Statement of Basis

Permit to Construct No. P-2013.0022
Project ID 61173

Western States Asphalt
Boise, Idaho

Facility ID 001-00049

Final

May 15, 2013
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Permit Writer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

Btu	British thermal units
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
GHG	greenhouse gases
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
hr/yr	hours per consecutive 12 calendar month period
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
m	meters
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NSPS	New Source Performance Standards
PC	permit condition
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTC/T2	permit to construct and Tier II operating permit
PTE	potential to emit
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SM	synthetic minor
SO_2	sulfur dioxide
SO_x	sulfur oxides
T/day	tons per calendar day
T/hr	tons per hour
T/yr	tons per consecutive 12 calendar month period
T2	Tier II operating permit
TAP	toxic air pollutants
U.S.C.	United States Code
VOC	volatile organic compounds
yd^3	cubic yards
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

Western States Asphalt operates an asphalt terminal in Boise (Boise Asphalt Terminal). The facility receives asphalt cement (AC) by truck and railcar and stores the AC in above ground tanks. The AC is shipped out via truck. In addition, asphalt emulsion (AE) and emulsion cutback (EC) is manufactured through the milling of additives such as soaps, tall oil, caustic, hydrochloric acid, and fuel oil along with the asphalt cement. The AE and EC are stored on-site in tanks and eventually shipped out via truck. Table 1 below provides a list of equipment currently in operation at the facility. Steam from the boiler is used to heat the asphalt cement so that it can be pumped. The hot-oil heater is used to keep the contents in various tanks warm so they can be pumped into trucks for shipment. The facility uses several large storage tanks. Sources of fugitive organic vapor emissions at the facility are pumps, valves, and fittings. Sources of fugitive dust emissions are paved and unpaved roads and traffic areas.

Permitting History

This is a permit to contruct (PTC) to convert the existing Tier II operating permit No. T2-2009.0057, issued July 1, 2008, to a facility-wide PTC.

The following information was derived from a review of the permit files available to DEQ. Permit status is noted as active and in effect (A) or superseded (S).

December 4, 2009	T2-2009.0057, Change of ownership from SemMaterials Energy Partners, LLC to Western States Asphalt, Permit status (A, but will become S upon issuance of this permit)
June 30, 2009	T2-2009.0057, Change of ownership from SemMaterials L.P. to SemMaterials Energy Partners, LLC, Permit status (S)
July 1, 2008	T2-2008.0039, Renewal with tank changes and replacement of two Kewanee boilers with one Sellers boiler – owner changed from Koch to SemMaterials, Permit status (S)
March 14, 2003	T2-001-00049, Renewal with the addition of storage tanks, Permit status (S)
April 4, 1997	T2-001-00049, Permit status (S)

Application Scope

This project is to renew the facility's existing Tier II operating permit No. T2-2009.0057, issued July 1, 2008, and to convert the Tier II to a PTC.

Application Chronology

March 28, 2013	DEQ received an application and an application fee.
April 22, 2013	DEQ determined that the application was complete.
April 26, 2013	DEQ made available the draft permit and statement of basis for applicant review.
May 6, 2013	DEQ received the permit processing fee.
May 15, 2013	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Sources	Control Equipment
	Point Sources	
T1	Tank No. 1, Asphalt Cement; 2,121,000 gallons (gal)	Product throughput limits. Sulfa Treat system for odors.
T2	Tank No. 2, Asphalt Cement; 1,071,000 gal	
T3	Tank No. 3, Chemical Storage; 5,300 gal	Product throughput limits.
T4	Tank No. 4, Polymer Modified Asphalt Cement; 105,800 gal	Product throughput limits. Sulfa Treat system for odors.
T5	Tank No. 5, Polymer Modified Asphalt Cement; 105,800 gal	
T6	Tank No. 6, Polymer Modified Asphalt Cement; 105,800 gal	
T7	Tank No. 7, Polymer Modified Asphalt Cement; 105,800 gal	
T8	Tank No. 8, Polymer Modified Asphalt Cement; 50,900 gal	
T9	Tank No. 9, Polymer Modified Asphalt Cement; 105,800 gal	
T10	Tank No. 10, Distillate Oil; 13,500 gal	Product throughput limits.
T11	Tank No. 11, Chemical Storage; 11,800 gal	
T12	Tank No. 12, Chemical Storage; 50,200 gal	Product throughput limits. Sulfa Treat system for odors.
T13	Tank No. 13, Polymer Modified Asphalt Cement; 105,800 gal	
T14	Tank No. 14, Asphalt Emulsion; 47,000 gal	Product throughput limits.
T15	Tank No. 15, Asphalt Emulsion; 50,200 gal	
T16	Tank No. 16, Asphalt Emulsion; 79,400 gal	
T17	Tank No. 17, Asphalt Emulsion; 105,800 gal	
T18	Tank No. 18, Asphalt Emulsion; 50,600 gal	
T19	Tank No. 19, Asphalt Emulsion; 38,100 gal	
T20	Tank No. 20, Asphalt Emulsion; 50,200 gal	
T21	Tank No. 21, Asphalt Emulsion; 66,300 gal	
T22	Tank No. 22, Asphalt Emulsion; 50,200 gal	
T23	Tank No. 23, Asphalt Emulsion; 50,200 gal	
T24	Tank No. 24, Asphalt Emulsion; 50,200 gal	
T25	Tank No. 25, Asphalt Emulsion; 36,100 gal	
T26	Tank No. 26, Asphalt Emulsion; 29,400 gal	
T27	Tank No. 27, Asphalt Cement; 28,600 gal	
T28	Tank No. 28, Distillate Oil; 24,100 gal	
T29	Tank No. 29, Distillate Oil; 21,300 gal	
T30	Tank No. 30, Hydrochloric Acid; 6,500 gal	
T31	Tank No. 31, Tall Oil; 16,900 gal	
T32	Tank No. 32, Chemical Storage; 6,000 gal	
T33	Tank No. 33, Chemical Storage; 6,000 gal	
T34	Tank No. 34, Chemical Storage; 9,100 gal	
T35	Tank No. 35, Chemical Storage; 6,000 gal	
T36	Tank No. 36, Chemical Storage; 10,600 gal	
T37	Tank No. 37, Chemical Storage; 12,100 gal	

Source ID No.	Sources	Control Equipment
T38	Tank No. 38, Asphalt Cement; 4,220,000 gal	Product throughput limits. Sulfa Treat system for odors.
T39	Tank No. 39, Distillate Oil; 13,500 gal	Product throughput limits.
T40	Tank No. 40, Chemical Storage; 21,300 gal	
T41	Tank No. 41, Asphalt Cutback; 16,900 gal	Product throughput limits. Sulfa Treat system for odors.
T42	Tank No. 42, Chemical Storage; 4,100 gal	Product throughput limits.
T43	Tank No. 43, Chemical Storage; 8,800 gal	
T44	Tank No. 44, Chemical Storage; 4,800 gal	
T45	Tank No. 45, Chemical Storage; 8,800 gal	
T46	Tank No. 46, Phosphoric Acid; 6,000 gal	
T47	Tank No. 47, Chemical Storage; 10,500 gal	
T48	Tank No. 48, Polymer Modified Asphalt Cement; 192,500 gal	
T49	Tank No. 49, Asphalt Cement; 1,322,000 gal	Product throughput limits. Sulfa Treat system for odors.
T50	Tank No. 50, Asphalt Cement; 1,322,000 gal	
T51	Tank No. 51, Polymer Modified Asphalt Cement; 51,100 gal	
T52	Tank No. 52, Chemical Storage; 9,953 gal	Product throughput limits.
T53	Tank No. 53, Chemical Storage; 7,520 gal	
H1	Hot Oil Heater, 14.5 MMBtu/hr, natural gas-fired	Fuel throughput limit, no control devices
B3	Boiler, Sellers Model 105E, 17 MMBtu/hr, Serial No. 103787, natural gas-fired	
R1	Reclaim Tank	
PW	2 – Parts washers	
	Emulsion Mill 1	
	Emulsion Mill 2	
	Asphalt reclaim pot	
SH1	Space Heater, 0.08 MMBtu/hr, natural gas-fired	No control device
OH1	Oil Heater, 0.3 MMBtu/hr, propane-fired	
	Waste-oil burner	
	QA/QC lab and associated equipment	
	Process water tank	
Fugitive VOC/Odor Emissions Sources		
	Truck Loading Rack 1; Asphalt Cement Loading Arm	Product throughput limits. Sulfa Treat system for odors.
	Truck Loading Rack 2; Asphalt Cement Loading Arm	
	Truck Loading Rack 3; Asphalt Cutback Loading Arm	
	Truck Loading Rack 4; Asphalt Emulsion Loading Arm	Product throughput limits.
	Truck Loading Rack 5; Asphalt Emulsion Loading Arm	
FUG	Equipment Fugitives (e.g., pumps, valves, flanges, connectors)	No control devices.
RAIL	Railcar Heating	
Fugitive Dust Emissions Sources		
	Equipment used by maintenance crews	Reasonable control of fugitive dust
	Welding and cutting torches	
ROAD	Plant vehicles	

Emissions Inventories

Since this proposed project is for a renewal of the existing T2 permit that is expiring and the conversion of the permit to a PTC, emissions will not change as a result of the issuance of this permit. The emission inventory is included in Appendix A as supplied by the Applicant. Table 2 presents the Potential to Emit for criteria and GHG pollutants from all emissions units at the facility as determined by DEQ staff. Table 2 includes fugitive sources along with point sources. All emission rates and throughput limits in the existing T2 permit are carried over to the PTC with no change in emissions rates as a result of this permitting action.

Table 2 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	PM T/yr[a]	SO_2 T/yr[a]	NO_x T/yr[a]	CO T/yr[a]	VOC T/yr[a]	CO_2e T/yr[a]
Hot Oil Heater (OH1)	0.47	0.04	6.21	5.22	0.34	14797.03
Boiler (B3)	0.55	0.04	7.30	6.13	0.40	
Space Heater (SH1)	0.00	0.00	0.05	0.04	0.00	
Fuel Oil Combustion	0.019	0.67	0.19	0.05	0.002	---
Total from Storage Tanks	---	---	---	---	6.47	---
Reclaim Tank (R1)	---	---	---	---	0.00	---
Truck Loading Fugitives	---	---	---	---	2.79	---
Pipeline Fugitives	---	---	---	---	1.77	---
Railcar	---	---	---	---	0.00	---
Parts Washer	---	---	---	---	1.21	---
Road Fugitives	1.31	---	---	---	---	---
Post Project Totals	**2.35**	**0.75**	**13.75**	**11.44**	**12.98**	**14797.03**

a) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating schedule and annual limits.

Ambient Air Quality Impact Analyses

Emissions will not increase as a result of this permitting action, thus the ambient impact analysis is not required.

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Ada County, which is designated as attainment or unclassifiable for $PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, and Ozone. Refer to 40 CFR 81.313 for additional information.

Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201 .....Permit to Construct Required

The permittee has requested that a PTC be issued to the facility to renew the existing Tier II operating permit that is expiring. Therefore, a permit to construct is required to be issued in accordance with IDAPA 58.01.01.220. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.401 .....Tier II Operating Permit

At the recommendation of Idaho DEQ the applicant did not apply for a Tier II operating permit in accordance with IDAPA 58.01.01.401. Instead the applicant requested, in writing, that the existing/expiring Tier II operating permit be replaced by a PTC to avoid recurring renewals and fees. This request is consistent with current permitting practice. Therefore, the requirements under IDAPA 58.01.01.400-410 do not apply and a PTC will be issued instead.

Visible Emissions (IDAPA 58.01.01.625)

IDAPA 58.01.01.625 ..... Visible Emissions

The sources of PM_{10} emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Condition 2.6.

Standards for New Sources (IDAPA 58.01.01.676)

IDAPA 58.01.01.676 ..... Standards for New Sources

The fuel burning equipment located at this facility, with a maximum rated input of ten (10) million BTU per hour or more, are subject to a particulate matter limitation of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume when combusting gaseous fuels. Fuel-Burning Equipment is defined as any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer. This requirement is assured by Permit Condition 2.9.

Rules for Control of Odors (IDAPA 58.01.01.775)

IDAPA 58.01.01.775 ..... Rules for Control of Odors

Section 776.01 states that no person shall allow, suffer, cause, or permit the emission of odorous gases, liquids, or solids into the atmosphere in such quantities as to cause air pollution. These requirements are assured by Permit Condition 2.3.

Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

IDAPA 58.01.01.301 ..... Requirement to Obtain Tier I Operating Permit

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for PM_{10}, SO_2, NOx, CO, VOC, and HAP or 10 tons per year for any one HAP or 25 tons per year for all HAPs combined as demonstrated for previously issued permits. Therefore, the facility is not a Tier I source in accordance with IDAPA 58.01.01.006 and the requirements of IDAPA 58.01.01.301 do not apply.

PSD Classification (40 CFR 52.21)

40 CFR 52.21 ..... Prevention of Significant Deterioration of Air Quality

The facility is not a major stationary source as defined in 40 CFR 52.21(b)(1), nor is it undergoing any physical change at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary source, that would constitute a major stationary source by itself as defined in 40 CFR 52. Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a), and does not have facility-wide emissions of any criteria pollutant that exceed 250 T/yr.

NSPS Applicability (40 CFR 60)

The facility has a boiler with a rated input capacity of less than or equal to 100 MMBtu/hr and greater than or equal to 10 MMBtu/hr, and it was manufactured after June 9, 1989. The boiler is, therefore, an emission unit subject to the requirements of 40 CFR Subparts A and Dc. The only substantive requirements that apply are monitoring natural gas usage rates and future reporting of changes that may increase emissions. There are no emission rate limits or opacity limits for a natural gas fired boiler with a rated input capacity of 17 MMBtu/hr. Numerous tanks at the facility remain subject to Subpart K, and this is described in the "Summary of the Point Sources" list in the Permitting Technical Memorandum, issued on March 14, 2003 for a previously issued Tier II permit and updated with the issuance of this permit. A copy of this list is included in Appendix B for convenient reference.

NESHAP Applicability (40 CFR 61)

The facility is not subject to any NESHAP requirements in 40 CFR 61.

MACT Applicability (40 CFR 63)

The facility is not subject to any MACT standards in 40 CFR Part 63.

Permit Conditions Review

This section describes the permit conditions for this PTC issued to renew an existing Tier II operating permit. Note that some minor editing may have been done on the existing permit conditions, but the substantive meaning of those conditions has not been changed.

Permit Condition 2.3 (Odors)

The requirements were updated to match the latest version being used in air permit templates.

Permit Condition 2.11 (NSPS 40 CFR 60 Subpart A)

Table 2.1, the summary of the general provisions, was moved from Appendix B in the Tier II OP and inserted under Permit Condition 2.10.

Permit Condition 3.3 (Emission Limits for Storage Tanks)

The VOC emission limits were moved from Appendix A in the Tier II OP to Table 3.1.

Permit Condition 4.3 (Emission Limits for the Sellers Boiler and the Hot-Oil Heater)

The PM_{10} and NO_x emission limits were moved from Appendix A in the Tier II OP to Table 4.1.

Permit Condition 5.3 (Emission Limits for the Loading Racks)

The VOC emission limits were moved from Appendix A in the Tier II OP to Table 5.1.

Permit Condition 6.1

The duty to comply general compliance provision requires that the permittee comply with all of the permit terms and conditions pursuant to Idaho Code §39-101.

Permit Condition 6.2

The maintenance and operation general compliance provision requires that the permittee maintain and operate all treatment and control facilities at the facility in accordance with IDAPA 58.01.01.211.

Permit Condition 6.3

The obligation to comply general compliance provision specifies that no permit condition is intended to relieve or exempt the permittee from compliance with applicable state and federal requirements, in accordance with IDAPA 58.01.01.212.01.

Permit Condition 6.4

The inspection and entry provision requires that the permittee allow DEQ inspection and entry pursuant to Idaho Code §39-108.

Permit Condition 6.5

The permit expiration construction and operation provision specifies that the permit expires if construction has not begun within two years of permit issuance or if construction has been suspended for a year in accordance with IDAPA 58.01.01.211.02.

Permit Condition 6.6

The notification of construction and operation provision requires that the permittee notify DEQ of the dates of construction and operation, in accordance with IDAPA 58.01.01.211.03.

Permit Condition 6.7

The performance testing notification of intent provision requires that the permittee notify DEQ at least 15 days prior to any performance test to provide DEQ the option to have an observer present, in accordance with IDAPA 58.01.01.157.03.

Permit Condition 6.8

The performance test protocol provision requires that any performance testing be conducted in accordance with the procedures of IDAPA 58.01.01.157, and encourages the permittee to submit a protocol to DEQ for approval prior to testing.

Permit Condition 6.9

The performance test report provision requires that the permittee report any performance test results to DEQ within 30 days of completion, in accordance with IDAPA 58.01.01.157.04-05.

Permit Condition 6.10

The monitoring and recordkeeping provision requires that the permittee maintain sufficient records to ensure compliance with permit conditions, in accordance with IDAPA 58.01.01.211.

Permit Condition 6.11

The excess emissions provision requires that the permittee follow the procedures required for excess emissions events, in accordance with IDAPA 58.01.01.130-136.

Permit Condition 6.12

The certification provision requires that a responsible official certify all documents submitted to DEQ, in accordance with IDAPA 58.01.01.123.

Permit Condition 6.13

The false statement provision requires that no person make false statements, representations, or certifications, in accordance with IDAPA 58.01.01.125.

Permit Condition 6.14

The tampering provision requires that no person render inaccurate any required monitoring device or method, in accordance with IDAPA 58.01.01.126.

Permit Condition 6.15

The transferability provision specifies that this permit to construct is transferable, in accordance with the procedures of IDAPA 58.01.01.209.06.

Permit Condition 6.16

The severability provision specifies that permit conditions are severable, in accordance with IDAPA 58.01.01.211.

PUBLIC REVIEW

Public Comment Opportunity

Because this permitting action does not authorize an increase in emissions, an opportunity for public comment period was not required or provided in accordance with IDAPA 58.01.01.209.04 or IDAPA 58.01.01.404.04.

APPENDIX A – EMISSIONS INVENTORIES

WESTERN STATES ASPHALT
SUMMARY OF ESTIMATED EMISSIONS FOR THE BOISE, ID, FACILITY

Source ID (if applicable)

Emisions based on the comprehensive Potential-To-Emit for the facility.

ESTIMATED ANNUAL EMISSIONS

SOURCE	Nitrogen Oxides (tons/yr)	Carbon Monoxide (tons/yr)	Particulate Matter (tons/yr)	Non-methane VOC (tons/yr)	Sulfur Dioxide (tons/yr)	HAPS (tons/yr)
Individual Heating Units:	13.51	11.35	1.03	0.74	0.08	0.26
Hot Oil Heater	*9.27*	*7.22*	*0.47*	*0.54*	*0.07*	*0.12*
Space Heater #2	*3.79*	*3.13*	*0.55*	*0.40*	*0.06*	*0.14*
Space Heater	*0.05*	*0.01*	*0.00*	*0.00*	*0.00*	*0.00*
Fuel Oil Combustion	0.188	0.047	0.019	0.002	0.666	0.006
Total from All Storage Tanks	—	—	—	6.47	—	0.10
Reclaim Tank	—	—	—	0.00	—	0.00
Truck Loading Fugitives	—	—	—	2.79	—	0.05
Pipeline Fugitives	—	—	—	1.77	—	0.03
Railcar	—	—	—	0.00	—	0.00
Parts Washer	—	—	—	1.21	—	—
HCl Tank	—	—	—	—	—	0.01
Road Fugitives	—	—	1.31	—	—	—
PLANT-WIDE ANNUAL TOTALS (tons/yr)	**13.70**	**11.40**	**2.36**	**12.99**	**0.75**	**0.44**

Western States Asphalt
Boise, ID

Estimate Based on a Comprehensive Potential-to-Emit

Timeframe used for Data Entry: (Monthly or Annual)

Comprehensive Potential-to-Emit:	PTE	Units		Logic
Truck Unloading				
AC Trucks Unloaded (tons):	327,934	327,934	tons	Permit Limit (50% of 157,282,436 limit)
Asphalt Extender Unloaded (gal):	2,500,000	2,500,000	gal	Permit Limit
No. 1 Fuel Oil Unloaded (gal):	2,250,000	2,250,000	gal	Permit Limit
No. 2 Diesel Unloaded (gal):	2,250,000	2,250,000	gal	Permit Limit
Naphtha Unloaded (gal):	1,000,000	1,000,000	gal	Permit Limit
Tall Oil Unloaded (gal):	5,000,000	5,000,000	gal	Assume maximum 10% of AE limit is tall oil
HCl Unloaded (gal):	100,000	100,000	gal	Assumed maximum usage of HCl
Railcar Unloading				
AC Railcars Unloaded (tons):	327,934	327,934	tons	Permit Limit (50% of 157,282,436 limit)
Truck Loading				
Asphalt Cement Loaded (tons):	156,375	156,375	tons	50,000,000 gallons (times 0.75)
PMAC Loaded (tons):	52,125	52,125	tons	50,000,000 gallons (times 0.25)
MC Flush Asphalts (tons):	59,250	59,250	tons	15,000,000 gallon cutback limit by permit
Asphalt Emulsions Loaded (gal):	50,000,000	50,000,000	tons	50,000,000 gallon AE limit by permit
Combustion				
Plant-wide Nat. Gas Usage (therms):	2,766,408	2,766,408	Therms	Total Potential based on Unit Sizes
[illegible]	1,270,200	[illegible]	[illegible]	[illegible]
[illegible]	1,489,200	[illegible]	[illegible]	[illegible]
[illegible]	7,008	7,008	[illegible]	[illegible]
Fuel Oil Usage (gal)	18,771	18771.4	gal/yr	Maximum heat input of oil heater, 300,000 btu/hr

Tank Turnovers

Tank ID	Tank Volume (mgal)	% of total Volume	Total Throughput (mgal)	Throughput per Tank (mgal)
Base AC				
1	2120.9	18.10%	157,282	28,474
2	1070.7	9.14%	157,282	14,375
12	50.2	0.43%	157,282	673
38	4219.8	36.02%	157,282	56,652
49	1321.9	11.28%	157,282	17,747
50	1321.9	11.28%	157,282	17,747
Asphalt Emulsions				
14	47.0	6.97%	50,000	3,487
15	50.2	7.44%	50,000	3,721
16	79.4	11.79%	50,000	5,893
17	105.8	15.69%	50,000	7,845
18	50.6	7.51%	50,000	3,753
19	38.1	5.65%	50,000	2,824
20	50.2	7.44%	50,000	3,721
21	66.3	9.83%	50,000	4,917
22	50.2	7.44%	50,000	3,721
23	50.2	7.44%	50,000	3,721
24	50.2	7.44%	50,000	3,721
25	36.1	5.36%	50,000	2,678
Emulsion Base Tanks				
26	29.3	50.65%	5,000	2,532
27	28.6	49.35%	5,000	2,468
PMAC				
4	105.8	15.43%	12,500	1,929
5	105.8	15.43%	12,500	1,929
6	105.8	15.43%	12,500	1,929
7	105.8	15.43%	12,500	1,929
8	50.9	7.43%	12,500	928
9	105.8	15.43%	12,500	1,929
13	105.8	15.43%	12,500	1,929
48	192.5	100.00%	12,500	12,500
51	48.1	100.00%	12,500	12,500
No. 1 Fuel Oil				
28	50.2	100.00%	2,250	2,250
No. 2 Diesel				
39	50.2	100.00%	2,250	2,250
Naphtha				
10	13.5	38.79%	1,000	388
29	21.3	61.21%	1,000	612
Asphalt Extender				
37	12.1	36.17%	2,500	904
40	21.3	63.83%	2,500	1,596
Tall Oil				
31	16.9	100.00%	5,000	5,000
Truck Flush (MC Cutbacks)				
41	16.9	100.00%	na	302

ESTIMATED EMISSIONS FROM STORAGE TANKS

Western States Asphalt

TANK NO.	PRODUCT STORED	COEFFICIENT TO USE	TANK DIAMETER (feet)	TANK HEIGHT (feet)	CALCULATED TANK VOLUME (gallons)	MAXIMUM FILL RATE (gpm)	ACTUAL THROUGHPUT (Mgal/yr)	STANDING LOSSES (lbs/yr)	WORKING LOSSES (lbs/yr)	TOTAL EMISSIONS (lbs/yr)	MAXIMUM HOURLY LOSS (lbs/hr)	Avg. Liq. Surface Temp. (F)	Min. Liq Surface Temp. (F)	Max. Liq. Surface Temp. (F)	Bulk Liq. Temp. (F)
1	Asphalt Cement	AC	96	40	2,128,987	350	20,474	403.2	884.4	[illegible]	0.02	380	360	325	280
2	Asphalt Cement	AC	87.5	40	1,078,750	350	14,276	200.6	164.0	[illegible]	0.02	380	280	320	380
3	Molten Sulfur	na	6	14	6,294	350		na	na	na	na				
4	PMAC	AC	30	30	106,753	350	[illegible]	88.0	166.3	252.3	0.08	380	300	375	360
5	PMAC	AC	30	20	106,753	350	[illegible]	88.0	166.3	[illegible]	0.08	380	300	375	350
6	PMAC	AC	30	20	106,742	350	[illegible]	88.9	166.3	[illegible]	0.08	380	300	375	380
7	PMAC	AC	30	20	106,762	350	[illegible]	88.0	166.3	[illegible]	0.08	380	300	375	350
8	PMAC	AC	19	24	50,902	350	[illegible]	47.7	80.1	123.7	0.05	380	300	375	380
9	PMAC	AC	30	20	106,753	350	[illegible]	88.0	166.3	[illegible]	0.08	380	300	375	380
10	Distillate	DISTILLATE	10	23	13,512	350	[illegible]	1.8	5.8	7.6	0.01	80.8	30	62.8	20.8
11	Antistrip	na	12	14	11,844	350		na	na	[illegible]	na				
12	Hydrolene	EXT	20.7	20	50,188	350	[illegible]	32.4	38.0	[illegible]	0.04	280	250	325	280
13	PMAC	AC	30	20	106,753	350	[illegible]	88.6	166.3	[illegible]	0.08	280	300	371	350
14	Asphalt Emulsion	AE	20	20	47,001	350	[illegible]	107.8	229.1	[illegible]	0.04	180	100	200	180
15	Asphalt Emulsion	AE	20.7	20	50,188	350	[illegible]	114.3	250.2	[illegible]	0.04	180	100	200	180
16	Asphalt Emulsion	AE	29	20	79,432	350	[illegible]	182.0	404.2	[illegible]	0.04	180	100	200	180
17	Asphalt Emulsion	AE	30	20	106,753	350	[illegible]	242.2	608.1	781.3	0.04	180	100	200	160
18	Asphalt Emulsion	AE	21	20	49,583	350	[illegible]	116.3	267.4	[illegible]	0.04	180	100	200	150
19	Asphalt Emulsion	AE	18	20	38,071	350	[illegible]	98.6	183.7	280.2	0.04	180	100	200	160
20	Asphalt Emulsion	AE	20.7	20	50,188	350	2,731	114.3	[illegible]	[illegible]	0.04	180	100	200	180
21	Asphalt Emulsion	AE	24	20	68,279	350	[illegible]	161.5	337.2	[illegible]	0.04	180	100	200	150
22	Asphalt Emulsion	AE	20.7	20	50,186	350	[illegible]	114.3	258.2	[illegible]	0.04	180	100	200	180
23	Asphalt Emulsion	AE	20.7	20	50,188	350	3,721	114.3	258.2	[illegible]	0.04	180	100	200	180
24	Asphalt Emulsion	AE	20.7	20	50,188	350	3,721	114.3	285.2	[illegible]	0.04	180	100	200	160
25	Asphalt Emulsion	AE	16	24	36,037	350	[illegible]	81.3	182.7	[illegible]	0.04	180	100	200	160
26	Asphalt Emulsion	AE	16	19.5	29,339	350	[illegible]	88.8	158.4	[illegible]	0.03	180	100	200	180
27	Asphalt Cement	AC	16	18	26,577	350	2,450	0.2	4.5	[illegible]	0.00	160	100	200	180
28	Distillate	DISTILLATE	16	18	24,066		[illegible]	3.2	18.4	19.7	0.00	80.8	30	62.8	50.9
29	Distillate	DISTILLATE	11	30	21,327		612	2.1	9.3	12.0	0.00	80.8	30	62.8	50.9
30	HCL	na	10	11	8,463		180	0.8	14.8	14.8	na	80.0	30	62.8	50.9
31	Tall oil	AE	12	20	16,920	350	5,600	18.2	161.1	180.2	0.02	80.0	30	62.8	50.8
32	Emulsifier	na	8	16	6,016			na	na	na	na				
33	Emulsifier	na	8	16	6,015			na	na	[illegible]	na				
34	Emulsifier	na	10.5	14	9,065			na	na	na	na				
35	Caustic	na	8	16	6,016			na	na	na	na				
36	Latex	na	10	18	10,575			na	na		na				
37	Antistrip	na	11	17	12,065		804	na	na	na	na				
38	Asphalt Cement	AC	134	40	4,218,783	350	[illegible]	784.2	725.8	[illegible]	0.02	280	260	325	280
39	Distillate	DISTILLATE	12	18	13,536	350	[illegible]	3.1	11.7	14.8	0.00	80.8	30	62.8	50.8
40	Antistrip	na	11	30	21,327	350	[illegible]	na	na	na	na				
41	Track Wash	MC	12	30	16,920	350	302	231.8	418.3	[illegible]	0.03	215	200	330	220
42	MT/Unused	na	8	11	4,136			na	na	na	na				
43	Emulsifier	na	10	15	8,812			na	na	[illegible]	na				
44	Emulsifier	na	10	9	4,772			na	na	na	na				
45	Antistrip	na	10	16	8,812			na	na	na	na				
46	Polyphosphoric Acid	na	8	18	6,016			na	na	na	na				
47	Latex	na	8	25	10,524			na	na	na	na				
48	PMAC	AC	32	32	192,616	350	12,500	182.8	877.7	870.2	0.03	360	300	375	350
49	Asphalt Cement	AC	75.0	40.0	1,321,912	350	17,747	228.7	227.1	[illegible]	0.02	280	280	325	230
50	Asphalt Cement	AC	75.0	40.0	1,321,912	[illegible]	17,747	228.7	227.1	[illegible]	0.02	280	280	325	230
51	PMAC	AC	16.0	32.0	48,136	350	12,500	193.7	988.3	[illegible]	0.03	375	300	450	350

lbs/yr	lbs/hr
12,988	1.73

* Estimated [illegible] Asphalt [illegible] Products [illegible] "Compilation of Air Pollutant Emission Factors" (AP-42) [illegible] 1994, section 12.1, equation 1-1)

KEY

PRODUCT CODES
AC = Asphalt Cement
PMAC = Polymer Modified Asphalt
AE = Asphalt Emulsion
CB or MC = Cutback Asphalts
Chem = Emulsifier Chemicals (i.e. surfactants)
HCl = Hydrochloric Acid
EXT = Asphalt Extender Oil (e.g. re-refined lube oils)

HF Tanks are Horizontal Tanks.

AIR EMISSION ESTIMATIONS

US EPA Formulas from AP-42

Tank Identification	1	2	3	4	5	6	7	8	9	10	11	12
Contents of Tank	AC	AC	na	AC	AC	AC	AC	AC	AC	DISTILLATE	na	E"T
Tank Type (Vertical or Horizontal)	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Heated (Yes or No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Diameter, ft	95.0	67.5	8.0	30.0	30.0	30.0	30.0	19.0	39.0	10.0	12.0	20.7
Effective Diameter, ft	95.0	67.5	8.0	30.0	30.0	30.0	30.0	19.0	38.0	10.0	12.0	20.7
Shell Height or Length, ft	40.0	40.0	14.0	20.0	20.0	20.0	20.0	24.0	20.0	23.0	14.0	20.0
Nominal Capacity, gal	2,121,000	1,071,000	5,300	105,800	105,800	105,800	105,800	50,900	105,800	13,500	11,700	50,200
Geometric Capacity, gal	2,120,937	1,070,750	5,264	105,753	105,753	105,753	105,753	50,902	105,753	13,513	11,844	50,155
Throughput, gallons/yr	2,474,408	14,375,2?	0	1,92?,516	1,928,616	1,928,616	1,928,616	929,307	1,92? ?16	3?,?5?	0	673,346
Average Liquid Height, ft (def. = Shell Height 2)	20.00	20.00	7.00	10.00	10.00	10.00	10.00	12.00	10.00	11.50	7.00	10.00
Maximum Liquid Height, ft (def. = Shell Height)	40.0	40.0	14.0	20.0	20.0	20.0	20.0	24.0	20.0	23.0	14.0	20.0
Roof Type (Cone or Dome)	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone
Tank Roof Cone Slope, ft ft (def. = 0.0625)	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Roof Outage, ft	0.990	0.703	0.083	0.313	0.313	0.313	0.313	0.198	0.313	0.104	0.125	0.215
Vapor Space Outage, ft	20.99	20.70	7.08	10.31	10.31	10.31	10.31	12.20	10.31	11.60	7.13	10.22
Vapor Space Volume, ft^3	148779	74086	356	7289	7289	7289	7289	3458	7289	911	806	3425
Daily Minimum Liquid Temperature, F	250.0	250.0	0.0	300.0	300.0	300.0	300.0	300.0	300.0	39.0	0.0	2.4.0
Daily Maximum Liquid Temperature, F	325.0	325.0	0.0	375.0	375.0	375.0	375.0	375.0	375.0	62.	0.0	325.0
Daily Average Liquid Temperature, F	290.0	290.0	0.0	350.0	350.0	350.0	350.0	350.0	350.0	50.9	0.0	2.4.0
Daily Total Solar Insulation Factor, Btu/ft²/day	1401	1401	1401	1401	1401	1401	1401	1401	1401	1401	1401	1401
Tank Paint Solar Absorbance, dimensionless	0.680	0.680	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170
Daily Vapor Temperature Range, R	80.7	80.7	6.7	60.7	60.7	60.7	60.7	60.7	60.7	23.8	6.7	60.7
Daily Average Liquid Surf. Temperature, F	280.0	280.0	0.0	350.0	350.0	350.0	350.0	350.0	350.0	50.9	0.0	280.0
Daily Minimum Liquid Surf. Temperature, F	250.0	250.0	0.0	300.0	300.0	300.0	300.0	300.0	300.0	39.0	0.0	250.0
Daily Maximum Liquid Surf. Temperature, F	325.0	325.0	0.0	375.0	375.0	375.0	375.0	375.0	375.0	62.8	0.0	325.0
Liquid Bulk Temperature	290.0	290.0	0.0	350.0	350.0	350.0	350.0	350.0	350.0	50.9	0.0	290.0
Type of Substance (Organic or Petroleum)	ORGANIC	ORGANIC	Unknown	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	Unknown	ORGANIC
Vapor Molecular Weight, lb/lbmol	105.0	105.0	UNKNOWN	105.0	105.0	105.0	105.0	105.0	105.0	170.0	UNKNOWN	130.0
Antoine's Coefficient A	75350.0600	75350.0600	UNKNOWN	75350.0600	75350.0600	75350.0600	75350.0600	75350.0600	75350.0600	5.7103	UNKNOWN	4.2409
Antoine's Coefficient B	9.0035	9.0035	UNKNOWN	9.0035	9.0035	9.0035	9.0035	9.0035	9.0035	1498.3920	UNKNOWN	1215.7340
Antoine's Coefficient C	0.0000	0.0000	UNKNOWN	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	225.5520	UNKNOWN	160.4580
Vapor Pressure at Avg. Liq. Surf. Temp., psia	0.00512	0.00512	UNKNOWN	0.03449	0.03449	0.03449	0.03449	0.03449	0.03449	0.00484	UNKNOWN	0.01900
Vapor Pressure at Min. Liquid Surf. Temp., psia	0.0020	0.0020	UNKNOWN	0.0092	0.0092	0.0092	0.0092	0.0092	0.0092	0.0032	UNKNOWN	0.0106
Vapor Pressure at Max. Liquid Surf. Temp., psia	0.0181	0.0181	UNKNOWN	0.0631	0.0631	0.0631	0.0631	0.0631	0.0631	0.0072	UNKNOWN	0.0407
Vapor Density, lb/ft^3	0.00007	0.00007	#VALUE!	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00011	#VALUE!	0.00031
Daily Vapor Pressure range, psi	0.0161	0.0161	#VALUE!	0.0539	0.0539	0.0539	0.0539	0.0539	0.0539	0.0040	#VALUE!	0.0301
Breather Vent Pressure Setting, psig (def. = 0.03)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Breather Vent Vacuum Setting, psig (def. = -0.03)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Breather Vent Pressure Setting Range, psi	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ambient Pressure, psia (def. = 14.7)	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Vapor Space Expansion Factor	0.1103	0.1103	#VALUE!	0.0790	0.0790	0.0790	0.0790	0.0790	0.0790	0.0469	#VALUE!	0.0813
Vented Vapor Saturation Factor	0.994	0.994	#VALUE!	0.981	0.981	0.981	0.981	0.978	0.981	0.997	#VALUE!	0.990
Maximum Fill Rate (gpm)	350	350	350	350	350	350	350	350	350	350	350	350
Annual Turnovers	13.4	13.4	0.0	18.2	18.2	18.2	18.2	18.2	18.2	28.7	0.0	13.5
Turnover Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Working Loss Product Factor (def=1)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Standing Storage Loss, lbs/yr	483.32	280.80	na	85.99	85.99	85.99	85.99	40.66	85.99	1.79	na	32.49
Working Loss, lbs/yr	364.36	183.96	na	166.31	166.31	166.31	166.31	80.05	166.31	5.81	na	39.59
Total Losses, lbs/yr	747.61	384.76	na	252.30	252.30	252.30	252.30	120.71	252.30	7.60	na	72.04
Maximum Hourly Loss, lbs/hr	0.92	0.92	na	0.06	0.06	0.06	0.06	0.06	0.06	0.01	na	0.04
Standing Loss EF, lb/1000 gal capacity	0.19	0.19	na	0.81	0.81	0.81	0.81	0.80	0.81	0.13	na	0.65
Working Loss EF, lb/1000 gal throughput	0.01	0.01	na	0.81	0.81	0.81	0.81	0.80	0.81	0.13	na	0.65
Maximum Loss EF, lb/1000 gal throughput	2.72	2.72	na	9.46	9.46	9.46	9.46	9.46	9.46	1.34	na	7.56

AIR EMISSION ESTIMATIONS
US EPA Formulas from AP-42

Tank Identification	13	14	15	16	17	18	19	20	21	22	23	24
Contents of Tank	AC	AE	AE	AE	AE	AE	AE	AE	AE	AE	AE	AE
Tank Type (Vertical or Horizontal)	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Heated (Yes or No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Diameter, ft	30.0	20.0	20.7	26.0	30.0	20.8	15.0	20.7	23.8	20.7	20.7	20.7
Effective Diameter, ft	30.0	20.0	20.7	26.0	30.0	20.8	18.0	20.7	23.8	20.7	20.7	20.7
Shell Height or Length, ft	30.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Nominal Capacity, gal	105,800	47,000	50,155	79,432	105,753	50,600	37,100	50,200	66,700	50,200	50,200	50,200
Geometric Capacity, gal	105,753	47,001	50,155	79,432	105,753	50,593	38,071	50,155	66,279	50,155	50,155	50,155
Throughput, gallons/yr	1,928,616	2,486,2[illegible]	3,720,671	5,892,605	7,845,[illegible]	3,753,158	2,824,266	3,720,671	4,916,580	3,720,671	3,720,671	3,720,671
Average Liquid Height, ft (def. = Shell Height/2)	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Maximum Liquid Height, ft (def. = Shell Height)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Roof Type (Cone or Dome)	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone
Tank Roof Cone Slope, ft (def. = 0.0625)	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Roof Outage, ft	0.313	0.208	0.215	0.271	0.313	0.216	0.188	0.215	0.247	0.215	0.215	0.215
Vapor Space Outage, ft	10.31	10.21	10.22	10.27	10.31	10.22	10.19	10.22	10.25	10.22	10.22	10.22
Vapor Space Volume, ft^3	7269	3207	3425	5453	7269	3455	2592	3425	4540	3425	3425	3425
Daily Minimum Liquid Temperature, F	300.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Daily Maximum Liquid Temperature, F	375.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Daily Average Liquid Temperature, F	350.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Daily Total Solar Insulation Factor, Btu/ft^2/day	1401	1401	1401	1401	1401	1401	1401	1401	1401	1401	1401	1401
Tank Paint Solar Absorbance, dimensionless	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170
Daily Vapor Temperature Range, R	60.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
Daily Average Liquid Surf. Temperature, F	350.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
Daily Minimum Liquid Surf. Temperature, F	300.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Daily Maximum Liquid Surf. Temperature, F	375.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Liquid Bulk Temperature	350.0	150.0	180.0	180.0	180.0	150.0	180.0	180.0	150.0	150.0	180.0	180.0
Type of Substance (Organic or Petroleum)	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC
Vapor Molecular Weight, lb/lbmol	105.0	112.8	113.8	113.8	113.8	112.8	112.8	113.8	113.8	113.8	113.8	113.8
Antoine's Coefficient A	75350.0600	na	75350.0600	75350.0600	75350.0600	75350.0600	75350.0600	75350.0600	75350.0600	75350.0600	75350.0600	75350.0600
Antoine's Coefficient B	9.0035	na	9.0035	9.0035	9.0035	9.0035	9.0035	9.0035	9.0035	9.0035	9.0035	9.0035
Antoine's Coefficient C	0.0000	na	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vapor Pressure at Avg. Liq. Surf. Temp., psia	0.03449	0.04435	0.04435	0.04435	0.04435	0.04435	0.04435	0.04435	0.04435	0.04435	0.04435	0.04435
Vapor Pressure at Min. Liquid Surf. Temp., psia	0.0092	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067
Vapor Pressure at Max. Liquid Surf. Temp., psia	0.0691	0.0656	0.0656	0.0656	0.0656	0.0656	0.0656	0.0656	0.0656	0.0656	0.0656	0.0656
Vapor Density, lb/ft^3	0.00042	0.00073	0.00073	0.00073	0.00073	0.00073	0.00073	0.00073	0.00073	0.00073	0.00073	0.00073
Daily Vapor Pressure range, psi	0.0539	0.0589	0.0589	0.0589	0.0589	0.0589	0.0589	0.0589	0.0589	0.0589	0.0589	0.0589
Breather Vent Pressure Setting, psig (def. = 0.03)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Breather Vent Vacuum Setting, psig (def. = -0.03)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Breather Vent Pressure Setting Range, psi	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ambient Pressure, psia (def. = 14.7)	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Vapor Space Expansion Factor	0.0790	0.1274	0.1274	0.1274	0.1274	0.1274	0.1274	0.1274	0.1274	0.1274	0.1274	0.1274
Vented Vapor Saturation Factor	0.981	0.977	0.977	0.976	0.976	0.977	0.977	0.977	0.976	0.977	0.977	0.977
Maximum Fill Rate (gpm)	350	350	350	350	350	350	350	350	350	350	350	350
Annual Turnovers	18.2	74.2	74.2	74.2	74.2	74.2	74.2	74.2	74.2	74.2	74.2	74.2
Turnover Factor	1.00	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
Working Loss Product Factor (def.=1)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Standing Storage Loss, lbs/yr	85.99	107.05	114.31	181.99	243.26	114.31	86.64	114.31	151.92	114.31	114.31	114.31
Working Loss, lbs/yr	166.51	239.15	265.19	484.16	538.08	297.42	193.72	265.19	337.23	265.19	265.19	265.19
Total Losses, lbs/yr	252.30	346.20	369.50	666.15	781.34	372.73	253.25	369.50	488.75	369.50	369.50	369.50
Maximum Hourly Loss, lbs/hr	0.06	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Standing Loss EF, lb/1000 gal capacity	0.81	2.28	2.28	2.29	2.30	2.28	2.27	2.28	2.29	2.28	2.28	2.28
Working Loss EF, lb/1000 gal throughput	0.81	2.28	2.28	2.29	2.30	2.28	2.27	2.28	2.29	2.28	2.28	2.28
Maximum Loss EF, lb/1000 gal throughput	9.46	6.09	6.09	6.09	6.09	6.09	6.09	6.09	6.09	6.09	6.09	6.09

AIR EMISSION ESTIMATIONS
(*) EPA Formulas from AP-42*

Tank Identification	25	26	27	28	29	30	31	32	33	34	35	36
Contents of Tank	AE	AE	AC	DISTILLATE	DISTILLATE	na	AE	na	na	na	na	na
Tank Type (Vertical or Horizontal)	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Heated (Yes or No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Diameter, ft	16.0	16.0	16.0	16.0	11.0	10.0	12.0	8.0	8.0	10.5	8.0	10.0
Effective Diameter, ft	16.0	16.0	16.0	16.0	11.0	10.0	12.0	8.0	8.0	10.5	8.0	10.0
Shell Height or Length, ft	24.0	19.5	19.0	16.0	30.0	11.0	20.0	16.0	16.0	14.0	16.0	18.0
Nominal Capacity, gal	36,100	29,300	27,600	21,100	21,300	6,500	16,900	6,000	6,000	9,100	6,000	10,600
Geometric Capacity, gal	36,097	29,329	28,577	24,065	21,327	6,463	16,920	6,016	6,016	9,068	6,016	10,575
Throughput, gallons/yr	2,477,823	2,532,468	2,467,532	2,250,600	612,142	100,000	5,000,000	0	0	0	0	0
Average Liquid Height, ft (def. = Shell Height/2)	12.00	9.75	9.50	8.00	15.00	5.50	10.00	8.00	8.00	7.00	8.00	9.00
Maximum Liquid Height, ft (def. = Shell Height)	24.0	19.5	19.0	16.0	30.0	11.0	20.0	16.0	16.0	14.0	16.0	18.0
Roof Type (Cone or Dome)	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone
Tank Roof Cone Slope, ft/ft (def. = 0.0625)	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Roof Outage, ft	0.167	0.167	0.167	0.167	0.115	0.104	0.125	0.083	0.083	0.109	0.083	0.104
Vapor Space Outage, ft	12.17	9.92	9.67	8.17	15.11	5.60	10.13	8.08	8.08	7.11	8.08	9.10
Vapor Space Volume, ft^3	2446	1994	1944	1642	1436	440	1145	406	406	616	406	715
Daily Minimum Liquid Temperature, F	100.0	100.0	100.0	29.0	39.0	29.0	39.0	0.0	0.0	0.0	0.0	0.0
Daily Maximum Liquid Temperature, F	200.0	200.0	200.0	42.8	62.8	62.8	62.8	0.0	0.0	0.0	0.0	0.0
Daily Average Liquid Temperature, F	150.0	150.0	150.0	50.9	50.9	50.9	50.9	0.0	0.0	0.0	0.0	0.0
Daily Total Solar Insulation Factor, Btu/ft^2/day	1401	1401	1401	1401	1401	1401	1401	1401	1401	1401	1401	1401
Tank Paint Solar Absorbance, dimensionless	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.680	0.680	0.680	0.680	0.680
Daily Vapor Temperature Range, R	78.7	78.7	78.7	23.8	23.8	23.8	23.8	26.7	26.7	26.7	26.7	26.7
Daily Average Liquid Surf. Temperature, F	150.0	150.0	150.0	50.9	50.9	50.9	50.9	0.0	0.0	0.0	0.0	0.0
Daily Minimum Liquid Surf. Temperature, F	100.0	100.0	100.0	39.0	39.0	39.0	39.0	0.0	0.0	0.0	0.0	0.0
Daily Maximum Liquid Surf. Temperature, F	200.0	200.0	200.0	62.8	62.8	62.8	62.8	0.0	0.0	0.0	0.0	0.0
Liquid Bulk Temperature	150.0	150.0	150.0	50.9	50.9	50.9	50.9	0.0	0.0	0.0	0.0	0.0
Type of Substance (Organic or Petroleum)	ORGANIC	ORGANIC	ORGANIC	ORGANIC	ORGANIC	Unknown	ORGANIC	Unknown	Unknown	Unknown	Unknown	Unknown
Vapor Molecular Weight, lb/lbmol	113.5	113.8	105.0	130.0	130.0	UNKNOWN	113.8	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Antoine's Coefficient A	75250.0600	75350.0600	75350.0600	5.7173	5.7173	UNKNOWN	75350.0600	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Antoine's Coefficient B	9.0035	9.0035	9.0035	1458.8920	1458.8920	UNKNOWN	9.0035	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Antoine's Coefficient C	0.0000	0.0000	0.0000	225.5990	225.5990	UNKNOWN	0.0000	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Vapor Pressure at Avg. Liq. Surf. Temp., psia	0.04435	0.04435	0.00016	0.00484	0.00484	UNKNOWN	0.04435	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Vapor Pressure at Min. Liquid Surf. Temp., psia	0.0067	0.0067	0.0000	0.0032	0.0032	UNKNOWN	0.0067	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Vapor Pressure at Max. Liquid Surf. Temp., psia	0.0656	0.0656	0.0004	0.0072	0.0072	UNKNOWN	0.0656	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
Vapor Density, lb/ft^3	0.00073	0.00073	0.00000	0.00011	0.00011	#VALUE!	0.00052	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Daily Vapor Pressure range, psi	0.0589	0.0589	0.0003	0.0040	0.0040	#VALUE!	0.0589	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Breather Vent Pressure Setting, psig (def. = 0.03)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0300	0.0300	0.0300	0.0300	0.0300
Breather Vent Vacuum Setting, psig (def. = -0.03)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0300	-0.0300	-0.0300	-0.0300	-0.0300
Breather Vent Pressure Setting Range, psi	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0600	0.0600	0.0600	0.0600	0.0600
Ambient Pressure, psia (def. = 14.7)	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Vapor Space Expansion Factor	0.1274	0.1274	0.1250	0.0469	0.0469	#VALUE!	0.0511	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Vented Vapor Saturation Factor	0.972	0.977	1.000	0.998	0.996	#VALUE!	0.977	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Maximum Fill Rate (gpm)	350	350	350	0	0	0	350	0	0	0	0	0
Annual Turnovers	74.2	86.3	86.3	93.5	28.7	15.5	295.5	0.0	0.0	0.0	0.0	0.0
Turnover Factor	0.57	0.51	0.51	0.49	1.00	1.00	0.27	1.00	1.00	1.00	1.00	1.00
Working Loss Product Factor (def.=1)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Standing Storage Loss, lb/yr	81.39	66.69	0.33	3.22	2.81	na	19.30	na	na	na	na	na
Working Loss, lb/yr	183.66	156.37	0.52	16.43	9.17	na	161.05	na	na	na	na	na
Total Losses, lb/yr	264.95	223.07	0.73	19.65	11.98	na	180.35	na	na	na	na	na
Maximum Hourly Loss, lbs/hr	0.04	0.03	0.00	0.00	0.00	na	0.02	na	na	na	na	na
Standing Loss EF, lb/1000 gal capacity	2.25	2.27	0.01	0.13	0.13	na	1.14	na	na	na	na	na
Working Loss EF, lb/1000 gal throughput	2.25	2.27	0.01	0.13	0.13	na	1.13	na	na	na	na	na
Maximum Loss EF, lb/1000 gal throughput	6.09	5.48	0.05	#DIV/0!	#DIV/0!	na	2.86	na	na	na	na	na

AIR EMISSION ESTIMATIONS
US EPA Formulas from AP-42

Tank Identification	37	38	39	40	41	42	43	44	45	46	47	48
Contents of Tank	na	JC	DISTILLATE	na	MC	na	na	na	na	na	na	JC
Tank Type (Vertical or Horizontal)	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Heated (Yes or No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Diameter, ft	11.9	134.0	12.0	11.0	12.0	8.0	10.0	9.5	10.0	8.0	8.0	32.0
Effective Diameter, ft	11.0	134.0	12.0	11.0	12.0	8.0	10.0	9.5	10.0	8.0	8.0	32.0
Shell Height or Length, ft	17.0	40.0	16.0	30.0	20.0	11.0	15.0	9.0	15.0	16.0	25.0	32.0
Nominal Capacity, gal	12,100	4,220,000	13,500	21,300	16,900	4,100	3,800	4,500	8,500	6,000	10,500	19,500
Geometric Capacity, gal	12,085	4,219,783	13,536	21,327	16,920	4,136	8,813	4,772	8,813	6,016	10,528	192,518
Throughput, gallons/yr	904,255	56,652,240	2,250,000	1,595,745	301,923	0	0	0	0	0	0	12,500,000
Average Liquid Height, ft (def. = Shell Height/2)	8.50	20.00	8.00	15.00	10.00	5.50	7.50	4.50	7.50	8.00	14.00	16.00
Maximum Liquid Height, ft (def. = Shell Height)	17.0	40.0	16.0	30.0	20.0	11.0	15.0	9.0	15.0	16.0	28.0	32.0
Roof Type (Cone or Dome)	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone	Cone
Tank Roof Cone Slope, ft/ft (def. = 0.0625)	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Roof Outage, ft	0.115	1.396	0.129	0.115	0.125	0.083	0.104	0.099	0.104	0.083	0.083	0.333
Vapor Space Outage, ft	8.61	21.40	8.13	15.11	10.13	5.58	7.60	4.60	7.60	8.08	14.08	16.33
Vapor Space Volume, ft^3	819	301737	919	1436	1145	281	597	326	597	406	708	13136
Daily Minimum Liquid Temperature, F	0.0	250.0	39.0	0.0	200.0	0.0	0.0	0.0	0.0	0.0	0.0	300.0
Daily Maximum Liquid Temperature, F	0.0	325.0	62.5	0.0	230.0	0.0	0.0	0.0	0.0	0.0	0.0	375.0
Daily Average Liquid Temperature, F	0.0	287.0	50.9	0.0	215.0	0.0	0.0	0.0	0.0	0.0	0.0	350.0
Daily Total Solar Insulation Factor, Btu/ft^2/day	1401	1401	1401	1401	1401	1401	1401	1401	1401	1401	1401	1401
Tank Paint Solar Absorbance, dimensionless	0.680	0.680	0.680	0.680	0.680	0.680	0.630	0.680	0.630	0.680	0.680	0.630
Daily Vapor Temperature Range, R	26.7	80.7	43.8	26.7	48.3	26.7	26.7	26.7	26.7	26.7	26.7	80.7
Daily Average Liquid Surf. Temperature, F	0.0	280.0	50.9	0.0	215.0	0.0	0.0	0.0	0.0	0.0	0.0	350.0
Daily Minimum Liquid Surf. Temperature, F	0.0	250.0	39.0	0.0	200.0	0.0	0.0	0.0	0.0	0.0	0.0	300.0
Daily Maximum Liquid Surf. Temperature, F	0.0	325.0	62.8	0.0	230.0	0.0	0.0	0.0	0.0	0.0	0.0	375.0
Liquid Bulk Temperature	0.0	287.0	50.9	0.0	215.0	0.0	0.0	0.0	0.0	0.0	0.0	350.0
Type of Substance (Organic or Petroleum)	Unknown	ORGANIC	ORGANIC	Unknown	ORGANIC	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	ORGANIC
Vapor Molecular Weight, lb/lbmol	UNKNOWN	105.0	130.0	UNKNOWN	130.0	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	105.0
Antoine's Coefficient A	UNKNOWN	75350.0600	5.7473	UNKNOWN	5.3060	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	75350.0600
Antoine's Coefficient B	UNKNOWN	9.0035	1458.8920	UNKNOWN	1133.7910	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	9.0035
Antoine's Coefficient C	UNKNOWN	0.0000	215.5690	UNKNOWN	185.9740	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	0.0000
Vapor Pressure at Avg. Liq. Surf. Temp., psia	UNKNOWN	0.00512	0.00484	UNKNOWN	0.44754	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	0.03549
Vapor Pressure at Min. Liquid Surf. Temp., psia	UNKNOWN	0.0020	0.0032	UNKNOWN	0.3414	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	0.0092
Vapor Pressure at Max. Liquid Surf. Temp., psia	UNKNOWN	0.0181	0.0072	UNKNOWN	0.5778	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	0.0631
Vapor Density, lb/ft^3	#VALUE!	0.00007	0.00011	#VALUE!	0.00804	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.00042
Daily Vapor Pressure range, psi	#VALUE!	0.0161	0.0040	#VALUE!	0.2365	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.0539
Breather Vent Pressure Setting, psig (def. = 0.03)	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300	0.0300
Breather Vent Vacuum Setting, psig (def. = -0.03)	-0.0300	-0.0300	-0.0300	-0.0300	-0.0300	-0.0300	-0.0300	-0.0300	-0.0300	-0.0300	-0.0300	-0.0300
Breather Vent Pressure Setting Range, psi	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600
Ambient Pressure, psia (def. = 14.7)	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Vapor Space Expansion Factor	#VALUE!	0.1058	0.0816	#VALUE!	0.0853	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.0892
Vented Vapor Saturation Factor	#VALUE!	0.994	0.998	#VALUE!	0.806	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.971
Maximum Fill Rate (gpm)	0	350	350	350	350	0	0	0	0	0	0	350
Annual Turnovers	74.8	15.4	166.2	0.35	74.8	17.8	0.0	0.0	0.0	0.0	0.0	64.9
Turnover Factor	0.57	1.00	0.35	0.57	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.63
Working Loss Product Factor (def.=1)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Standing Storage Loss, lb/yr	na	784.22	3.14	na	230.98	na	na	na	na	na	na	193.48
Working Loss, lb/yr	na	724.97	11.78	na	418.33	na	na	na	na	na	na	677.70
Total Losses, lb/yr	na	1,509.19	14.84	na	649.30	na	na	na	na	na	na	871.18
Maximum Hourly Loss, lb/hr	na	8.03	0.00	na	0.63	na	na	na	na	na	na	0.43
Standing Loss EF, lb/1000 gal capacity	na	0.19	0.23	na	13.67	na	na	na	na	na	na	1.00
Working Loss EF, lb/1000 gal throughput	na	0.19	0.23	na	13.65	na	na	na	na	na	na	1.00
Maximum Loss EF, lb/1000 gal throughput	na	2.72	0.46	na	107.31	na	na	na	na	na	na	5.95

AIR EMISSION ESTIMATIONS

US EPA Formulas from AP-42

Tank Identification	49	50	51
Contents of Tank	AC	AC	AC
Tank Type (Vertical or Horizontal)	Vertical	Vertical	Vertical
Heated (Yes or No)	Yes	Yes	Yes
Diameter, ft	75.0	75.0	16.0
Effective Diameter, ft	75.0	75.0	16.0
Shell Height or Length, ft	40.0	40.0	32.0
Nominal Capacity, gal	1,322,000	1,322,000	48,100
Geometric Capacity, gal	1,321,913	1,321,913	48,129
Throughput, gallons/yr	17,747,207	17,747,207	12,500,000
Average Liquid Height, ft (def. = Shell Height/2)	20.00	20.00	16.00
Maximum Liquid Height, ft (def. = Shell Height)	40.0	40.0	32.0
Roof Type (Cone or Dome)	Cone	Cone	Cone
Tank Roof Cone Slope, ft/ft (def. = 0.0625)	0.0625	0.0625	0.0625
Roof Outage, ft	0.781	0.781	0.167
Vapor Space Outage, ft	20.78	20.78	16.17
Vapor Space Volume, ft^3	91809	91809	3251
Daily Minimum Liquid Temperature, F	250.0	250.0	300.0
Daily Maximum Liquid Temperature, F	325.0	325.0	450.0
Daily Average Liquid Temperature, F	280.0	280.0	375.0
Daily Total Solar Insulation Factor, Btu/ft^2/day	1401	1401	1401
Tank Paint Solar Absorbance, dimensionless	0.650	0.650	0.170
Daily Vapor Temperature Range, R	80.7	80.7	114.7
Daily Average Liquid Surf. Temperature, F	280.0	280.0	375.0
Daily Minimum Liquid Surf. Temperature, F	250.0	250.0	300.0
Daily Maximum Liquid Surf. Temperature, F	325.0	325.0	450.0
Liquid Bulk Temperature	280.0	280.0	375.0
Type of Substance (Organic or Petroleum)	ORGANIC	ORGANIC	ORGANIC
Vapor Molecular Weight, lb/lbmol	105.0	105.0	105.0
Antoine's Coefficient A	75350.0600	75350.0600	75350.0600
Antoine's Coefficient B	9.0035	9.0035	9.0035
Antoine's Coefficient C	0.0000	0.0000	0.0000
Vapor Pressure at Avg. Liq. Surf. Temp., psia	0.00512	0.00512	0.06309
Vapor Pressure at Min. Liquid Surf. Temp., psia	0.0020	0.0020	0.0092
Vapor Pressure at Max. Liquid Surf. Temp., psia	0.0181	0.0181	0.3163
Vapor Density, lb/ft^3	0.00007	0.00007	0.00074
Daily Vapor Pressure range, psi	0.0161	0.0161	0.3072
Breather Vent Pressure Setting, psig (def. = 0.03)	0.0300	0.0300	0.0000
Breather Vent Vacuum Setting, psig (def. = -0.03)	-0.0300	-0.0300	0.0000
Breather Vent Pressure Setting Range, psi	0.0600	0.0600	0.0000
Ambient Pressure, psia (def. = 14.7)	13.3	13.3	13.3
Vapor Space Expansion Factor	0.1058	0.1058	0.1606
Vented Vapor Saturation Factor	0.994	0.994	0.949
Maximum Fill Rate (gpm)	350	350	350
Annual Turnovers	13.4	13.4	259.7
Turnover Factor	1.00	1.00	0.25
Working Loss Product Factor (def.=1)	1.00	1.00	1.00
Standing Storage Loss, lbs/yr	238.65	238.65	133.49
Working Loss, lbs/yr	227.11	227.11	556.53
Total Losses, lbs/yr	465.76	465.76	690.02
Maximum Hourly Loss, lbs/hr	0.02	0.02	0.08
Standing Loss EF, lb/1000 gal capacity	0.18	0.18	2.78
Working Loss EF, lb/1000 gal throughput	0.18	0.18	2.78
Maximum Loss EF, lb/1000 gal throughput	2.72	2.72	13.39

RECLAIM VESSEL CALCULATIONS
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I. Basis

The asphalt reclaim vessel is equipped with a removable cover and is used to recycle material. Emissions from the reclaim vessel include both breathing and working losses. The reclaim vessel contains mixtures of various asphalt products and is assumed to have difusivity charachteristics similar to long chain hydrocarbon such as a No. 6 Oil.

Breathing Losses
Breathing losses from reclaim vessel are calculated using the principle of diffusivity. Air blown across the top of the vent induces eddy diffusion, causing evaporation. The following formulas are taken from "Equilibrium Stage Separation Operations in Chemical Engineering" by Henley and Seader, dated 1981. Breathing losses are calculated using the evaporation rate, cross-sectional area of the vent, and the molecular weight of the chemical. The diffusivity is from "Handbook of Transport Property Data", Yaws, Carl. L., Gulf Publishing Company.

$$N_A = \frac{D_{AB} * C * \ln[(1-y_{A0})/(1-y_{AZ})]}{Dz} \qquad y_A = \frac{P_L^*}{P_L} \qquad C = \frac{n}{V} = \frac{P_L^* * MW}{R * T}$$

Where:

N_A: evaporation rate, gmol/cm^2 sec
D_{AB}: diffusivity of chemical (A) into air (B), cm^2/s
C: concentration of chemical at the surface of the liquid, gmol/cm^3
Dz: stagnant air space (distance from liquid to top), cm
y_{A0}: mole fraction of chemical in the vapor at top, 0
y_{AZ}: mole fraction of chemical in the vapor at liquid surface
P_L^*: vapor pressure of pure chemical, psia
P_L: vapor pressure of mixture, psia
n: moles, lbmol
V: volume, ft^3
R: gas constant, 0.0821 atm liter/gmol K
T: absolute temperature of gas, K
MW: molecular weight of gas, lb/lbmol or g/gmol
A: cross sectional area, cm^2

II. Working Losses
Working losses are calculated using the Ideal Gas Law. The total number of moles is calculated using the Ideal Gas Law. Emissions are calculated using the mole fraction of chemical in the vapor calculated above.

$$P_L * V = n * R * T$$
$$n = \frac{P_L * V}{R * T}$$

P_L: pressure, psia
V: volume, ft^3
n: moles, lbmol
R: gas constant, 10.73 psia ft^3/lbmol R
T: temperature, R

III. Inputs

D_{AB} =	0.5 cm^2/s			
Δz =	15.24 cm			
MW =	105 lb/lbmol			
P_L^*:	0.016 psia	(0.0011	atm)	
P_L:	13.7 psia			
T:	411.15 K	(740.13	R)	
A:	18232 cm^2	(5.00	ft diameter,	10 ft. height)
V:	196 ft^3	(1458.73	gal. Capacity)	
Fill Rate:	2,917 gal/hr			
Throughput:	21,900 gal/yr			

RECLAIM VESSEL CALCULATIONS
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IV. Calculation of Breathing Losses

Evaporation Rate

$$y_{Az} = \frac{0.01588 \text{ psia}}{13.7 \text{ psia}}$$

$$y_{Az} = 0.0012$$

$$C = \frac{0.0011 \text{ atm}}{0.0821 \text{ atm lit/gmol K} * 411.15 \text{ K}} * 105 \text{ g/gmol}$$

$$C = 0.0000 \text{ gmol/liter} \quad (1 \text{ liter} = 1000 \text{ cm}^3)$$
$$C = 2.57E\text{-}08 \text{ gmol/cm}^3$$

$$N_A = \frac{0.5 \text{ cm}^2/\text{s} * 2.57E\text{-}08 \text{ gmol/cm}^3 * \ln\left(\frac{(1 - 0)}{(1 - 0.0012)}\right)}{15.24 \text{ cm}}$$

$$N_A = 9.78E\text{-}13 \text{ gmol/cm}^2 \text{ sec}$$

Breathing Losses Short Term Emissions

$$\text{VOC Emissions} = 9.78E\text{-}13 \frac{\text{gmol}}{\text{cm}^2 \text{ sec}} * 18232.22 \text{ cm}^2 * 60 \frac{\text{seconds}}{\text{minutes}} * 0.12\% = \boxed{1.24E\text{-}09 \frac{\text{lb VOC}}{\text{hr}}}$$

Breathing Losses Annual Emissions

$$\text{VOC Emissions} = 1.24E\text{-}09 \frac{\text{lb VOC}}{\text{hr}} * 8760 \frac{\text{hr}}{\text{yr}} * \frac{1 \text{ ton}}{2000 \text{ lb}} * 0.12\% = \boxed{6.30E\text{-}12 \frac{\text{ton VOC}}{\text{yr}}}$$

V. Calculation of Working Losses

Working Losses Short Term Emissions

$$n = \frac{13.7 \text{ psia} * 2,917 \text{ gal/hr} * 0.1337 \text{ scf/gal}}{10.73 \text{ scf psia/lbmol R} * 740 \text{ R}} * 0.12\% = 7.80E\text{-}04 \frac{\text{lbmol}}{\text{hr}}$$

$$y = 0.0012$$

$$\text{VOC Emissions} = 7.80E\text{-}04 \frac{\text{lbmol}}{\text{hr}} * 105 \frac{\text{lb}}{\text{lbmol}} * 0.0012 = \boxed{9.49E\text{-}05 \frac{\text{lb}}{\text{hr}}}$$

Working Losses Annual Emissions

$$n = \frac{13.7 \text{ psia} * 21,900 \text{ gal/yr} * 0.1337 \text{ scf/gal}}{10.73 \text{ scf psia/lbmol R} * 740 \text{ R}} * 0.12\% = 0.0059 \frac{\text{lbmol}}{\text{yr}}$$

$$y = 0.0012$$

$$\text{VOC Emissions} = 0.0059 \frac{\text{lbmol}}{\text{yr}} * 105 \frac{\text{lb}}{\text{lbmol}} * \frac{1 \text{ ton}}{2000 \text{ lb}} * 0.12\% = \boxed{3.56E\text{-}07 \frac{\text{ton}}{\text{yr}}}$$

V. Summary

Emissions	VOC Emission Rate	
	lb/hr	tpy
Breathing	1.24E-09	6.30E-12
Working	9.49E-05	3.56E-07
Total	9.49E-05	3.6E-07

Note: emissions are included with misc. sources on application summary page.

VOC EMISSION CALCULATIONS FOR RAILCAR HEATING

Basis: Using the Ideal Gas Law, PV=nRT, the volume change realized when the product is heated at atmospheric pressure can be used to calculate the mass forced out by the expansion. The calculated mass is adjusted for the vapor pressure of material in the vapor phase.

$$P_L * V = n * R * T$$

Symbol	Description	Value	Units	Formula
P_M =	atm, or operating pressure	13.3	psi	given
P_L =	vapor pressure of pure chemical	0.0159	psi	$P_L = (10^{(-0.05223*A/T)+B)})*0.019337$
MW =	vapor molecular weight	105	lb/lb-mole	given
R =	gas constant	10.726	psi*ft^3/lb-mole	constant
T_2 =	temp of heated prod.	320	degrees F	given
T_1 =	temp of incoming prod.	50.9	degrees F	given
V =	change in volume	calculated	cubic feet	$V = (V_2-V_1)*$density
n=	moles	calculated	moles	$n = P_L*V/R*T$
Y =	mole fraction of chemical in vapor phase	calculated	no units	$Y = P_L/P_M$
m =	VOC mass of pure chemical	calculated	lbs.	$m = P_M*V*MW/(R*T)$
m_L =	VOC mass lost from mixture	calculated	lbs.	$m_L = m * (P_L/P_M)$

2. Operating Data and Calculations

RR cars heated per year =	3,575	Volume of material heated (gallons/yr) =	78,641,218
Calculated RR cars heated/day =	9.8	(calculated using throughput volume)	
Max RR cars heated/day =	14	(based on 14 rail spots and a maximum of 1 switch per day)	
RR Car Nominal Capacity (gal) =	22,000	Change in Volume, V (cubic feet) =	8.32
RR car Shell Capacity (gallons) =	22,118	VOC mass of pure chemical in vapor space, m (lbs/RR car heated) =	1.39
Orig. Vapor Space Vol. (cu.ft.) = (prior to heating)	15.80	VOC mass loss from mix in vapor space, m_L (lbs/RR car heated) =	0.0017
Volume After Heating (cu.ft.) = (at max temp.)	24.13	Pound VOC/yr =	5.93
		Tons VOC/yr =	0.003
		Max. VOC lbs/hr =	0.016

Typical Railcar Dimensions

Diameter:	110	inches
Length:	44.8	feet
Calculated Volume:	22,118	gallons
Nominal Capacity	22,000	gallons

VOC EMISSION CALCULATIONS FOR LOADING RACKS

PRODUCT NAME	Asphalt Cement	PMAC	Asphalt Emulsions	MC Flush Asphalt	
Product Specific Emission Factors:					
Loading Method (Mode of Operation):	Splash	Splash	Splash	Splash	
Saturation factor, S, from AP-42, Table 5.2-1:	1.45	1.45	1.45	1.45	
Temperature of the product being loaded (degrees F):	320	350	200	200	
Antoine's Coefficient A	75350.0600	75350.0600	75350.0600	N/A	
Antoine's Coefficient B	9.0035	9.0035	9.0035	N/A	
Antoine's Coefficient C	0.0000	0.0000	0.0000	N/A	
True vapor pressure of the product being loaded (psia):	0.015880	0.034493	0.000352	0.065618	
Molecular weight of the product vapors (lb / lbmol):	105	105	105	113.75	
Maximum Pump Capacity Load Rate (gpm):	900	900	350	250	
Loading Loss Emission Factor* (lbs / Mgal):	0.039	0.081	0.001	0.204	
Loading Loss Emission Factor (tons / MMgal):	0.019	0.040	0.0005	0.102	
Truck Rack Annual Throughput (MMgal / yr)	37.50	12.50	50.00	15.00	
Uncontrolled VOC emissions (tons / yr):	0.72	0.50	0.03	1.53	
Control Technology Claimed: none	0%	0%	0%	0%	*Estimated Efficiency*
VOC emissions (tons / yr):	0.72	0.50	0.03	1.53	Total 2.78 tons
Maximum Hourly VOC Emission** (lbs/hr):	2.086	4.382	0.021	3.065	6.47 lbs/hr

* Basis of Estimate: AP-42, Section 5.2, Equation (1)

$$L_L = (12.46 * S * M * P) / T$$

L_L = Loading Loss in lbs/1000 gallons
M = Molecular Weight, lbs/lb-Mol
P = Vapor Pressure (psia)
T = Temperature (°R = °F + 460)
S= Saturation Factor (from AP-42, Table 5.2-1)
Splash Loading, 1.45
Submerged Loading, 0.6

** Maximum Hourly VOC Emission is based on the maximum pump rate times the Loading Loss emission factor.

Western States Asphalt
Hazardous Air Pollutant (HAP) Emissions from Asphalt Products

Source Description	TPY	Reference (AP-42 11.1, 12/2000)
Storage		
Asphalt Storage Tank Emissions (VOC)	6.47	See Tank Calculations or Emissions Summary Page
Organic PM10 (from Organic PM10)	0.13	Estimated assuming 2.08% total VOC is PM
Loading and Yard Emissions		
Asphalt Railcar Heating Emissions (VOC)	0.003	See Railcar Heating Emission Calculations or Summary Page
Organic PM10 (from Organic PM10)	6.16782E-05	Estimated assuming 2.08% total VOC is PM
Asphalt Pipeline (Fittings) Emissions (VOC)	1.77	See Fittings Emission Calculations or Emissions Summary Page
Organic PM10 (from Organic PM10)	3.69E-02	Estimated assuming 2.08% total VOC is PM
Asphalt Truck Loading Emissions (VOC)	2.79	See Truck Loading Rack Emission Calculations Page
Organic PM10 (from Organic PM10)	0.06	Estimated assuming 2.08% total VOC is PM
Asphalt Reclaim Vessel (VOC)	3.56299E-07	See Reclaim Vessel Emission Calculations Page
Organic PM10 (from Organic PM10)	7.41103E-09	Estimated assuming 2.08% total VOC is PM
Organic PM10 is estimated assuming that :	2.08%	of total VOC is Organic PM10

Volatile Organic HAPs	Speciation Profile for Loadout and Yard Emissions	Speciation Profile for Asphalt Storage Tank Emissions	HAP Emissions from Storage	HAP Emissions from Railcar Heating	HAP Emissions from Pipeline (Fittings)	HAP Emissions from Truck Loading	HAP Emissions from Reclaim Vessel	Total HAP Emissions from Loading & Yard Emissions	Total HAP Emissions	Total HAP Emissions
	Component/VOC	Component/VOC	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr	tons/yr
Benzene	0.052%	0.032%	4.14	0.00	1.84	2.90	0.00	4.74	8.89	4.44E-03
1,1,1-Trichloroethane	ND	ND							0.00	0.00E+00
2-Butanone	0.049%	0.039%	5.05	0.00	1.74	2.73	0.00	4.47	9.52	4.76E-03
Bromomethane	0.0098%	0.0049%	0.63	0.00	0.34	0.54	0.00	0.88	1.51	7.55E-04
Carbon Disulfide	0.013%	0.016%	2.07	0.00	0.48	0.72	0.00	1.19	3.26	1.63E-03
Chloroethane	0.000%	0.004%	0.52	0.00	0.01	0.01	0.00	0.02	0.54	2.69E-04
Chloromethane	0.015%	0.023%	2.93	0.00	0.53	0.84	0.00	1.37	4.35	2.17E-03
Cumene	0.11%	ND		0.01	3.90	6.13	0.00	10.04	10.04	5.02E-03
Ethylbenzene	0.26%	0.035%	4.92	0.02	9.93	15.61	0.00	25.56	30.47	1.52E-02
Formaldehyde	0.088%	0.85%	59.35	0.01	3.12	4.90	0.00	8.03	97.38	4.87E-02
Isooctane	0.002%	0.000%	0.04	0.00	0.06	0.10	0.00	0.16	0.20	1.02E-04
m-/p-Xylene	0.41%	0.20%	26.90	0.02	14.53	22.85	0.00	37.41	63.31	3.17E-02
Methylene Chloride	ND	0.00027%	0.03						0.03	1.75E-05
MTBE	ND	ND							0.00	0.00E+00
n-Hexane	0.15%	0.10%	12.96	0.01	5.32	8.36	0.00	13.69	26.64	1.33E-02
o-Xylene	0.080%	0.057%	7.38	0.00	2.84	4.46	0.00	7.30	14.68	7.34E-03
Styrene	0.0073%	0.0054%	0.70	0.00	0.26	0.41	0.00	0.67	1.37	6.85E-04
Tetrachloroethene	0.008%	ND		0.00	0.27	0.43	0.00	0.70	0.70	3.51E-04
Toluene	0.21%	0.082%	8.03	0.01	7.44	11.70	0.00	19.16	27.19	1.36E-02
Trichloroethene	ND	ND							0.00	0.00E+00
Trichlorofluoromethane	0.001%	ND		0.00	0.05	0.07	0.00	0.12	0.12	5.83E-05
Polycyclic Aromatic Hydrocarbons (PAH)										
Acenaphthene	0.280%	0.470%	1.27	0.00	0.19	0.30	0.00	0.49	1.76	8.80E-04
Acenaphthylene	0.028%	0.014%	0.04	0.00	0.02	0.03	0.00	0.05	0.09	4.54E-05
Anthracene	0.070%	0.130%	0.35	0.00	0.05	0.08	0.00	0.13	0.48	2.42E-04
Benzo(a)anthracene	0.019%	0.056%	0.16	0.00	0.01	0.02	0.00	0.04	0.19	9.34E-05
Benzo(b)fluoranthene	0.0076%	ND		0.00	0.01	0.01	0.00	0.01	0.01	7.21E-06
Benzo(k)fluoranthene	0.002%	ND		0.00	0.00	0.00	0.00	0.00	0.00	2.09E-06
Benzo(g,h,i)perylene	0.002%	ND		0.00	0.00	0.00	0.00	0.00	0.00	1.80E-06
Benzo(a)pyrene	0.0023%	ND		0.00	0.00	0.00	0.00	0.00	0.00	2.18E-06
Benzo(e)pyrene	0.002%	0.010%	0.03	0.00	0.00	0.00	0.00	0.00	0.03	1.50E-05
Chrysene	0.103%	0.210%	0.57	0.00	0.06	0.12	0.00	0.20	0.76	3.81E-04
Dibenz(a,h)anthracene	0.00037%	ND		0.00	0.00	0.00	0.00	0.00	0.00	3.51E-07
Fluoranthene	0.050%	0.150%	0.40	0.00	0.04	0.06	0.00	0.09	0.50	2.49E-04
Fluorene	0.770%	1.010%	2.72	0.00	0.57	0.89	0.00	1.46	4.18	2.09E-03
Indeno(1,2,3-cd)pyrene	0.00047%	ND		0.00	0.00	0.00	0.00	0.00	0.00	4.46E-07
2-Methylnaphthalene	2.360%	6.270%	14.20	0.00	1.75	2.76	0.00	4.52	18.71	9.36E-03
Naphthalene	1.25%	1.82%	4.90	0.00	0.92	1.45	0.00	2.37	7.27	3.64E-03
Perylene	0.02%	0.03%	0.08	0.00	0.02	0.03	0.00	0.04	0.12	6.13E-05
Phenanthrene	0.81%	1.80%	4.85	0.00	0.80	0.94	0.00	1.54	6.39	3.19E-03
Pyrene	0.15%	0.44%	1.19	0.00	0.11	0.17	0.00	0.28	1.47	7.35E-04
Phenol	1.16%	ND		0.00	0.87	1.37	0.00	2.24	2.24	1.12E-03
ND = Measured data below detection limits.								PAC For TRI Report:	0.21	
Total HAPs from Asphalt Emissions (lb/yr)			195.44	0.10	67.85	91.00	0.00	148.98	344.42	
Total HAPs from Asphalt Emissions (tpy)			0.10	0.00	0.03	0.05	0.00	0.07		0.17

Example Calculation - Volatile Organic HAPs
Benzene Emissions due to Asphalt Storage Emissions:

$E_{b-s} = VOC_s * B_s$ Where,

E_{bs} = Benzene emissions due to asphalt storage emissions
VOC_s = VOC emissions due to asphalt storage = 12.87 ton/yr
B_s = Speciation profile for benzene (storage) = 0.032%

E_{bs} = 12.87 ton/yr * 0.032% * 2,000 lb/ton = 12.84 lb/yr

Example Calculation - Polycyclic Aromatic Hydrocarbons (PAH)
Acenaphthene due to Asphalt Storage
Organic PM10 will be estimated assuming that 2.08% of total VOC is organic PM10

$E_{as} = VOC_s * B_s * \%$ organic PM10 Where,

E_{as} = Acenaphthene emissions due to asphalt storage emissions
VOC_s = VOC emissions due to asphalt storage = 12.87 ton/yr
B_s = Speciation profile for Acenaphthene (storage) = 0.470%
% organic PM10 = 2.08

E_{as} = 12.87 ton/yr * 0.470% * 2.08% * 2,000 lb/ton = 2.98 lb/yr

EMISSION CALCULATIONS FOR NATURAL GAS HEATING UNITS

NATURAL GAS HEATING UNITS

	Boiler	Heater	Space Heater
Unit Name			
Manufacturer	Sellers	American	
Installation Date	2008	2002	
Burner Model #			
Burner Serial #			
Input Burner Size (MMBTU/hr)	17	14.5	0.08
Estimated Percent of Total Load	54%	46%	
Actual Gas Consumption (MMCF)	145.96	124.26	1.00

Fuel Type	Natural Gas
Heat Input (PTE)	31.58 MMBtu/hr
Higher Heating Value of Fuel	1,020 Btu/scf
Maximum Potential Fuel Use	271.2 MMscf/yr
Annual Fuel Usage	271.2 MMscf/yr
Hours of Operation	8,760 hrs/yr

	EMISSION FACTOR	Total Emissions from All Units					Basis of Estimate
	lbs/MMscf	hourly lbs/hour	Daily lbs/day	Monthly lbs/month	Annual tons/year	Annual lbs/year	
Nitrogen Oxides	100	3.0861	74.31	2260.1	13.53	27,122	AP-42, Table 1.4-1 (7/98)
Carbon Monoxide	84	2.6007	62.42	1898.5	11.39	22,782	AP-42, Table 1.4-1 (7/98)
Particulate Matter	7.6	0.2353	5.65	171.8	1.03	2,061	AP-42, Table 1.4-1 (7/98)
Non-methane VOC	5.5	0.1703	4.09	124.3	0.75	1,492	AP-42, Table 1.4-1 (7/98)
Sulfur Dioxide	0.6	0.0186	0.45	13.6	0.08	163	AP-42, Table 1.4-1 (7/98)
Lead	0.0005	0.0000	0.00	0.0	0.00	0	AP-42, Table 1.4-1 (7/98)

	EMISSION FACTOR	Boiler Estimated Combustion Emissions					Basis of Estimate
	lbs/MMscf	hourly lbs/hour	Daily lbs/day	Monthly lbs/month	Annual tons/year	Annual lbs/year	
Nitrogen Oxides	100	1.8687	39.99	1216.3	7.30	14,598	AP-42, Table 1.4-1 (7/98)
Carbon Monoxide	84	1.4000	33.59	1021.7	6.13	12,260	AP-42, Table 1.4-1 (7/98)
Particulate Matter	7.6	0.1267	3.04	92.4	0.55	1,109	AP-42, Table 1.4-1 (7/98)
Non-methane VOC	5.5	0.0917	2.20	66.9	0.40	803	AP-42, Table 1.4-1 (7/98)
Sulfur Dioxide	0.6	0.0100	0.24	7.3	0.04	88	AP-42, Table 1.4-1 (7/98)
Lead	0.0005	0.0000	0.00	0.0	0.00	0	AP-42, Table 1.4-1 (7/98)

	EMISSION FACTOR	Hot Oil Heater Estimated Combustion Emissions					Basis of Estimate
	lbs/MMscf	hourly lbs/hour	Daily lbs/day	Monthly lbs/month	Annual tons/year	Annual lbs/year	
Nitrogen Oxides	100	1.4216	34.04	1035.5	6.21	12,426	AP-42, Table 1.4-1 (7/98)
Carbon Monoxide	84	1.1941	28.60	869.8	5.22	10,438	AP-42, Table 1.4-1 (7/98)
Particulate Matter	7.6	0.1080	2.59	78.7	0.47	944	AP-42, Table 1.4-1 (7/98)
Non-methane VOC	5.5	0.0782	1.87	57.0	0.34	683	AP-42, Table 1.4-1 (7/98)
Sulfur Dioxide	0.6	0.0085	0.20	6.2	0.04	75	AP-42, Table 1.4-1 (7/98)
Lead	0.0005	0.0000	0.00	0.0	0.00	0	AP-42, Table 1.4-1 (7/98)

	EMISSION FACTOR	Space Heater Estimated Combustion Emissions					Basis of Estimate
	lbs/MMscf	hourly lbs/hour	Daily lbs/day	Monthly lbs/month	Annual tons/year	Annual lbs/year	
Nitrogen Oxides	100	0.0078	0.27	8.3	0.05	100	AP-42, Table 1.4-1 (7/98)
Carbon Monoxide	84	0.0066	0.23	7.0	0.04	84	AP-42, Table 1.4-1 (7/98)
Particulate Matter	7.6	0.0006	0.02	0.6	0.00	8	AP-42, Table 1.4-1 (7/98)
Non-methane VOC	5.5	0.0004	0.02	0.5	0.00	6	AP-42, Table 1.4-1 (7/98)
Sulfur Dioxide	0.6	0.0000	0.00	0.1	0.00	1	AP-42, Table 1.4-1 (7/98)
Lead	0.0005	0.0000	0.00	0.0	0.00	0	AP-42, Table 1.4-1 (7/98)

Explanation of Calculation Methodology

Example of Calculation:

Maximum Emission Rate (lbs/hr)= (Emission Factor, lbs/MMscf) x (Heat Input, MMBtu/hr) / (Heating Value, Btu/scf)
Annual Pollutant Emission (tons/yr)= (Emission Factor, lbs/MMscf) x (Fuel Consumption, MMscf) / 2000

Western States Asphalt
HAP Emissions from Natural Gas Combustion

Operational Data

145.96 MMscf natural gas usage for Boiler
124.26 MMscf natural gas usage for Heater
1.00 MMscf natural gas usage for Space Heater
271.22 Total MMscf natural gas usage

Pollutant	NG Emission Factor (lb/MMscf)[1]	NG Emission Factor (lb/MMBtu)[1]	Boiler Natural Gas Emissions (lb/yr)	Heater Natural Gas Emissions (lb/yr)	Space Heater Natural Gas Emissions (lb/yr)	Total HAP Emissions (lb/yr)	Total HAP Emissions (tpy)
1,1,1 Trichloroethane	2.40E-05	2.35E-08	3.50E-03	2.98E-03	2.40E-05	6.51E-03	3.25E-06
2-Methylnaphtalene	1.80E-06	1.76E-09	2.63E-04	2.24E-04	1.80E-06	4.88E-04	2.44E-07
3-Methylchloranthrene	1.60E-05	1.57E-08	2.34E-03	1.99E-03	1.60E-05	4.34E-03	2.17E-06
7,12-Dimethylbena(a)anthracene	1.80E-06	1.76E-09	2.63E-04	2.24E-04	1.80E-06	4.88E-04	2.44E-07
Acenapthene	1.80E-06	1.76E-09	2.63E-04	2.24E-04	1.80E-06	4.88E-04	2.44E-07
Acenapthylene	2.40E-06	2.35E-09	3.50E-04	2.98E-04	2.40E-06	6.51E-04	3.25E-07
Anthracene	2.00E-04	1.96E-07	2.92E-02	2.49E-02	2.00E-04	5.42E-02	2.71E-05
Arsenic	2.10E-03	2.06E-06	3.07E-01	2.61E-01	2.10E-03	5.70E-01	2.85E-04
Benzene	1.80E-06	1.76E-09	2.63E-04	2.24E-04	1.80E-06	4.88E-04	2.44E-07
Benzo(a)anthracene	1.20E-06	1.18E-09	1.75E-04	1.49E-04	1.20E-06	3.25E-04	1.63E-07
Benzo(a)pyrene	1.80E-06	1.76E-09	2.63E-04	2.24E-04	1.80E-06	4.88E-04	2.44E-07
Benzo(b)fluoranthene	1.20E-06	1.18E-09	1.75E-04	1.49E-04	1.20E-06	3.25E-04	1.63E-07
Benzo(g,h,I)perylene	1.80E-06	1.76E-09	2.63E-04	2.24E-04	1.80E-06	4.88E-04	2.44E-07
Benzo(k)fluoranthene	1.20E-05	1.18E-08	1.75E-03	1.49E-03	1.20E-05	3.25E-03	1.63E-06
Beryllium	1.10E-03	1.08E-06	1.61E-01	1.37E-01	1.10E-03	2.98E-01	1.49E-04
Cadmium	1.40E-03	1.37E-06	2.04E-01	1.74E-01	1.40E-03	3.80E-01	1.90E-04
Chromium	1.80E-06	1.76E-09	2.63E-04	2.24E-04	1.80E-06	4.88E-04	2.44E-07
Chrysene	8.40E-05	8.24E-08	1.23E-02	1.04E-02	8.40E-05	2.28E-02	1.14E-05
Cobalt	1.20E-06	1.18E-09	1.75E-04	1.49E-04	1.20E-06	3.25E-04	1.63E-07
Copper	1.20E-03	1.18E-06	1.75E-01	1.49E-01	1.20E-03	3.25E-01	1.63E-04
Dibenzo(a,h)anthracene	3.00E-06	2.94E-09	4.38E-04	3.73E-04	3.00E-06	8.14E-04	4.07E-07
Dichlorobenzene	2.80E-06	2.75E-09	4.09E-04	3.48E-04	2.80E-06	7.59E-04	3.80E-07
Ethylbenzene	7.50E-02	7.35E-05	1.09E+01	9.32E+00	7.50E-02	2.03E+01	1.02E-02
Fluoranthene	1.80E+00	1.76E-03	2.63E+02	2.24E+02	1.80E+00	4.88E+02	2.44E-01
Fluorene	1.80E-06	1.76E-09	2.63E-04	2.24E-04	1.80E-06	4.88E-04	2.44E-07
Formaldehyde	5.00E-04	4.90E-07	7.30E-02	6.21E-02	5.00E-04	1.36E-01	6.78E-05
Hexane	3.80E-04	3.73E-07	5.55E-02	4.72E-02	3.80E-04	1.03E-01	5.15E-05
Indo(1,2,3-cd)pyrene	2.60E-04	2.55E-07	3.79E-02	3.23E-02	2.60E-04	7.05E-02	3.53E-05
Lead	6.10E-04	5.98E-07	8.90E-02	7.58E-02	6.10E-04	1.65E-01	8.27E-05
Manganese	2.10E-03	2.06E-06	3.07E-01	2.61E-01	2.10E-03	5.70E-01	2.85E-04
Mercury							
Naphthalene	1.70E-05	1.67E-08	2.48E-03	2.11E-03	1.70E-05	4.59E-03	2.30E-06
Nickel	5.00E-06	4.90E-09	7.30E-04	6.21E-04	5.00E-06	1.35E-03	6.78E-07
OCDD	2.40E-05	2.35E-08	3.50E-03	2.98E-03	2.40E-05	6.49E-03	3.24E-06
o-Xylene	3.40E-03	3.33E-06	4.96E-01	4.22E-01	3.40E-03	9.19E-01	4.59E-04
Phenanthrene							
Pyrene							
Selenium							
Toluene							
Zinc							
			0.14	0.12	0.00		
				Total		512.18	0.26

[1] AP-42, Section 1.4, Table 1.4-3 "*Emission Factors for Speciated Organic Compounds from Natural Gas Combustion*", July 1998.

EMISSIONS CALCULATIONS FOR HOT OIL HEATER BURING FUEL OIL

Hot Oil Heater	0.30 Space Heater
Primary Fuel Type	No. 1 Fuel Oil
Back-up Fuel (if applicable)	na

Heat Input	0.3	MMBtu/hr
Higher Heating Value of Fuel	140,000	Btu/gal
Max Fuel Consumption Rate	2.1	gal/hr
Max Fuel Oil Sulfur Content, S	0.5	%
Max Annual Fuel Consumption	18.8	Mgal
Actual Fuel Consumption	18.8	Mgal
Annual Hours of Operation	8,760	hours

Combustion Products	EMISSION FACTOR		EMISSION RATES		Basis of Estimate
Nitrogen Oxides	20	lbs/Mgal	0.04 lbs/hr	0.188 tpy	AP-42, Table 1.3-1 (9/98)
Carbon Monoxide	5	lbs/Mgal	0.01 lbs/hr	0.047 tpy	AP-42, Table 1.3-1 (9/98)
Particulate Matter	2	lbs/Mgal	0.00 lbs/hr	0.019 tpy	AP-42, Table 1.3-1 (9/98)
Non-methane VOC	0.2	lbs/Mgal	0.00 lbs/hr	0.002 tpy	AP-42, Table 1.3-3 (9/98)
Sulfur Dioxide	71	lbs/Mgal	0.15 lbs/hr	0.666 tpy	AP-42, Table 1.3-1 (9/98)
Sulfur Trioxide	1	lbs/Mgal	0.00 lbs/hr	0.009 tpy	AP-42, Table 1.3-1 (9/98)

Explanation of Calculation Methodology

Example of Calculation:

Pollutant Emission Rate (lbs/hr)= (Emission Factor, lbs/MGal) x (Fuel Consumption, Mgal) / (Hours of Operation, hrs)

Pollutant Emission Rate (tons/yr)= (Pollutant Emission Factor, lbs/Mgal) x (Annual Fuel Consumption, Mgal) / (2000 lbs/ton)

Premier Emulsions, LLC
Permit Number: 970509

Hazardous Air Pollutant (HAP) Emissions from Heating Units Burning Fuel (

HAP Emisions based on the comprehensive Potential-To-Emit for the facility.

Operational Data

Mgal	
18.77	Space Heater (Annual Fuel Oil Consumption)
18.77	Total Fuel Oil Combustion (Hourly Fuel Oil Consumption)

Pollutant	FO Emission Factor (lb/Mgal)[1]	Space Heater Fuel Oil Emissions (lb/yr)	Total HAP Emissions (lb/hr)	Total HAP Emissions (lb/month)	Total HAP Emissions (lb/yr)	Total HAP Emissions (tpy)
1,1,1 Trichloroethane	2.36E-04	4.43E-03	5.06E-07	3.69E-04	4.43E-03	2.22E-06
Acenapthene	2.11E-05	3.96E-04	4.52E-08	3.30E-05	3.96E-04	1.98E-07
Acenapthylene	2.53E-07	4.75E-06	5.42E-10	3.96E-07	4.75E-06	2.37E-09
Anthracene	1.22E-06	2.29E-05	2.61E-09	1.91E-06	2.29E-05	1.15E-08
Antimony	5.25E-03	9.86E-02	1.13E-05	8.21E-03	9.86E-02	4.93E-05
Arsenic	1.32E-03	2.48E-02	2.83E-06	2.06E-03	2.48E-02	1.24E-05
Barium	2.57E-03	4.82E-02	5.51E-06	4.02E-03	4.82E-02	2.41E-05
Benzene	2.14E-04	4.02E-03	4.59E-07	3.35E-04	4.02E-03	2.01E-06
Benzo(a)anthracene	4.01E-06	7.53E-05	8.59E-09	6.27E-06	7.53E-05	3.76E-08
Benzo(b)fluoranthene	1.48E-06	2.78E-05	3.17E-09	2.32E-06	2.78E-05	1.39E-08
Benzo(g,h,I)perylene	2.26E-06	4.24E-05	4.84E-09	3.54E-06	4.24E-05	2.12E-08
Beryllium	2.78E-05	5.22E-04	5.96E-08	4.35E-05	5.22E-04	2.61E-07
Cadmium	3.98E-04	7.47E-03	8.53E-07	6.23E-04	7.47E-03	3.74E-06
Chloride	3.47E-01	6.51E+00	7.44E-04	5.43E-01	6.51E+00	3.26E-03
Chromium	1.09E-03	2.05E-02	2.34E-06	1.71E-03	2.05E-02	1.03E-05
Chrysene	2.38E-06	4.47E-05	5.10E-09	3.72E-06	4.47E-05	2.23E-08
Cobalt	6.02E-03	1.13E-01	1.29E-05	9.42E-03	1.13E-01	5.65E-05
Copper	1.76E-03	3.30E-02	3.77E-06	2.75E-03	3.30E-02	1.65E-05
Dibenzo(a,h)anthracene	1.67E-06	3.13E-05	3.58E-09	2.61E-06	3.13E-05	1.57E-08
Ethylbenzene	6.36E-05	1.19E-03	1.36E-07	9.95E-05	1.19E-03	5.97E-07
Fluoranthene	4.84E-06	9.09E-05	1.04E-08	7.57E-06	9.09E-05	4.54E-08
Fluorene	4.47E-06	8.39E-05	9.58E-09	6.99E-06	8.39E-05	4.20E-08
Fluoride	3.73E-02	7.00E-01	7.99E-05	5.83E-02	7.00E-01	3.50E-04
Formaldehyde	3.30E-02	6.19E-01	7.07E-05	5.16E-02	6.19E-01	3.10E-04
Indo(1,2,3-cd)pyrene	2.14E-06	4.02E-05	4.59E-09	3.35E-06	4.02E-05	2.01E-08
Lead	1.51E-03	2.83E-02	3.24E-06	2.36E-03	2.83E-02	1.42E-05
Manganese	3.00E-03	5.63E-02	6.43E-06	4.69E-03	5.63E-02	2.82E-05
Mercury	1.13E-04	2.12E-03	2.42E-07	1.77E-04	2.12E-03	1.06E-06
Molybdenum	7.87E-04	1.48E-02	1.69E-06	1.23E-03	1.48E-02	7.39E-06
Naphthalene	1.13E-03	2.12E-02	2.42E-06	1.77E-03	2.12E-02	1.06E-05
Nickel	8.45E-02	1.59E+00	1.81E-04	1.32E-01	1.59E+00	7.93E-04
OCDD	3.10E-09	5.82E-08	6.64E-12	4.85E-09	5.82E-08	2.91E-11
o-Xylene	1.09E-04	2.05E-03	2.34E-07	1.71E-04	2.05E-03	1.02E-06
Phenanthrene	1.05E-05	1.97E-04	2.25E-08	1.64E-05	1.97E-04	9.86E-08
Pyrene	4.25E-06	7.98E-05	9.11E-09	6.65E-06	7.98E-05	3.99E-08
Phosphorus	9.46E-03	1.78E-01	2.03E-05	1.48E-02	1.78E-01	8.88E-05
Selenium	6.83E-04	1.28E-02	1.46E-06	1.07E-03	1.28E-02	6.41E-06
Toluene	6.20E-03	1.16E-01	1.33E-05	9.70E-03	1.16E-01	5.82E-05
Vanadium	3.18E-02	5.97E-01	6.81E-05	4.97E-02	5.97E-01	2.98E-04
Zinc	0.03	5.46E-01	6.24E-05	4.55E-02	5.46E-01	2.73E-04
			0.0013	0.95	11	0.0057

[1] AP-42, Section 1.3, Table 1.3-9 "*Emission Factors for Speciated Organic Compounds from Fuel Oil Combustion*", September 1998.

[2] AP-42, Section 1.3, Table 1.3-11 "***Emission Factors for Metals from Uncontrolled No. 6 Fuel Oil Combustion***", September 1998.

GHG Applicability Assessment

NATURAL GAS HEATING UNITS

Unit Name	Boiler	Heater	Space Heater
Manufacturer	Sellers	American	
Model Number	2500	Mag	
Serial Number			
Unit ID	H-1	H-3	
Input Burner Size (MMBTU/hr)	17	14.5	0.08
Estimated Percent of Total Load	54%	46%	
Actual Fuel Usage (MMSFC)	145.99	124.28	1.00
Fuel Type	Natural Gas		
Heat Input (PTE)	31.6 MMBtu/hr		
Higher Heating Value of Fuel	1,020 Btu/scf		
Maximum Potential Fuel Use	271.2 MMscf/yr		
Annual Fuel Usage	271.2 MMscf/yr		
Hours of Operation	8,760 hrs/yr		

Conclusion

Reporting is NOT required as the criteria specified in 40 CFR 98.2(a)(1)-(3) may all be answered 'no'.

Applicability Assessment

No	40 CFR 98.2(a)(1) - A facility that contains any source category (as defined in subparts C through JJ of this
No	40 CFR 98.2(a)(2) - A facility that contains any source category (as defined in subparts C through JJ of this part) that is listed in this paragraph (a)(2) in any calendar year starting in 2010 and that emits 25,000 metric tons CO2e or more per year in combined emissions from stationary fuel combustion units, miscellaneous uses of carbonate, and all source categories that are listed in this paragraph.
No	40 CFR 98.2(a)(3) - A facility that in any calendar year starting in 2010 meets all three of the conditions listed in this paragraph (a)(3). For these facilities, the annual GHG report must cover emissions from stationary fuel combustion sources only.
Yes	(i) The facility does not meet the requirements of either paragraph (a)(1) or (a)(2) of this section.
Yes	(ii) The aggregate maximum rated heat input capacity of the stationary fuel combustion units at the
No	(iii) The facility emits 25,000 metric tons CO2e or more per year in combined emissions from all stationary fuel combustion sources.

GHG Calculations

Tier I CO2 Calculation	14,787.63	(per Eq C-1)	$CO_2 = 1 \times 10^{-3} * Fuel * HHV * EF$	(Eq. C-1)
Tier I CH4 Calculation	0.28	(per Eq C-8)	$CH_4 \text{ or } N_2O = 1 \times 10^{-3} \cdot Fuel \cdot HHV \cdot EF$	(Eq. C-8)
Tier I N2O Calculation	0.03	(per Eq C-8)	$CH_4 \text{ or } N_2O = 1 \times 10^{-3} \cdot Fuel \cdot HHV \cdot EF$	(Eq. C-8)
Total GHG Emissions (tons)	14,782.94			
Total CO2e (tons)	14,797.03	(per Eq A-1)	$CO_2e = \sum_{i=1}^{n} GHG_i \times GWP_i$	(Eq. A-1)

Constants

HHV =	0.001028	(from table C-1)
EF_{CO2} =	53.02	(from table C-1)
EF_{CH4} =	0.001	(from table C-2)
EF_{N2O} =	0.0001	(from table C-2)
GWP_{CO2}	1	(from table A-1)
GWP_{CH4}	21	(from table A-1)
GWP_{N2O}	310	(from table A-1)

Citations from 40 CFR 98

$$CO_2e = \sum_{i=1}^{n} GHG_i \times GWP_i \qquad \text{(Eq. A-1)}$$

FUGITIVE ROAD DUST EMISSION CALCULATIONS

UNPAVED ROADWAYS

Calculate Vehicle Miles Traveled (VMT)

	Total Volume Received :	91,741	m-gals
	Total Volume Shipped:	100,000	m-gals
	Total Volume Through Plant:	191,741	m-gals

		Trucks
	Total Volume Shipped & Received by Truck (m-gals/yr)	191,741
	Capacity of transport truck (m-gals):	6.50
n	Number of vehicles per year: *	29498.6
	Average distance traveled (miles/vehicle):	0.25
W	Vehicle Weight (tons):	26.5
	Vehicle miles traveled (VMT)/day	20.2
	Vehicle miles traveled (VMT)/year	7,375

Factor Calculation

		PM	PM 10	PM 2.5
k	Particle size empirical constant, (dimensionless) (Table 13.2-1.1)	0.082	0.016	0.002
sL	Road Surface Silt Loading (g/m^2)	2.4	2.4	2.4
W	Mean vehicle weight (tons):	26.5	26.5	26.5
	E = k (sL/2)^0.65 (W/3)^1.5 (Equation 1)			
E	Size-specific emission factor, dry, (lb/VMT) (pg 13.2.1.3 Eq 1)	2.42	0.47	0.07
p	Number of days with at least 0.01 in of rain (Fig 13.2.2-1)	90	90	90
E	Emission factor adjusted for moisture, lb/VMT (pg 13.2.2-5)	1.83	0.36	0.05

Emissions Calculations

Annual Emissions

		PM	PM 10	PM 10	
E	Emission Factor, lb/VMT (use moisture adjusted factor)	1.83	0.36	0.05	
VMT	Vehicle Miles Traveled, mile/yr	7,375	7,375	7,375	
	Uncontrolled Emissions, lb/year (E x VMT)	13,486	2,628	394	
	Uncontrolled Emissions, ton/year	6.73	1.31	0.20	
	Control Type Claimed: None	0%	0%	0%	*Estimated Efficiency*
	Estimated Emissions, lbs/year (E x VMT)	13,486	2,628	394	
	Estimated Emissions, ton/year	6.73	1.31	0.20	
	Maximum estimated hourly emission, lbs/hr	0.00	0.00	0.00	

Explanation of Calculation Methodology
per AP-42 Section 13.2.1 (9/98) "Paved Roads"

* For PTE calculation, use maximum number of trucks actually loaded in a single day at the facility times a factor of 2.

Explanation of Calculation Methodology
per AP-42 Section 13.2.2 (9/98) "Unpaved Roads"

* For PTE calculation, use maximum number of trucks actually loaded in a single day at the facility times a factor of 2.

WESTERN STATES ASPHALT
ASPHALT EMULSION AND CUTBACK VAPOR PRESSURE CALCULATIONS

Flushing Fluid (<35% Fuel Oil)	Min	Average	Max
Temperature:	200	215	230
Flushing Fluid	Asphalt	Distillate #1 or #2	Mixture
Antoine's Coefficient A	75350.0600	5.7473	
Antoine's Coefficient B	9.0035	1498.892	
Antoine's Coefficient C	0.0000	225.589	
Min True vapor pressure of the product being loaded (psia):	0.000352	0.215685	
Ave True vapor pressure of the product being loaded (psia):	0.000611	0.284118	
Max True vapor pressure of the product being loaded (psia):	0.001033	0.369176	
Composition Percentage	65.0000	35	
Molecular weight of the product vapors (g / g-mol):	105	130	113.75
g-moles in 100 g	0.619047619	0.269230769	
Molar Ratio	0.696907216	0.303092784	
Partial Pressure (psi) at 200 (F)	0.000245462	0.065372617	0.065618079
Partial Pressure (psi) at 215 (F)	0.000425531	0.086114167	0.086539698
Partial Pressure (psi) at 230 (F)	0.000720243	0.111894728	0.112614971

Asphalt Emulsion (<35% Fuel Oil)	Min	Average	Max
Temperature:	100	180	200
Flushing Fluid	Asphalt	Distillate #1 or #2	Mixture
Antoine's Coefficient A	75350.0600	5.7473	
Antoine's Coefficient B	9.0035	1498.892	
Antoine's Coefficient C	0.0000	225.589	
Min True vapor pressure of the product being loaded (psia):	0.000004	0.022000	
Ave True vapor pressure of the product being loaded (psia):	0.000162	0.145938	
Max True vapor pressure of the product being loaded (psia):	0.000352	0.215685	
Composition Percentage	65.0000	35	
Molecular weight of the product vapors (g / g-mol):	105	130	113.75
g-moles in 100 g	0.619047619	0.269230769	
Molar Ratio	0.696907216	0.303092784	
Partial Pressure (psi) at 100 (F)	2.94799E-06	0.006667899	0.006670847
Partial Pressure (psi) at 180 (F)	0.000113227	0.044232764	0.044345991
Partial Pressure (psi) at 200 (F)	0.000245462	0.065372617	0.065618079

Meteorological Data

City (for which Meteorological Data is provided)	Boise, ID	
Average Barometric Pressure	13.3	psia
Average Daily Minimum Ambient Temperature, F	39.0	F
Average Daily Maximum Ambient Temperature, F	62.8	F
Daily Average Temperature, F	50.9	F
Daily Total Solar Insulation Factor, Btu/ft^2/day	1401	Btu/ft^2/day

Meteorological Data can be found in the TANKS 4.0 database. This data can be used to complete temperature ranges for unheated tanks, such as fuel oil

EPA AP-42, Ch.11 (Hot Mix Asphalt Plants)
A= 75350.06 B= 9.00346 MW = 105

Product Density, Antoine Coefficients, & Vapor Molecular Weight

		Source:
Asphalt Cement & Polymer-Modified Asphalt Cement		
Coefficient Name:	AC	
Density:	8.34 lbs/gal	
Vapor Molecular Weight:	105 lb/lb-mol	
A=	75350.06	EPA AP-42, Ch.11 (Hot Mix Asphalt Plants)
B=	9.00346	EPA AP-42, Ch.11 (Hot Mix Asphalt Plants)
C=	0	EPA AP-42, Ch.11 (Hot Mix Asphalt Plants)
Asphalt Emulsions		
Coefficient Name:	AE	
Density:	7.9 lbs/gal	
Vapor Molecular Weight:	105 lb/lb-mol	
A=	75350.06	EPA AP-42, Ch.11 (Hot Mix Asphalt Plants)
B=	9.00346	EPA AP-42, Ch.11 (Hot Mix Asphalt Plants)
C=	0	EPA AP-42, Ch.11 (Hot Mix Asphalt Plants)
Light Cutback Asphalt - MC-70 and lower		
Coefficient Name:	CB	
Density:	7.9 lbs/gal	
Vapor Molecular Weight:	130 lb/lb-mol	
A=	4.9458	From the Koch TANKS3.1 Chemical Database
B=	1060.01	(calculation documentation has not been found)
C=	201.842	
Heavy Cutback Asphalt - MC 250 and greater		
Coefficient Name:	MC	
Density:	7.9 lbs/gal	
Vapor Molecular Weight:	130 lb/lb-mol	
A=	5.306	From the Koch TANKS3.1 Chemical Database
B=	1133.791	(calculation documentation has not been found)
C=	185.984	
Asphalt Extenders, No. 4 Fuel Oil, Brexlube		
Coefficient Name:	EXT	
Density:	7.9 lbs/gal	
Vapor Molecular Weight:	130 lb/lb-mol	
A=	4.2709	From the Koch TANKS3.1 Chemical Database
B=	1276.034	(calculation documentation has not been found)
C=	160.458	
Distillates, Diesel, No.1 and No. 2 Fuel Oils, Jet A		
Coefficient Name:	DISTILLATE	
Density:	7.9 lbs/gal	
Vapor Molecular Weight:	130 lb/lb-mol	
A=	5.7473	From the Koch TANKS3.1 Chemical Database
B=	1498.892	(calculation documentation has not been found)
C=	225.589	

VOC EMISSION CALCULATIONS FOR FUGITIVE PIPELINE LOSSES

Fugitive VOC Emissions

SOURCE DESCRIP.	SOURCE COUNT	SERVICE	Emission Factor[a] (kg/hr/component)		Emission Factor (lb/day/component)	(VOC) %	lbs/hr	tons/yr
Connector	0	heavy oil (<20 API Gravity)	7.50E-06	=	0.000396825	100.00%	0.0000	0.00
Flange	1,000	heavy oil (<20 API Gravity)	3.90E-07	=	2.06349E-05	100.00%	0.0009	0.00
Open-ended line	0	heavy oil (<20 API Gravity)	1.40E-04	=	0.007407408	100.00%	0.0000	0.00
Other[a]	0	heavy oil (<20 API Gravity)	3.20E-05	=	0.001693122	100.00%	0.0000	0.00
Pump[d]	50	heavy oil (<20 API Gravity)	7.50E-05	=	0.003968254	100.00%	0.0084	0.04
Valve	400	heavy oil (<20 API Gravity)	3.10E-06	=	0.000164021	100.00%	0.0074	0.03
Connector	0	light oil (>=20 API Gravity)	2.10E-04	=	0.011111184	100.00%	0.0000	0.00
Flange	100	light oil (>=20 API Gravity)	1.10E-04	=	0.005820194	100.00%	0.0243	0.11
Open-ended line	0	light oil (>=20 API Gravity)	1.40E-03	=	0.07407456	100.00%	0.0000	0.00
Other[a]	0	light oil (>=20 API Gravity)	7.50E-03	=	0.396828	100.00%	0.0000	0.00
Pump	5	light oil (>=20 API Gravity)	1.30E-02	=	0.6878352	100.00%	0.1433	0.63
Valve	40	light oil (>=20 API Gravity)	2.50E-03	=	0.132276	100.00%	0.2205	0.97
					Totals:		0.4047	1.77 tons

[a]The "other" equipment type was derived from compressors, diaphragms, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, relief valves, and vents.
This "other" equipment type should be applied for any equipment type other than connectors, flanges, open-ended lines, pumps, or valves.

[b]Water/Oil emission factors apply to water streams in oil service with a water content greater than 50%, from the point of origin to the point where the water content reaches 99%. For water streams with a water content greater than 99%, the emission rate is considered negligible.

[c]These factors are for total organic compound emission rates (including non-VOC's such as methane and ethane) and apply to light crude, heavy crude, gas plant, gas production and off shore facilities.

[d]Not enough data was available to develop the indicated emission factor.
The factor was derived using the average ratio of light to heavy crude oil factors for all other components.

[e]Gas service is assumed to be 90% Methane and the remaining 10% is assumed to be VOC's.

Basis: All Pipeline valves (3" and larger), flanges (3" and larger), compressor seals, and pumps.
All fugitive emissions from components less than 3 inches were assumed to be negligible.
Emission Factors were taken from "Average Emission Factors for Oil and Gas Production Operations"
The operation time used for the facility is: 24 hrs/day x 7 days/wk x 52 wks/yr OR 8760 hrs/yr

NOTE: These calculations are taken from a copy of EPA "Protocol for Equipment Leak Emission Estimates" released in November 1995 for Oil & Gas Production.

Example Calculation:
VOC Emissions (lbs/hr) = (source count) x (VOC content, %) / (100) x (emission factor lbs/day/source) / (24 hrs/day)

WESTERN STATES ASPHALT
PARTS WASHER VOC EMISSIONS

Period	Solvent Receipts (gal)	Spent Solvent Shipments (gal)	Evaporative Loss (lbs)
Any	360	0	2412
Annual Loss			2412

Emissions (TPY):	**1.21**
Short Term Emission Rate (lbs/hr):	**0.0008**

Solvent naphtha (Pet Dist. Lights, CAS# 64742-47-8, 100%)
Density of Solvent = 6.7 lbs/gal, Safety Clean Premium Gold Solvent
Emissions are included w/Misc. sources on application summary page.

HCl Emissions Estimate

Vapor Pressure:	0.170	psia @ 62.8	°F [A]
Gas Constant:	10.73	psia·ft^3/lb-mol·R	
Molecular Weight:	36.46	lb/lb-mol	
Vapor Concentration:	0.00015	lb/gal [B]	
Annual Receipts :	100000	gal [E]	
Maximum Daily Vapor Displacement:	274.0	gal [C]	
Daily Emissions:	0.040	lb/day	
Total HCl Emissions:	14.78	lbs/yr [D]	

Notes:

A Vapor pressure from Perry's Chemical Engineers' Handbook, Seventh Edition.

B Based on average maximum ambient temperature of 62.8 °F (Tanks 4.0.9d) and 30% HCl.

C Assumes annual receipt / 365 days per year

C2 Assumes total monthly inventory over 12 month period / 365 days per year

D Emissions estimate assumed to be conservative as water scrubber use is not considered in calculation.

Air Emissions for the aboveground storage tanks were estimated using the procedures described in Section 7.1.3.1 of the AP-42, Fifth Edition approved by the U. S. Environmental Protection Agency.

Total losses from fixed roof tanks (lb/yr) = Standing Storage Losses + Working Losses

Standing Storage Losses (lb/yr) = $365*V_V*W_V*K_E*K_S$

Where:

V_V = vapor space volume, ft3

W_V = vapor density (lb/ft3)

K_E = vapor space expansion factor

K_S = vented vapor saturation factor

365 = constant, days per year

Working Losses (lb/yr) = $0.0010*M_V*P_{VA}*Q*K_N*K_P$

Where:

M_V = vapor molecular weight (lb/lbmole)

P_{VA} = vapor pressure at daily average liquid surface temperature (psia)

Q = annual net throughput (bbl/yr)

K_N = turnover factor

K_P = working loss product factor

Vapor Pressure (psia) = $(10^{((-0.05223*A/T)+B)})*0.019337$

Where:

A & B are Antoine's constants

P = vapor pressure, psia

T = absolute temperature, Kelvin

mmHg = 0.019337 psia

Meteorological Data		
City (for which Meteorological Data is provided)	Boise, ID	
Average Barometric Pressure	13.3	psia
Average Daily Minimum Ambient Temperature, F	39.0	F
Average Daily Maximum Ambient Temperature, F	62.8	F
Daily Average Temperature, F	50.9	F
Daily Total Solar Insulation Factor, Btu/ft^2/day	1401	Btu/ft2/day

Product Density, Antoine Coefficients, & Vapor Molecular Weight

Asphalt Cement & Polymer-Modified Asphalt Cement

Coefficient Name:	AC	
Density:	8.34	lbs/gal
Vapor Molecular Weight:	105	lb/lb-mol
Antoine's Constants: A=	75350.06	
B=	9.00346	

Source of Antoine's constants for Asphalt:

EPA - AP-42, Fifth Edition, Volume I, Ch.11
11. MINERAL PRODUCTS INDUSTRY
11.1. Hot Mix Asphalt Plants
11.1.2.5. Fugitive Emissions from Production Operations

Asphalt Emulsions

Coefficient Name:	AE	
Density:	7.9	lbs/gal
Vapor Molecular Weight:	105	lb/lb-mol
Antoine's Constants: A=	75350.06	
B=	9.00346	

Distillates, Diesel, No.1 and No. 2 Fuel Oils, Jet A

Coefficient Name:	DISTILLATE	
Density:	7.9	lbs/gal
Vapor Molecular Weight:	130	lb/lb-mol
Antoine's Constants: A=	5.7473	
B=	1498.892	
C=	225.589	

APPENDIX B – SUMMARY OF THE POINT SOURCES

SUMMARY OF THE POINT SOURCES

(This is a copy from the Air Quality Permitting Technical Memorandum dated March 14, 2003 that contains NSPS applicability information for the tanks. This list has been updated with the issuance of the PTC issued May 15, 2013.)

Fuel Burning Equipment

1. Boiler No.1 – Natural gas fired with a maximum rated capacity of 16.74MMBTU/hr. The boiler was constructed in 1975 and it is not a NSPS source.

Boiler Specifications:

Manufacturer:	Sellers
Model:	105E
Max. Hourly Combustion Rate:	16.16 x10^3 SCF/hr
Fuel:	Natural Gas
Secondary Fuel:	None

Stack Design Specifications:

Height:	24 Feet
Exit Diameter:	2.0 Feet
Exit Gas Flow Rate:	Unknown
Exit Temperature:	400°F

2. Hot Oil Heater – Natural gas fired with a maximum rated capacity of 14.5MMBTU/hr. The heater was constructed in 2001.

Hot Oil Heater Specifications:

Manufacturer:	American
Model:	AHE-1200
Max. Hourly Combustion Rate:	13.8x10^3 SCF/hr
Fuel:	Natural Gas
Secondary Fuel:	None

Stack Design Specifications:

Height:	24 Feet
Exit Diameter:	2.0 Feet
Exit Gas Flow Rate:	Unknown
Exit Temperature:	400°F

Storage Tanks

Tank No.1- Fixed roof tank with a rated capacity of 2,121,077 gallons. The tank was installed in 1991 and is not a NSPS source.

TankNo.1 Specifications:

Material Handling:	Asphalt Cement
Tank Type:	Fixed Roof
Tank Capacity:	2,121,007gallons

Tank No.2- Fixed roof tank with a rated capacity of 1,070,821 gallons. The tank was installed in 1975 and is a NSPS source. The tank is subject to 40 CFR 60 subpart K.

TankNo.2 Specifications:

Material Handling:	Asphalt Cement
Tank Type:	Fixed Roof
Tank Capacity:	1,070,821gallons

Tank No.4, No.5, No.6, No.7, No.9, No.17 - Fixed roof tank with a rated capacity of 105,760 gallons. The tanks were installed in 1975 and are NSPS sources. The tanks are subject to 40 CFR 60 subpart K.

Tank No.4, No.5, No.6, No.7, No.9, No.17 Specifications:

Material Handling:	Asphalt Cement
Tank Type:	Fixed Roof
Tank Capacity:	105,760 gallons

Tank No.8- Fixed roof tank with a rated capacity of 50,900 gallons. The tank was installed in 1980 and is not a NSPS source.

TankNo.8 Specifications:

Material Handling:	Asphalt Cement
Tank Type:	Fixed Roof
Tank Capacity:	50,000 gallons

Tank No.10- Fixed roof tank with a rated capacity of 13,514 gallons. The tank was installed in 1985 and is not a NSPS source.

TankNo.10 Specifications:

Material Handling:	Distillate Oil
Tank Type:	Fixed Roof
Tank Capacity:	13,514 gallons

Tank No.12 - Fixed roof tank with a rated capacity of 50,155 gallons. The tank was installed in 1975 and is a NSPS source. The tank is subject to 40 CFR 60 subpart K.

Tank No.12 Specifications:

Material Handling:	Chemical
Tank Type:	Fixed Roof
Tank Capacity:	50,155 gallons

Tank No.13 - Fixed roof tank with a rated capacity of 105,760 gallons. The tank was installed in 1975 and is a NSPS source. The tank is subject to 40 CFR 60 subpart K.

Tank No.13 Specifications:

Material Handling:	Asphalt Cutback
Tank Type:	Fixed Roof
Tank Capacity:	105,760 gallons

Tank No.14 - Fixed roof tank with a rated capacity of 47,000 gallons. The tank was installed in 1975 and is a NSPS source. The tank is subject to 40 CFR 60 subpart K.

Tank No.14 Specifications:

Material Handling:	Asphalt Emulsion
Tank Type:	Fixed Roof
Tank Capacity:	47,000 gallons

Tank No.15 - Fixed roof tank with a rated capacity of 50,155 gallons. The tank was installed in 1975 and is a NSPS source. The tank is subject to 40 CFR 60 subpart K.

Tank No.15 Specifications:

Material Handling:	Asphalt Emulsion
Tank Type:	Fixed Roof
Tank Capacity:	50,155 gallons

Tank No.16 - Fixed roof tank with a rated capacity of 79,384 gallons. The tank was installed in 1975 and is a NSPS source. The tank is subject to 40 CFR 60 subpart K.

Tank No.16 Specifications:

Material Handling:	Asphalt Emulsion
Tank Type:	Fixed Roof
Tank Capacity:	79,384 gallons

Tank No.18, No.20, No.22, No.23, and No.24 - Fixed roof tank with a rated capacity of 50,155 gallons. The tank was installed in 1975 and is a NSPS source. The tank is subject to 40 CFR 60 subpart K.

Tank No.18, No.20, No.22, No.23, and No.24 Specifications:

Material Handling:	Asphalt Emulsion
Tank Type:	Fixed Roof
Tank Capacity:	50,155 gallons

Tank No.19 - Fixed roof tank with a rated capacity of 38,074 gallons. The tank was installed in 1975 and is not a NSPS source.

Tank No.19 Specifications:

Material Handling:	Asphalt Emulsion
Tank Type:	Fixed Roof
Tank Capacity:	38,074 gallons

Tank No.21 - Fixed roof tank with a rated capacity of 66,300 gallons. The tank was installed in 1975 and is a NSPS source. The tank is subject to 40 CFR 60 subpart K.

Tank No.21 Specifications:

Material Handling:	Asphalt Emulsion
Tank Type:	Fixed Roof
Tank Capacity:	66,300 gallons

Tank No.25 - Fixed roof tank with a rated capacity of 36,100 gallons. The tank was installed in 1975 and is a NSPS source. The tank is subject to 40 CFR 60 subpart K.

Tank No.25 Specifications:

Material Handling:	Asphalt Emulsion
Tank Type:	Fixed Roof
Tank Capacity:	36,100 gallons

Tank No.26 - Fixed roof tank with a rated capacity of 30,083 gallons. The tank was installed in 1975 and is not a NSPS source.

Tank No.26 Specifications:

Material Handling:	Asphalt Emulsion
Tank Type:	Fixed Roof
Tank Capacity:	30,083 gallons

Tank No. 27 – Fixed roof tank with a rated capacity of 28, 577 gallons. The tank was installed in 1975 and is not a NSPS source.

Tank No.27 Specifications:

Material Handling:	Asphalt Cement
Tank Type:	Fixed Roof
Tank Capacity:	28,577 gallons

Tank No.28 - Fixed roof tank with a rated capacity of 24,066 gallons. The tank was installed in 1975 and is not a NSPS source.

Tank No.28 Specifications:

Material Handling:	No.1 Fuel Oil
Tank Type:	Fixed Roof
Tank Capacity:	24,066 gallons

Tank No.29 - Fixed roof tank with a rated capacity of 21,328 gallons. The tank was installed in 1985 and is not a NSPS source.

Tank No.29 Specifications:

Material Handling:	No.2 Fuel Oil
Tank Type:	Fixed Roof
Tank Capacity:	21,328 gallons

Tank No.38 - Fixed roof tank with a rated capacity of 4,220,061 gallons. The tank was installed in 1995 and is not a NSPS source.

Tank No.38 Specifications:

Material Handling:	Asphalt Cement
Tank Type:	Fixed Roof
Tank Capacity:	4,220,061 gallons

Tank No.39 - Fixed roof tank with a rated capacity of 13,536 gallons. The tank was installed in 1997 and is not a NSPS source.

Tank No.39 Specifications:

Material Handling:	No.2 Diesel Oil
Tank Type:	Fixed Roof
Tank Capacity:	13,536 gallons

Tank No.46 - Fixed roof tank with a rated capacity of 6,000 gallons. The tank was installed in 2000 and is a not NSPS source.

Tank No.46 Specifications:

Material Handling:	Polyphosphoric Acid
Tank Type:	Fixed Roof
Tank Capacity:	6,000 gallons

Tank No.48 - Fixed roof tank with a rated capacity of 192,500 gallons. The tank was installed in 2000 and is not a NSPS source.

Tank No.48 Specifications:

Material Handling:	Asphalt Cement
Tank Type:	Fixed Roof
Tank Capacity:	192,500 gallons

Tank No.49 - Fixed roof tank with a rated capacity of 1,322,000 gallons. The tank was installed in 2001 and is not a NSPS source.

Tank No.49 Specifications:

Material Handling:	Asphalt Cement
Tank Type:	Fixed Roof
Tank Capacity:	1,322,000 gallons

Tank No.50 - Fixed roof tank with a rated capacity of 1,322,000 gallons. The tank was installed in 2001 and is not a NSPS source.

Tank No.50 Specifications:

Material Handling:	Asphalt Cement
Tank Type:	Fixed Roof
Tank Capacity:	1,322,000 gallons

Tank No.51 - Fixed roof tank with a rated capacity of 57,100 gallons. The tank was installed in 2001 and is not a NSPS source.

Tank No.51 Specifications:

Material Handling:	Asphalt Cement
Tank Type:	Fixed Roof
Tank Capacity:	57,100 gallons

Loading Racks

Loading Rack No.1 and No.2 – Asphalt Cement loading arm. These racks were installed in 1975.

Loading Rack Specifications

Material Handling:	Asphalt Cement
Type of Loading	Over head loading – splash fill, normal service
Total Annual Throughput	50,000,000 gallons

Loading Rack No.3 – Asphalt Cutback loading arm. This rack was installed in 1975.

Loading Rack Specifications

Material Handling:	Asphalt Cutback
Type of Loading:	Over head loading – splash fill, normal service
Total Annual Throughput:	15,000,000 gallons

Loading Rack No.4 and No.5 – Asphalt Emulsion loading arm. These racks were installed in 1975.

Loading Rack Specifications

Material Handling:	Asphalt Emulsion
Type of Loading:	Over head loading – splash fill, normal service
Total Annual Throughput:	50,000,000 gallons

Fugitive Sources:

1. Pumps, values, and fittings.
2. Paved and Unpaved Roads.

APPENDIX C – FACILITY DRAFT COMMENTS

The following comments were received from the facility on May 8, 2013:

Facility Comment: Provided they continue to be regulatory requirements associated with the facility, we would like to have Conditions 2.2 and 2.6 of the existing Permit added to the new/draft Permit. These conditions were related to logging dust control events and maintenance of an odor abatement system O&M manual, respectively. We are afraid that if they are not included within the permit, yet still regulatory requirements, they may be overlooked in the future as facility personnel change.

DEQ Response: Permit Condition 2.2 of the existing Tier II permit was not removed from the PTC. It was combined into one permit condition with existing Permit Condition 2.3 and is now Permit Condition 2.2 in the PTC under Responsible Control Measures. Existing Permit Condition 2.6 will be reinserted into the PTC at the facility's request.

Facility Comment: A number of sections in the Permit and Statement of Basis refer to NSPS Kb. Please note that this may no longer be the case as NSPS Kb was updated to exempt tanks containing a material with a vapor pressure of less than 3.5 kPa (0.507 psi). Only one tank (Tank 41) at the facility contains a VOL with a vapor pressure greater than 0.507 psi, but it has a capacity of 16,900 gallons, which is less than 75 m3 (19,813 gallons) and thus is excluded as well.

DEQ Response: DEQ concurs with the facility's findings that Subpart Kb no longer applies to several tanks at the facility. Subpart K still applies and the requirements are included in the PTC.

Facility Comment: We would like to make several typographical changes to Table 1 in the Permit and the "Summary of the Point Sources" list in the Statement of Basis. These changes are reflected in the attached documents.

DEQ Response: DEQ has made the requested changes.

APPENDIX D – PROCESSING FEE