120.19	0.00000

Component Vapor Pressure

PVAi=(0.019337)10^(A-(B/(TLA+C)))

A	**B**	**C**	**P_{VAi}**
6.878	1171.5	224.37	1.0808
6.906	1211	220.79	0.6372
6.812	1257.8	220.74	0.3168
7.017	1377.6	222.64	0.1675
6.95	1419.3	212.61	0.0482
7.009	1462.3	215.11	0.0417
7.146	1831.6	211.82	0.0009
6.929	1455.8	207.2	0.0210

Attachment C

Upstream GHG Calculations

Upstream GHG Calculations - Before Project

Propane Source

Product	Unit	Gal/yr (Liquid)	MMBTU/yr*
Propane	Flares	17,575	1,599

* MMBTU/yr based on default high heat values from 40 CFR 98 Subpart C Table C-1.

Pollutant	CH4	N2O	CO2	GHG**
Emission Factor (lb/MMBTU)**	0.27	0.0006	38.13	(CH4*84)+(N2O*264)+(CO2*1)
lb/yr	426.635	0.952	60,980.580	97,069.24
tons/yr	0.213	0.0005	30.490	48.535

** Source is Table A1 in Appendix A. Emission Factors for Use by State Agencies and Applicants, converted from g/MMBTU to lb/MMBTU

Upstream GHG Calculations - After Project

Propane Source

Product	Unit	Gal/yr (Liquid)	MMBTU/yr*
Propane	Flares	500	46

* MMBTU/yr based on default high heat values from 40 CFR 98 Subpart C Table C-1.

Pollutant	CH4	N2O	CO2	GHG**
Emission Factor (lb/MMBTU)**	0.27	0.0006	38.13	(CH4*84)+(N2O*264)+(CO2*1)
lb/yr	12.138	0.027	1,734.867	2,761.57
tons/yr	0.006	0.00001	0.867	1.381

** Source is Table A1 in Appendix A. Emission Factors for Use by State Agencies and Applicants, converted from g/MMBTU to lb/MMBTU