Appendix D – Fugitive Emissions Calculation

Appendix D, Table D-1
Post-Project Potential to Emit (PTE) Fugitive Emissions Summary for Existing Sources
Phillips 66 Company - San Francisco Refinery, Rodeo, CA

Equipment Component POC Emissions by Material Service[1]

Stock		Unit 40	Unit 76	Unit 110	Unit 240	Unit 246	Unit Rail Unloading
		S-322	S-318	S-437	S-307	S-434	S-70
Crude-Blended	LL/HL	--	--	--	--	--	--
Gas Oil	HL	--	--	--	--	--	--
Coker Gas Oil	HL	--	--	--	--	--	--
Light Atm Gas Oil	HL	--	--	--	--	--	--
Heavy Gas Oil	HL	--	--	--	--	--	--
Hydrocracker Bottoms	HL	--	--	--	--	--	--
U240 SC1	HL	--	--	--	--	--	--
Diesel	HL	--	--	--	--	--	--
UGO	HL	--	--	--	--	--	--
Resid	HL	--	--	--	--	--	--
Butane	LL	--	--	86.77	--	--	--
Light Hydrocracked Naphtha	LL	--	--	--	--	--	--
Heavy Naphtha	LL	--	--	--	--	--	--
Light Hydrocracked Naphtha LB	LL	--	--	--	--	--	--
Naphtha	LL	--	--	--	--	--	--
Desulfurized Naphtha	LL	--	--	--	--	--	--
Light Slop Oil	LL	--	--	--	--	--	--
Gasoline	LL	--	--	--	--	--	--
Cracked Gas	GV	--	--	--	--	--	--
Coker Heavy Naphtha	LL	--	--	--	--	--	--
RFG	GV	89.06	2.64	2,175.37	5,254.19	586.92	--
Sat Gas	GV	--	--	--	--	--	--
Propane	LL	4.69	--	--	563.02	--	--
Renewable Feedstocks	HL	5,170.74	1,230.91	254.05	4,718.73	1,216.17	1,602.01
Renewable Diesel	HL	131.65	1,896.20	--	1,378.99	599.34	--
Renewable Jet	HL	131.65	1,909.83	--	366.36	201.47	--
Renewable Naphtha	LL	2,580.57	6,866.18	151.75	5,611.44	4,705.88	--
Reformate LB	LL	--	--	--	--	--	--
Sour Water	LL	242.83	--	--	5.04	101.81	--
Unknown/No HAPs	LL	1,982.60	1,787.61	613.76	2,757.15	1,069.92	--
Jet Fuel	HL	--	--	--	--	--	--
Heavy Vacuum Gas Oil	HL	--	--	--	--	--	--

Equipment Component TAC Emissions[2]

Chemical Name	CAS No.	Unit 40	Unit 76	Unit 110	Unit 240	Unit 246	Unit Rail Unloading
		S-322	S-318	S-437	S-307	S-434	S-70
Benzene	71-43-2	0.04	0.07	0.33	0.84	0.14	--
1,3-Butadiene	106-99-0	0.01	0.00	0.26	0.53	0.06	--
Cresol (mixed isomers)	1319-77-3	--	--	--	--	--	--
Ethylbenzene	100-41-4	0.23	0.62	0.01	0.51	0.42	--
n-Hexane	110-54-3	121.38	321.69	18.98	291.16	223.63	--
Hydrogen sulfide	7783-06-4	1.84	0.00	0.25	2.18	0.76	--
Mercury	7439-97-6	--	--	--	--	--	--
Naphthalene	91-20-3	0.05	0.14	0.00	0.11	0.09	--
Phenol	108-95-2	--	--	--	--	--	--
Propylene	115-07-1	2.16	0.06	47.88	139.86	12.85	--
Styrene	100-42-5	--	--	--	--	--	--
Toluene	108-88-3	0.58	1.51	0.36	2.02	1.12	--
Xylene (mixed isomers)	1330-20-7	0.20	0.48	0.58	1.76	0.48	--
PAHs (as B[a]P equiv)	1151	--	--	--	--	--	--

Notes:

1. PTE POC emissions were calculated using CAPCOA correlation equations and are a function of component count, component type, and maximum leak rate. POC emissions were calculated assuming continuous facility operation (24 hours/day, 365 days/year).
2. PTE TAC emissions were calculated by multiplying POC emissions in the upper table with wt% data from the respective TAC speciation profiles. Emissions were summed across streams in order to total TAC emissions by process unit.

Appendix D, Table D-2: Pre-Project Fugitive Component Counts and Potentials to Emit (PTE) for Existing Sources

Process Component Counts[1]

Location	Fugitive Component Type	Crude-Blended	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocracker Bottoms	U240 SCI	Diesel	UGO	Resid	Butane	Light Hydrocracked Naphtha	Heavy Naphtha	Light Hydrocracked Naphtha LB	Naphtha	Desulfurized Naphtha	Light Slop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Renewable Feedstocks	Renewable Diesel	Renewable Jet	Renewable Naphtha	Reformate LB	Sour Water	Unknown/No HAPs	Jet Fuel	Heavy Vacuum Gas Oil
		LL/HL	HL	HL	HL	HL	HL	HL	HL	HL	HL	LL	LL	LL	LL	LL	LL	LL	LL	GV	LL	GV	GV	LL	HL	HL	HL	LL	LL	LL	LL	HL	HL
Unit 40 (S-322)	Connectors	1,272	--	38	--	--	--	--	59	--	--	109	356	79	4	164	--	8	50	10	113	32	--	2	--	--	--	--	1	80	564	--	--
	Valves	1,139	--	34	--	--	--	--	53	--	--	98	319	71	4	147	--	7	45	9	101	29	--	2	--	--	--	--	1	72	505	--	--
	Pressure Relief Valves	51	--	4	--	--	--	--	5	--	--	11	28	4	1	13	--	2	6	--	3	--	--	--	--	--	--	--	--	3	5	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	233	--	--
	Pumps	24	--	1	--	--	--	--	2	--	--	--	4	3	--	3	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--
Unit 76 (S-318)	Connectors	--	--	--	--	--	--	--	2,419	--	--	308	3	--	--	--	--	180	2,399	1	137	--	--	--	--	--	--	--	--	--	378	--	--
	Valves	--	--	--	--	--	--	--	973	--	--	212	2	--	--	--	--	124	1,651	1	94	--	--	--	--	--	--	--	--	--	260	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	5	--	--	5	--	--	--	--	--	2	92	--	7	--	--	--	--	--	--	--	--	--	9	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	214	--	--
	Pumps	--	--	--	--	--	--	--	7	--	--	4	--	--	--	--	--	2	28	--	1	--	--	--	--	--	--	--	--	--	7	--	--
Unit 110 (S-437)	Connectors	--	--	--	--	--	--	--	--	--	--	109	--	--	--	--	--	--	--	22	--	1,065	--	--	--	--	--	--	79	--	133	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	75	--	--	--	--	--	--	--	15	--	731	--	--	--	--	--	--	54	--	91	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	17	--	--	--	--	--	--	1	--	3	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	107	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--
Unit 240 (S-307)	Connectors	--	166	349	116	232	695	348	24	--	20	489	33	484	38	219	--	629	331	1,129	807	1,445	44	199	--	--	--	--	4	3	779	--	--
	Valves	--	71	101	33	67	200	100	18	--	15	370	25	312	29	166	--	313	251	855	611	1,094	33	151	--	--	--	--	3	2	590	--	--
	Pressure Relief Valves	--	1	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	7	37	4	--	--	--	--	--	--	--	--	3	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	1	3	--	--	--	--	--	--	--	--	384	--	--
	Pumps	--	1	3	1	2	6	3	1	--	--	5	2	8	--	3	--	8	4	2	--	--	--	2	--	--	--	--	--	--	--	--	--
Unit 246 (S-434)	Connectors	5	--	196	--	--	--	--	196	196	--	--	--	--	384	26	80	11	272	57	342	153	--	--	--	--	--	--	--	43	149	--	196
	Valves	5	--	49	--	--	--	--	49	49	--	--	--	--	1,076	28	87	12	298	62	374	167	--	--	--	--	--	--	--	47	163	--	49
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	9	--	3	--	3	--	5	1	--	--	--	--	--	--	--	--	2	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	216	--	--
	Pumps	--	--	2	--	--	--	--	4	2	--	--	--	2	3	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Unit Rail Unloading (S-70)	Connectors	--	--	--	--	--	--	--	--	--	--	411	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	320	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

POC Emission Factors[2]

Component Type	Equation	HL Leak Rate (ppm)	LL/GV Leak Rate (ppm)	HL EF (lb/hr/comp)	LL/GV EF (lb/hr/comp)
Valves	5.00E-06(SV)^0.747	100	100	1.6E-04	1.6E-04
Pumps	1.12E-04(SV)^0.622	500	500	5.3E-03	5.3E-03
Others	1.92E-05(SV)^0.642	100	100	3.7E-04	3.7E-04
Connectors	3.37E-06(SV)^0.736	100	100	1.0E-04	1.0E-04
Pressure Relief Valves	1.92E-05(SV)^0.642	500	500	1.0E-03	1.0E-03

Emissions[3]

Location	Fugitive Component Type	Crude-Blended	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocracker Bottoms	U240 SCI	Diesel	UGO	Resid	Butane	Light Hydrocracked Naphtha	Heavy Naphtha	Light Hydrocracked Naphtha LB	Naphtha	Desulfurized Naphtha	Light Slop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Renewable Feedstocks	Renewable Diesel	Renewable Jet	Renewable Naphtha	Reformate LB	Sour Water	Unknown/No HAPs	Jet Fuel	Heavy Vacuum Gas Oil
		(POC lb/day)																															
Unit 40	Connectors	3.05	--	0.09	--	--	--	--	0.14	--	--	0.26	0.85	0.19	0.01	0.39	--	0.02	0.12	0.02	0.27	0.08	--	0.01	--	--	--	--	0.00	0.19	1.35	--	--
	Valves	4.26	--	0.13	--	--	--	--	0.20	--	--	0.37	1.19	0.27	0.01	0.55	--	0.03	0.17	0.03	0.38	0.11	--	0.01	--	--	--	--	0.00	0.27	1.89	--	--
	Pressure Relief Valves	1.27	--	0.10	--	--	--	--	0.12	--	--	0.27	0.70	0.10	0.02	0.32	--	0.05	0.15	--	0.07	--	--	--	--	--	--	--	--	0.07	0.12	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.06	--	--
	Pumps	3.08	--	0.13	--	--	--	--	0.26	--	--	--	0.51	0.38	--	0.38	--	--	--	--	--	--	--	--	--	--	--	--	--	0.13	--	--	--
Unit 76	Connectors	--	--	--	--	--	--	--	5.80	--	--	0.74	0.01	--	--	--	--	0.43	5.75	0.00	0.33	--	--	--	--	--	--	--	--	--	0.91	--	--
	Valves	--	--	--	--	--	--	--	3.64	--	--	0.79	0.01	--	--	--	--	0.46	6.18	0.00	0.35	--	--	--	--	--	--	--	--	--	0.97	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	0.12	--	--	0.12	--	--	--	--	--	0.05	2.29	--	0.17	--	--	--	--	--	--	--	--	--	0.22	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.90	--	--
	Pumps	--	--	--	--	--	--	--	0.90	--	--	0.51	--	--	--	--	--	0.28	3.59	--	0.12	--	--	--	--	--	--	--	--	--	0.90	--	--
Unit 110	Connectors	--	--	--	--	--	--	--	--	--	--	0.26	--	--	--	--	--	--	--	0.05	--	2.55	--	--	--	--	--	--	0.19	--	0.32	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	0.28	--	--	--	--	--	--	--	0.06	--	2.74	--	--	--	--	--	--	0.20	--	0.34	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	0.02	--	--	--	--	--	--	--	--	--	0.42	--	--	--	--	--	--	0.02	--	0.07	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	0.95	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	0.13	--	--	--	--	--	--	--	--	--	0.13	--	--	--	--	--	--	--	--	--	--	--
Unit 240	Connectors	--	0.40	0.84	0.28	0.56	1.67	0.83	0.06	--	0.05	1.17	0.09	1.16	0.09	0.53	--	1.51	0.79	2.71	1.93	3.46	0.10	0.48	--	--	--	--	0.01	0.01	1.87	--	--
	Valves	--	0.27	0.39	0.12	0.25	0.75	0.37	0.07	--	0.06	1.38	0.09	1.17	0.11	0.62	--	1.17	0.94	3.20	2.29	4.09	0.12	0.57	--	--	--	--	0.01	0.01	2.21	--	--
	Pressure Relief Valves	--	0.02	--	--	--	--	--	--	--	--	--	--	0.02	--	--	--	--	--	0.17	0.92	0.10	--	--	--	--	--	--	--	--	0.07	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.01	0.03	--	--	--	--	--	--	--	--	3.40	--	--
	Pumps	--	0.12	0.27	0.12	0.24	0.73	0.37	0.13	--	--	0.64	0.26	1.02	--	0.39	--	1.01	0.51	0.26	--	--	--	0.26	--	--	--	--	--	--	--	--	--	--
Unit 246	Connectors	0.01	--	0.47	--	--	--	--	0.47	0.47	--	--	--	--	2.36	0.06	0.19	0.03	0.65	0.14	0.82	0.37	--	--	--	--	--	--	--	0.10	0.36	--	0.47
	Valves	0.02	--	0.18	--	--	--	--	0.18	0.18	--	--	--	--	4.03	0.10	0.33	0.04	1.12	0.23	1.40	0.63	--	--	--	--	--	--	--	0.18	0.61	--	0.18
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	0.22	--	0.07	--	0.07	--	0.12	0.02	--	--	--	--	--	--	--	--	0.05	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.91	--	--
	Pumps	--	--	0.19	--	--	--	--	0.45	0.19	--	--	--	0.26	0.38	--	--	0.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.19
Unit Rail Unloading	Connectors	--	--	--	--	--	--	--	--	--	--	0.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	1.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	0.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S-322 Unit 40 Total (lb/day)		**11.66**	**--**	**0.45**	**--**	**--**	**--**	**--**	**0.72**	**--**	**--**	**0.90**	**3.26**	**0.94**	**0.05**	**1.65**	**--**	**0.09**	**0.44**	**0.06**	**0.72**	**0.19**	**--**	**0.01**	**--**	**--**	**--**	**--**	**0.01**	**0.67**	**5.43**	**--**	**--**
S-318 Unit 76 Total (lb/day)		**--**	**--**	**--**	**--**	**--**	**--**	**--**	**10.46**	**--**	**--**	**2.17**	**0.01**	**--**	**--**	**--**	**--**	**1.20**	**17.82**	**0.01**	**0.98**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**4.90**	**--**	**--**
S-437 Unit 110 Total (lb/day)		**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**0.70**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**0.11**	**--**	**5.85**	**--**	**--**	**--**	**--**	**--**	**--**	**0.42**	**--**	**1.68**	**--**	**--**
S-307 Unit 240 Total (lb/day)		**--**	**0.81**	**1.58**	**0.52**	**1.05**	**3.15**	**1.57**	**0.25**	**--**	**0.10**	**3.20**	**0.43**	**3.38**	**0.20**	**1.53**	**--**	**3.69**	**2.25**	**6.36**	**5.15**	**7.68**	**0.23**	**1.30**	**--**	**--**	**--**	**--**	**0.02**	**0.01**	**7.55**	**--**	**--**
S-434 Unit 246 Total (lb/day)		**0.03**	**--**	**0.85**	**--**	**--**	**--**	**--**	**1.10**	**0.85**	**--**	**--**	**--**	**0.26**	**7.00**	**0.17**	**0.59**	**0.20**	**1.84**	**0.37**	**2.34**	**1.02**	**--**	**--**	**--**	**--**	**--**	**--**	**0.28**	**2.93**	**--**	**0.85**
S-70 Unit Rail Unloading Total (lb/day)		**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**2.82**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
Grand Total (lb/day)		**149.1**																															
Grand Total (ton/yr)		**27.2**																															

lb/day	tons/year
27.3	4.973
37.4	6.853
8.8	1.597
52.0	9.494
26.7	3.772
2.8	0.514
149.1	27.206

Notes:

1. Counts are based on the following:
   Valve/PRD/Compressors are based on the inspection database on the PTE Guidance tab.
   Connectors are based on filed counts for non-leaking components and an inspection database for leaking components.
   Heavy Liquid Multipliers are from the BAAQMD "Petroleum Refinery Emissions Inventory Guidelines" Table 3.2-2 Heavy Liquid Multipliers. This table is derived using counts listed in EPA's "Emission Estimation Protocol for Petroleum Refineries", Version 3- Table 2-5.
   Heavy Liquid Multipliers are used to calculate the component counts for heavy liquids by multiplying the Heavy Liquid Multipliers by the number of "Light Liquid" plus "Both Gas and Light Liquid" components for each type of connector.
   For example, if there are 504 valves in "Light Liquid" plus "Both Gas and Light Liquid" service, multiply that number by 0.79 to calculate 399 valves in Heavy Liquid service.
2. Per the BAAQMD "Petroleum Refinery Emissions Inventory Guidelines" published in July 2013, EPA Method 21 Correlation Equations from the CAPCOA 1999 California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities - Table IV-3a (Method 3) are used. Leak rates vary by component type and are from BAAQMD Regulation 8-18. Consistent with CAPCOA guidance, drains are assumed to fall into the "Other" component category.
3. Emissions are calculated assuming continuous facility operation (24 hours/day, 365 days/year).

Appendix D, Table D-3: Post-Project Net Increase in Fugitive Component Counts and Corresponding Emissions Increase for Existing Sources

Process Component Counts[1]

Location	Fugitive Component Type	Crude-Blended	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocracker Bottoms	U240 SC1	Diesel	UGO	Recid	Butane	Light Hydrocracked Naphtha	Heavy Naphtha	Light Hydrocracked Naphtha LB	Naphtha	Desulfurized Naphtha	Light Stop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Reasonable Feedstocks	Reasonable Diesel	Reasonable Jet	Reasonable Naphtha	Reformate LB	Sour Water	Unknown/ No HAPs	Jet Fuel	Heavy Vacuum Gas Oil	Total (=subtraction)
		LL/HL	HL	HL	HL	HL	HL	HL	HL	HL	HL	LL	LL	LL	LL	LL	LL	LL	LL	GP	LL	GP	GP	LL	HL	HL	HL	LL	LL	LL	LL	HL	HL	
Unit 40 (S-322)	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	282	--	--	--	--	--	--	--	--	282
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	71	--	--	--	--	--	--	--	--	71
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-1	--	--	--	--	--	--	--	--	-1
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--	3
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	2
Unit 76 (S-318)	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-111	--	--	--	--	--	--	--	-111
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-3	--	--	--	--	--	--	--	-3
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0
Unit 110 (S-457)	Connectors	--	--	--	--	--	--	--	--	--	--	62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	62
	Valves	--	--	--	--	--	--	--	--	--	--	15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0
Unit 240 (S-347)	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	106	--	73	68	151	263	696	--	--	--	--	--	5,291 subtracted replacment connectors from highlighted cell
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	27	--	18	14	30	66	154	--	--	--	--	--	316 subtracted replacment valves from highlighted cell
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1	--	--	--	--	--	3
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	2	--	--	--	--	--	4
Unit 246 (S-434)	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	67	--	--	420	73	--	134	--	--	--	--	--	792 subtracted replacment connectors from highlighted cell
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17	--	--	102	18	--	34	--	--	--	--	--	171 subtracted replacment valves from highlighted cell
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	1
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	--	--	--	--	--	4
Unit Rail Unloading (S-70)	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	423	--	--	--	--	--	--	--	--	423
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	101	--	--	--	--	--	--	--	--	101 subtracted replacment valves from highlighted cell
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-1	--	--	--	--	--	--	--	--	-1
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5	--	--	--	--	--	--	--	--	5
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--	3

POC Emission Factors[2]

Component Type	Equation	HL Leak Rate (ppm)	LL/GV Leak Rate (ppm)	HL EF (lb/hr/comp)	LL/GV EF (lb/hr/comp)
Valves	5.00E-06(SV)^0.747	100	100	1.6E-04	1.6E-04
Pumps	1.12E-04(SV)^0.622	100	100	2.0E-03	2.0E-03
Others	1.32E-05(SV)^0.642	100	100	3.7E-04	3.7E-04
Connectors	3.37E-06(SV)^0.736	100	100	1.0E-04	1.0E-04
Pressure Relief Valves	1.32E-05(SV)^0.642	500	500	1.0E-03	1.0E-03

UNIT	Component Type	# of Replacements	Baseline Service	Post-Project Service
U240 (S-307)	Connectors	35	Coker Gas Oil	Renewable Feedstock
U240 (S-307)	Valves	17	Coker Gas Oil	Renewable Feedstock
U246 (S-434)	Connectors	20	Coker Gas Oil	Renewable Feedstock
U246 (S-434)	Valves	10	Coker Gas Oil	Renewable Feedstock
Rail Unloading	Valves	5	Butane	Renewable Feedstock

Emissions[3]

Location	Fugitive Component Type	Crude-Blended	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocracker Bottoms	U240 SC1	Diesel	UGO	Recid	Butane	Light Hydrocracked Naphtha	Heavy Naphtha	Light Hydrocracked Naphtha LB	Naphtha	Desulfurized Naphtha	Light Stop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Reasonable Feedstocks	Reasonable Diesel	Reasonable Jet	Reasonable Naphtha	Reformate LB	Sour Water	Unknown/ No HAPs	Jet Fuel	Heavy Vacuum Gas Oil
		(POC lb/day)																															
Unit 40	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.63	--	--	--	--	--	--	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.26	--	--	--	--	--	--	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-0.01	--	--	--	--	--	--	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	--	--	--	--	--	--	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.19	--	--	--	--	--	--	--	--
Unit 76	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-0.03	--	--	--	--	--	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-0.01	--	--	--	--	--	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unit 110	Connectors	--	--	--	--	--	--	--	--	--	--	0.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	0.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unit 240	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.25	--	0.17	0.21	0.36	0.63	1.40	--	--	--	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.10	--	0.07	0.05	0.14	0.25	0.58	--	--	--	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	--	--	0.03	--	--	--	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.19	--	--	0.19	--	--	--	--	--
Unit 246	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.16	--	--	1.03	0.17	--	0.32	--	--	--	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.06	--	--	0.20	0.07	--	0.13	--	--	--	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	--	--	--	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.21	--	--	0.21	--	--	--	--	--
Unit Rail Unloading	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.02	--	--	--	--	--	--	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.24	--	--	--	--	--	--	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	-0.02	--	--	--	--	--	--	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	--	--	--	--	--	--	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.16	--	--	--	--	--	--	--	--
Unit 40 Total (lb/day)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**1.06**	--	--	--	--	--	--	--	--
Unit 76 Total (lb/day)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**-0.04**	--	--	--	--	--	--	--
Unit 110 Total (lb/day)		--	--	--	--	--	--	--	--	--	--	**0.24**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unit 240 Total (lb/day)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.35**	--	**0.24**	**0.40**	**0.59**	**0.88**	**2.19**	--	--	--	--	--
Unit 246 Total (lb/day)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.22**	--	--	**1.41**	**0.24**	--	**0.49**	--	--	--	--	--
Unit Rail Unloading Total (lb/day)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**1.57**	--	--	--	--	--	--	--	--
Grand Total (lb/day)		**10.0**																															
Grand Total (ton/yr)		**1.8**																															

Notes:

1. Counts are based on expected change in component counts for the Rodeo Renewed project.
2. Per the BAAQMD "Petroleum Refinery Emissions Inventory Guidelines" published in July 2019, EPA Method 21 Correlation Equations from the CAPCOA 1999 California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities - Table IV-3a (Method 3) are used. Leak rates vary by component type and are from BAAQMD Regulation 8-18. Consistent with CAPCOA guidance, drains are assumed to fall into the "Other" component category.

Appendix D, Table D-4: Post-Project Fugitive Component Counts and Potential to Emit (PTE) for Existing Sources

Process Component Counts[1]

Location	Fugitive Component Type	Crude-Bleeded	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocrcker Bottoms	U240 SC1	Diesel	UGO	Resid	Butane	Light Hydrocrcked Naphtha	Heavy Naphtha	Light Hydrocrcked Naphtha LB	Naphtha	Deculfurized Naphtha	Light Slop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Reactable Feedstocks	Reactable Diesel	Reactable Jet	Reactable Naphtha	Reformate LB	Sour Water	Unknown/ No HAPs	Jet Fuel	Heavy Vacuum Gas Oil	# Components
		LL/HL	HL	HL	HL	HL	HL	HL	HL	HL	HL	LL	LL	LL	LL	LL	LL	LL	LL	GV	LL	GV	GV	LL	HL	HL	HL	LL	LL	LL	HL	HL	
Unit 40 (S-322)	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	42	--	2	1,110	30	30	768	--	80	564	--	--	3,226
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	36	--	2	1,349	27	27	666	--	72	505	--	--	2,707
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	67	3	3	55	--	3	1	--	--	135
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--	233	--	--	236
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	27	1	1	10	--	1	--	--	--	43
Unit 76 (S-318)	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	488	1,188	1,210	2,539	--	--	378	--	--	5,814
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	336	484	487	1,747	--	--	260	--	--	3,314
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7	3	3	93	--	--	9	--	--	120
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	214	--	--	214
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6	4	4	23	--	--	7	--	--	43
Unit 110 (S-437)	Connectors	--	--	--	--	--	--	--	--	--	--	62	--	--	--	--	--	--	--	--	--	1,087	--	--	103	--	--	19	--	--	133	--	--	1,470
	Valves	--	--	--	--	--	--	--	--	--	--	15	--	--	--	--	--	--	--	--	--	746	--	--	54	--	--	54	--	--	91	--	--	981
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	17	--	--	1	--	--	1	--	--	3	--	--	23
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	107	--	--	108
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1	--	--	--	--	--	--	--	--	2
Unit 240 (S-307)	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2,660	--	272	2,436	859	275	2,577	--	3	773	--	--	9,880
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,376	--	163	1,084	247	75	1,514	--	2	530	--	--	5,121
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11	--	--	2	--	--	33	--	--	3	--	--	56
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5	--	--	--	--	--	1	--	--	384	--	--	390
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	2	25	6	1	19	--	--	--	--	--	54
Unit 246 (S-434)	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	277	--	--	836	367	98	1,838	--	43	149	--	--	3,607
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	246	--	--	216	92	25	1,097	--	47	163	--	--	2,687
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	21	--	--	2	--	--	24
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	216	--	--	217
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	3	2	9	--	--	--	--	--	--	--	--	18
Unit Rail Unloading (S-70)	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	635	--	--	--	--	--	--	--	--	--	--	--	835
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	421	--	--	--	--	--	--	--	--	--	--	--	421
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--	--	3
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5	--	--	--	--	--	--	--	--	5
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6	--	--	--	--	--	--	--	--	6

TOTALS (all sources S-70, S-307, S-318, S-322, S-434, and S-437)

14,352	Connectors
10,110	Valves
312	Pressure Relief Valves
150	Others
116	Pumps

POC Emission Factors[2]

Component Type	Equation	HL Leak Rate (ppm)	LL/GV Leak Rate (ppm)	HL EF (lb/hr/comp)	LL/GV EF (lb/hr/comp)
Valves	5.00E-06(SV)^0.747	100	100	1.6E-04	1.6E-04
Pumps	1.12E-04(SV)^0.622	100	100	2.0E-03	2.0E-03
Others	1.92E-05(SV)^0.642	100	100	3.7E-04	3.7E-04
Connectors	3.37E-06(SV)^0.726	100	100	1.0E-04	1.0E-04
Pressure Relief Valves	1.92E-05(SV)^0.642	500	500	1.0E-03	1.0E-03

*500 ppm leak rate for pre-project counts, 100 ppm leak rate for new component counts

Emissions[3]

Location	Fugitive Component Type	Crude-Bleeded	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocrcker Bottoms	U240 SC1	Diesel	UGO	Resid	Butane	Light Hydrocrcked Naphtha	Heavy Naphtha	Light Hydrocrcked Naphtha LB	Naphtha	Deculfurized Naphtha	Light Slop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Reactable Feedstocks	Reactable Diesel	Reactable Jet	Reactable Naphtha	Reformate LB	Sour Water	Unknown/ No HAPs	Jet Fuel	Heavy Vacuum Gas Oil
		(POC lb/day)																															
Unit 40	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.10	--	0.01	4.10	0.07	0.07	1.84	--	0.19	1.35	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.14	--	0.01	5.05	0.10	0.10	2.51	--	0.27	1.89	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.68	0.06	0.06	1.37	--	0.07	0.12	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	--	--	--	--	--	2.06	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.31	0.03	0.03	1.28	--	0.13	--	--	--
Unit 76	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	--	--	1.17	2.87	2.90	6.09	--	--	0.91	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	--	--	1.26	1.81	1.82	6.54	--	--	0.97	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.17	0.06	0.06	2.47	--	--	0.22	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.90	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.77	0.45	0.45	3.72	--	--	--	--	--	0.30	--	--
Unit 110	Connectors	--	--	--	--	--	--	--	--	--	--	0.15	--	--	--	--	--	--	--	--	--	2.61	--	--	0.26	--	--	0.19	--	--	0.32	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	0.06	--	--	--	--	--	--	--	--	--	2.13	--	--	0.28	--	--	0.20	--	--	0.34	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	0.42	--	--	0.02	--	--	0.02	--	--	0.07	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	--	--	--	--	--	--	--	--	0.35	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.13	--	--	0.13	--	--	--	--	--	--	--	--
Unit 240	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.43	--	0.65	5.84	2.06	0.66	6.10	--	0.01	1.67	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.39	--	0.63	4.06	0.92	0.28	5.93	--	0.01	2.21	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.27	--	--	0.06	--	--	0.90	--	--	0.07	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	--	--	--	--	--	0.01	--	--	3.40	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.26	--	0.26	2.37	0.80	0.06	2.20	--	--	--	--	--
Unit 246	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.66	--	--	2.00	0.88	0.24	4.41	--	0.10	0.36	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.92	--	--	0.81	0.34	0.09	7.10	--	0.18	0.61	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	--	--	--	--	--	0.53	--	--	0.05	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	--	--	1.91	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.51	--	0.42	0.22	0.22	0.05	--	--	--	--	--	--
Unit Rail Unloading	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.00	--	--	--	--	--	--	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.58	--	--	--	--	--	--	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.23	--	--	--	--	--	--	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	--	--	--	--	--	--	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.54	--	--	--	--	--	--	--	--
S-322 Unit 40 Total (lb/day)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.24**	--	**0.01**	**14.17**	**0.36**	**0.36**	**7.07**	--	**0.67**	**5.43**	--	--
S-318 Unit 76 Total (lb/day)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.01**	--	--	**3.37**	**5.29**	**5.23**	**18.01**	--	--	**4.39**	--	--
S-437 Unit 110 Total (lb/day)		--	--	--	--	--	--	--	--	--	--	**0.24**	--	--	--	--	--	--	--	--	--	**5.36**	--	--	**0.70**	--	--	**0.42**	--	--	**1.68**	--	--
S-307 Unit 240 Total (lb/day)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**14.40**	--	**1.54**	**12.93**	**3.78**	**1.00**	**15.37**	--	**0.01**	**7.55**	--	--
S-434 Unit 246 Total (lb/day)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**1.61**	--	--	**3.33**	**1.64**	**0.55**	**12.89**	--	**0.28**	**2.93**	--	--
S-70 Unit Rail Unloading Total (lb/day)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**4.33**	--	--	--	--	--	--	--	--
Grand Total (lb/day)		**153.0**																															
Grand Total (ton/yr)		**23.0**																															

Post-Project Totals / **Emissions Increase**

Total lb/day	Total tons/year[4]	lb/day	tons/year
28.3	**5.167**	**1.1**	**0.153**
37.5	**6.847**	**0.0**	**-0.007**
9.0	**1.641**	**0.2**	**0.043**
56.6	**10.327**	**4.6**	**0.834**
23.2	**4.241**	**2.6**	**0.468**
4.4	**0.801**	**1.6**	**0.287**

Notes:

1. Counts are based on the sum of the PTE Pre-Project plus the expected change in component counts for the Rodeo Renewed project.
2. Per the BAAQMD "Petroleum Refinery Emissions Inventory Guidelines" published in July 2015, EPA Method 21 Correlation Equations from the CAPCOA 1999 California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities - Table IV-3a (Method 3) are used. Leak rates vary by component type and are from BAAQMD Regulation 8-18. Consistent with CAPCOA guidance, drains are assumed to fall into the "Other" component category.
3. Emissions are calculated assuming continuous facility operation (24 hours/day, 365 days/year).
4. Total tons/year are based on lb/day x 365

Appendix D, Table D-5: Fugitive TAC Speciations

Material Service[1]		Benzene	1,3-Butadiene	Cresol (mixed isomers)	Ethylbenzene	n-Hexane	Hydrogen sulfide	Mercury	Naphthalene	Phenol	Propylene	Styrene	Toluene	Xylene (mixed isomers)	PAHs (as B[a]P equiv)
		71-43-2	106-99-0	1319-77-3	100-41-4	110-54-3	7783-06-4	7439-97-6	91-20-3	108-95-2	115-07-1	100-42-5	108-88-3	1330-20-7	1150
		wt %													
Crude-Blended	LL/HL	0.159	--	0.037	0.117	0.853	0.01	6.63E-07	0.047	--	--	--	0.405	0.54	0.0004
Gas Oil	HL	0.107	0.002	0.005	0.220	0.0195	0.0001	--	0.124	0.005	--	0.09	0.38	1.17	0.006
Coker Gas Oil	HL	0.014	0.015	--	0.029	--	0.0001	--	0.0086	--	--	--	0.013	0.05	0.001
Light Atm Gas Oil	HL	0.011	--	--	0.023	0.025	0.0001	--	0.089	--	--	--	0.03	0.206	--
Heavy Gas Oil	HL	--	--	--	0.02	--	0.0001	--	0.02	--	--	--	0.25	0.07	--
Hydrocracker Bottoms	HL	--	--	--	--	--	0.0001	--	0.0008	--	--	--	--	--	0.006
U240 SC1	HL	0.014	0.015	--	0.029	0.013	0.0001	--	0.01	--	--	--	0.013	0.05	0.001
Diesel	HL	0.0008	--	0.017	0.156	0.012	0.0001	--	0.262	0.26	--	--	0.546	0.83	0.003
UGO	HL	--	--	--	--	--	0.0001	--	0.0008	--	--	--	--	--	0.006
Resid	HL	--	--	--	--	--	0.0001	--	0.41	--	--	--	--	--	0.001
Butane	LL	--	0.047	--	--	0.19	0.29	--	--	--	0.28	--	--	--	--
Light Hydrocracked Naphtha	LL	3.348	--	--	1.624	1.551	--	--	--	--	--	--	5.457	9.278	--
Heavy Naphtha	LL	0.716	--	--	1.095	3.089	--	--	0.065	--	--	--	3.575	4.662	--
Light Hydrocracked Naphtha LB	LL	0.835	--	--	1.624	1.551	--	--	--	--	--	--	5.457	9.278	--
Naphtha	LL	0.652	--	--	0.931	2.57	--	--	0.14	--	--	--	3.758	4.218	--
Desulfurized Naphtha	LL	1.237	--	--	0.985	3.799	--	--	0.032	--	--	--	4.226	3.295	--
Light Slop Oil	LL	0.449	--	1.45	0.509	1.236	--	--	0.137	0.09	0.13	0.59	2.235	2.237	--
Gasoline	LL	0.44	--	--	1.213	1.239	--	--	0.039	--	--	--	5.955	7.042	0.0004
Cracked Gas	GV	1.571	0.157	--	1.11	0.699	10.7	--	--	--	9.72	--	1.710	0.03	--
Coker Heavy Naphtha	LL	0.291	0.015	0.017	0.927	0.178	--	--	--	--	--	0.035	2.254	3.218	--
RFG	GV	0.015	0.01	--	--	0.538	0.0001	--	--	--	2.19	--	0.015	0.026	--
Sat Gas	GV	1.401	0.012	--	0.10	1.021	0.94	--	0.012	--	0.81	--	0.646	--	--
Propane	LL	--	--	--	--	--	0.38	--	--	--	4.41	--	--	--	--
Renewable Feedstocks	HL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Renewable Diesel	HL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Renewable Jet	HL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Renewable Naphtha	LL	0.001	--	--	0.009	4.685	--	--	0.002	--	--	--	0.022	0.007	--
Reformate LB	LL	0.615	--	--	3.305	2.183	--	--	0.302	--	--	0.108	15.978	16.326	--
Sour Water	LL	--	--	--	--	--	0.75	--	--	--	--	--	--	--	--
Unknown/No HAPs	LL	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Heavy Vacuum Gas Oil	HL	--	--	--	0.02	--	0.0001	--	0.02	--	--	--	0.25	0.07	--

Notes:

1. Speciation by stock obtained from facility's 2019 Regulation 12-15 Emissions Inventory or based on engineering design.

Appendix D, Table D-6: Post-Project Fugitive Potential to Emit (PTE) Emissions For S-600 Pretreatment Unit

Process Component Counts[1]

Fugitive Component Type	PTU Train 1		PTU Train 2		PTU Train 3		FOG Recovery and DAF		Total Number of Components
	Oil	Waste Water	Oil	Waste Water	Oil	Waste Water	Oil	Waste Water	
Connectors	3,361	173	2,199	173	2,199	173	--	866	9,144
Valves	1,120	58	733	58	733	58	--	289	3,049
Pressure Relief Valves	46	--	48	--	48	--	-	14	156
Process Drains	--	--	--	--	--	--	--	--	--
Pumps/All Others (except for 154 Pumps Below)	64	5	45	5	45	5	0	43	58
154 Pumps									154

POC Emission Factors[2]

Component Type	Equation	Leak Rate (ppm)	Emission Factor (kg/hr/comp)
Valves	2.27E-06(SV)^0.747	100	7.08E-05
Pumps	5.07E-05(SV)^0.622	100	8.89E-04
Others	8.69E-06(SV)^0.642	100	1.67E-04
Connectors	1.53E-06(SV)^0.736	100	4.54E-05
Pressure Relief Device	8.69E-06(SV)^0.642	500	4.70E-04
154 Pumps Permitted at 50 ppm	5.07E-05(SV)^0.622	50	5.78E-04

Emissions Calculations[3]

Fugitive Component Type	Total Number of Components	POC Emissions	
		lb/day	ton/year
Connectors	9,144	21.95	4.005
Valves	3,049	11.42	2.084
Pressure Relief Valves	156	3.88	0.707
Process Drains	--	0.00	0.000
Pumps/All Others	58	2.73	0.498
154 Pumps	154	4.71	0.859
Total		44.68	8.154

Notes:

1. Process component counts based on engineering design.
2. Emission factors were calculated using equations from CAPCOA "California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities" Table IV-3a. Leak rates are consistent with interim BAAQMD Guidance until BAAQMD's development and implementation of a heavy liquid leak rate is established and approved.
3. Emissions calculated assuming continuous facility operation (24 hours/day, 365 days/year).

Abbreviations:

hr - hour
kg - kilogram
lb - pound
POC - precursor organic compound
ppm - parts per million
PTU - Pretreatment Unit

References:

CAPCOA. California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities. February 1999. Available online: https://ww3.arb.ca.gov/fugitive/impl_doc.pdf

Appendix D, Table D-7: Post-Project Fugitive Potential to Emit (PTE) Emissions for S-599 Sour Water Strippers and Amine Gas Treatment

Process Component Counts[1]

Fugitive Component Type	Natural Gas	Amine Acid Gas	Total Number of Components
Connectors	880	240	1120
Valves	220	60	280
Pressure Relief Valves	--	--	--
Process Drains	--	--	--
Pumps/All Others	--	--	--

POC Emission Factors[2]

Component Type	Equation	Leak Rate (ppm)	Emission Factor (kg/hr/comp)
Valves	2.27E-06(SV)^0.747	100	7.08E-05
Pumps	5.07E-05(SV)^0.622	100	8.89E-04
Others	8.69E-06(SV)^0.642	100	1.67E-04
Connectors	1.53E-06(SV)^0.736	100	4.54E-05
Pressure Relief Device	8.69E-06(SV)^0.642	500	4.70E-04

POC Emissions Calculations[3]

Fugitive Component Type	POC Emissions					
	Natural Gas		Amine Acid Gas		Total Components	
	lb/day	ton/year	lb/day	ton/year	lb/day	ton/year
Connectors	2.1	0.39	0.58	0.105	2.7	0.49
Valves	0.82	0.150	0.22	0.041	1.05	0.19
Pressure Relief Valves	--	--	--	--	--	--
Process Drains	--	--	--	--	--	--
Pumps/All Others	--	--	--	--	--	--
Total	**2.9**	**0.54**	**0.80**	**0.146**	**3.7**	**0.68**

TAC Emissions Calculations[4]

Stream	Chemical	wt%	lb/year
Natural Gas	N/A	N/A	N/A
Amine Acid Gas	Hydrogen Sulfide	12.9	38

Notes:

1. Process component counts based on engineering design.
2. Emission factors were calculated using equations from CAPCOA "California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities" Table IV-3a.
3. Emissions calculated assuming continuous facility operation (24 hours/day, 365 days/year).
4. Amine Acid Gas chemical speciation based on engineering design. Natural gas assumed not to contain any TACs.

Abbreviations:

hr - hour
kg - kilogram
lb - pound
POC - precursor organic compound
ppm - parts per million
TAC - toxic air contaminant

References:

CAPCOA. California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities. February 1999. Available online: https://ww3.arb.ca.gov/fugitive/impl_doc.pdf

Appendix D, Table D-8: Total Project New and Replacement Fugitive Component Counts by Type and Emissions for New and Existing Sources

Fugitive Component Type	New Source	New Source	Existing Sources	New and Existing Sources	
	S-599 Sour Water Strippers and Amine Gas Treatment	S-600 Pretreatment Unit	Total (S-70, S-307, S-318, S-322, S-434, S-437 combined)	Total for Project	Total for Project excluding exempt S-70
Connectors	1120	9144	2776	13,040	12,617
Valves	280	3049	706	4,035	3,929
Pressure Relief Valves	0	156	5	161	161
Process Drains	0	0	8	8	3
Pumps/All Others	0	212	14	226	223
POC Emissions (lbs/day)	3.7	44.7	10.3	58.7	57.1
POC Emissions (tons/year)	0.682	8.154	1.878	10.714	10.421

Appendix D, Table D-9: Project New and Replacement Fugitive Component Counts and Emissions for Existing Sources by Materials Service

Process Component Counts[1]

Location	Fugitive Component Type	Renewable Feedstocks	Renewable Diesel	Renewable Naphtha	Renewable Jet	Butane	Propane	RFG	Sum
		HL	HL	LL	HL	LL	LL	GV	
Unit 240 (S-307)	Connectors	123	151	616	263	--	73	106	1333
	Valves	31	38	154	66	--	18	27	333
	Pressure Relief Valves	1.3	--	1.3	--	--	--	--	3
	Process Drains	--	--	--	--	--	--	--	0
	Pumps/All Others	2.2	--	2.2	--	--	--	--	4
Unit 246 (S-434)	Connectors	448	73	134	--	--	--	67	722
	Valves	112	18	34	--	--	--	17	181
	Pressure Relief Valves	--	--	1.3	--	--	--	--	1
	Process Drains	--	--	--	--	--	--	--	0
	Pumps/All Others	--	--	4.4	--	--	--	--	4
Rail Unloading (S-70)	Connectors	423	--	--	--	--	--	--	423
	Valves	106	--	--	--	--	--	--	106
	Pressure Relief Valves	0.00	--	--	--	--	--	--	0
	Process Drains	4.8	--	--	--	--	--	--	5
	Pumps/All Others	3.3	--	--	--	--	--	--	3
Unit 110 (S-437)	Connectors	--	--	--	--	62	--	--	62
	Valves	--	--	--	--	15	--	--	15
	Pressure Relief Valves	--	--	--	--	1.3	--	--	1
	Process Drains	--	--	--	--	--	--	--	0
	Pumps/All Others	--	--	--	--	--	--	--	0
Unit 40 (S-322)	Connectors	282	--	--	--	--	--	--	282
	Valves	71	--	--	--	--	--	--	71
	Pressure Relief Valves	0.00	--	--	--	--	--	--	0
	Process Drains	3.2	--	--	--	--	--	--	3
	Pumps/All Others	2.2	--	--	--	--	--	--	2
Unit 76 (S-318)	Connectors	--	0	--	--	--	--	--	0
	Valves	--	0.0	--	--	--	--	--	0
	Pressure Relief Valves	--	--	--	--	--	--	--	
	Process Drains	--	--	--	--	--	--	--	
	Pumps/All Others	--	--	--	--	--	--	--	

Total Existing	
2776	Connectors
706	Valves
5	PRVs
8	Process Drains
14	Pumps

POC Emission Factors[2]

Component Type	Equation	HL Leak Rate (ppm)	LL/GV Leak Rate (ppm)	HL Emission Factor (kg/hr/comp)	LL/GV Emission Factor (kg/hr/comp)
Valves	2.27E-06(SV)^0.747	100	100	7.08E-05	7.08E-05
Pumps	5.07E-05(SV)^0.622	100	100	8.89E-04	8.89E-04
Others	8.69E-06(SV)^0.642	100	100	1.67E-04	1.67E-04
Connectors	1.53E-06(SV)^0.736	100	100	4.54E-05	4.54E-05
Pressure Relief Device	8.69E-06(SV)^0.642	500	500	4.70E-04	4.70E-04

Emissions[3]

Location	Fugitive Component Type	Renewable Feedstocks	Renewable Diesel	Renewable Naphtha	Renewable Jet	Butane	Propane	RFG
		(VOC lb/day)						
Unit 240 (S-307)	Connectors	0.30	0.36	1.5	0.63	--	0.17	0.26
	Valves	0.12	0.14	0.58	0.25	--	0.068	0.10
	Pressure Relief Valves	0.032	--	0.032	--	--	--	--
	Process Drains	--	--	--	--	--	--	--
	Pumps/All Others	0.10	--	0.10	--	--	--	--
Unit 246 (S-434)	Connectors	1.1	0.17	0.32	--	--	--	0.16
	Valves	0.42	0.068	0.13	--	--	--	0.063
	Pressure Relief Valves	--	--	0.032	--	--	--	--
	Process Drains	--	--	--	--	--	--	--
	Pumps/All Others	--	--	0.21	--	--	--	--
Rail Unloading (S-70)	Connectors	1.0	--	--	--	--	--	--
	Valves	0.40	--	--	--	--	--	--
	Pressure Relief Valves	0.000	--	--	--	--	--	--
	Process Drains	0.042	--	--	--	--	--	--
	Pumps/All Others	0.16	--	--	--	--	--	--
Unit 110 (S-437)	Connectors	--	--	--	--	0.15	--	--
	Valves	--	--	--	--	0.058	--	--
	Pressure Relief Valves	--	--	--	--	0.032	--	--
	Process Drains	--	--	--	--	--	--	--
	Pumps/All Others	--	--	--	--	--	--	--
Unit 40 (S-322)	Connectors	0.68	--	--	--	--	--	--
	Valves	0.26	--	--	--	--	--	--
	Pressure Relief Valves	0.000	--	--	--	--	--	--
	Process Drains	0.028	--	--	--	--	--	--
	Pumps/All Others	0.10	--	--	--	--	--	--
Unit 76 (S-318)	Connectors	--	0.000	--	--	--	--	--
	Valves	--	0.000	--	--	--	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--
	Process Drains	--	--	--	--	--	--	--
	Pumps/All Others	--	--	--	--	--	--	--
Unit 240 Total (lb/day)		**0.55**	**0.50**	**2.2**	**0.88**	**--**	**0.24**	**0.36**
Unit 246 Total (lb/day)		**1.5**	**0.24**	**0.7**	**--**	**--**	**--**	**0.22**
Rail Unloading Total (lb/day)		**1.61**	**--**	**--**	**--**	**--**	**--**	**--**
Unit 110 Total (lb/day)		**--**	**--**	**--**	**--**	**0.24**	**--**	**--**
Unit 40 Total (lb/day)		**1.07**	**--**	**--**	**--**	**--**	**--**	**--**
Unit 76 Total (lb/day)		**--**	**0.0000**	**--**	**--**	**--**	**--**	**--**
							Total (lbs/day)	**10.29**
							Total (tons/year)	**1.88**

Notes:

1. Counts are based on engineering design.
2. Emission factors were calculated using equations from CAPCOA "California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities" Table IV-3a. Leak rates for all components in heavy liquid service are consistent with interim BAAQMD guidance until BAAQMD's development and implementation of a heavy liquid leak rate is established and approved. Leak rates for components in light liquid service vary by component type and are from 2019 Regulation 12-15 calculations for the facility. Consistent with CAPCOA guidance, drains are assumed to fall into the "Other" component category.
3. Emissions calculated assuming continuous facility operation (24 hours/day, 365 days/year).

Abbreviations:

GV - Gas/Vapor
HL - Heavy Liquid
hr - hour
kg - kilogram
lb - pound
LL - Light Liquid
POC - precursor organic compound
ppm - parts per million

References:

CAPCOA. California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities. February 1999. Available online: https://ww3.arb.ca.gov/fugitive/impl_doc.pdf

Appendix D, Table D-10: Pre-Project Fugitive Potential to Emit (PTE) Emissions for S-425 and S-426 Marine Terminal

Process Component Counts[1]

Location	Fugitive Component Type	Crude-Bleaded	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocracker Bottoms	U240 SC1	Diesel	UGO	Resid	Butane	Light Hydrocracked Naphtha	Heavy Naphtha	Light Hydrocracked Naphtha LB	Naphtha	Desulfurized Naphtha	Light Slop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Renewable Feedstocks	Renewable Diesel	Renewable Jet	Renewable Naphtha	Reformate LB	Sour Water	Unknown/ No HAPs	Heavy Vacuum Gas Oil
		LL/HL	HL	HL	HL	HL	HL	HL	HL	HL	HL	LL	LL	LL	LL	LL	LL	LL	LL	GV	LL	GV	GV	LL	HL	HL	HL	LL	LL	LL	LL	HL
Marine Terminal	Connectors	206	822	--	--	--	--	--	822	--	--	--	--	--	--	--	--	1,109	415	--	--	305	--	--	--	--	--	--	--	64	216	--
	Valves	160	308	--	--	--	--	--	308	--	--	--	--	--	--	--	--	863	323	--	--	237	--	--	--	--	--	--	--	50	168	--
	Pressure Relief Valves	8	14	--	--	--	--	--	--	--	6	--	--	--	--	--	--	5	--	--	--	--	2	--	--	--	--	--	--	2	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	331	--	--
	Pumps	3	4	--	--	--	--	--	1	--	--	--	--	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	--	--	--	--

POC Emission Factors[2]

Component Type	Equation	HL Leak Rate (ppm)	LL/GV Leak Rate (ppm)	HL EF (lb/hr/comp)	LL/GV EF (lb/hr/comp)
Valves	5.00E-06(SV)^0.747	100	100	1.6E-04	1.6E-04
Pumps	1.12E-04(SV)^0.622	500	500	5.3E-03	5.3E-03
Others	1.92E-05(SV)^0.642	100	100	3.7E-04	3.7E-04
Connectors	3.37E-06(SV)^0.736	100	100	1.0E-04	1.0E-04
Pressure Relief Valves	1.92E-05(SV)^0.642	500	500	1.0E-03	1.0E-03

POC Emissions[3]

Location	Fugitive Component Type	Crude-Bleaded	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocracker Bottoms	U240 SC1	Diesel	UGO	Resid	Butane	Light Hydrocracked Naphtha	Heavy Naphtha	Light Hydrocracked Naphtha LB	Naphtha	Desulfurized Naphtha	Light Slop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Renewable Feedstocks	Renewable Diesel	Renewable Jet	Renewable Naphtha	Reformate LB	Sour Water	Unknown/ No HAPs	Heavy Vacuum Gas Oil
		(POC lb/day)																														
Marine Terminal	Connectors	0.43	1.97	--	--	--	--	--	1.97	--	--	--	--	--	--	--	--	2.66	1.00	--	--	0.73	--	--	--	--	--	--	--	0.15	0.52	--
	Valves	0.60	1.15	--	--	--	--	--	1.15	--	--	--	--	--	--	--	--	3.23	1.21	--	--	0.83	--	--	--	--	--	--	--	0.19	0.63	--
	Pressure Relief Valves	0.20	0.35	--	--	--	--	--	--	--	0.15	--	--	--	--	--	--	0.12	--	--	--	--	0.05	--	--	--	--	--	--	0.05	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.93	--	--
	Pumps	0.38	0.51	--	--	--	--	--	0.13	--	--	--	--	--	--	--	--	7.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Marine Terminal Total (lb/day)		**1.68**	**3.99**	--	--	--	--	--	**3.25**	--	**0.15**	--	--	--	--	--	--	**13.84**	**2.20**	--	--	**1.62**	**0.05**	--	--	--	--	--	--	**3.32**	**1.15**	--
Grand Total (lb/day)		**31.2**																														
Grand Total (ton/yr)		**5.7**																														

Notes:

1. Counts are based on 2019 Regulation 12-15 calculations for the facility.
2. Per the BAAQMD "Petroleum Refinery Emissions Inventory Guidelines" published in July 2019, EPA Method 21 Correlation Equations from the CAPCOA 1999 California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities - Table IV-3a (Method 3) are used. Leak rates vary by component type and are from BAAQMD Regulation 8-18. Consistent with CAPCOA guidance, drains are assumed to fall into the "Other" component category.
3. Emissions are calculated assuming continuous facility operation (24 hours/day, 365 days/year).

Appendix D, Table D-11: Post-Project Fugitive Potential to Emit (PTE) Emissions for S-425 and S-426 Marine Terminal

Process Component Counts[1]

Location	Fugitive Component Type	Crude-Blended	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocracker Bottoms	U240 SC1	Diesel	UGO	Resid	Butane	Light Hydrocracked Naphtha	Heavy Naphtha	Light Hydrocracked Naphtha LB	Naphtha	Desulferized Naphtha	Light Slop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Renewable Feedstocks	Renewable Diesel	Renewable Jet	Renewable Naphtha	Reformate LB	Sour Water	Unknown/ No HAPs	Heavy Vacuum Gas Oil
		LL/HL	HL	HL	HL	HL	HL	HL	HL	HL	HL	LL	LL	LL	LL	LL	LL	LL	LL	GV	LL	GV	GV	LL	HL	HL	HL	LL	LL	LL	LL	HL
Marine Terminal	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	305	--	--	2,137	411	411	415	--	64	216	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	237	--	--	1,331	154	154	323	--	50	168	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	33	--	--	--	--	2	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	331	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	68	1	1	--	--	--	--	--

POC Emission Factors[2]

Component Type	Equation	HL Leak Rate (ppm)	LL/GV Leak Rate (ppm)	HL EF (lb/hr/comp)	LL/GV EF (lb/hr/comp)
Valves	5.00E-06(SV)^0.747	100	100	1.6E-04	1.6E-04
Pumps	1.12E-04(SV)^0.622	500	500	5.3E-03	5.3E-03
Others	1.92E-05(SV)^0.642	100	100	3.7E-04	3.7E-04
Connectors	3.37E-06(SV)^0.736	100	100	1.0E-04	1.0E-04
Pressure Relief Valves	1.92E-05(SV)^0.642	500	500	1.0E-03	1.0E-03

POC Emissions[3]

Location	Fugitive Component Type	Crude-Blended	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocracker Bottoms	U240 SC1	Diesel	UGO	Resid	Butane	Light Hydrocracked Naphtha	Heavy Naphtha	Light Hydrocracked Naphtha LB	Naphtha	Desulferized Naphtha	Light Slop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Renewable Feedstocks	Renewable Diesel	Renewable Jet	Renewable Naphtha	Reformate LB	Sour Water	Unknown/ No HAPs	Heavy Vacuum Gas Oil
		(POC lb/day)																														
Marine Terminal	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.73	--	--	5.12	0.33	0.33	1.00	--	0.15	0.52	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.83	--	--	4.38	0.58	0.58	1.21	--	0.13	0.63	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05	--	0.82	--	--	--	--	0.05	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.93	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.72	0.06	0.06	--	--	--	--	--
Marine Terminal Total (lb/day)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**1.62**	**0.05**	--	**19.65**	**1.63**	**1.63**	**2.20**	--	**3.32**	**1.15**	--

Grand Total (lb/day)	**31.2**
Grand Total (ton/yr)	**5.7**

Notes:

1. Counts are based on 2019 Regulation 12-15 calculations for the facility, plus expected change in component counts for the Rodeo Renewed project.
2. Per the BAAQMD "Petroleum Refinery Emissions Inventory Guidelines" published in July 2013, EPA Method 21 Correlation Equations from the CAPCOA 1999 California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities - Table IV-3a (Method 3) are used. Leak rates vary by component type and are from BAAQMD Regulation 8-18. Consistent with CAPCOA guidance, drains are assumed to fall into the "Other" component category.
3. Emissions are calculated assuming continuous facility operation (24 hours/day, 365 days/year).

Appendix D, Table D-12: Pre-Project Fugitive Potential to Emit (PTE) Emissions for S-309 Unit 248

Process Component Counts[1]

Location	Fugitive Component Type	Crude-Blended	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocracker Bottoms	U240 SC1	Diesel	UGO	Resid	Butane	Light Hydrocracked Naphtha	Heavy Naphtha	Light Hydrocracked Naphtha LB	Naphtha	Desulferized Naphtha	Light Slop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Renewable Feedstocks	Renewable Diesel	Renewable Jet	Renewable Naphtha	Reformate LB	Sour Water	LL/No HAPs	Jet Fuel	Heavy Vacuum Gas Oil
		LL/HL	HL	HL	HL	HL	HL	HL	HL	HL	HL	LL	LL	LL	LL	LL	LL	LL	LL	GV	LL	GV	GV	LL	HL	HL	HL	LL	LL	LL	LL	HL	HL
Unit 248 (S-309)	Connectors	--	33	--	--	--	--	--	--	--	--	--	--	--	224	58	--	2	3	260	59	46	--	--	--	--	--	--	12	--	55	279	--
	Valves	--	32	--	--	--	--	--	--	--	--	--	--	--	220	57	--	2	3	255	58	45	--	--	--	--	--	--	12	--	54	47	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	--	--	7	--	--	--	--	--	--	--	--	--	1	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	60	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	4	--

POC Emission Factors[2]

Component Type	Equation	HL Leak Rate (ppm)	LL/GV Leak Rate (ppm)	HL EF (lb/hr/comp)	LL/GV EF (lb/hr/comp)
Valves	5.00E-06(SV)^0.747	100	100	1.6E-04	1.6E-04
Pumps	1.12E-04(SV)^0.622	500	500	5.3E-03	5.3E-03
Others	1.92E-05(SV)^0.642	100	100	3.7E-04	3.7E-04
Connectors	3.37E-06(SV)^0.736	100	100	1.0E-04	1.0E-04
Pressure Relief Valves	1.92E-05(SV)^0.642	500	500	1.0E-03	1.0E-03

POC Emissions[3]

Location	Fugitive Component Type	Crude-Blended	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocracker Bottoms	U240 SC1	Diesel	UGO	Resid	Butane	Light Hydrocracked Naphtha	Heavy Naphtha	Light Hydrocracked Naphtha LB	Naphtha	Desulferized Naphtha	Light Slop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Renewable Feedstocks	Renewable Diesel	Renewable Jet	Renewable Naphtha	Reformate LB	Sour Water	LL/No HAPs	Jet Fuel	Heavy Vacuum Gas Oil
		(POC lb/day)																															
Unit 248	Connectors	--	0.08	--	--	--	--	--	--	--	--	--	--	--	0.54	0.14	--	0.00	0.01	0.62	0.14	0.11	--	--	--	--	--	--	0.03	--	0.13	0.67	--
	Valves	--	0.12	--	--	--	--	--	--	--	--	--	--	--	0.52	0.21	--	0.01	0.01	0.95	0.22	0.17	--	--	--	--	--	--	0.04	--	0.20	0.18	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.02	--	--	--	--	0.17	--	--	--	--	--	--	--	--	--	0.02	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01	--	--	--	--	--	0.02	--	--	--	--	--	--	--	--	--	0.53	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.26	--	--	--	--	--	--	--	--	--	--	--	0.51	--
Unit 248 Total (lb/day)		--	**0.20**	--	--	--	--	--	--	--	--	--	--	--	**1.40**	**0.38**	--	**0.01**	**0.02**	**1.83**	**0.55**	**0.28**	--	--	--	--	--	--	**0.07**	--	**0.89**	**1.36**	--

Grand Total (lb/day)	**7.0**
Grand Total (ton/yr)	**1.276**

Notes:

1. Counts are based on 2019 Regulation 12-15 calculations for the facility.
2. Per the BAAQMD "Petroleum Refinery Emissions Inventory Guidelines" published in July 2019, EPA Method 21 Correlation Equations from the CAPCOA 1999 California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities - Table IV-3a (Method 3) are used. Leak rates vary by component type and are from BAAQMD Regulation 8-18. Consistent with CAPCOA guidance, drains are assumed to fall into the "Other" component category.
3. Emissions are calculated assuming continuous facility operation (24 hours/day, 365 days/year).

Appendix D, Table D-13: Post-Project Fugitive Potential to Emit (PTE) Emissions for S-309 Unit 248

Process Component Counts[1]

Location	Fugitive Component Type	Crude-Bleaded	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocracker Bottoms	U240 SC1	Diesel	UGO	Resid	Butane	Light Hydrocracked Naphtha	Heavy Naphtha	Light Hydrocracked Naphtha LB	Naphtha	Desulfurized Naphtha	Light Slop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Renewable Feedstocks	Renewable Diesel	Renewable Jet	Renewable Naphtha	Reformate LB	Sour Water	LL/No HAPs	Jet Fuel	Heavy Vacuum Gas Oil
		LL/HL	HL	HL	HL	HL	HL	HL	HL	HL	HL	LL	LL	LL	LL	LL	LL	LL	LL	GV	LL	GV	GV	LL	HL	HL	HL	LL	LL	LL	LL	HL	HL
Unit 248 (S-309)	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	306	59	--	35	--	279	238	--	--	55	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	300	58	--	34	--	47	232	--	--	54	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7	--	--	--	--	2	--	--	1	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	1	--	--	60	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	--	--	--	--	4	--	--	--	--	--	--

POC Emission Factors[2]

Component Type	Equation	HL Leak Rate (ppm)	LL/GV Leak Rate (ppm)	HL EF (lb/hr/comp)	LL/GV EF (lb/hr/comp)
Valves	5.00E-06(SV)^0.747	100	100	1.6E-04	1.6E-04
Pumps	1.12E-04(SV)^0.622	500	500	5.3E-03	5.3E-03
Others	1.32E-05(SV)^0.642	100	100	3.7E-04	3.7E-04
Connectors	3.37E-06(SV)^0.736	100	100	1.0E-04	1.0E-04
Pressure Relief Valves	1.32E-05(SV)^0.642	500	500	1.0E-03	1.0E-03

POC Emissions[3]

Location	Fugitive Component Type	Crude-Bleaded	Gas Oil	Coker Gas Oil	Light Atm Gas Oil	Heavy Gas Oil	Hydrocracker Bottoms	U240 SC1	Diesel	UGO	Resid	Butane	Light Hydrocracked Naphtha	Heavy Naphtha	Light Hydrocracked Naphtha LB	Naphtha	Desulfurized Naphtha	Light Slop Oil	Gasoline	Cracked Gas	Coker Heavy Naphtha	RFG	Sat Gas	Propane	Renewable Feedstocks	Renewable Diesel	Renewable Jet	Renewable Naphtha	Reformate LB	Sour Water	LL/No HAPs	Jet Fuel	Heavy Vacuum Gas Oil
		(POC lb/day)																															
Unit 248	Connectors	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.13	0.14	--	0.08	--	0.67	0.71	--	--	0.13	--	--
	Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.12	0.22	--	0.13	--	0.18	1.09	--	--	0.20	--	--
	Pressure Relief Valves	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.17	--	--	--	--	0.05	--	--	0.02	--	--
	Others	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	--	--	--	--	0.01	--	--	0.53	--	--
	Pumps	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.26	--	--	--	--	0.51	--	--	--	--	--	--
Unit 248 Total (lb/day)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**2.11**	**0.55**	--	**0.21**	--	**1.36**	**1.87**	--	--	**0.89**	--	--
Grand Total (lb/day)		**7.0**																															
Grand Total (ton/yr)		**1.276**																															

Notes:

1. Counts are based on 2019 Regulation 12-15 calculations for the facility, plus expected change in component counts for the Rodeo Renewed project.
2. Per the BAAQMD "Petroleum Refinery Emissions Inventory Guidelines" published in July 2019, EPA Method 21 Correlation Equations from the CAPCOA 1999 California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities - Table IV-3a (Method 3) are used. Leak rates vary by component type and are from BAAQMD Regulation 8-18. Consistent with CAPCOA guidance, drains are assumed to fall into the "Other" component category.
3. Emissions are calculated assuming continuous facility operation (24 hours/day, 365 days/year).

Appendix E- Marine Loading Operations Emissions Calculations

Appendix E, Table E-1
Marine Terminal Vessel Loading Potential to Emit (S-425, S-426)

Material Type	bbl/day - Max	bbl/day - Avg.	bbl/year	Mgal/year	Saturation Factor	Vapor Molecular Weight	TVP (psia)	Temp. (F)	EF (lb/Mgal)	Emissions (lb/d)	Emissions (tons/year)	Pump #/ Capacity	PTE Basis
Post-Project													
Renewable Diesel	145,400	67,000	24,455,000	1,027,110	0.35	130	1.4E-02	80	5.6E-03	34.3	2.881	G-407 4,240 gpm	Project Design
Renewable Feedstocks	113,100	25,000	9,125,000	383,250	0.35	284	1.0E-04	80	2.3E-04	1.1	0.044	G-5/6 3,300 gpm	Project Design
Gasoline	145,400	25,000	9,125,000	383,250					2.7E-02	164.9	5.174	G-408/409 4,240 gpm	PC 4336-6a
									Post-Project Total	200.2	8.099		
Pre-Project													
Gas Oil	87,040	6,190	2,259,350	94,893	0.35	130	8.5E-02	80	8.9E-02	325.8	4.229	Max rate 2019	2019 Actuals
Diesel	138,446	18,677	6,817,157	286,321	0.35	130	1.4E-02	80	5.6E-03	32.6	0.803	G-407 4,240 gpm	2019 Actuals
Gasoline	95,936	25,000	9,125,000	383,250					2.7E-02	108.8	5.174	G-408/409 4,240 gpm	PC 4336-6a
									Pre-Project Total	467.3	10.206		
Post-Project Minus Pre-Project										**-267.0**	**-2.1**	**No increase in PTE**	

Notes:

1. Loading emission factor calculated based on AP-42 Chapter 5.2 methodology, as follows (except for gasoline): EF = 12.46 * [Saturation Factor] * [Molecular Weight] *[TVP] / [Temperature in Rankine]
2. Saturation factor from AP-42 Table 5.2-1, assume 50% loaded for submerged ship loading (0.2 factor) and 50% for submerged barge (0.5 factor).
3. Diesel loading emission factor reduced by 61% to account for clean and purge of vessels. The diesel cleaned and purge utilizes emission reduction similar to the reduction of gasoline for typical (1.8 lb/thou gal) to gas-freed (0.7 lb/thou gal) loading from Table 9.4 in the "Emissions Estimation Protocol for Petroleum Refineries" April 2015. RTI Intl. for US EPA OAQPS = (1 - (0.71/1.8) = 0.61
4. Gasoline emission factor of 1.8 lb/thou gal loaded for typical situation loading a ship or ocean barge from from Table 9-4 of Emission Estimation Protocol for Petroleum Refineries. Factor adjusted for thermal oxidizer efficiency of 98.5% (Condition 4336).
5. bbl/day average values represent the maximum 12 month rolling average.
6. Pre-Project gas oil loading capacity based on 2019 loading rate of 6,190 bbl/day.
7. Max bbl/d for gas oil, diesel, and gasoline from 2019 actual data. Bbl/year and average bbl/d for diesel from 2019 actual data.

Appendix F – Wastewater Treatment System Emissions Calculation

Appendix F, Table F-1
Potentials to Emit (PTE) Emissions for Wastewater Treatment System
Pre-Project PTE = Post-Project PTE

Source #	Description	Throughput (gal/yr)[2]	POC Vapor Ctrl Eff (%)[3]	POC Emissions (lb/day)[4,5]	POC Emissions (ton/yr)[8]	NOx Emissions (lb/day)	NOx Emissions (ton/yr)	CO Emissions (lb/day)	CO Emissions (ton/yr)	PM10 Emissions (lb/day)	PM10 Emissions (ton/yr)	SO2 Emissions (lb/day)	SO2 Emissions (ton/yr)
101	Tank 104 Storm Water Equalization	3.68E+09		29.00	0.396								
102	Tank 105 Storm Water Equalization	3.68E+09		29.00	0.396								
106	Tank 130 Stormwater Equalization	3.68E+09		53.00	2.42								
324	U100_API OIL WASTEWATER SEPARATOR (with outlet channel cover), abated by A-53 Thermal Oxidizer[6]	3.68E+09	10 ppmv	0.03	0.185	15.4	2.803	40.3	7.358	1.3	0.245	1.9	0.35
381	Aeration Tank, Pact (F-201)	1.84E+09	95%	0.93	0.169								
382	Aeration Tank, Pact (F-202)	1.84E+09	95%	0.93	0.169								
383	Clarifier (F-203)	1.84E+09	--	0.35	0.063								
384	Clarifier (F-204)	1.84E+09	--	0.35	0.063								
385	Media Filter (F-271 to F-278)[1]	--	--	--	--								
386	PAC Regeneration Sludge Thickener (F-211)[1]	--	--	--	--								
387	Wet Air Regeneration (P-202)[1]	--	--	--	--								
390	F-284 Thickened Sludge Storage[1]	--	--	--	--								
400	Wet Weather Wastewater Sump	3.68E+09	--	--	--								
401	Dry Weather Wastewater Sump	3.68E+09	--	--	--								
1007	U100-Dissolved Air Flotation Unit (with fixed roof), abated by A-49 Thermal Oxidizer, A-51 DAF Carbon Bed, and A-53 Thermal Oxidizer	3.68E+09	10 ppmv	0.79	0.145	1.15	0.210	0.85	0.156	0.077	0.014	6.48	1.182
1008	Unit 100 Primary Stormwater Basin				0.102								
1009	Unit 100 Main Basin				--								

Notes:

1. Emissions from these sources are negligible and are monitored/reported under the LDAR program.
2. BAAQMD Condition 20989, Part A limits throughput of the Waste Water Treatment Unit to 3.68 E9 gal/yr. The WATER9 model assumes an even split of this total inlet flow into each Aeration Tank and subsequent Clarifier.
3. A vapor control efficiency of 95% is applied for aeration tanks S-381 and S-382, consistent with the Regulation 12-15 Emissions Inventory (powder activated carbon).
4. Modeled flow, temperature, pH, and biomass conditions were estimated based on a 3-year look back for the most conservative conditions (e.g., max flow and temperature, min pH and biomass).
5. POC emissions are estimated by summing emissions of all modeled constituents (organics) from WATER9 model, except as noted in #6 and #7 below.
6. Emissions are from Application 27061 (for combustion emissions) and WATER9 (for process emissions).
7. Emissions are from Application 13424 (for combustion emissions) and WATER9 (for process emissions).
8. POC emissions for S-324 are the sum of A-53's combustion emissions (from Application 27061) and outlet POC emission emissions from WATER9 model. Emissions for other criteria pollutants are from Application 27061.
9. POC emissions for S-1007 are the sum of A-49's combustion emissions (using AP-42 Chapter 1.4-2 emission factor) and outlet POC emission emissions from WATER9 model. Emissions for other criteria pollutants are from Application 27061.
10. POC emissions for S-1008 and S-1009 were estimated based on highest actual annual emissions from previous Regulation 12-15 inventory submissions.
11. POC emissions for S-101, S-102, and S-106 are from Application 483.

Appendix F, Table F-2
Potentials to Emit (PTE) TAC Emissions for Wastewater Treatment System
Pre-Project PTE = Post-Project PTE

Source #	Description	TAC Emissions (lb/yr)										
		Benzene	Cresol	Ethyl benzene	Naph thalene	PAHs (B[a]P equiv)	Phenol	Toluene	Xylene (total)	Hydrogen Sulfide	Formaldehyde	Toluene
101	Tank 104 Storm Water Equalization	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
102	Tank 105 Storm Water Equalization	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
106	Tank 130 Stormwater Equalization	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
324	U100_API OIL WASTEWATER SEPARATOR (with outlet channel cover), abated by A-53 Thermal Oxidizer	0.66	0.01	0.74	0.06	0.00	0.00	3.83	3.41		4.83	0.22
381	Aeration Tank, Pact (F-201)	17.72	0.02	10.40	6.22	0.02	0.08	67.50	75.66			
382	Aeration Tank, Pact (F-202)	17.72	0.02	10.40	6.22	0.02	0.08	67.50	75.66			
383	Clarifier (F-203)	3.63	0.06	1.74	1.52	0.05	0.13	12.56	26.01			
384	Clarifier (F-204)	3.63	0.06	1.74	1.52	0.05	0.13	12.56	26.01			
385	Media Filter (F-271 to F-278)	--	--	--	--	--	--	--	--			
386	PAC Regeneration Sludge Thickener (F-211)	--	--	--	--	--	--	--	--			
387	Wet Air Regeneration (P-202)	--	--	--	--	--	--	--	--			
390	F-284 Thickened Sludge Storage	--	--	--	--	--	--	--	--			
400	Wet Weather Wastewater Sump	--	--	--	--	--	--	--	--			
401	Dry Weather Wastewater Sump	--	--	--	--	--	--	--	--			
1007	U100-Dissolved Air Flotation Unit (with fixed roof), abated by A-49 Thermal Oxidizer, A-51 DAF Carbon Bed, and A-53 Thermal Oxidizer	13.75	0.19	18.12	1.68	0.01	0.07	97.95	93.24	18.51	0.28	0.01
1008	Unit 100 Primary Stormwater Basin	5.70	--	16.72	10.80	19.55	84.55	58.07	53.32			
1009	Unit 100 Main Basin	--	--	--	--	--	--	--	--			

1. Emissions calculated in WATER9 model, except for S-324 (from Application 27061 for A-53's combustion emissions and WATER9 for process emissions), S-1007 (using calculations below for A-49's combustion emissions and WATER9 for process emissions), S-1008, and S-1009.
2. POC emissions for S-1008 and S-1009 were estimated based on highest actual annual emissions from previous Regulation 12-15 inventory submissions.

Combustion Emission Factors for A-49 for (S-1007)
(from BAAQMD Policy: Emission Factors for Toxic Air Contaminants
from Miscellaneous Natural Gas Combustion Sources)
Combustion Emissions for A-49:

	EF (lb/MMBtu)	A-49 Firing Rate (Mmbtu/hr)	lb/hr	lb/yr
Benzene	2.06E-06	0.44	9.06E-07	7.94E-03
Formaldehyde	7.35E-05	0.44	3.23E-05	2.83E-01
Toluene	3.33E-06	0.44	1.47E-06	1.28E-02

Appendix F, Table F-3: Water9 Results

Water 9 Results
Air Emissions per Compound per Unit in Mg/yr: (Controls NOT included)

	S-400/S-401	S-106	S-101	S-102	S-324	S-324		S-1007	S-382	S-381	S-384	S-383	
Compound	**Storm Water Splitter**	**TK 130**	**TK 104**	**TK105**	**API F222/223C/D**	**API F221/223A/B**	**Flash Mix Tank**	**DAF F6-9**	**Aeration Tank F-202**	**Aeration Tank F-201**	**Clarifier F-204**	**Clarifier F-203**	**Total (lb/yr)**
Anthracene	0.00E+00	6.03E-18	3.65E-18	3.65E-18	9.89E-06	9.89E-06	2.30E-20	7.44E-04	1.28E-02	1.28E-02	1.24E-03	1.24E-03	2.89E-02
Benzo(a)anthracene	0.00E+00	2.46E-17	1.49E-17	1.49E-17	1.59E-05	1.59E-05	9.37E-20	1.20E-03	8.49E-02	8.49E-02	4.86E-03	4.86E-03	1.81E-01
Benzo(a)pyrene	0.00E+00	1.49E-17	9.01E-18	9.01E-18	2.89E-07	2.89E-07	5.68E-20	2.19E-05	2.49E-03	2.49E-03	1.93E-04	1.93E-04	5.39E-03
Total Cresol	0.00E+00	2.53E-15	1.53E-15	1.53E-15	5.08E-05	5.08E-05	9.65E-18	3.84E-03	2.16E-04	2.16E-04	2.72E-05	2.72E-05	4.42E-03
2,4-Dimethylphenol	0.00E+00	2.98E-16	1.80E-16	1.80E-16	1.68E-06	1.68E-06	1.14E-18	1.26E-04	2.74E-05	2.74E-05	3.47E-06	3.47E-06	1.92E-04
Fluorene	0.00E+00	5.88E-18	3.56E-18	3.56E-18	1.03E-05	1.03E-05	2.24E-20	7.71E-04	1.32E-02	1.32E-02	1.25E-03	1.25E-03	2.97E-02
2-Methylnaphthalene	0.00E+00	3.20E-17	1.94E-17	1.94E-17	9.81E-05	9.81E-05	1.22E-19	7.36E-03	1.11E-01	1.11E-01	8.59E-03	8.59E-03	2.46E-01
Benzene	0.00E+00	7.08E-17	4.28E-17	4.28E-17	4.25E-03	4.25E-03	2.68E-19	2.85E-01	1.61E-01	1.61E-01	1.65E-03	1.65E-03	6.18E-01
n-Butylbenzene	0.00E+00	2.38E-18	1.44E-18	1.44E-18	4.63E-04	4.63E-04	8.89E-21	2.40E-02	9.33E-03	9.33E-03	6.73E-05	6.73E-05	4.38E-02
Ethylbenzene	0.00E+00	6.11E-17	3.70E-17	3.70E-17	6.05E-03	6.05E-03	2.30E-19	3.76E-01	9.43E-02	9.43E-02	7.88E-04	7.88E-04	5.78E-01
Naphthalene	0.00E+00	2.53E-17	1.53E-17	1.53E-17	4.78E-04	4.78E-04	9.63E-20	3.47E-02	5.64E-02	5.64E-02	6.89E-04	6.89E-04	1.50E-01
Phenanthrene	0.00E+00	2.24E-17	1.35E-17	1.35E-17	4.72E-06	4.72E-06	8.52E-20	3.56E-04	1.63E-04	1.63E-04	1.98E-05	1.98E-05	7.31E-04
Phenol	0.00E+00	1.49E-15	9.01E-16	9.01E-16	1.96E-05	1.96E-05	5.68E-18	1.48E-03	7.42E-04	7.42E-04	5.93E-05	5.93E-05	3.12E-03
n-Propylbenzene	0.00E+00	1.49E-17	9.01E-18	9.01E-18	2.15E-03	2.15E-03	5.59E-20	1.22E-01	7.14E-02	7.14E-02	6.04E-04	6.04E-04	2.71E-01
Pyrene	0.00E+00	3.20E-17	1.94E-17	1.94E-17	2.25E-06	2.25E-06	1.22E-19	1.70E-04	4.20E-03	4.20E-03	5.24E-04	5.24E-04	9.61E-03
Toluene	0.00E+00	4.17E-16	2.52E-16	2.52E-16	3.12E-02	3.12E-02	1.58E-18	2.03E+00	6.12E-01	6.12E-01	5.70E-03	5.70E-03	3.33E+00
1,3,5-Trimethylbenzene	0.00E+00	5.36E-17	3.24E-17	3.24E-17	4.40E-03	4.40E-03	2.03E-19	2.83E-01	4.65E-02	4.65E-02	4.21E-04	4.21E-04	3.85E-01
Xylenes, total	0.00E+00	6.73E-16	4.07E-16	4.07E-16	2.78E-02	2.78E-02	2.55E-18	1.93E+00	6.86E-01	6.86E-01	1.18E-02	1.18E-02	3.39E+00
4-Isopropyltoluene (p-cymene)	0.00E+00	4.25E-18	2.57E-18	2.57E-18	4.58E-04	4.58E-04	1.60E-20	2.80E-02	3.07E-03	3.07E-03	2.43E-05	2.43E-05	3.51E-02
1,2,4-Trimethylbenzene	0.00E+00	1.68E-16	1.02E-16	1.02E-16	6.11E-03	6.11E-03	6.39E-19	4.29E-01	1.15E+00	1.15E+00	2.16E-02	2.16E-02	2.79E+00
Chrysene	0.00E+00	3.87E-17	2.34E-17	2.34E-17	1.07E-05	1.07E-05	1.48E-19	8.09E-04	1.91E-02	1.91E-02	2.29E-03	2.29E-03	4.36E-02
Chloroform	0.00E+00	3.95E-18	2.39E-18	2.39E-18	1.99E-04	1.99E-04	1.50E-20	1.36E-02	1.28E-02	1.28E-02	1.34E-04	1.34E-04	3.98E-02
Methylene chloride (dichloromethane	0.00E+00	1.56E-18	9.46E-19	9.46E-19	4.61E-05	4.61E-05	5.94E-21	3.28E-03	7.12E-03	7.12E-03	8.54E-05	8.54E-05	1.78E-02
Total (lb/yr)	0.00E+00	5.99E-15	3.63E-15	3.63E-15	8.38E-02	8.38E-02	2.28E-17	5.58E+00	3.16E+00	3.16E+00	6.26E-02	6.26E-02	1.22E+01

Water 9 Results
1 Mg = 2204.62 lb
Air Emissions per Compound per Unit in lb/yr: (Controls NOT included)

Compound	**Storm Water Splitter**	**TK 130**	**TK 104**	**TK105**	**API F222/223C/D**	**API F221/223A/B**	**Flash Mix Tank**	**DAF F6-9**	**Aeration Tank F-202**	**Aeration Tank F-201**	**Clarifier F-204**	**Clarifier F-203**	**Total (lb/yr)**
Anthracene	0.00	0.00	0.00	0.00	0.02	0.02	0.00	1.64	28.29	28.29	2.73	2.73	63.73
Benzo(a)anthracene	0.00	0.00	0.00	0.00	0.03	0.03	0.00	2.63	187.10	187.10	10.71	10.71	398.32
Benzo(a)pyrene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	5.49	5.49	0.43	0.43	11.87
Total Cresol	0.00	0.00	0.00	0.00	0.11	0.11	0.00	8.46	0.48	0.48	0.06	0.06	9.75
2,4-Dimethylphenol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.06	0.06	0.01	0.01	0.42
Fluorene	0.00	0.00	0.00	0.00	0.02	0.02	0.00	1.70	29.15	29.15	2.76	2.76	65.57
2-Methylnaphthalene	0.00	0.00	0.00	0.00	0.22	0.22	0.00	16.22	243.70	243.70	18.95	18.95	541.95
Benzene	0.00	0.00	0.00	0.00	9.38	9.38	0.00	628.01	354.41	354.41	3.63	3.63	1,362.84
n-Butylbenzene	0.00	0.00	0.00	0.00	1.02	1.02	0.00	52.99	20.56	20.56	0.15	0.15	96.46
Ethylbenzene	0.00	0.00	0.00	0.00	13.33	13.33	0.00	828.06	207.94	207.94	1.74	1.74	1,274.07
Naphthalene	0.00	0.00	0.00	0.00	1.05	1.05	0.00	76.58	124.31	124.31	1.52	1.52	330.35
Phenanthrene	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.79	0.36	0.36	0.04	0.04	1.61
Phenol	0.00	0.00	0.00	0.00	0.04	0.04	0.00	3.26	1.64	1.64	0.13	0.13	6.88
n-Propylbenzene	0.00	0.00	0.00	0.00	4.74	4.74	0.00	270.04	157.41	157.41	1.33	1.33	597.01
Pyrene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	9.25	9.25	1.16	1.16	21.20
Toluene	0.00	0.00	0.00	0.00	68.79	68.79	0.00	4,476.64	1,349.93	1,349.93	12.56	12.56	7,339.20
1,3,5-Trimethylbenzene	0.00	0.00	0.00	0.00	9.71	9.71	0.00	622.89	102.46	102.46	0.93	0.93	849.09
Xylenes, total	0.00	0.00	0.00	0.00	61.31	61.31	0.00	4,261.64	1,513.27	1,513.27	26.01	26.01	7,462.83
4-Isopropyltoluene (p-cymene)	0.00	0.00	0.00	0.00	1.01	1.01	0.00	61.63	6.78	6.78	0.05	0.05	77.31
1,2,4-Trimethylbenzene	0.00	0.00	0.00	0.00	13.47	13.47	0.00	945.47	2,543.38	2,543.38	47.53	47.53	6,154.24
Chrysene	0.00	0.00	0.00	0.00	0.02	0.02	0.00	1.78	42.10	42.10	5.04	5.04	96.12
Chloroform	0.00	0.00	0.00	0.00	0.44	0.44	0.00	29.98	28.15	28.15	0.30	0.30	87.75
Methylene chloride (dichloromethane	0.00	0.00	0.00	0.00	0.10	0.10	0.00	7.23	15.69	15.69	0.19	0.19	39.19
Total (lb/yr)	0.00	0.00	0.00	0.00	184.85	184.85	0.00	12,298.35	6,971.92	6,971.92	137.94	137.94	26,887.76

(calculated based on efficiencies to right)

% of Fugitive Water9 emissions emitted @ DAF area source, not collected 1.00%
% of Fugitive Water9 emissions @ DAF T.O. stack, collected but not destroyed 1.19%
T.O. Collection Efficiency - DAF 99%
T.O. Destruction Efficiency - DAF 98.80%
T.O. COMBINED Efficiency - DAF 97.81200%

EPA-450/3-85-001a "VOC Emissions from Petroleum Refinery Wastewater Systems - Background Information for Proposed Standards" Section 4.1.3.2 (PDF page 128) for covered dissolved Air Flotation Systems. "For example, tightly covering a DAF and venting the emissions to a flare will reduce emissions by approximately 97 percent. This assumes a 99 percent capture efficiency for the roof and a 98 percent destruction efficiency for the flare."
average of 9-4-09 and 11-24-09 tests

% of Fugitive Water9 emissions emitted @ API area source, not collected 1.00%
% of Fugitive Water9 emissions @ API T.O. stack, collected but not destroyed 1.78%
T.O. Collection Efficiency - API 99%
T.O. Destruction Efficiency - API 98.20%
T.O. COMBINED Efficiency - API 97.22%

EPA-450/3-85-001a "VOC Emissions from Petroleum Refinery Wastewater Systems - Background Information for Proposed Standards" Section 4.1.2.2 (PDF page 122) for covered Oil/water Separators, which includes the API style separator. "The use of a fixed roof with vapors vented to a control device will result in greater overal control of captured VOC emissions. Due to some possible leakage, the capture efficiency of the roof in this type of control system would be approximately 99 percent."
5-13-16 test

Aeration Tank powder activated carbon 95%
AP-42, 4.3 for liquid phase carbon adsorption ("Average removal efficiency ranges from 90 to 99 percent")
Estimated removal efficiency above represents expected total control efficiency for liquid phase carbon adsorption, no need to account for a "capture" efficiency like for sources where gases are collected and sent to thermal oxidizers.

Air Emissions per Compound per Unit in lb/yr (Correcting for Controls):

	400	106	101	102	324			1007	382	381	384	383	
Compound	**Storm Water Splitter**	**TK 130**	**TK 104**	**TK105**	**API F222/223C/D**	**API F221/223A/B**	**Flash Mix Tank**	**DAF F6-9**	**Aeration Tank F-202**	**Aeration Tank F-201**	**Clarifier F-204**	**Clarifier F-203**	**Total (lb/yr)**
Anthracene	0.00E+00	1.33E-14	8.05E-15	8.05E-15	6.06E-04	6.06E-04	5.07E-17	3.59E-02	1.41E+00	1.41E+00	2.73E+00	2.73E+00	8.33E+00
Benzo(a)anthracene	0.00E+00	5.42E-14	3.28E-14	3.28E-14	9.73E-04	9.73E-04	2.06E-16	5.76E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.96E-02
Benzo(a)pyrene	0.00E+00	3.28E-14	1.99E-14	1.99E-14	1.77E-05	1.77E-05	1.25E-16	1.05E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.09E-03
Total Cresol	0.00E+00	5.58E-12	3.38E-12	3.38E-12	3.12E-03	3.12E-03	2.13E-14	1.85E-01	2.38E-02	2.38E-02	6.00E-02	6.00E-02	3.59E-01
2,4-Dimethylphenol	0.00E+00	6.57E-13	3.97E-13	3.97E-13	1.03E-04	1.03E-04	2.50E-15	6.10E-03	3.02E-03	3.02E-03	7.66E-03	7.66E-03	2.77E-02
Fluorene	0.00E+00	1.30E-14	7.85E-15	7.85E-15	6.29E-04	6.29E-04	4.94E-17	3.72E-02	1.46E+00	1.46E+00	2.76E+00	2.76E+00	8.48E+00
2-Methylnaphthalene	0.00E+00	7.06E-14	4.27E-14	4.27E-14	6.02E-03	6.02E-03	2.69E-16	3.55E-01	1.22E+01	1.22E+01	1.89E+01	1.89E+01	6.26E+01
Benzene	0.00E+00	1.56E-13	9.44E-14	9.44E-14	2.61E-01	2.61E-01	5.91E-16	1.37E+01	1.77E+01	1.77E+01	3.63E+00	3.63E+00	5.70E+01
n-Butylbenzene	0.00E+00	5.26E-15	3.18E-15	3.18E-15	2.84E-02	2.84E-02	1.96E-17	1.16E+00	1.03E+00	1.03E+00	1.48E-01	1.48E-01	3.57E+00
Ethylbenzene	0.00E+00	1.35E-13	8.15E-14	8.15E-14	3.71E-01	3.71E-01	5.08E-16	1.81E+01	1.04E+01	1.04E+01	1.74E+00	1.74E+00	4.31E+01
Naphthalene	0.00E+00	5.58E-14	3.38E-14	3.38E-14	2.93E-02	2.93E-02	2.12E-16	1.68E+00	6.22E+00	6.22E+00	1.52E+00	1.52E+00	1.72E+01
Phenanthrene	0.00E+00	4.93E-14	2.98E-14	2.98E-14	2.89E-04	2.89E-04	1.88E-16	1.72E-02	1.80E-02	1.80E-02	4.36E-02	4.36E-02	1.41E-01
Phenol	0.00E+00	3.28E-12	1.99E-12	1.99E-12	1.20E-03	1.20E-03	1.25E-14	7.13E-02	8.18E-02	8.18E-02	1.31E-01	1.31E-01	4.99E-01
n-Propylbenzene	0.00E+00	3.28E-14	1.99E-14	1.99E-14	1.32E-01	1.32E-01	1.23E-16	5.91E+00	7.87E+00	7.87E+00	1.33E+00	1.33E+00	2.46E+01
Pyrene	0.00E+00	7.06E-14	4.27E-14	4.27E-14	1.38E-04	1.38E-04	2.69E-16	8.21E-03	4.63E-01	4.63E-01	1.16E+00	1.16E+00	3.24E+00
Toluene	0.00E+00	9.20E-13	5.56E-13	5.56E-13	1.91E+00	1.91E+00	3.48E-15	9.79E+01	6.75E+01	6.75E+01	1.26E+01	1.26E+01	2.62E+02
1,3,5-Trimethylbenzene	0.00E+00	1.18E-13	7.15E-14	7.15E-14	2.70E-01	2.70E-01	4.47E-16	1.36E+01	5.12E+00	5.12E+00	9.27E-01	9.27E-01	2.63E+01
Xylenes, total	0.00E+00	1.48E-12	8.98E-13	8.98E-13	1.71E+00	1.71E+00	5.63E-15	9.32E+01	7.57E+01	7.57E+01	2.60E+01	2.60E+01	3.00E+02
4-Isopropyltoluene (p-cymene)	0.00E+00	9.36E-15	5.66E-15	5.66E-15	2.81E-02	2.81E-02	3.53E-17	1.35E+00	3.39E-01	3.39E-01	5.35E-02	5.35E-02	2.19E+00
1,2,4-Trimethylbenzene	0.00E+00	3.71E-13	2.24E-13	2.24E-13	3.75E-01	3.75E-01	1.41E-15	2.07E+01	1.27E+02	1.27E+02	4.75E+01	4.75E+01	3.71E+02
Chrysene	0.00E+00	8.54E-14	5.17E-14	5.17E-14	6.57E-04	6.57E-04	3.25E-16	3.90E-02	2.11E+00	2.11E+00	5.04E+00	5.04E+00	1.43E+01
Chloroform	0.00E+00	8.70E-15	5.26E-15	5.26E-15	1.22E-02	1.22E-02	3.30E-17	6.56E-01	1.41E+00	1.41E+00	2.96E-01	2.96E-01	4.09E+00
Methylene chloride (dichloromethane	0.00E+00	3.45E-15	2.09E-15	2.09E-15	2.83E-03	2.83E-03	1.31E-17	1.58E-01	7.85E-01	7.85E-01	1.88E-01	1.88E-01	2.11E+00
Total (lb/yr)	0.00E+00	1.32E-11	7.99E-12	7.99E-12	5.14E+00	5.14E+00	5.03E-14	2.69E+02	3.39E+02	3.39E+02	1.27E+02	1.27E+02	1.21E+03
Benzo(a)phenanthrene													
PAH (as B(a)P-equivalent)	0.00E+00	3.91E-14	2.37E-14	2.37E-14	1.22E-04	1.22E-04	1.49E-16	7.21E-03	2.11E-02	2.11E-02	5.04E-02	5.04E-02	

BAAQMD Reg 2-5 Table 2-5-1, Footnote 8 PAH or derivative												
benz(a)anthracene	--	5.42E-14	3.28E-14	3.28E-14	9.73E-04	9.73E-04	2.06E-16	5.76E-02	--	--	--	--
benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
benzo(j)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--
benzo(a)pyrene	--	3.28E-14	1.99E-14	1.99E-14	1.77E-05	1.77E-05	1.25E-16	1.05E-03	--	--	--	--
chrysene	--	8.54E-14	5.17E-14	5.17E-14	6.57E-04	6.57E-04	3.25E-16	3.90E-02	2.11E+00	2.11E+00	5.04E+00	5.04E+00
dibenz(a,j)acridine	--	--	--	--	--	--	--	--	--	--	--	--
dibenz(a,h)acridine	--	--	--	--	--	--	--	--	--	--	--	--
dibenz(a,h)anthracene	--	--	--	--	--	--	--	--	--	--	--	--
7H-dibenzo(c,g)carbazole	--	--	--	--	--	--	--	--	--	--	--	--
dibenzo(a,e)pyrene	--	--	--	--	--	--	--	--	--	--	--	--
dibenzo(a,h)pyrene	--	--	--	--	--	--	--	--	--	--	--	--
dibenzo(a,i)pyrene	--	--	--	--	--	--	--	--	--	--	--	--
dibenzo(a,l)pyrene	--	--	--	--	--	--	--	--	--	--	--	--
7,12-dimethylbenz(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	--
indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--	--	--
5-methylchrysene	--	--	--	--	--	--	--	--	--	--	--	--
3-methylcholanthrene	--	--	--	--	--	--	--	--	--	--	--	--
5-nitroacenaphthene	--	--	--	--	--	--	--	--	--	--	--	--
1-nitropyrene	--	--	--	--	--	--	--	--	--	--	--	--
4-nitropyrene	--	--	--	--	--	--	--	--	--	--	--	--
1,6-dinitropyrene	--	--	--	--	--	--	--	--	--	--	--	--
1,8-dinitropyrene	--	--	--	--	--	--	--	--	--	--	--	--
6-nitrocrysene	--	--	--	--	--	--	--	--	--	--	--	--
2-nitrofluorene	--	--	--	--	--	--	--	--	--	--	--	--

Appendix F, Figure F-1: Wastewater Treatment Plant Schematic (Water9)

Confidential Business Information

REDACTED

Appendix F, Table F-4: Water9 Inputs
A LISTING OF INPUT SPECIFICATIONS FOR EACH UNIT

Red font indicates values adjusted to represent PTE emissions

Type of unit is closed sump, vent			
Description of unit	**Stormwater Splitter Box**		Unit Engineer/Maintainence provided unit dimensions: 29' L x 11' W x 22' 7" D.
	Water9 Default	**P66 Input RR PTE**	
Underflow T (C)	25	**39**	3-Yr Max Temperature
Total water added at the unit (l/s)	0	0	This will be specified by the influent stream to the system - See "Stream Inputs Summary" Tab
Area of openings at unit (cm2)	50	50	default . This would be the visible area available for exit/entrance flow
Radius of drop pipe (cm)	5	5	default. For a closed sump this refers to the vertical pipe that is the vent of the closed sump.
Drop length to conduit (cm)	61	61	default. For a closed sump this refers to the vertical pipe that is the vent of the closed sump.
Open surface=1	0	0	this unit is closed (as per unit engineer)
Subsurface entrance=1	0	1	Based on P&ID "0100-YD-016-001"
subsurface exit =1	0	1	Based on P&ID "0100-YD-016-001"
radius of underflow conduit (cm)	12	30.48	Radius of circular exiting pipe that connects the unit to the next unit downstream. A 24" pipe is exiting Storm Splitter Box according to P&ID "0100-YD-016-001"
distance to next unit (cm)	500	500	default
slope of underflow conduit	0.015	0.015	default
control device effectiveness	0.95	0	No carbon canister or control device on unit
velocity air at opening (ft/min)	88	88	default
municipal waste in conduit =1	0	0	default
Assume equilibrium in unit. =1	0	0	default
pH (enter 0 for no pH adjustment)	0	0	default

Type of unit is closed sump, vent			Source
Description of unit	**Dry Weather Sump**		*Unit Engineer has provided unit dimensions: 32' L x 36' W x 22' 9" D
	Water9 Default	**P66 Input RR PTE**	
Underflow T (C)	25	**39**	3-Yr Max Temperature
Total water added at the unit (l/s)	0	0	This will be specified by the influent stream to the system - See "Stream Inputs Summary" Tab
Area of openings at unit (cm2)	50	50	default . This would be the visible area available for exit/entrance flow
Radius of drop pipe (cm)	5	5	default. For a closed sump this refers to the vertical pipe that is the vent of the closed sump.
Drop length to conduit (cm)	61	61	default. For a closed sump this refers to the vertical pipe that is the vent of the closed sump.
Open surface=1	0	0	Unit Engineer described unit as closed to atmosphere
Subsurface entrance=1	0	1	As per P&ID, "0100-YD-016-002"
subsurface exit =1	0	1	As per P&ID, "0100-YD-016-002"
radius of underflow conduit (cm)	12	30.48	Radius of circular exiting pipe that connects the unit to the next unit downstream. A 24" pipe is exiting Dry Sump to APIs according to P&ID "0100-YD-016-002"
distance to next unit (cm)	500	500	default
slope of underflow conduit	0.015	0.015	default
control device effectiveness	0.95	0	No carbon canister or control device on unit - Unit Engineer
velocity air at opening (ft/min)	88	88	default
municipal waste in conduit =1	0	0	default
Assume equilibrium in unit. =1	0	0	default
pH (enter 0 for no pH adjustment)	0	**4.6**	3-Yr Min pH

Type of unit is divert flow	**Flow Diverted from Stormwater Splitter to Wet Weather Sump**		
Description of unit	**Water9 Default**	**P66 Input RR PTE**	Source
flow diversion rate (l/s)	0	**143.98**	Based on 3-Yr Average
fraction waste flow diverted	0		

Type of unit is closed sump, vent			Source
Description of unit	**Wet Weather Sump**		*Unit Engineer has provided unit dimensions: 32' L x 36' W x 22' 9" D
	Water9 Default	**P66 Input RR PTE**	
Underflow T (C)	25	**39**	3-Yr Max Temperature
Total water added at the unit (l/s)	0	0	This will be specified by the influent stream to the system - See "Stream Inputs Summary" Tab
Area of openings at unit (cm2)	50	50	default . This would be the visible area available for exit/entrance flow
Radius of drop pipe (cm)	5	5	default. For a closed sump this refers to the vertical pipe that is the vent of the closed sump.
Drop length to conduit (cm)	61	61	default. For a closed sump this refers to the vertical pipe that is the vent of the closed sump.
Open surface=1	0	0	Unit Engineer described unit as closed to atmosphere
Subsurface entrance=1	0	1	As per P&ID, "0100-YD-016-001"
subsurface exit =1	0	1	As per P&ID, "0100-YD-016-001"
radius of underflow conduit (cm)	12	30.48	Radius of circular exiting pipe that connects the unit to the next unit downstream. A 24" pipe is exiting Wet Weather Sump according to P&ID "0100-YD-016-001"
distance to next unit (cm)	500	500	default
slope of underflow conduit	0.015	0.015	default
control device effectiveness	0.95	0	No carbon canister or control device on unit - Unit Engineer
velocity air at opening (ft/min)	88	88	default
municipal waste in conduit =1	0	0	default
Assume equilibrium in unit. =1	0	0	default
pH (enter 0 for no pH adjustment)	0	0	default

Type of unit is divert flow	**Flow Diverted From Sumps to Equalization Tk 130**		
Description of unit	**Water9 Default**	**P66 Input RR PTE**	Source
flow diversion rate (l/s)	0		
fraction waste flow diverted	0	0.33	Flow will be divided equally among the 3 equalization tanks

Type of unit is divert flow	**Flow Diverted From Sumps to Equalization Tk 105**		
Description of unit	**Water9 Default**	**P66 Input RR PTE**	Source
flow diversion rate (l/s)	0		
fraction waste flow diverted	0	0.33	Flow will be divided equally among the 3 equalization tanks

Type of unit is equalization			
Description of unit	**Equalization Tank 130**		
	Water9 Default	**P66 Input RR PTE**	Source
Wastewater temperature (C)	25	**39**	3-Yr Max Temperature
length of unit (m)	100	48.6	Unit Dimensions specified on P&ID: "0100-YD-016-003": Diameter 180', Height 57'. Using diameter, calculate area and determine l and w
width of unit (m)	10	48.6	Unit Dimensions specified on P&ID: "0100-YD-016-003": Diameter 180', Height 57'
depth of unit (m)	5	17.4	Unit Dimensions specified on P&ID: "0100-YD-016-003": Diameter 180', Height 57'
Area of agitation (each aerator,m2)	47	0	No agitation in unit - mixers never added
Total number of agitators in the unit	1	0	No agitation in unit - mixers never added
Power of agitation (each aerator,HP)	7.5	0	No agitation in unit - mixers never added
Impeller diameter (cm)	60	0	No agitation in unit - mixers never added
Impeller rotation (RPM)	1200	0	No agitation in unit - mixers never added
Agitator mechanical efficiency	0.83	0	No agitation in unit - mixers never added
aerator effectiveness, alpha	0.83	0	No aeration
if there is plug flow, enter 1	0	0	default - assume well mixed
Overall biorate (mg/g bio-hr)	19	0	No biomass in unit
Aeration air flow (m3/s)	0	0	No aeration
active biomass, (g/l)	0.05	0	No biomass in unit
If covered, then enter 1	0	1	Unit is covered - See P&ID "0100-YD-016-003"
special input	0	0	
pH (enter 0 for no pH adjustment)	0	**4.6**	Assuming pH from Dry Weather Sump

Type of unit is equalization			
Description of unit	**Equalization Tank 104**		
	Water9 Default	**P66 Input RR PTE**	Source
Wastewater temperature (C)	25	**39**	3-Yr Max Temperature
length of unit (m)	100	37.8	Unit Dimensions specified on P&ID: "TANK-YD-22L-001": Diameter 140', Height 48'. Using diameter, calculate area and determine l and w
width of unit (m)	10	37.8	Unit Dimensions specified on P&ID: "TANK-YD-22L-001": Diameter 140', Height 48'.
depth of unit (m)	5	14.6	Unit Dimensions specified on P&ID: "TANK-YD-22L-001": Diameter 140', Height 48'.
Area of agitation (each aerator,m2)	47	0	No agitation in unit - mixers never added
Total number of agitators in the unit	1	0	No agitation in unit - mixers never added
Power of agitation (each aerator,HP)	7.5	0	No agitation in unit - mixers never added
Impeller diameter (cm)	60	0	No agitation in unit - mixers never added
Impeller rotation (RPM)	1200	0	No agitation in unit - mixers never added
Agitator mechanical efficiency	0.83	0	No agitation in unit - mixers never added
aerator effectiveness, alpha	0.83	0	No aeration
if there is plug flow, enter 1	0	0	default - assume well mixed
Overall biorate (mg/g bio-hr)	19	0	No biomass in unit
Aeration air flow (m3/s)	0	0	No aeration
active biomass, (g/l)	0.05	0	No biomass in unit
If covered, then enter 1	0	1	Unit is covered - See P&ID "0100-YD-016-003"
special input	0	0	
pH (enter 0 for no pH adjustment)	0	**4.6**	Assuming pH from Dry Weather Sump

Type of unit is equalization			
Description of unit	**Equalization Tank 105**		
	Water9 Default	**P66 Input RR PTE**	Source
Wastewater temperature (C)	25	**39**	3-Yr Max Temperature
length of unit (m)	100	37.8	Unit Dimensions specified on P&ID: "TANK-YD-22L-002": Diameter 140', Height 48'. Using diameter, calculate area and determine l and w
width of unit (m)	10	37.8	Unit Dimensions specified on P&ID: "TANK-YD-22L-002": Diameter 140', Height 48'.
depth of unit (m)	5	14.6	Unit Dimensions specified on P&ID: "TANK-YD-22L-002": Diameter 140', Height 48'.
Area of agitation (each aerator,m2)	47	0	No agitation in unit - mixers never added
Total number of agitators in the unit	1	0	No agitation in unit - mixers never added
Power of agitation (each aerator,HP)	7.5	0	No agitation in unit - mixers never added
Impeller diameter (cm)	60	0	No agitation in unit - mixers never added
Impeller rotation (RPM)	1200	0	No agitation in unit - mixers never added
Agitator mechanical efficiency	0.83	0	No agitation in unit - mixers never added
aerator effectiveness, alpha	0.83	0	No aeration
if there is plug flow, enter 1	0	0	default - assume well mixed
Overall biorate (mg/g bio-hr)	19	0	No biomass in unit
Aeration air flow (m3/s)	0	0	No aeration
active biomass, (g/l)	0.05	0	No biomass in unit
If covered, then enter 1	0	1	Unit is covered - See P&ID "0100-YD-016-003"
special input	0	0	
pH (enter 0 for no pH adjustment)	0	**4.6**	Assuming pH from Dry Weather Sump

Type of unit is divert flow	**Flow Diverted FromEqualization Tanks to API**		
Description of unit	**Water9 Default**	**P66 Input RR PTE**	Source

flow diversion rate (l/s)	0		
fraction waste flow diverted	0	0.5	Flow divided equally among 2 APIs

Type of unit is covered separator			
Description of unit	**API F222/223C/D**		*Combining F222 Forebay and F223C/D Afterbays
	Water9 Default	**P66 Input RR PTE**	Source
Wastewater temperature ©	25	**39**	3-Yr Max Temperature
area of run vent or opening (cm2/unit)	80	80	default
velocity air at opening (ft/min)	88	88	default
length of unit (m)	10	24.2	Combining F222/F223C/D: P&ID "0100-YD-006-001" for unit dimensions
width of unit (m)	10	24.2	F222: 41'L x 12'W x 6'-4"D, F223C/D: 145'Lx20'W x 7'-8"D
depth of unit (m)	5	6.6	Sum of depths
Cover vent rate (m3/s per m2 surface)	0.0005	0.0005	default
headspace depth (cm)	30	30	default
fraction of oil recovered from water	0.7	0.7	default - no data available (per unit engineer)
oil in composite wastewater (wt. %)	0	0	default - no data available (per unit engineer)
pH (enter 0 for no pH adjustment)	0	**5.56**	3-Yr Min pH

Type of unit is covered separator			
Description of unit	**API F221/223A/B**		*Combining F221 Forebay and F223A/B Afterbays
	Water9 Default	**P66 Input RR PTE**	Source
Wastewater temperature ©	25	**39**	3-Yr Max Temp
area of run vent or opening (cm2/unit)	80	80	default
velocity air at opening (ft/min)	88	88	default
length of unit (m)	10	24.2	Combining F222/F223C/D: P&ID "0100-YD-006-001" for unit dimensions
width of unit (m)	10	24.2	F222: 41'L x 12'W x 6'-4"D, F223C/D: 145'Lx20'W x 7'-8"D
depth of unit (m)	5	6.6	Sum of depths
Cover vent rate (m3/s per m2 surface)	0.0005	0.0005	default
headspace depth (cm)	30	30	default
fraction of oil recovered from water	0.7	0.7	default - no data available (per unit engineer)
oil in composite wastewater (wt. %)	0	0	default - no data available (per unit engineer)
pH (enter 0 for no pH adjustment)	0	**5.56**	3-Yr Min pH

Type of unit is mix tank			
Description of unit	**Flash Mix Tank**		
	Water9 Default	**P66 Input RR PTE**	Source
Wastewater temperature (C)	25	**39**	3-Yr Max Temp
length of unit (m)	10	3	Dimensions from Unit Engineer/Maintainence: 10' X 10' x 9'
width of unit (m)	10	3	Dimensions from Unit Engineer/Maintainence: 10' X 10' x 9'
depth of unit (m)	5	2.7	Dimensions from Unit Engineer/Maintainence: 10' X 10' x 9'
Area of agitation (each aerator,m2)	47	47	Default
total number of agitators in the unit	1	1	From Unit Engineer: 1 agitator, model 72Q5 "Lightnin", 4-blade, 39" impeller, 84 rpm
Power of agitation (each aerator,HP)	7.5	7.5	Default due to lack of information - 70 series equipment come in a variety of hP
Impeller diameter (cm)	60	99.06	From Unit Engineer: 1 agitator, model 72Q5 "Lightnin", 4-blade, 39" impeller, 84 rpm
Impeller rotation (RPM)	1200	84	From Unit Engineer: 1 agitator, model 72Q5 "Lightnin", 4-blade, 39" impeller, 84 rpm
if there is plug flow, enter 1	0	0	Default
Aeration air flow (m3/s)	0	0	Covered Unit
vent air emission control factor	0	0	
If covered, then enter 1	0	1	Unit Engineer specified - leaks may develop but are repaired
pH (enter 0 for no pH adjustment)	0	**6.5**	Assuming API Effluent pH - 3-Yr Min pH

Type of unit is DAF or grit separator			
Description of unit	**DAF F6-9**		
	Water9 Default	**P66 Input RR PTE**	Source
Wastewater temperature (C)	25	**39**	3-Yr Max Temp
KL unit surface (m/s)	0.001	0.001	Default
Pretreatment length (m)	5	19.8	Unit Engineer provided unit dimensions: 65' L x 20' W x 10' D
Pretreatment width (m)	3	6.1	Unit Engineer provided unit dimensions: 65' L x 20' W x 10' D
Pretreatment depth (m)	3	3	Unit Engineer provided unit dimensions: 65' L x 20' W x 10' D
air flow (m3/s)	0	0.00708	Unit Engineer provided an estimate of 12-15 SCFM/DAF. To be conservative we will use 15 scfm
oil in composite wastewater (wt. %)	0	0	Assume default as site specific data is not available
fraction surface covered with float	0.2	0.2	Assume default as site specific data is not available
Oil molecular weight	180	180	Default
Density of oil (g/cc)	0.7	0.7	Default
Active biomass, (g/l)	0.05	0	No active biomass in this unit
number units in parallel	1	4	DAF Units F6-9 are operated in parallel
vent air emission control factor	0	0	Default - will apply TO efficiency to results
cover vent rate (m3/s per m2 surface) 0.0	0.0005	0.0005	Default
If covered, then enter 1	0	1	Covered and vented to TO
pH (enter 0 for no pH adjustment)	0	0	Default

Type of unit is closed sump, vent			Source
Description of unit	**Aeration Feed Sump**		
	Water9 Default	**P66 Input RR PTE**	Dimensions of Unit according to P&ID "0100-YD-018-001"- 24'L x 16' W x 14'-9" H
Underflow T (C)	25	**39**	3-Yr Max Temp
Total water added at the unit (l/s)	0	0	Will be specified by system influent flow
Area of openings at unit (cm2)	50	0	The area that can vent headspace gas or permit outside air to enter the collection system. Unit is closed
Radius of drop pipe (cm)	5	2.54	This refers to the vertical pipe that is the vent of the closed sump - According to P&ID "0100-YD-018-001"- 2" Pipe Diameter to TO
Drop length to conduit (cm)	61	61	This is the length in centimeters from the top of the hub in the drop pipe to the typical liquid surface in the underflow conduit. The length is always positive. Sent to TO, not vented to atmosphere. Assume default
Open surface=1	0	0	Covered Unit
Subsurface entrance=1	0	1	Enters below liquid level
subsurface exit =1	0	1	
radius of underflow conduit (cm)	12	22.86	One half the diameter of a circular exiting pipe that connects the unit to the next unit downstream. This pipe is considered closed and not exposed to leaks and air exchange with the environment during the run of the pipe. The combined effluent pipe is 18" according to P&ID "0100-YD-018-001"
distance to next unit (cm)	500	500	Verify for model improvement
slope of underflow conduit	0.015	0.015	Assume default
control device effectiveness	0.95	0	Covered and sent to TO - apply efficiency after model emisions calculation
velocity air at opening (ft/min)	88	88	Assume default
municipal waste in conduit =1	0	0	Default
Assume equilibrium in unit, =1	0	0	Default
pH (enter 0 for no pH adjustment)	0	0	Default

Type of unit is divert flow	**Flow Diverted From Aeration Feed Sump to Aeration Tanks**		
Description of unit	**Water9 Default**	**P66 Input RR PTE**	Source
flow diversion rate (l/s)	0		
fraction waste flow diverted	0	0.5	Flow equally divided between Aeration Tanks F201 & F-202

Type of unit is diffused air biotreatment			Source
Description of unit	**Aeration Tank F-202**		
	Water9 Default	**P66 Input RR PTE**	
Wastewater temperature (C)	25	**38**	3-Yr Max Temp
length of aeration unit (m)	50	27	Unit Dimensions are specified on P&ID: "0100-YD-018-003" as 100'ID x 24' Ht
width of aeration unit (m)	50	27	Unit Dimensions are specified on P&ID: "0100-YD-018-003" as 100'ID x 24' Ht
depth of aeration unit (m)	5	7.3	Unit Dimensions are specified on P&ID: "0100-YD-018-003" as 100'ID x 24' Ht
fraction of surface agitated by air	0.2	0.2	Site specific information unavailable, default is assumed
fraction of surface quiescent	0.8	0.8	Site specific information unavailable, default is assumed
if there is plug flow, enter 1	0	0	Assume well mixed
Overall biorate (mg/g bio-hr)	19	19	Assume default
Aeration air flow (m3/s)	0	**2.02**	3-Yr Max Flow
activated sludge biomass(g/l)	2	**2.03**	3-Yr Min Concentration
If covered, then enter 1	0	0	Open to the atomsphere according to P&ID
special input	0	0	
pH (enter 0 for no pH adjustment)	0	**3.20**	3-Yr Min pH

Type of unit is diffused air biotreatment			Source
Description of unit	**Aeration Tank F-201**		
	Water9 Default	**P66 Input RR PTE**	
Wastewater temperature (C)	25	**38**	3-Yr Max Temp
length of aeration unit (m)	50	27	Unit Dimensions are specified on P&ID: "0100-YD-018-003" as 100'ID x 24' Ht
width of aeration unit (m)	50	27	Unit Dimensions are specified on P&ID: "0100-YD-018-003" as 100'ID x 24' Ht
depth of aeration unit (m)	5	7.3	Unit Dimensions are specified on P&ID: "0100-YD-018-003" as 100'ID x 24' Ht
fraction of surface agitated by air	0.2	0.2	Site specific information unavailable, default is assumed
fraction of surface quiescent	0.8	0.8	Site specific information unavailable, default is assumed
if there is plug flow, enter 1	0	0	Assume well mixed
Overall biorate (mg/g bio-hr)	19	19	Assume default
Aeration air flow (m3/s)	0	**2.02**	3-Yr Max Flow
activated sludge biomass(g/l)	2	**2.03**	3-Yr Min Concentration
If covered, then enter 1	0	0	Open to the atomsphere according to P&ID
special input	0	7.3	
pH (enter 0 for no pH adjustment)	0	**3.20**	3-Yr Min pH

Type of unit is circular clarifier			Source
Description of unit	**Clarifier F-204**		
	Water9 Default	**P66 Input RR PTE**	
Wastewater temperature (C)	25	**38**	3-Yr Max Temp
Secondary clarifier diameter (m)	10	29	Unit dimensions specified on P&id: "0100-yd-018-004": 95' IDx 14'6" HT
Secondary clarifier depth (m)	3	4.4	Unit dimensions specified on P&id: "0100-yd-018-004": 95' IDx 14'6" HT
clarifier solids removal efficiency	0.7	0.7	Assume default
waterfall drop height (cm)	20	20	Assume default
clarifier weir/circumference	0.5	0.5	Assume default
Center well present, =1	0	1	As per unit engineer
number of identical units in parallel	1	0	Modeling units separately
pH (enter 0 for no pH adjustment)	0	**3.20**	Assume same pH as Aeration Tanks

Type of unit is circular clarifier			Source

Description of unit	Clarifier F-203		
	Water9 Default	P66 Input RR PTE	
Wastewater temperature (C)	25	38	3-Yr Max Temp
Secondary clarifier diameter (m)	10	29	Unit dimensions specified on P&id: "0100-yd-018-004": 95' IDx 14'6" HT
Secondary clarifier depth (m)	3	4.4	Unit dimensions specified on P&id: "0100-yd-018-004": 95' IDx 14'6" HT
clarifier solids removal efficiency	0.7	0.7	Assume default
waterfall drop height (cm)	20	20	Assume default
clarifier weir/circumference	0.5	0.5	Assume default
Center well present, =1	0	1	As per unit engineer
number of identical units in parallel	1	0	Modeling units separately
pH (enter 0 for no pH adjustment)	0	3.20	Assume same pH as Aeration Tanks

Type of unit is solids removal stream	Return Activated Sludge Stream to Aeration Tank		
Description of unit	Water9 Default	P66 Input RR PTE	Source
Flow diversion rate (l/s)	0	116.50	Derived from correlation
Fraction solids in waste diverted	0		

Type of unit is solids removal stream	Return Activated Sludge Stream to Aeration Tank		
Description of unit	Water9 Default	P66 Input RR PTE	Source
Flow diversion rate (l/s)	0	116.50	Derived from correlation
Fraction solids in waste diverted	0		

Appendix F, Table F-5: Previous Regulation 12-15 emissions inventory submissions for P66 for S-1008 and S-1009

		POC Emissions					
Source	**Description**	**CY2016**	**CY2017**	**CY2018**	**CY2019**	**CY2020**	**CY2021**
1008	Unit 100 Primary Stormwater Basin	0.102	0.007	0.051	0.000	0.000	0.042
1009	Unit 100 Main Basin	0.000	0.000	0.000	0.000	0.000	0.000

Appendix F, Table F-6: Previous Regulation 12-15 TAC emissions inventory submissions for P66 for S-1008

3.79	L/gal
2.2046E-06	lb/mg

Date	Volume, gal Primary Basin	Main Basin			mg/L Benzene	mg/L Toluene	mg/L Ethylbenze	mg/L Total xylene	mg/L Phenol	mg/L 2,4-Dimeth	mg/L Napthalene	
1/19/2016	200	0		051-ESDR-16	0.017	0.39	0.15	0.85				
1/24/2016	1,300,000	0		052-ESDR-16	0.052	0.97	0.23	1.66	7.3	1.8		
10/15/2016	5,000	0		343-ESDR-16	0.75	5.7	0.81	4.7	0.95			
12/15/2016	1,200,000	0		003-ESDR-17	0.19	2	0.66	3.5	0.52		0.34	
1/10/2017	2000000	0		ESDR-053-17	0.029	0.24	0.087	0.54				no WWTP diversions in 2019
1/9/2018	1,900,000	0		ESDR-029-18	0.17	2.7	0.87	1.4	0.66		0.68	no WWTP diversions in 2020
10/24/2021	2,200,000	6,666,666	ESDR-431-:	Initial Sample	0.31	2.5	0.72	ND (0.05)	ND (0.02)	ND (1)	0.18	
Total gal	2,505,200	0										Assume all mass volatilizes

	lb/event	lb/event	lb/event	lb/event	lb/event	lb/event	lb/event
1/19/2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1/24/2016	0.56	10.54	2.50	18.03	79.29	19.55	0.00
10/15/2016	0.03	0.24	0.03	0.20	0.04	0.00	0.00
12/15/2016	1.91	20.05	6.62	35.09	5.21	0.00	3.41
1/10/2017	0.48	4.01	1.45	9.02	0.00	0.00	0.00
1/9/2018	2.70	42.86	13.81	22.23	10.48	0.00	10.80
10/24/2021	5.70	45.95	13.24	0.00	0.00	0.00	3.31
12/13/2021	0.00	12.12	3.49	0	0	0	0.87

		Benzene	Toluene	Ethylbenze	Total xylene	Phenol	2,4-Dimeth	Napthalene	Total VOC lb/yr	Total VOC tpy
CY2016	Total lbs/yr	2.50	30.83	9.15	53.32	84.55	19.55	3.41	203.31	0.102
CY2017	Total lbs/yr	0.48	4.01	1.45	9.02	0.00	0.00	0.00	14.97	0.007
CY2018	Total lbs/yr	2.70	42.86	13.81	22.23	10.48	0.00	10.80	102.87	0.051
CY2021	Total lbs/yr	5.70	58.07	16.72	0.00	0.00	0.00	4.18	84.68	0.042
Highest	Total lbs/yr	5.70	58.07	16.72	53.32	84.55	19.55	10.80	203.31	0.102

Appendix G -Pretreatment Unit Emissions Calculation

Appendix G, Table G-1
S-600 Pretreatment Unit Emissions
Phillips 66 Company - San Francisco Refinery
Rodeo, CA

Vapor Flow Rate[1]	VOC Concentration[2]	VOC Flow Rate	VOC Emission Rate[3]		
scfm	ppmv	scfm	lb/hr	lb/day	tons/year
4,400	10	0.044	0.109	2.6	0.478

Notes:

1. Vapor flow rate is based on engineering design.
2. VOC concentration is 10 ppmv at outlet of carbon canisters.
3. Daily and annual VOC emission rates calculated from VOC flow rate using the molar volume of an ideal gas at 70°F and 1 atm to convert from volume to moles and assuming all VOCs are methane to convert from moles to mass. Continuous facility operation is also assumed.

Abbreviations:

lb - pound
ppmv - parts per million by volume
scfm - standard cubic feet per minute
VOC - volatile organic compound
yr - year

Conversions	
386.9	ft3/lbmol at 70F and 1 atm
16	lb/lbmol Methane
2000	lb/ton
60	min/hr
24	hr/day
365	day/yr

Appendix G, Table G-2
S-614 Wet Surface Air Cooler Emissions
Phillips 66 Company - San Francisco Refinery
Rodeo, CA

Throughput[1]

Value	Units
8,000	gpm
6	Circulations
12	MMgal/day
4,205	MMgal/yr

PM Emission Factor Derivation

Source	Percent Drift[2]	TDS[3]	PM EF[4]
	vol%	mg/L	lb/MMgal
WSAC	0.0005%	190	0.0079

PM Emissions

Source	PM_{10} Emissions[4]		$PM_{2.5}$ Emissions[4]	
	(lb/day)	(ton/year)	(lb/day)	(ton/year)
WSAC	0.55	0.10	0.55	0.10

Notes:

1. Throughput in gallons per minute based on engineering design. Daily and annual throughput calculated assuming continuous operation.
2. Percent drift based on engineering design. Drift eliminators will be installed.
3. Total dissolved solids (TDS) concentration estimated to be 140-190 mg/L by East Bay Municipal Water District. Maximum of range selected for most conservative emissions estimate.
4. Consistent with AP-42 Chapter 13 Section 4 methodology, all TDS conservatively assumed to be PM_{10}. For the purposes of estimating post-project emissions from new sources, PM_{10} also conservatively set equal to $PM_{2.5}$ emissions.

Abbreviations:

EF - emission factor
gpm - gallons per minute
L - liters
lb - pound
mg - milligrams
MMgal - million gallons
PM_{10} - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
TDS - total dissolved solids
yr - year

References:

US EPA. AP-42, Fifth Edition, Volume 1, Chapter 13 Section 4 "Wet Cooling Towers". Available online: https://www3.epa.gov/ttnchie1/ap42/ch13/final/c13s04.pdf

Conversion Factors	
2000	lb/ton
2.20462E-06	lb/mg
0.264172052	gal/L

Appendix H- Material Handling Emissions Calculations

Appendix H, Table H-1
Material Handling Emissions from Pre-Treatment Unit Silos and Day Hoppers[1]
Phillips 66 Company - San Francisco Refinery
Rodeo, CA

SourceType	Source Numbers	Material	Air Flow Rate[1]	Grain Loading[1]	Emission Rate per Source	Number of Abatement Devices	Criteria Air Pollutant Emissions			Toxic Air Contaminant Emissions			
							$PM_{10}/PM_{2.5}$ Emission Rate[2,3]			Crystalline Silica Content[4]	Crystalline Silica Emission Rate[3,5]		
			dscfm	grain/dscf	grain/min		lb/hour	lb/day	ton/yr	wt% of PM	lb/hour	lb/day	lb/yr
Silo	S-601 Bleaching Earth Storage Silos (12), each abated by A-627 through A-638 Pulse Jet Dust Houses [exempt per 2-1-115.1.4.4]	Bleached Earth	1,600	0.0015	2.4	12	0.25	5.9	1.1	5%	0.0123	0.296	108
	S-602 Filter Aid Storage Silos (9) and Truck Loading/Traffic, each abated by A-606 through A-614 Pulse Jet Dust Houses (9)	Filter Aid	1,600	0.0015	2.4	9	0.19	4.4	0.81	50%	0.093	2.22	811
Day Hopper	S-604 Bleaching Earth Adsorption Day Hoppers (6), each abated by A-639 through A-644 Dust Filters (6), 665 dscfm maximum each [exempt per 2-1-115.1.4.4]	Bleached Earth	665	0.002	1.3	6	0.068	1.6	0.30	5%	0.0034	0.082	30
	S-603 Polyethylene Removal Filter Aid Day Hoppers (4), abated by A-615 and A-618 Dust Filters (4)	Filter Aid	665	0.002	1.3	4	0.046	1.1	0.20	50%	0.0228	0.547	200
	S-605 Filter Aid Adsorption Day Hoppers (3), abated by A-619 and A-621 Dust Filters (3)	Filter Aid	665	0.002	1.3	3	0.034	0.8	0.15	50%	0.0171	0.410	150

Notes:

1. Material handling dust emissions will be generated during transfer of bleached earth and filter aid from trucks to silos and from silos to day hoppers. Each transfer point is controlled by a baghouse. Dust filter control specifications and maximum air flowrate based on baghouse vendor data and are representative of a single source.
2. Particulate matter emissions are less than 1 micron, therefore PM10 and PM2.5 emission rates are equal.
3. Daily and annual emission rates calculated assuming continuous operation of the pre-treatment unit (24 hours per day, 365 days per year). Emissions only occur during loading.
4. Crystalline silica content from manufacturer's SDS. For each material, the upper end of the weight percent range was conservatively selected.
5. Crystalline silica emissions calculated by multiplying the PM emission rate for each material by the crystalline silica content.

Abbreviations:

ft^3 - cubic feet
hr - hour
lb - pound
m^3 - cubic meters
mg - milligrams
PM_{10} - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PTU - Pre-Treatment Unit
yr - year

Conversions	
7000	grains/lb
2000	lb/ton
60	min/hr
24	hr/day
365	day/yr

Appendix I – Sour Water Strippers and Amine Acid Gas Treatment System Emissions Calculation

Appendix I, Table I-1: Post-Project Potential to Emit (Criteria Pollutants) for S-599 Sour Water Strippers and Amine Gas Treatment System
Phillips 66 Company - San Francisco Refinery
Rodeo, CA

Operational Parameters

Parameter		Value	Units
# Thermal Oxidizers		2	--
Natural Gas Firing Rate (per ThermOx)		7.4	MMBtu/hr
Natural Gas Firing Rate (Total)		14.8	MMBtu/hr
Natural Gas HHV		1,020	Btu/Scf
Natural Gas Flow		14,095	scf/hr
Hours per Day		24	hr/day
Days per Year		365	day/yr

Stack Concentrations

			Converted to 3% O2:	
H2S	2.5	ppmv@0%O2	2.1	ppmv@3% O2
Ammonia	10	ppmv@3%O2	10.0	ppmv@3% O2
Sulfuric Acid Mist	55	ppmv@15%O2	166.9	ppmv@3% O2
SO2	50	ppmv@3%O2	50.0	ppmv@3% O2
NOx	50	ppmv@15%O2	151.7	ppmv@3% O2
CO	90	ppmv@3%O2	90.0	ppmv@3% O2

Pollutant	ppmv	%O2	MW	Volume	Stack Flow	EF	Emissions from 1 stack			Emissions from 2 stacks		
				scf/lbmol	lbmol/hr dry at 3%	lb/MMBtu	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy
POC	3	3	44	386.92	252	0.0045	0.033	0.8	0.15	0.07	1.6	0.19
NOx	50	15	46	386.92	252	0.24	1.76	42.2	7.70	3.5	84.4	10.0
CO	90	3	28	386.92	252	0.09	0.64	15.2	2.78	1.3	30.5	3.62
SO2	50	3	64	386.92	252	0.11	0.81	19.4	3.53	1.6	38.7	4.59
PM10/PM2.5	55	15	98				0.73	17.5	3.20	0.95	22.8	4.16

1. For POC, NOx, CO, and SO2, Phillips 66 agreed to permit condition limits to cap the combined annual criteria pollutant emissions from both stacks to 1.3 times the annual emissions from each individual stack.

   For PM10/PM2.5 (as sulfuric acid mist), Phillips 66 agreed to a permit condition limit of 4.16 tons/year from both stacks combined. The permit condition limit from each stack is back-calculated as follows: (4.16 tons/year) ÷ 1.3 = 3.20 tons/year

Appendix I, Table I-2: Post-Project Potential to Emit (TACs and Greenhouse Gases) for S-599 Sour Water Strippers and Amine Gas Treatment System

Phillips 66 Company - San Francisco Refinery

Rodeo, CA

Operational Parameters[1]

Parameter	Value	Units
# Thermal Oxidizers	2	--
Natural Gas Firing Rate (per ThermOx)	7.4	MMBtu/hr
Natural Gas Firing Rate (Total)	14.8	MMBtu/hr
Natural Gas HHV	1,050	Btu/Scf
Natural Gas Flow	14,095	scf/hr
Hours per Day	24	hr/day
Days per Year	365	day/yr

Emissions Calculations

Pollutant	Emission Factor		Both Stacks Combined Emissions	
	Value	Units	lb/day	ton/yr (MT/yr for CO_2)
TACs[3]				
Benzene	2.1E-06	lb/Mscf	7.1E-04	1.3E-04
Formaldehyde	7.5E-05	lb/Mscf	0.025	0.0046
Toluene	3.4E-06	lb/Mscf	0.0012	2.1E-04
Sulfuric Acid	4.2	ton/yr	23	4.2
GHGs[2]				
CO_2e (NG combustion)	120,000	lb/MMscf	40,594	6,721
CO_2e (acid gas content)	5,150	lb/hr	123,600	20,463
Total CO_2e	--	--	164,194	27,184

Notes:

1. Natural gas feed rate to each thermal oxidizer based on engineering design.
2. Benzene, formaldehyde, and toluene emissions are assumed to be from natural gas combustion. Emission factors are from BAAQMD policy guidance, referencing AP-42 Chapter 1, Section 4, "Natural Gas Combustion" Table 1.4-3 and are based on 1,020 BTU/scf. Particulate matter emissions are reported as sulfuric acid mist and thus these emissions are accounted for in both the CAP and TAC sections.

References:

US EPA. AP 42, Fifth Edition, Volume 1, Chapter 1 Section 4 "Natural Gas Combustion". Available at: https://www3.epa.gov/ttn/chief/ap42/ch01/

Conversion factors		
	1000	scf/Mscf
	1.00E+06	scf/mmscf
	2000	lb/ton
	2204.62	lb/MT
	44	lb/lbmol CO2

Appendix I, Table I-3: Post-Project Potential to Emit (TACs - Hydrogen Sulfide and Ammonia) for S-599 Sour Water Strippers and Amine Gas Treatment System

H2S and Ammonia Emission Factor Calculations:

TAC Concentration - Per Stack

TAC	ppmv	reported %O2	corrected ppm to 0% O2
H2S	2.5	0	2.5
Ammonia	10	3	11.67597765

Exhaust Rate - Per Stack

Parameter	Value	Units
Velocity	22.75	m/s
Diameter	0.305	m
Area	0.073	m2
Exhaust Flow Rate	1.662	m3/s
	3521.902	ACFM
	3069.834	SCFM

Temperature

Parameter	Value	Units
Exhaust Temperature	148	deg F
Standard Temperature	70	deg F
Exhaust Temperature	607.67	deg Rank
Standard Temperature	529.67	deg Rank

TAC Emission Factors

TAC	ppmv @ 0% O2	Exhaust Flow Rate (SCFM)	TAC Flow Rate (SCFM)	TAC Flow Rate (lbmol/hr)	MW (lb/lbmol)	Per Stack (lb/hr)	Both Stacks (lb/hr)	Per Stack (lb/yr)	Both Stacks (lb/yr)	Per Stack (tons/year)	Both Stacks (tons/year)
H2S	2.5	3070	0.0077	0.0012	34.1	0.04	0.08	355.50	711.01	0.18	0.36
Ammonia	11.7	3070	0.0358	0.0056	17.031	0.09	0.19	829.24	1658.49	0.41	0.83

Conversion: 386.92 SCF/lbmol at 70F and 1 atm
60 min/hr

Appendix I, Table I-4
Potential to Emit (PTE) Emissions for U235 Sulfur Recovery Unit (S-1010)
Pre-Project PTE = Post-Project PTE

Parameter	Value	Units	Reference
Max Firing Rate	19.5	MMBtu/hour	Thermal oxidizer (A424), Facility permit, Table II B
Fuel HHV	1050	BTU/SCF	Default HHV
Hours per day	24	Hours	
Days per year	365	Days	

Pollutant	Emission Factor	Units	PTE Emissions		Reference
Criteria			**lb/day**	**ton/yr**	
PM10	2.03E-02	lb/MMBtu	9.50	1.19	BAAQMD Cond. 23125, Part 10b/11f
PM2.5	2.03E-02	lb/MMBtu	9.50	1.19	Assumed to be equal to PM10
NOX	4.10E-01	lb/MMBtu	192.00	11.20	BAAQMD Cond. 23125, Part 9a/11d
CO	4.44E-01	lb/MMBtu	207.67	37.90	BAAQMD Cond. 23125, Part 7b/11c[1]
SO2	4.29E-01	lb/MMBtu	201.00	29.70	BAAQMD Cond. 23125, Part 7a/11a[1]
POC	4.98E-03	lb/MMBtu	2.33	0.43	BAAQMD Cond. 23125, Part 11e[1]
Greenhouse Gases			**MT/day**	**MT/yr**	
CO2 (NG combustion)	5.30E+01	kg/MMBtu	24.81	9,056.88	CARB default EF for fuel gas
CH4 (NG combustion)	1.00E-03	kg/MMBtu	0.0005	0.17	CARB default EF for fuel gas
N2O (NG combustion)	1.00E-04	kg/MMBtu	0.0000	0.02	CARB default EF for fuel gas
CO2 (Sour gas content)			21.1886	7,733.83	CFR 98.253(f)(4), Equation Y-12
CO2e			46.03	16,799.59	CARB GWP factors
Toxic Air Contaminants			**lb/day**	**lb/yr**	
Acetaldehyde	1.40E-02	lb/MMcf	0.0062	2.28	CATEF
Ammonia	4.51E-02	lb/MMBtu	21.1200	7,700.00	BAAQMD Cond. 23125, Part 9c/11b
Benzene	2.10E-06	lb/Mscf	0.0009	0.34	BAAQMD Policy[2]
Ethylbenzene	1.13E-03	lb/MMcf	0.0005	0.18	CATEF
Formaldehyde	7.50E-05	lb/Mscf	0.0334	12.20	BAAQMD Policy[2]
Hydrogen sulfide	1.18E-02	lb/MMcf	5.5200	1,950.00	BAAQMD Cond. 23125, Part 9b/11h
Naphthalene	1.12E-03	lb/MMcf	0.0005	0.18	CATEF
PAHs (as B[a]P equiv)	2.42E-06	lb/MMcf	0.0000	0.00	CATEF (as B[a]P equiv)
Propylene	2.35E-01	lb/MMcf	0.1047	38.23	CATEF
Sulfuric acid	6.62E-02	lb/MMBtu	31.0000	11,315.00	BAAQMD Cond. 23125, Part 10a/11g
Toluene	3.40E-06	lb/Mscf	0.0015	0.55	BAAQMD Policy[2]
Xylene (mixed isomers)	1.43E-02	lb/MMcf	0.0064	2.33	CATEF

1. BAAQMD Engineering Evaluation Application #13424
2. https://www.baaqmd.gov/~/media/Files/Engineering/policy_and_procedures/TACEmFacfromNatGasCombustion.ashx
   "Emission Factors for Toxic Air Contaminants from Miscellaneous Natural Gas Combustion Sources"