May 2017 **SCH No. 2014091020**

TESORO
LOS ANGELES REFINERY

INTEGRATION AND COMPLIANCE PROJECT

FINAL
ENVIRONMENTAL IMPACT REPORT

VOLUME II: Appendix B

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APPENDIX B

AIR EMISSION CALCULATONS AND HEALTH RISK ASSESSMENT

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INTEGRATION AND COMPLIANCE PROJECT

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PEAK CONSTRUCTION EMISSION CALCULATIONS

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APPENDIX B-1

UNMITIGATED EMISSION CALCULATIONS

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Appendix B-1
Tesoro Integration and Compliance Project
Total Project Component
Construction Emission Summary

	Year 1												Year 2												Year 3											
Emissions from Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	23.19	19.85	20.24	22.79	33.42	37.09	40.53	40.51	38.87	31.08	38.67	32.76	44.59	44.79	49.21	41.63	38.79	38.79	31.95	41.18	38.35	30.11	29.81	30.70	12.19	12.86	11.30	11.66	11.25	11.25	6.97
CO (lb/day)	0.00	0.00	0.00	0.00	0.00	196.51	157.92	160.14	183.91	285.51	310.90	344.53	354.67	341.45	283.50	335.40	282.92	382.47	383.56	422.81	357.47	338.49	335.17	274.08	378.47	344.31	271.79	270.82	275.33	122.05	129.02	110.07	113.50	110.27	110.27	69.39
NOx (lb/day)	0.00	0.00	0.00	0.00	0.00	238.31	176.74	182.77	207.19	341.79	370.07	412.91	402.91	375.56	318.92	361.41	308.08	420.92	417.40	467.25	380.80	353.19	345.92	279.72	376.06	339.93	269.97	270.77	273.10	117.73	126.40	109.14	114.91	108.94	108.94	66.92
SOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.55	0.35	0.36	0.41	0.69	0.73	0.85	0.86	0.81	0.69	0.78	0.66	0.90	0.89	1.00	0.82	0.77	0.76	0.60	0.95	0.81	0.64	0.65	0.64	0.30	0.31	0.26	0.28	0.26	0.26	0.15
PM10 (lb/day)	0.00	0.00	0.00	0.00	0.00	13.35	11.15	11.39	12.93	24.21	26.17	28.20	27.84	26.78	22.80	26.42	23.13	29.82	29.87	32.60	27.94	26.26	25.92	22.07	26.66	25.05	20.76	20.66	21.07	11.22	11.82	10.93	11.14	10.87	10.87	8.59
PM2.5 (lb/day)(1)	0.00	0.00	0.00	0.00	0.00	13.21	11.03	11.28	12.80	20.68	22.61	24.62	24.27	23.21	19.28	22.87	19.61	26.23	26.28	28.98	24.37	22.71	22.37	18.56	23.10	21.51	17.26	17.16	17.56	7.81	8.41	7.52	7.74	7.46	7.46	5.21
CO_2 (MT/day)	0.00	0.00	0.00	0.00	0.00	13.33	8.48	8.74	9.98	16.68	17.69	20.42	20.73	19.50	16.72	18.89	15.81	21.63	21.39	24.00	19.65	18.51	18.23	14.56	22.92	19.55	15.37	15.60	15.48	7.18	7.45	6.33	6.67	6.37	6.37	3.70
CO_2 (tonnes/yr)												2144.88												5166.66												2992.11

	Year 1												Year 2												Year 3											
Emission from Trips - Onsite/Offsite	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	8.71	6.99	6.68	6.98	6.04	6.05	6.05	7.51	7.55	7.35	7.56	7.50	7.79	5.41	5.52	5.30	4.03	4.03	3.84	3.22	3.13	3.02	2.76	2.76	2.27	1.09	1.01	1.01	0.73	0.73	0.55
CO (lb/day)	0.00	0.00	0.00	0.00	0.00	87.48	75.43	73.19	82.98	82.79	86.29	86.28	100.64	102.99	96.61	98.69	96.54	106.00	89.37	92.73	85.78	66.46	66.46	60.39	58.93	58.32	54.18	52.35	52.35	33.31	24.91	21.91	21.91	19.93	19.93	13.12
NOx (lb/day)	0.00	0.00	0.00	0.00	0.00	198.09	154.88	146.85	148.39	119.43	117.02	117.02	150.55	149.73	148.66	153.71	153.35	154.81	94.92	95.45	94.36	70.70	70.70	69.74	51.36	49.52	48.80	43.29	43.29	40.24	14.97	14.48	14.48	8.51	8.51	7.41
SOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.54	0.44	0.42	0.45	0.40	0.40	0.40	0.49	0.50	0.48	0.49	0.49	0.51	0.37	0.38	0.37	0.28	0.28	0.26	0.30	0.30	0.28	0.26	0.26	0.19	0.11	0.10	0.10	0.08	0.08	0.06
PM10 (lb/day)	0.00	0.00	0.00	0.00	0.00	38.13	30.32	28.87	29.84	25.19	25.06	25.06	31.48	31.53	30.89	31.85	31.64	32.57	21.76	22.09	21.41	16.20	16.20	15.60	16.38	15.95	15.39	14.08	14.08	11.53	5.56	5.15	5.15	3.74	3.74	2.83
Exhaust PM (lb/day)	0.00	0.00	0.00	0.00	0.00	6.99	5.67	5.42	5.74	5.08	5.12	5.12	6.29	6.34	6.13	6.31	6.24	6.54	4.71	4.81	4.59	3.50	3.50	3.31	3.48	3.41	3.23	3.04	3.04	2.21	1.32	1.19	1.19	0.98	0.98	0.69
Fugitive PM (lb/day)	0.00	0.00	0.00	0.00	0.00	31.13	24.65	23.45	24.10	20.11	19.94	19.94	25.19	25.19	24.76	25.55	25.40	26.03	17.06	17.28	16.82	12.69	12.69	12.29	12.91	12.54	12.16	11.05	11.05	9.32	4.23	3.96	3.96	2.76	2.76	2.14
PM2.5 (lb/day)(1)	0.00	0.00	0.00	0.00	0.00	12.29	9.86	9.41	9.84	8.50	8.51	8.51	10.58	10.62	10.34	10.65	10.55	10.96	7.61	7.75	7.45	5.66	5.66	5.40	5.67	5.55	5.30	4.92	4.92	3.80	2.04	1.87	1.87	1.45	1.45	1.05
Exhaust PM (lb/day)	0.00	0.00	0.00	0.00	0.00	6.99	5.67	5.42	5.74	5.08	5.12	5.12	6.29	6.34	6.13	6.31	6.24	6.54	4.71	4.81	4.59	3.50	3.50	3.31	3.48	3.41	3.23	3.04	3.04	2.21	1.32	1.19	1.19	0.98	0.98	0.69
Fugitive PM (lb/day)	0.00	0.00	0.00	0.00	0.00	5.29	4.19	3.99	4.10	3.42	3.39	3.39	4.28	4.28	4.21	4.34	4.32	4.43	2.90	2.94	2.86	2.16	2.16	2.09	2.19	2.13	2.07	1.88	1.88	1.58	0.72	0.67	0.67	0.47	0.47	0.36
CO_2 (lb/day)	0.00	0.00	0.00	0.00	0.00	56272.19	45722.49	43763.26	46437.31	41302.11	41737.29	41735.48	51150.03	51583.12	49829.37	51225.35	50634.54	53213.56	38609.58	39528.02	37630.55	28732.88	28732.88	27075.40	30956.66	30355.29	28797.68	26993.57	26993.57	19907.29	11638.43	10521.38	10521.38	8566.92	8566.92	6028.85
CO_2 (tonnes/yr)												3234.98												5184.06												2243.75

	Year 1												Year 2												Year 3											
Fugitive Earthmoving PM - Peak	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
PM10 (lb/day)(2)	0.00	0.00	0.00	0.00	0.00	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)(1)(2)	0.00	0.00	0.00	0.00	0.00	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.00	0.00	0.00	0.00	0.00	0.00

	Year 1												Year 2												Year 3											
Offroad Fugitive PM - Peak	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
PM10 (lb/day)(2)	0.00	0.00	0.00	0.00	0.00	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
PM2.5 (lb/day)(1)(2)	0.00	0.00	0.00	0.00	0.00	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80

	Year 1												Year 2												Year 3											
Paint	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62.25	62.25	62.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Year 1												Year 2												Year 3											
Total Emissions	**Thresholds**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	75	0.00	0.00	0.00	0.00	0.00	33.56	28.50	28.57	31.44	41.11	44.80	48.24	49.69	48.07	38.42	46.24	40.26	52.38	50.20	54.72	46.93	42.82	42.82	35.79	106.64	103.74	95.38	32.58	33.46	14.45	13.95	12.31	12.68	11.98	11.98	7.53
CO (lb/day)	550	0.00	0.00	0.00	0.00	0.00	283.99	233.35	233.33	266.89	368.30	397.19	430.81	455.31	444.44	380.11	434.08	379.45	488.48	472.93	515.54	443.25	404.96	401.64	334.47	437.40	402.63	325.97	323.17	327.67	155.36	153.93	131.98	135.42	130.20	130.20	82.50
NOx (lb/day)	100	0.00	0.00	0.00	0.00	0.00	436.40	331.62	329.62	355.59	461.22	487.10	529.94	553.47	525.29	467.58	515.12	461.43	575.73	512.33	562.70	475.16	423.89	416.62	349.47	427.42	389.46	318.78	314.06	316.40	157.97	141.37	123.62	129.39	117.45	117.45	74.33
SOx (lb/day)	150	0.00	0.00	0.00	0.00	0.00	1.09	0.79	0.78	0.86	1.09	1.14	1.25	1.35	1.31	1.18	1.28	1.15	1.41	1.26	1.38	1.18	1.05	1.04	0.87	1.25	1.11	0.92	0.91	0.91	0.49	0.42	0.37	0.38	0.35	0.35	0.21
PM10 (lb/day)(2)	150	0.00	0.00	0.00	0.00	0.00	57.63	47.63	46.43	48.93	55.56	57.39	59.42	65.48	64.46	59.85	64.44	60.93	68.55	57.80	60.85	55.51	48.62	48.28	43.84	49.20	47.16	42.31	40.90	41.32	28.91	21.17	19.88	20.10	18.41	18.41	15.22
PM2.5 (lb/day)(1)(2)	55	0.00	0.00	0.00	0.00	0.00	26.98	22.38	22.17	24.12	30.65	32.61	34.61	36.32	35.32	31.10	35.00	31.65	38.67	35.37	38.21	33.30	29.85	29.51	25.44	30.25	28.53	24.04	23.55	23.96	13.09	11.25	10.19	10.40	9.72	9.72	7.06
CO_2 (tonnes/day)	NA	0.00	0.00	0.00	0.00	0.00	38.86	29.22	28.59	31.04	35.42	36.63	39.35	43.94	42.90	39.32	42.13	38.78	45.77	38.91	41.93	36.71	31.55	31.27	26.84	36.96	33.32	28.43	27.85	27.72	16.21	12.73	11.10	11.44	10.25	10.25	6.44
CO_2 (tonnes/yr)	NA												5379.85												10350.72												5235.86

(1) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_5ratio.xls
(2) Mitigated PM.

Appendix B-1
Tesoro Integration and Compliance Project
Total Project Component
Construction Emission Summary

	Year 4												Year 5												Year 6											
Emissions from Equipment	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
VOC (lb/day)	3.91	3.91	3.91	3.91	3.91	3.91	3.34	2.25	1.72	1.41	2.29	2.60	3.25	3.74	3.78	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	2.96	2.01	1.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	43.53	43.53	43.53	43.53	40.35	40.35	35.34	25.41	21.77	20.93	25.22	30.60	40.62	44.17	45.53	44.35	44.35	44.35	44.35	44.35	44.35	44.35	41.21	41.21	35.76	26.12	22.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	41.11	41.11	41.11	41.11	35.32	35.32	31.64	23.29	20.40	20.87	23.45	28.39	36.31	39.12	39.86	38.97	38.97	38.97	38.97	38.97	38.97	38.97	33.68	33.68	28.22	20.80	18.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	0.10	0.10	0.10	0.10	0.09	0.09	0.08	0.06	0.05	0.06	0.05	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.08	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	6.83	6.83	6.83	6.83	6.56	6.56	6.30	5.72	5.48	5.37	5.78	5.95	6.44	6.67	6.68	6.61	6.61	6.61	6.61	6.61	6.61	6.61	6.37	6.37	5.96	5.49	5.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)(1)	3.46	3.46	3.46	3.46	3.20	3.20	2.94	2.37	2.13	2.02	2.43	2.59	3.08	3.30	3.32	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.01	3.01	2.61	2.14	1.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (MT/day)	2.43	2.43	2.43	2.43	2.15	2.15	1.91	1.36	1.21	1.45	1.32	1.88	2.29	2.44	2.53	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.20	2.20	1.96	1.41	1.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (tonnes/yr)												521.11												652.83												104.36

	Year 4												Year 5												Year 6											
Emission from Trips - Onsite/Offsite	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
VOC (lb/day)	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.52	0.52	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	13.46	13.46	13.46	13.46	13.46	13.46	13.46	13.46	13.46	13.46	13.46	13.46	13.29	13.29	13.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.13	9.13	9.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.68	1.68	1.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exhuast PM (lb/day)	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.55	0.55	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive PM (lb/day)	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)(1)	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.74	0.74	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exhuast PM (lb/day)	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.55	0.55	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive PM (lb/day)	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (lb/day)	3386.59	3386.59	3386.59	3386.59	3386.59	3386.59	3386.59	3386.59	3386.59	3386.59	3386.59	3386.59	3373.83	3373.83	3373.83	3373.83	3373.83	3373.83	3373.83	3373.83	3373.83	3373.83	3373.83	3373.83	3289.89	3289.89	3289.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (tonnes/yr)												414.76												413.20												100.73

	Year 4												Year 5												Year 6											
Fugitive Earthmoving PM - Peak	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
PM10 (lb/day)(2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)(1)(2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 4												Year 5												Year 6											
Offroad Fugitive PM - Peak	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
PM10 (lb/day)(2)	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)(1)(2)	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 4												Year 5												Year 6											
Paint	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	62.25	62.25	62.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62.25	62.25	62.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Year 4												Year 5												Year 6											
Total Emissions	**Thresholds**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
VOC (lb/day)	75	4.18	4.18	4.18	4.18	4.18	4.18	65.86	64.76	64.23	1.68	2.56	2.86	3.80	4.30	4.33	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	65.73	64.78	64.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	550	50.77	50.77	50.77	50.77	47.58	47.58	42.58	32.64	29.01	28.16	32.45	37.83	54.08	57.63	58.99	57.81	57.81	57.81	57.81	57.81	57.81	57.81	54.67	54.67	49.05	39.40	35.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	100	44.30	44.30	44.30	44.30	38.51	38.51	34.83	26.48	23.59	24.06	26.64	31.58	46.07	48.88	49.62	48.73	48.73	48.73	48.73	48.73	48.73	48.73	43.44	43.44	37.36	29.93	27.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	150	0.13	0.13	0.13	0.13	0.12	0.12	0.11	0.09	0.08	0.09	0.09	0.11	0.12	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.11	0.09	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)(2)	150	12.15	12.15	12.15	12.15	11.88	11.88	11.62	11.05	10.80	10.69	11.10	11.27	11.93	12.16	12.17	12.11	12.11	12.11	12.11	12.11	12.11	12.11	11.86	11.86	11.45	10.97	10.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)(1)(2)	55	4.84	4.84	4.84	4.84	4.58	4.58	4.32	3.75	3.51	3.40	3.81	3.97	4.64	4.86	4.87	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.57	4.57	4.15	3.68	3.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (tonnes/day)	NA	3.97	3.97	3.97	3.97	3.68	3.68	3.45	2.90	2.75	2.98	2.86	3.41	3.82	3.97	4.06	4.01	4.01	4.01	4.01	4.01	4.01	4.01	3.73	3.73	3.45	2.90	2.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (tonnes/yr)	NA												935.87												1066.03												205.09
30yr amortized CO_2 (tonnes/yr)	NA																																				772.45

(1) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_5ratio.xls
(2) Mitigated PM.

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emission Rates

Equipment Type	Hp	2016 Emission Factors lb/hr[1] VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.07023	0.4263	0.97905	0.00147	0.04659	0.03534
>40T Cranes	500	0.07815	0.4431	1.20587	0.00213	0.04978	0.05136
Pile/Drill Rig	Composite	0.04246	0.5016	0.72299	0.00244	0.02698	0.05882
Tractors	Composite	0.03268	0.3689	0.38566	0.00080	0.02590	0.01922
Welders	50	0.03684	0.2483	0.19141	0.00039	0.01712	0.00938
Light Plants	50	0.03684	0.3134	0.19141	0.00039	0.01712	0.00938
Genertors	120	0.04342	0.4767	0.47247	0.00074	0.03702	0.01795
Hydro Vacs/Pumps	120	0.04342	0.4842	0.47247	0.00074	0.03702	0.01795
Fork Lifts	Composite	0.02152	0.4549	0.33240	0.00089	0.01769	0.02146
Loader/Backhoe	Composite	0.03268	0.3689	0.38566	0.00080	0.02590	0.01922
Air Compressors	50	0.03684	0.2281	0.19141	0.00039	0.01712	0.00938
Manlifts	Composite	0.00659	0.1592	0.12905	0.00044	0.00466	0.01066

Equipment Type	Hp	2017 Emission Factors lb/hr[1] VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.06537	0.4152	0.90923	0.00147	0.04291	0.03535
>40T Cranes	500	0.07236	0.4243	1.11689	0.00213	0.04535	0.05139
Pile/Drill Rig	Composite	0.04029	0.5013	0.67483	0.00244	0.02483	0.05882
Tractors	Composite	0.03046	0.3666	0.35832	0.00080	0.02366	0.0192
Welders	50	0.03579	0.2408	0.18867	0.00039	0.01662	0.00938
Light Plants	50	0.03579	0.3047	0.18867	0.00039	0.01662	0.00938
Genertors	120	0.04173	0.4728	0.45336	0.00074	0.03547	0.01794
Hydro Vacs/Pumps	120	0.04173	0.4802	0.45336	0.00074	0.03547	0.01794
Fork Lifts	Composite	0.01948	0.4522	0.29726	0.00089	0.01519	0.02146
Loader/Backhoe	Composite	0.03046	0.3666	0.35832	0.00080	0.02366	0.0192
Air Compressors	50	0.03579	0.2209	0.18867	0.00039	0.01662	0.00938
Manlifts	Composite	0.00586	0.1548	0.11635	0.00044	0.00353	0.01066

Equipment Type	Hp	2018 Emission Factors lb/hr[1] VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.05782	0.4060	0.80171	0.00147	0.03738	0.03536
>40T Cranes	500	0.06523	0.4085	0.98933	0.00213	0.03992	0.05142
Pile/Drill Rig	Composite	0.03501	0.5011	0.56864	0.00243	0.02055	0.05865
Tractors	Composite	0.02557	0.3647	0.30639	0.00080	0.01923	0.01917
Welders	50	0.03361	0.2339	0.18349	0.00039	0.01563	0.00938
Light Plants	50	0.03361	0.2966	0.18349	0.00039	0.01563	0.00938
Genertors	120	0.03690	0.4694	0.40643	0.00075	0.03112	0.01796
Hydro Vacs/Pumps	120	0.03690	0.4767	0.40643	0.00075	0.03112	0.01796
Fork Lifts	Composite	0.01616	0.2173	0.24736	0.00089	0.01150	0.02146
Loader/Backhoe	Composite	0.02557	0.3647	0.30639	0.00080	0.01923	0.01917
Air Compressors	50	0.03361	0.2142	0.18349	0.00039	0.01563	0.00938
Manlifts	Composite	0.00499	0.1740	0.10274	0.00044	0.00238	0.01066

Equipment Type	Hp	2019 Emission Factors lb/hr[1] VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.05255	0.3982	0.72435	0.00147	0.03337	0.03536
>40T Cranes	500	0.06159	0.3951	0.91722	0.00213	0.03694	0.05143
Pile/Drill Rig	Composite	0.03316	0.5009	0.51942	0.00243	0.01889	0.05862
Tractors	Composite	0.02277	0.3630	0.27390	0.00080	0.01634	0.01916
Welders	50	0.03313	0.2271	0.18111	0.00039	0.01522	0.00937
Light Plants	50	0.03313	0.2890	0.18111	0.00039	0.01522	0.00937
Genertors	120	0.03398	0.4663	0.37708	0.00075	0.02830	0.01796
Hydro Vacs/Pumps	120	0.03398	0.4736	0.37708	0.00075	0.02830	0.01796
Fork Lifts	Composite	0.01468	0.2166	0.22583	0.00089	0.00988	0.02146
Loader/Backhoe	Composite	0.02277	0.3630	0.27390	0.00080	0.01634	0.01916
Air Compressors	50	0.03313	0.2078	0.18111	0.00039	0.01522	0.00937
Manlifts	Composite	0.00475	0.1715	0.09788	0.00044	0.00194	0.01066

(1) Off-Road 2011. CO emissions from SCAQMD, 2006 : http://www.aqmd.gov/ceqa/handbook/offroad/offroadEF07_25.xls

(2) Carbon Dioxide Equivalents (CO_{EQ}) are based on default emission factors for diesel. Metric tons per hour.

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	7	0	0	0	0	0	7	7	7	8	9	11	11
>40T Cranes	5	0	0	0	0	0	5	4	5	5	5	8	8
Pile/Drill Rig	8	0	0	0	0	0	11	1	1	1	1	1	2
Tractors	5	0	0	0	0	0	2	2	2	3	3	4	4
Welders	8	0	0	0	0	0	33	33	33	36	40	48	48
Light Plants	3	0	0	0	0	0	8	12	12	13	14	14	14
Genertors	3	0	0	0	0	0	6	6	6	7	7	8	6
Hydro Vacs/Pumps	5	0	0	0	0	0	1	1	1	2	2	3	2
Fork Lifts	4	0	0	0	0	0	5	5	5	5	6	8	8
Loader/Backhoe	5	0	0	0	0	0	2	2	2	2	3	3	3
Air Compressors	4	0	0	0	0	0	5	5	5	7	7	7	7
Manlifts	8	0	0	0	0	0	12	12	12	17	23	30	30

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.070	0.00	0.00	0.00	0.00	0.00	3.44	3.44	3.44	3.93	4.42	5.41	5.41
>40T Cranes	0.078	0.00	0.00	0.00	0.00	0.00	1.95	1.56	1.95	1.95	1.95	3.13	3.13
Pile/Drill Rig	0.042	0.00	0.00	0.00	0.00	0.00	3.74	0.34	0.34	0.34	0.34	0.34	0.68
Tractors	0.033	0.00	0.00	0.00	0.00	0.00	0.33	0.33	0.33	0.49	0.49	0.65	0.65
Welders	0.037	0.00	0.00	0.00	0.00	0.00	9.73	9.73	9.73	10.61	11.79	14.15	14.15
Light Plants	0.037	0.00	0.00	0.00	0.00	0.00	0.88	1.33	1.33	1.44	1.55	1.55	1.55
Genertors	0.043	0.00	0.00	0.00	0.00	0.00	0.78	0.78	0.78	0.91	0.91	1.04	0.78
Hydro Vacs/Pumps	0.043	0.00	0.00	0.00	0.00	0.00	0.22	0.22	0.22	0.43	0.43	0.65	0.43
Fork Lifts	0.022	0.00	0.00	0.00	0.00	0.00	0.43	0.43	0.43	0.43	0.52	0.69	0.69
Loader/Backhoe	0.033	0.00	0.00	0.00	0.00	0.00	0.33	0.33	0.33	0.33	0.49	0.49	0.49
Air Compressors	0.037	0.00	0.00	0.00	0.00	0.00	0.74	0.74	0.74	1.03	1.03	1.03	1.03
Manlifts	0.007	0.00	0.00	0.00	0.00	0.00	0.63	0.63	0.63	0.90	1.21	1.58	1.58
Total		0.00	0.00	0.00	0.00	0.00	23.19	19.85	20.24	22.79	25.14	30.71	30.57

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.426	0.00	0.00	0.00	0.00	0.00	20.89	20.89	20.89	23.87	26.86	32.83	32.83
>40T Cranes	0.443	0.00	0.00	0.00	0.00	0.00	11.08	8.86	11.08	11.08	11.08	17.72	17.72
Pile/Drill Rig	0.502	0.00	0.00	0.00	0.00	0.00	44.14	4.01	4.01	4.01	4.01	4.01	8.03
Tractors	0.369	0.00	0.00	0.00	0.00	0.00	3.69	3.69	3.69	5.53	5.53	7.38	7.38
Welders	0.248	0.00	0.00	0.00	0.00	0.00	65.55	65.55	65.55	71.51	79.46	95.35	95.35
Light Plants	0.313	0.00	0.00	0.00	0.00	0.00	7.52	11.28	11.28	12.22	13.16	13.16	13.16
Genertors	0.477	0.00	0.00	0.00	0.00	0.00	8.58	8.58	8.58	10.01	10.01	11.44	8.58
Hydro Vacs/Pumps	0.484	0.00	0.00	0.00	0.00	0.00	2.42	2.42	2.42	4.84	4.84	7.26	4.84
Fork Lifts	0.455	0.00	0.00	0.00	0.00	0.00	9.10	9.10	9.10	9.10	10.92	14.56	14.56
Loader/Backhoe	0.369	0.00	0.00	0.00	0.00	0.00	3.69	3.69	3.69	3.69	5.53	5.53	5.53
Air Compressors	0.228	0.00	0.00	0.00	0.00	0.00	4.56	4.56	4.56	6.39	6.39	6.39	6.39
Manlifts	0.159	0.00	0.00	0.00	0.00	0.00	15.28	15.28	15.28	21.65	29.29	38.21	38.21
Total		0.00	0.00	0.00	0.00	0.00	196.51	157.92	160.14	183.91	207.09	253.84	252.58

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.979	0.00	0.00	0.00	0.00	0.00	47.97	47.97	47.97	54.83	61.68	75.39	75.39
>40T Cranes	1.206	0.00	0.00	0.00	0.00	0.00	30.15	24.12	30.15	30.15	30.15	48.23	48.23
Pile/Drill Rig	0.723	0.00	0.00	0.00	0.00	0.00	63.62	5.78	5.78	5.78	5.78	5.78	11.57
Tractors	0.386	0.00	0.00	0.00	0.00	0.00	3.86	3.86	3.86	5.78	5.78	7.71	7.71
Welders	0.191	0.00	0.00	0.00	0.00	0.00	50.53	50.53	50.53	55.13	61.25	73.50	73.50
Light Plants	0.191	0.00	0.00	0.00	0.00	0.00	4.59	6.89	6.89	7.46	8.04	8.04	8.04
Genertors	0.472	0.00	0.00	0.00	0.00	0.00	8.50	8.50	8.50	9.92	9.92	11.34	8.50
Hydro Vacs/Pumps	0.472	0.00	0.00	0.00	0.00	0.00	2.36	2.36	2.36	4.72	4.72	7.09	4.72
Fork Lifts	0.332	0.00	0.00	0.00	0.00	0.00	6.65	6.65	6.65	6.65	7.98	10.64	10.64
Loader/Backhoe	0.386	0.00	0.00	0.00	0.00	0.00	3.86	3.86	3.86	3.86	5.78	5.78	5.78
Air Compressors	0.191	0.00	0.00	0.00	0.00	0.00	3.83	3.83	3.83	5.36	5.36	5.36	5.36
Manlifts	0.129	0.00	0.00	0.00	0.00	0.00	12.39	12.39	12.39	17.55	23.74	30.97	30.97
Total		0.00	0.00	0.00	0.00	0.00	238.31	176.74	182.77	207.19	230.20	289.84	290.42

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.001	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.07	0.08	0.09	0.11	0.11
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.05	0.04	0.05	0.05	0.05	0.09	0.09
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.21	0.02	0.02	0.02	0.02	0.02	0.04
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Welders	0.000	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.11	0.12	0.15	0.15
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.02
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.01
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.03	0.03
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Air Compressors	0.000	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Manlifts	0.000	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.06	0.08	0.11	0.11
Total		0.00	0.00	0.00	0.00	0.00	0.55	0.35	0.36	0.41	0.47	0.59	0.60

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.047	0.00	0.00	0.00	0.00	0.00	2.28	2.28	2.28	2.61	2.94	3.59	3.59
>40T Cranes	0.050	0.00	0.00	0.00	0.00	0.00	1.24	1.00	1.24	1.24	1.24	1.99	1.99
Pile/Drill Rig	0.027	0.00	0.00	0.00	0.00	0.00	2.37	0.22	0.22	0.22	0.22	0.22	0.43
Tractors	0.026	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.26	0.39	0.39	0.52	0.52
Welders	0.017	0.00	0.00	0.00	0.00	0.00	4.52	4.52	4.52	4.93	5.48	6.58	6.58
Light Plants	0.017	0.00	0.00	0.00	0.00	0.00	0.41	0.62	0.62	0.67	0.72	0.72	0.72
Genertors	0.037	0.00	0.00	0.00	0.00	0.00	0.67	0.67	0.67	0.78	0.78	0.89	0.67
Hydro Vacs/Pumps	0.037	0.00	0.00	0.00	0.00	0.00	0.19	0.19	0.19	0.37	0.37	0.56	0.37
Fork Lifts	0.018	0.00	0.00	0.00	0.00	0.00	0.35	0.35	0.35	0.35	0.42	0.57	0.57
Loader/Backhoe	0.026	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.26	0.26	0.39	0.39	0.39
Air Compressors	0.017	0.00	0.00	0.00	0.00	0.00	0.34	0.34	0.34	0.48	0.48	0.48	0.48
Manlifts	0.005	0.00	0.00	0.00	0.00	0.00	0.45	0.45	0.45	0.63	0.86	1.12	1.12
Total		0.00	0.00	0.00	0.00	0.00	13.35	11.15	11.39	12.93	14.28	17.60	17.41

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.035	0.00	0.00	0.00	0.00	0.00	1.73	1.73	1.73	1.98	2.23	2.72	2.72
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	1.28	1.03	1.28	1.28	1.28	2.05	2.05
Pile/Drill Rig	0.059	0.00	0.00	0.00	0.00	0.00	5.18	0.47	0.47	0.47	0.47	0.47	0.94
Tractors	0.019	0.00	0.00	0.00	0.00	0.00	0.19	0.19	0.19	0.29	0.29	0.38	0.38
Welders	0.009	0.00	0.00	0.00	0.00	0.00	2.48	2.48	2.48	2.70	3.00	3.60	3.60
Light Plants	0.009	0.00	0.00	0.00	0.00	0.00	0.23	0.34	0.34	0.37	0.39	0.39	0.39
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.32	0.32	0.32	0.38	0.38	0.43	0.32
Hydro Vacs/Pumps	0.018	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.09	0.18	0.18	0.27	0.18
Fork Lifts	0.021	0.00	0.00	0.00	0.00	0.00	0.43	0.43	0.43	0.43	0.52	0.69	0.69
Loader/Backhoe	0.019	0.00	0.00	0.00	0.00	0.00	0.19	0.19	0.19	0.19	0.29	0.29	0.29
Air Compressors	0.009	0.00	0.00	0.00	0.00	0.00	0.19	0.19	0.19	0.26	0.26	0.26	0.26
Manlifts	0.011	0.00	0.00	0.00	0.00	0.00	1.02	1.02	1.02	1.45	1.96	2.56	2.56
Total		0.00	0.00	0.00	0.00	0.00	13.33	8.48	8.74	9.98	11.25	14.12	14.40

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	7	11	12	10	10	10	16	16	16	14	11	11	10
>40T Cranes	5	8	9	8	8	8	10	9	9	7	5	5	4
Pile/Drill Rig	8	1	1	1	2	1	2	2	2	2	1	1	1
Tractors	5	4	4	4	6	6	7	7	7	7	6	6	5
Welders	8	48	53	34	54	51	71	72	72	69	61	61	56
Light Plants	3	14	13	7	9	7	11	15	15	14	10	10	9
Genertors	3	6	6	6	6	6	10	9	9	8	4	4	4
Hydro Vacs/Pumps	5	2	3	2	2	1	1	2	1	1	1	1	1
Fork Lifts	4	8	9	8	9	9	13	13	13	12	10	10	9
Loader/Backhoe	5	3	3	3	3	3	5	5	5	5	4	4	4
Air Compressors	4	7	7	7	7	7	8	7	7	7	3	3	2
Manlifts	8	30	33	29	23	24	34	32	32	29	27	27	23

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.065	5.03	5.49	4.58	4.58	4.58	7.32	7.32	7.32	6.41	5.03	5.03	4.58
>40T Cranes	0.072	2.89	3.26	2.89	2.89	2.89	3.62	3.26	3.26	2.53	1.81	1.81	1.45
Pile/Drill Rig	0.040	0.32	0.32	0.32	0.64	0.32	0.64	0.64	0.64	0.64	0.32	0.32	0.32
Tractors	0.030	0.61	0.61	0.61	0.91	0.91	1.07	1.07	1.07	1.07	0.91	0.91	0.76
Welders	0.036	13.74	15.17	9.73	15.46	14.60	20.33	20.61	20.61	19.76	17.47	17.47	16.03
Light Plants	0.036	1.50	1.40	0.75	0.97	0.75	1.18	1.61	1.61	1.50	1.07	1.07	0.97
Genertors	0.042	0.75	0.75	0.75	0.75	0.75	1.25	1.13	1.13	1.00	0.50	0.50	0.50
Hydro Vacs/Pumps	0.042	0.42	0.63	0.42	0.42	0.21	0.21	0.42	0.21	0.21	0.21	0.21	0.21
Fork Lifts	0.019	0.62	0.70	0.62	0.70	0.70	1.01	1.01	1.01	0.94	0.78	0.78	0.70
Loader/Backhoe	0.030	0.46	0.46	0.46	0.46	0.46	0.76	0.76	0.76	0.76	0.61	0.61	0.61
Air Compressors	0.036	1.00	1.00	1.00	1.00	1.00	1.15	1.00	1.00	1.00	0.43	0.43	0.29
Manlifts	0.006	1.41	1.55	1.36	1.08	1.12	1.59	1.50	1.50	1.36	1.27	1.27	1.08
Total		28.76	31.33	23.50	29.86	28.30	40.13	40.33	40.12	37.18	30.41	30.41	27.49

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	2017	13	14	15	16	17	18	19	20	21	22	23	24
<40 T Cranes	0.415	31.97	34.88	29.07	29.07	29.07	46.51	46.51	46.51	40.69	31.97	31.97	29.07
>40T Cranes	0.424	16.97	19.09	16.97	16.97	16.97	21.21	19.09	19.09	14.85	10.61	10.61	8.49
Pile/Drill Rig	0.501	4.01	4.01	4.01	8.02	4.01	8.02	8.02	8.02	8.02	4.01	4.01	4.01
Tractors	0.367	7.33	7.33	7.33	11.00	11.00	12.83	12.83	12.83	12.83	11.00	11.00	9.17
Welders	0.241	92.48	102.12	65.51	104.04	98.26	136.80	138.73	138.73	132.95	117.53	117.53	107.90
Light Plants	0.305	12.80	11.88	6.40	8.23	6.40	10.06	13.71	13.71	12.80	9.14	9.14	8.23
Genertors	0.473	8.51	8.51	8.51	8.51	8.51	14.19	12.77	12.77	11.35	5.67	5.67	5.67
Hydro Vacs/Pumps	0.480	4.80	7.20	4.80	4.80	2.40	2.40	4.80	2.40	2.40	2.40	2.40	2.40
Fork Lifts	0.452	14.47	16.28	14.47	16.28	16.28	23.52	23.52	23.52	21.71	18.09	18.09	16.28
Loader/Backhoe	0.367	5.50	5.50	5.50	5.50	5.50	9.17	9.17	9.17	9.17	7.33	7.33	7.33
Air Compressors	0.221	6.19	6.19	6.19	6.19	6.19	7.07	6.19	6.19	6.19	2.65	2.65	1.77
Manlifts	0.155	37.14	40.85	35.90	28.47	29.71	42.09	39.62	39.62	35.90	33.43	33.43	28.47
Total		242.18	263.85	204.66	247.08	234.30	333.86	334.94	332.54	308.85	253.84	253.84	228.78

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.909	70.01	76.38	63.65	63.65	63.65	101.83	101.83	101.83	89.10	70.01	70.01	63.65
>40T Cranes	1.117	44.68	50.26	44.68	44.68	44.68	55.84	50.26	50.26	39.09	27.92	27.92	22.34
Pile/Drill Rig	0.675	5.40	5.40	5.40	10.80	5.40	10.80	10.80	10.80	10.80	5.40	5.40	5.40
Tractors	0.358	7.17	7.17	7.17	10.75	10.75	12.54	12.54	12.54	12.54	10.75	10.75	8.96
Welders	0.189	72.45	80.00	51.32	81.51	76.98	107.17	108.68	108.68	104.15	92.07	92.07	84.53
Light Plants	0.189	7.92	7.36	3.96	5.09	3.96	6.23	8.49	8.49	7.92	5.66	5.66	5.09
Genertors	0.453	8.16	8.16	8.16	8.16	8.16	13.60	12.24	12.24	10.88	5.44	5.44	5.44
Hydro Vacs/Pumps	0.453	4.53	6.80	4.53	4.53	2.27	2.27	4.53	2.27	2.27	2.27	2.27	2.27
Fork Lifts	0.297	9.51	10.70	9.51	10.70	10.70	15.46	15.46	15.46	14.27	11.89	11.89	10.70
Loader/Backhoe	0.358	5.37	5.37	5.37	5.37	5.37	8.96	8.96	8.96	8.96	7.17	7.17	7.17
Air Compressors	0.189	5.28	5.28	5.28	5.28	5.28	6.04	5.28	5.28	5.28	2.26	2.26	1.51
Manlifts	0.116	27.92	30.72	26.99	21.41	22.34	31.65	29.79	29.79	26.99	25.13	25.13	21.41
Total		268.41	293.59	236.03	271.93	259.54	372.38	368.86	366.59	332.26	265.97	265.97	238.45

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.001	0.11	0.12	0.10	0.10	0.10	0.16	0.16	0.16	0.14	0.11	0.11	0.10
>40T Cranes	0.002	0.09	0.10	0.09	0.09	0.09	0.11	0.10	0.10	0.07	0.05	0.05	0.04
Pile/Drill Rig	0.002	0.02	0.02	0.02	0.04	0.02	0.04	0.04	0.04	0.04	0.02	0.02	0.02
Tractors	0.001	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.02	0.02
Welders	0.000	0.15	0.17	0.11	0.17	0.16	0.22	0.22	0.22	0.21	0.19	0.19	0.17
Light Plants	0.000	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01
Genertors	0.001	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01
Hydro Vacs/Pumps	0.001	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.03	0.03	0.03	0.03	0.03	0.05	0.05	0.05	0.04	0.04	0.04	0.03
Loader/Backhoe	0.001	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Air Compressors	0.000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Manlifts	0.000	0.11	0.12	0.10	0.08	0.08	0.12	0.11	0.11	0.10	0.10	0.10	0.08
Total		0.58	0.63	0.51	0.59	0.56	0.80	0.79	0.78	0.71	0.58	0.58	0.51

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.043	3.30	3.60	3.00	3.00	3.00	4.81	4.81	4.81	4.20	3.30	3.30	3.00
>40T Cranes	0.045	1.81	2.04	1.81	1.81	1.81	2.27	2.04	2.04	1.59	1.13	1.13	0.91
Pile/Drill Rig	0.025	0.20	0.20	0.20	0.40	0.20	0.40	0.40	0.40	0.40	0.20	0.20	0.20
Tractors	0.024	0.47	0.47	0.47	0.71	0.71	0.83	0.83	0.83	0.83	0.71	0.71	0.59
Welders	0.017	6.38	7.05	4.52	7.18	6.78	9.44	9.57	9.57	9.17	8.11	8.11	7.44
Light Plants	0.017	0.70	0.65	0.35	0.45	0.35	0.55	0.75	0.75	0.70	0.50	0.50	0.45
Genertors	0.035	0.64	0.64	0.64	0.64	0.64	1.06	0.96	0.96	0.85	0.43	0.43	0.43
Hydro Vacs/Pumps	0.035	0.35	0.53	0.35	0.35	0.18	0.18	0.35	0.18	0.18	0.18	0.18	0.18
Fork Lifts	0.015	0.49	0.55	0.49	0.55	0.55	0.79	0.79	0.79	0.73	0.61	0.61	0.55
Loader/Backhoe	0.024	0.35	0.35	0.35	0.35	0.35	0.59	0.59	0.59	0.59	0.47	0.47	0.47
Air Compressors	0.017	0.47	0.47	0.47	0.47	0.47	0.53	0.47	0.47	0.47	0.20	0.20	0.13
Manlifts	0.004	0.85	0.93	0.82	0.65	0.68	0.96	0.90	0.90	0.82	0.76	0.76	0.65
Total		16.02	17.48	13.48	16.56	15.72	22.40	22.45	22.28	20.52	16.60	16.60	15.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.035	2.72	2.97	2.47	2.47	2.47	3.96	3.96	3.96	3.46	2.72	2.72	2.47
>40T Cranes	0.051	2.06	2.31	2.06	2.06	2.06	2.57	2.31	2.31	1.80	1.28	1.28	1.03
Pile/Drill Rig	0.059	0.47	0.47	0.47	0.94	0.47	0.94	0.94	0.94	0.94	0.47	0.47	0.47
Tractors	0.019	0.38	0.38	0.38	0.58	0.58	0.67	0.67	0.67	0.67	0.58	0.58	0.48
Welders	0.009	3.60	3.98	2.55	4.05	3.83	5.33	5.40	5.40	5.18	4.58	4.58	4.20
Light Plants	0.009	0.39	0.37	0.20	0.25	0.20	0.31	0.42	0.42	0.39	0.28	0.28	0.25
Genertors	0.018	0.32	0.32	0.32	0.32	0.32	0.54	0.48	0.48	0.43	0.22	0.22	0.22
Hydro Vacs/Pumps	0.018	0.18	0.27	0.18	0.18	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09
Fork Lifts	0.021	0.69	0.77	0.69	0.77	0.77	1.12	1.12	1.12	1.03	0.86	0.86	0.77
Loader/Backhoe	0.019	0.29	0.29	0.29	0.29	0.29	0.48	0.48	0.48	0.48	0.38	0.38	0.38
Air Compressors	0.009	0.26	0.26	0.26	0.26	0.26	0.30	0.26	0.26	0.26	0.11	0.11	0.08
Manlifts	0.011	2.56	2.81	2.47	1.96	2.05	2.90	2.73	2.73	2.47	2.30	2.30	1.96
Total		13.92	15.21	12.34	14.14	13.38	19.20	18.96	18.87	17.21	13.87	13.87	12.41

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	7	13	13	12	12	12	4	4	3	3	3	3	1
>40T Cranes	5	5	5	4	4	4	1	1	1	2	1	1	0
Pile/Drill Rig	8	7	1	1	1	1	1	1	1	1	1	1	0
Tractors	5	8	8	8	8	8	4	4	3	3	3	3	2
Welders	8	68	68	60	60	60	16	16	12	12	12	12	4
Light Plants	3	10	10	9	9	9	6	6	5	5	5	5	4
Genertors	3	4	4	4	4	4	0	0	0	0	0	0	0
Hydro Vacs/Pumps	5	1	1	1	1	1	1	0	0	0	0	0	0
Fork Lifts	4	11	11	10	10	10	3	3	2	2	2	2	1
Loader/Backhoe	5	5	5	5	5	5	2	2	1	1	1	1	1
Air Compressors	4	7	7	6	6	6	5	5	5	5	5	5	4
Manlifts	8	31	31	27	27	27	13	13	8	8	8	8	1

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.058	5.26	5.26	4.86	4.86	4.86	1.62	1.62	1.21	1.21	1.21	1.21	0.40
>40T Cranes	0.065	1.63	1.63	1.30	1.30	1.30	0.33	0.33	0.33	0.65	0.33	0.33	0.00
Pile/Drill Rig	0.035	1.96	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.00
Tractors	0.026	1.02	1.02	1.02	1.02	1.02	0.51	0.51	0.38	0.38	0.38	0.38	0.26
Welders	0.034	18.29	18.29	16.13	16.13	16.13	4.30	4.30	3.23	3.23	3.23	3.23	1.08
Light Plants	0.034	1.01	1.01	0.91	0.91	0.91	0.61	0.61	0.50	0.50	0.50	0.50	0.40
Genertors	0.037	0.44	0.44	0.44	0.44	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.037	0.18	0.18	0.18	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.016	0.71	0.71	0.65	0.65	0.65	0.19	0.19	0.13	0.13	0.13	0.13	0.06
Loader/Backhoe	0.026	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.13	0.13	0.13	0.13	0.13
Air Compressors	0.034	0.94	0.94	0.81	0.81	0.81	0.67	0.67	0.67	0.67	0.67	0.67	0.54
Manlifts	0.005	1.24	1.24	1.08	1.08	1.08	0.52	0.52	0.32	0.32	0.32	0.32	0.04
Total		33.33	31.65	28.31	28.31	28.31	9.47	9.29	7.18	7.51	7.18	7.18	2.91

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.406	36.94	36.94	34.10	34.10	34.10	11.37	11.37	8.52	8.52	8.52	8.52	2.84
>40T Cranes	0.409	10.21	10.21	8.17	8.17	8.17	2.04	2.04	2.04	4.09	2.04	2.04	0.00
Pile/Drill Rig	0.501	28.06	4.01	4.01	4.01	4.01	4.01	4.01	4.01	4.01	4.01	4.01	0.00
Tractors	0.365	14.59	14.59	14.59	14.59	14.59	7.29	7.29	5.47	5.47	5.47	5.47	3.65
Welders	0.234	127.21	127.21	112.25	112.25	112.25	29.93	29.93	22.45	22.45	22.45	22.45	7.48
Light Plants	0.297	8.90	8.90	8.01	8.01	8.01	5.34	5.34	4.45	4.45	4.45	4.45	3.56
Genertors	0.469	5.63	5.63	5.63	5.63	5.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.477	2.38	2.38	2.38	2.38	2.38	2.38	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.217	9.56	9.56	8.69	8.69	8.69	2.61	2.61	1.74	1.74	1.74	1.74	0.87
Loader/Backhoe	0.365	9.12	9.12	9.12	9.12	9.12	3.65	3.65	1.82	1.82	1.82	1.82	1.82
Air Compressors	0.214	6.00	6.00	5.14	5.14	5.14	4.28	4.28	4.28	4.28	4.28	4.28	3.43
Manlifts	0.174	43.16	43.16	37.59	37.59	37.59	18.10	18.10	11.14	11.14	11.14	11.14	1.39
Total		301.76	277.71	249.68	249.68	249.68	91.00	88.62	65.93	67.97	65.93	65.93	25.04

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.802	72.96	72.96	67.34	67.34	67.34	22.45	22.45	16.84	16.84	16.84	16.84	5.61
>40T Cranes	0.989	24.73	24.73	19.79	19.79	19.79	4.95	4.95	4.95	9.89	4.95	4.95	0.00
Pile/Drill Rig	0.569	31.84	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	0.00
Tractors	0.306	12.26	12.26	12.26	12.26	12.26	6.13	6.13	4.60	4.60	4.60	4.60	3.06
Welders	0.183	99.82	99.82	88.07	88.07	88.07	23.49	23.49	17.61	17.61	17.61	17.61	5.87
Light Plants	0.183	5.50	5.50	4.95	4.95	4.95	3.30	3.30	2.75	2.75	2.75	2.75	2.20
Genertors	0.406	4.88	4.88	4.88	4.88	4.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.406	2.03	2.03	2.03	2.03	2.03	2.03	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.247	10.88	10.88	9.89	9.89	9.89	2.97	2.97	1.98	1.98	1.98	1.98	0.99
Loader/Backhoe	0.306	7.66	7.66	7.66	7.66	7.66	3.06	3.06	1.53	1.53	1.53	1.53	1.53
Air Compressors	0.183	5.14	5.14	4.40	4.40	4.40	3.67	3.67	3.67	3.67	3.67	3.67	2.94
Manlifts	0.103	25.48	25.48	22.19	22.19	22.19	10.68	10.68	6.58	6.58	6.58	6.58	0.82
Total		303.18	275.88	248.02	248.02	248.02	87.28	85.25	65.05	70.00	65.05	65.05	23.03

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.001	0.13	0.13	0.12	0.12	0.12	0.04	0.04	0.03	0.03	0.03	0.03	0.01
>40T Cranes	0.002	0.05	0.05	0.04	0.04	0.04	0.01	0.01	0.01	0.02	0.01	0.01	0.00
Pile/Drill Rig	0.002	0.14	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00
Tractors	0.001	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01
Welders	0.000	0.21	0.21	0.19	0.19	0.19	0.05	0.05	0.04	0.04	0.04	0.04	0.01
Light Plants	0.000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Genertors	0.001	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Loader/Backhoe	0.001	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Manlifts	0.000	0.11	0.11	0.10	0.10	0.10	0.05	0.05	0.03	0.03	0.03	0.03	0.00
Total		0.77	0.65	0.59	0.59	0.59	0.22	0.22	0.16	0.17	0.16	0.16	0.05

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.037	3.40	3.40	3.14	3.14	3.14	1.05	1.05	0.79	0.79	0.79	0.79	0.26
>40T Cranes	0.040	1.00	1.00	0.80	0.80	0.80	0.20	0.20	0.20	0.40	0.20	0.20	0.00
Pile/Drill Rig	0.021	1.15	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.00
Tractors	0.019	0.77	0.77	0.77	0.77	0.77	0.38	0.38	0.29	0.29	0.29	0.29	0.19
Welders	0.016	8.51	8.51	7.50	7.50	7.50	2.00	2.00	1.50	1.50	1.50	1.50	0.50
Light Plants	0.016	0.47	0.47	0.42	0.42	0.42	0.28	0.28	0.23	0.23	0.23	0.23	0.19
Genertors	0.031	0.37	0.37	0.37	0.37	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.031	0.16	0.16	0.16	0.16	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.012	0.51	0.51	0.46	0.46	0.46	0.14	0.14	0.09	0.09	0.09	0.09	0.05
Loader/Backhoe	0.019	0.48	0.48	0.48	0.48	0.48	0.19	0.19	0.10	0.10	0.10	0.10	0.10
Air Compressors	0.016	0.44	0.44	0.38	0.38	0.38	0.31	0.31	0.31	0.31	0.31	0.31	0.25
Manlifts	0.002	0.59	0.59	0.52	0.52	0.52	0.25	0.25	0.15	0.15	0.15	0.15	0.02
Total		17.84	16.85	15.16	15.16	15.16	5.12	4.97	3.83	4.03	3.83	3.83	1.55

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.035	3.22	3.22	2.97	2.97	2.97	0.99	0.99	0.74	0.74	0.74	0.74	0.25
>40T Cranes	0.051	1.29	1.29	1.03	1.03	1.03	0.26	0.26	0.26	0.51	0.26	0.26	0.00
Pile/Drill Rig	0.059	3.28	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.00
Tractors	0.019	0.77	0.77	0.77	0.77	0.77	0.38	0.38	0.29	0.29	0.29	0.29	0.19
Welders	0.009	5.10	5.10	4.50	4.50	4.50	1.20	1.20	0.90	0.90	0.90	0.90	0.30
Light Plants	0.009	0.28	0.28	0.25	0.25	0.25	0.17	0.17	0.14	0.14	0.14	0.14	0.11
Genertors	0.018	0.22	0.22	0.22	0.22	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.018	0.09	0.09	0.09	0.09	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.021	0.94	0.94	0.86	0.86	0.86	0.26	0.26	0.17	0.17	0.17	0.17	0.09
Loader/Backhoe	0.019	0.48	0.48	0.48	0.48	0.48	0.19	0.19	0.10	0.10	0.10	0.10	0.10
Air Compressors	0.009	0.26	0.26	0.23	0.23	0.23	0.19	0.19	0.19	0.19	0.19	0.19	0.15
Manlifts	0.011	2.64	2.64	2.30	2.30	2.30	1.11	1.11	0.68	0.68	0.68	0.68	0.09
Total		18.57	15.75	14.16	14.16	14.16	5.30	5.21	3.93	4.19	3.93	3.93	1.27

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	7	0	0	0	0	0	0	0	0	0	0	0	0
>40T Cranes	5	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	0	0	0	0	0	0	0	0	0
Tractors	5	0	0	0	0	0	0	0	0	0	0	0	0
Welders	8	0	0	0	0	0	0	0	0	0	0	0	0
Light Plants	3	0	0	0	0	0	0	0	0	0	0	0	0
Genertors	3	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Vacs/Pumps	5	0	0	0	0	0	0	0	0	0	0	0	0
Fork Lifts	4	0	0	0	0	0	0	0	0	0	0	0	0
Loader/Backhoe	5	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors	4	0	0	0	0	0	0	0	0	0	0	0	0
Manlifts	8	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.053	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.062	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.398	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.395	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.501	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.363	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.227	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.289	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.466	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.474	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.217	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.363	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.172	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.724	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.917	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.519	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.274	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.377	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.377	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.226	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.274	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.098	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.059	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	7	0	0	0	0	0	0	0	0	0	1	0	1
>40T Cranes	5	0	0	0	0	0	0	0	0	0	1	0	1
Pile Rig	8	0	0	0	0	0	0	0	0	0	1	0	1
Tractors	5	0	0	0	0	0	0	0	0	0	1	0	1
Welders	8	0	0	0	0	0	0	0	0	0	1	0	2
Light Plants	12	0	0	0	0	0	0	0	0	0	1	0	1
Genertors	12	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Vacs	5	0	0	0	0	0	0	0	0	0	1	0	1
Fork Lifts	4	0	0	0	0	0	0	0	0	0	1	0	1
Loader/Backhoe	5	0	0	0	0	0	0	0	0	0	1	0	1
Air Compressors	4	0	0	0	0	0	0	0	0	0	1	0	1
Manlifts	8	0	0	0	0	0	0	0	0	0	2	0	3

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.070	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.49
>40T Cranes	0.078	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.39
Pile Rig	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.34
Tractors	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Welders	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.59
Light Plants	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.44
Genertors	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.22
Fork Lifts	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.09
Loader/Backhoe	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Air Compressors	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.15
Manlifts	0.007	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.16
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.84	0.00	3.19

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.426	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.98	0.00	2.98
>40T Cranes	0.443	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.22	0.00	2.22
Pile Rig	0.502	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.01	0.00	4.01
Tractors	0.369	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84	0.00	1.84
Welders	0.248	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.99	0.00	3.97
Light Plants	0.313	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.76	0.00	3.76
Genertors	0.477	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.484	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.42	0.00	2.42
Fork Lifts	0.455	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.82	0.00	1.82
Loader/Backhoe	0.369	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84	0.00	1.84
Air Compressors	0.228	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.00	0.91
Manlifts	0.159	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.55	0.00	3.82
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.35	0.00	29.61

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.979	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.85	0.00	6.85
>40T Cranes	1.206	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.03	0.00	6.03
Pile Rig	0.723	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.78	0.00	5.78
Tractors	0.386	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.93	0.00	1.93
Welders	0.191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.53	0.00	3.06
Light Plants	0.191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.30	0.00	2.30
Genertors	0.472	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.472	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.36	0.00	2.36
Fork Lifts	0.332	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33	0.00	1.33
Loader/Backhoe	0.386	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.93	0.00	1.93
Air Compressors	0.191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77	0.00	0.77
Manlifts	0.129	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.06	0.00	3.10
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.87	0.00	35.44

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Pile Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.08

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.047	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.33
>40T Cranes	0.050	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.25
Pile Rig	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.22
Tractors	0.026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.13
Welders	0.017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.27
Light Plants	0.017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.21
Genertors	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.19
Fork Lifts	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.07
Loader/Backhoe	0.026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.13
Air Compressors	0.017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.07
Manlifts	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.11
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.79	0.00	1.97

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.25
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.26
Pile Rig	0.059	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.47
Tractors	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10
Welders	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.15
Light Plants	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.11
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.09
Fork Lifts	0.021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.09
Loader/Backhoe	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10
Air Compressors	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04
Manlifts	0.011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.26
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.74	0.00	1.90

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	7	1	1	1	1	0	0	0	2	0	1	1	0
>40T Cranes	5	1	1	1	1	0	0	0	2	0	1	1	0
Pile Rig	8	1	1	1	1	0	0	0	1	0	1	1	0
Tractors	5	1	1	1	1	0	0	0	1	0	1	1	0
Welders	8	5	2	2	5	0	0	0	3	0	5	5	0
Light Plants	12	2	1	1	2	0	0	0	1	0	1	1	0
Genertors	12	0	0	0	0	0	0	0	1	0	0	0	0
Hydro Vacs	5	1	1	1	1	0	0	0	1	0	1	1	0
Fork Lifts	4	1	1	1	1	0	0	0	1	0	1	1	0
Loader/Backhoe	5	1	1	1	1	0	0	0	1	0	1	1	0
Air Compressors	4	1	1	1	1	0	0	0	1	0	1	1	0
Manlifts	8	4	3	3	4	0	0	0	3	0	4	4	0

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.065	0.46	0.46	0.46	0.46	0.00	0.00	0.00	0.92	0.00	0.46	0.46	0.00
>40T Cranes	0.072	0.36	0.36	0.36	0.36	0.00	0.00	0.00	0.72	0.00	0.36	0.36	0.00
Pile Rig	0.040	0.32	0.32	0.32	0.32	0.00	0.00	0.00	0.32	0.00	0.32	0.32	0.00
Tractors	0.030	0.15	0.15	0.15	0.15	0.00	0.00	0.00	0.15	0.00	0.15	0.15	0.00
Welders	0.036	1.43	0.57	0.57	1.43	0.00	0.00	0.00	0.86	0.00	1.43	1.43	0.00
Light Plants	0.036	0.86	0.43	0.43	0.86	0.00	0.00	0.00	0.43	0.00	0.43	0.43	0.00
Genertors	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00
Hydro Vacs	0.042	0.21	0.21	0.21	0.21	0.00	0.00	0.00	0.21	0.00	0.21	0.21	0.00
Fork Lifts	0.019	0.08	0.08	0.08	0.08	0.00	0.00	0.00	0.08	0.00	0.08	0.08	0.00
Loader/Backhoe	0.030	0.15	0.15	0.15	0.15	0.00	0.00	0.00	0.15	0.00	0.15	0.15	0.00
Air Compressors	0.036	0.14	0.14	0.14	0.14	0.00	0.00	0.00	0.14	0.00	0.14	0.14	0.00
Manlifts	0.006	0.19	0.14	0.14	0.19	0.00	0.00	0.00	0.14	0.00	0.19	0.19	0.00
Total		4.35	3.02	3.02	4.35	0.00	0.00	0.00	4.63	0.00	3.92	3.92	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.415	2.91	2.91	2.91	2.91	0.00	0.00	0.00	5.81	0.00	2.91	2.91	0.00
>40T Cranes	0.424	2.12	2.12	2.12	2.12	0.00	0.00	0.00	4.24	0.00	2.12	2.12	0.00
Pile Rig	0.501	4.01	4.01	4.01	4.01	0.00	0.00	0.00	4.01	0.00	4.01	4.01	0.00
Tractors	0.367	1.83	1.83	1.83	1.83	0.00	0.00	0.00	1.83	0.00	1.83	1.83	0.00
Welders	0.241	9.63	3.85	3.85	9.63	0.00	0.00	0.00	5.78	0.00	9.63	9.63	0.00
Light Plants	0.305	7.31	3.66	3.66	7.31	0.00	0.00	0.00	3.66	0.00	3.66	3.66	0.00
Genertors	0.473	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.67	0.00	0.00	0.00	0.00
Hydro Vacs	0.480	2.40	2.40	2.40	2.40	0.00	0.00	0.00	2.40	0.00	2.40	2.40	0.00
Fork Lifts	0.452	1.81	1.81	1.81	1.81	0.00	0.00	0.00	1.81	0.00	1.81	1.81	0.00
Loader/Backhoe	0.367	1.83	1.83	1.83	1.83	0.00	0.00	0.00	1.83	0.00	1.83	1.83	0.00
Air Compressors	0.221	0.88	0.88	0.88	0.88	0.00	0.00	0.00	0.88	0.00	0.88	0.88	0.00
Manlifts	0.155	4.95	3.71	3.71	4.95	0.00	0.00	0.00	3.71	0.00	4.95	4.95	0.00
Total		39.70	29.02	29.02	39.70	0.00	0.00	0.00	41.65	0.00	36.04	36.04	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	2017	13	14	15	16	17	18	19	20	21	22	23	24
<40 T Cranes	0.909	6.36	6.36	6.36	6.36	0.00	0.00	0.00	12.73	0.00	6.36	6.36	0.00
>40T Cranes	1.117	5.58	5.58	5.58	5.58	0.00	0.00	0.00	11.17	0.00	5.58	5.58	0.00
Pile Rig	0.675	5.40	5.40	5.40	5.40	0.00	0.00	0.00	5.40	0.00	5.40	5.40	0.00
Tractors	0.358	1.79	1.79	1.79	1.79	0.00	0.00	0.00	1.79	0.00	1.79	1.79	0.00
Welders	0.189	7.55	3.02	3.02	7.55	0.00	0.00	0.00	4.53	0.00	7.55	7.55	0.00
Light Plants	0.189	4.53	2.26	2.26	4.53	0.00	0.00	0.00	2.26	0.00	2.26	2.26	0.00
Genertors	0.453	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.44	0.00	0.00	0.00	0.00
Hydro Vacs	0.453	2.27	2.27	2.27	2.27	0.00	0.00	0.00	2.27	0.00	2.27	2.27	0.00
Fork Lifts	0.297	1.19	1.19	1.19	1.19	0.00	0.00	0.00	1.19	0.00	1.19	1.19	0.00
Loader/Backhoe	0.358	1.79	1.79	1.79	1.79	0.00	0.00	0.00	1.79	0.00	1.79	1.79	0.00
Air Compressors	0.189	0.75	0.75	0.75	0.75	0.00	0.00	0.00	0.75	0.00	0.75	0.75	0.00
Manlifts	0.116	3.72	2.79	2.79	3.72	0.00	0.00	0.00	2.79	0.00	3.72	3.72	0.00
Total		40.94	33.22	33.22	40.94	0.00	0.00	0.00	52.12	0.00	38.68	38.68	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.001	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.02	0.00	0.01	0.01	0.00
>40T Cranes	0.002	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.02	0.00	0.01	0.01	0.00
Pile Rig	0.002	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.02	0.00	0.02	0.02	0.00
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.02	0.01	0.01	0.02	0.00	0.00	0.00	0.01	0.00	0.02	0.02	0.00
Light Plants	0.000	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Hydro Vacs	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.000	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00
Total		0.10	0.08	0.08	0.10	0.00	0.00	0.00	0.11	0.00	0.09	0.09	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.043	0.30	0.30	0.30	0.30	0.00	0.00	0.00	0.60	0.00	0.30	0.30	0.00
>40T Cranes	0.045	0.23	0.23	0.23	0.23	0.00	0.00	0.00	0.45	0.00	0.23	0.23	0.00
Pile Rig	0.025	0.20	0.20	0.20	0.20	0.00	0.00	0.00	0.20	0.00	0.20	0.20	0.00
Tractors	0.024	0.12	0.12	0.12	0.12	0.00	0.00	0.00	0.12	0.00	0.12	0.12	0.00
Welders	0.017	0.66	0.27	0.27	0.66	0.00	0.00	0.00	0.40	0.00	0.66	0.66	0.00
Light Plants	0.017	0.40	0.20	0.20	0.40	0.00	0.00	0.00	0.20	0.00	0.20	0.20	0.00
Genertors	0.035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00
Hydro Vacs	0.035	0.18	0.18	0.18	0.18	0.00	0.00	0.00	0.18	0.00	0.18	0.18	0.00
Fork Lifts	0.015	0.06	0.06	0.06	0.06	0.00	0.00	0.00	0.06	0.00	0.06	0.06	0.00
Loader/Backhoe	0.024	0.12	0.12	0.12	0.12	0.00	0.00	0.00	0.12	0.00	0.12	0.12	0.00
Air Compressors	0.017	0.07	0.07	0.07	0.07	0.00	0.00	0.00	0.07	0.00	0.07	0.07	0.00
Manlifts	0.004	0.11	0.08	0.08	0.11	0.00	0.00	0.00	0.08	0.00	0.11	0.11	0.00
Total		2.44	1.82	1.82	2.44	0.00	0.00	0.00	2.90	0.00	2.24	2.24	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	2017	13	14	15	16	17	18	19	20	21	22	23	24
<40 T Cranes	0.035	0.25	0.25	0.25	0.25	0.00	0.00	0.00	0.49	0.00	0.25	0.25	0.00
>40T Cranes	0.051	0.26	0.26	0.26	0.26	0.00	0.00	0.00	0.51	0.00	0.26	0.26	0.00
Pile Rig	0.059	0.47	0.47	0.47	0.47	0.00	0.00	0.00	0.47	0.00	0.47	0.47	0.00
Tractors	0.019	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.10	0.00	0.10	0.10	0.00
Welders	0.009	0.38	0.15	0.15	0.38	0.00	0.00	0.00	0.23	0.00	0.38	0.38	0.00
Light Plants	0.009	0.23	0.11	0.11	0.23	0.00	0.00	0.00	0.11	0.00	0.11	0.11	0.00
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00
Hydro Vacs	0.018	0.09	0.09	0.09	0.09	0.00	0.00	0.00	0.09	0.00	0.09	0.09	0.00
Fork Lifts	0.021	0.09	0.09	0.09	0.09	0.00	0.00	0.00	0.09	0.00	0.09	0.09	0.00
Loader/Backhoe	0.019	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.10	0.00	0.10	0.10	0.00
Air Compressors	0.009	0.04	0.04	0.04	0.04	0.00	0.00	0.00	0.04	0.00	0.04	0.04	0.00
Manlifts	0.011	0.34	0.26	0.26	0.34	0.00	0.00	0.00	0.26	0.00	0.34	0.34	0.00
Total		2.32	1.90	1.90	2.32	0.00	0.00	0.00	2.69	0.00	2.21	2.21	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	7	1	1	0	0	0	0	0	0	0	0	0	0
>40T Cranes	5	1	1	0	0	0	0	0	0	0	0	0	0
Pile Rig	8	1	1	0	0	0	0	0	0	0	0	0	0
Tractors	5	1	1	0	0	0	0	0	0	0	0	0	0
Welders	8	8	8	0	0	0	0	0	0	0	0	0	0
Light Plants	12	1	1	0	0	0	0	0	0	0	0	0	0
Genertors	12	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Vacs	5	1	1	0	0	0	0	0	0	0	0	0	0
Fork Lifts	4	1	1	0	0	0	0	0	0	0	0	0	0
Loader/Backhoe	5	1	1	0	0	0	0	0	0	0	0	0	0
Air Compressors	4	1	1	0	0	0	0	0	0	0	0	0	0
Manlifts	8	4	4	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	2018	25	26	27	28	29	30	31	32	33	34	35	36
<40 T Cranes	0.058	0.40	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.065	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.035	0.28	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.026	0.13	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.034	2.15	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.034	0.40	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.037	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.016	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.026	0.13	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.034	0.13	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.005	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		4.36	4.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.406	2.84	2.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.409	2.04	2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.501	4.01	4.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.365	1.82	1.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.234	14.97	14.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.297	3.56	3.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.469	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.477	2.38	2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.217	0.87	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.365	1.82	1.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.214	0.86	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.174	5.57	5.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		40.74	40.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.802	5.61	5.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.989	4.95	4.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.569	4.55	4.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.306	1.53	1.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.183	11.74	11.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.183	2.20	2.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.406	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.406	2.03	2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.247	0.99	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.306	1.53	1.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.183	0.73	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.103	3.29	3.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		39.16	39.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.001	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.002	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.002	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.000	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.037	0.26	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.040	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.021	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.019	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.016	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.016	0.19	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.031	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.031	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.012	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.019	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.016	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.002	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.35	2.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.035	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.051	0.26	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.059	0.47	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.019	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.009	0.60	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.009	0.11	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.018	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.021	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.019	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.009	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.011	0.34	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.43	2.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	7	0	0	0	0	0	0	0	0	0	0	0	0
>40T Cranes	5	0	0	0	0	0	0	0	0	0	0	0	0
Pile Rig	8	0	0	0	0	0	0	0	0	0	0	0	0
Tractors	5	0	0	0	0	0	0	0	0	0	0	0	0
Welders	8	0	0	0	0	0	0	0	0	0	0	0	0
Light Plants	12	0	0	0	0	0	0	0	0	0	0	0	0
Genertors	12	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Vacs	5	0	0	0	0	0	0	0	0	0	0	0	0
Fork Lifts	4	0	0	0	0	0	0	0	0	0	0	0	0
Loader/Backhoe	5	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors	4	0	0	0	0	0	0	0	0	0	0	0	0
Manlifts	8	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.053	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.062	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.398	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.395	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.501	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.363	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.227	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.289	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.466	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.474	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.217	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.363	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.172	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.724	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.917	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.519	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.274	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.377	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.377	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.226	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.274	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.098	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.059	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Onsite Construction Vehicle Trip Emissions

		Month (Vehicles per day)											
Vehicle	**Miles per Day**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Cars	2	0	0	0	0	0	0	0	0	0	0	0	0
Pickup Trucks	2	0	0	0	0	0	76	76	76	102	117	123	122
Total Light Vehicle Miles		0	0	0	0	0	152	152	152	204	234	246	244
Water Truck	2	0	0	0	0	0	15	15	15	15	15	15	15
Delivery Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	2	0	0	0	0	0	7	7	7	10	12	13	13
Misc. MD Truck	5	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		0	0	0	0	0	44	44	44	50	54	56	56
Truck, Dump Ford LT8000	2	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Semi-Tractor, Diesel 20 Ton	2	0	0	0	0	0	0	0	0	0	0	0	0
Misc. HD Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Total Heavy Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0001035	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.03	0.03
Medium Duty	0.0003717	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Heavy Duty	0.0006131	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.04	0.04	0.05	0.05

CO	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0033327	0.00	0.00	0.00	0.00	0.00	0.51	0.51	0.51	0.68	0.78	0.82	0.81
Medium Duty	0.0030301	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.13	0.15	0.16	0.17	0.17
Heavy Duty	0.0043046	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.64	0.64	0.64	0.83	0.94	0.99	0.98

NOx	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0005080	0.00	0.00	0.00	0.00	0.00	0.08	0.08	0.08	0.10	0.12	0.12	0.12
Medium Duty	0.0082326	0.00	0.00	0.00	0.00	0.00	0.36	0.36	0.36	0.41	0.44	0.46	0.46
Heavy Duty	0.0154328	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.44	0.44	0.44	0.52	0.56	0.59	0.58

SOx	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0000090	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000217	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000359	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PM10	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty Exhaust	0.0001064	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.03	0.03
Medium Duty Exhaust	0.0004787	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.03	0.03	0.03
Heavy Duty Exhaust	0.0004727	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.05	0.05	0.05	0.05
Light Duty Fugitive(2)	0.000221	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.05	0.05	0.05	0.05
Medium Duty Fugitve(2)	0.000467	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.03	0.03	0.03
Heavy Duty Fugitive(2)	0.002314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.07	0.08	0.08	0.08
Total		0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.09	0.11	0.13	0.13	0.13

CO_{2EQ}	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.907	0.00	0.00	0.00	0.00	0.00	137.87	137.87	137.87	185.03	212.24	223.13	221.31
Medium Duty	2.261	0.00	0.00	0.00	0.00	0.00	99.49	99.49	99.49	113.05	122.10	126.62	126.62
Heavy Duty	3.768	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	237.35	237.35	237.35	298.09	334.34	349.75	347.93

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks, and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = $CO_2 + CH_4 * 21 + N2O*310$

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

	2016		
Chemical	**Light**	**Medium**	**Heavy**
CO2 (lb/mi)	0.8956	2.2575	3.7642
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.907	2.261	3.768

Appendix B-1
Tesoro Integration and Compliance Project

Onsite Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day)											
		13	14	15	16	17	18	19	20	21	22	23	24
Cars	2	0	0	0	0	0	0	0	0	0	0	0	0
Pickup Trucks	2	127	135	124	126	114	122	118	122	110	73	73	61
Total Light Vehicle Miles		254	270	248	252	228	244	236	244	220	146	146	122
Water Truck	2	15	15	10	10	10	10	10	10	10	10	10	10
Delivery Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	2	14	14	13	13	11	12	11	12	10	8	8	6
Misc. MD Truck	5	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		58	58	46	46	42	44	42	44	40	36	36	32
Truck, Dump Ford LT8000	2	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Semi-Tractor, Diesel 20 Ton	2	0	0	0	0	0	0	0	0	0	0	0	0
Misc. HD Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Total Heavy Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty	0.0001035	0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.03	0.02	0.02	0.02	0.01
Medium Duty	0.0003717	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Heavy Duty	0.0006131	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.02
CO	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty	0.0033327	0.85	0.90	0.83	0.84	0.76	0.81	0.79	0.81	0.73	0.49	0.49	0.41
Medium Duty	0.0030301	0.18	0.18	0.14	0.14	0.13	0.13	0.13	0.13	0.12	0.11	0.11	0.10
Heavy Duty	0.0043046	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		1.02	1.08	0.97	0.98	0.89	0.95	0.91	0.95	0.85	0.60	0.60	0.50
NOx	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty	0.0005080	0.13	0.14	0.13	0.13	0.12	0.12	0.12	0.12	0.11	0.07	0.07	0.06
Medium Duty	0.0082326	0.48	0.48	0.38	0.38	0.35	0.36	0.35	0.36	0.33	0.30	0.30	0.26
Heavy Duty	0.0154328	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.61	0.61	0.50	0.51	0.46	0.49	0.47	0.49	0.44	0.37	0.37	0.33
SOx	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty	0.0000090	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000217	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000359	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty Exhaust	0.0001064	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.01
Medium Duty Exhaust	0.0004787	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Heavy Duty Exhaust	0.0004727	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.05	0.06	0.05	0.05	0.04	0.05	0.05	0.05	0.04	0.03	0.03	0.03
Light Duty Fugitive(2)	0.000221	0.06	0.06	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.03	0.03	0.03
Medium Duty Fugitve(2)	0.000467	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
Heavy Duty Fugitive(2)	0.002314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.08	0.09	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.05	0.05	0.04
Total		0.14	0.14	0.12	0.13	0.11	0.12	0.12	0.12	0.11	0.08	0.08	0.07
CO_{2EQ}	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty	0.907	230.38	244.90	224.94	228.57	206.80	221.31	214.06	221.31	199.55	132.43	132.43	110.66
Medium Duty	2.261	131.14	131.14	104.01	104.01	94.96	99.49	94.96	99.49	90.44	81.40	81.40	72.35
Heavy Duty	3.768	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		361.53	376.04	328.95	332.58	301.77	320.80	309.02	320.80	289.99	213.82	213.82	183.01

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks, and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

	2017		
Chemical	**Light**	**Medium**	**Heavy**
CO2 (lb/mi)	0.8956	2.2575	3.7642
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.907	2.261	3.768

Appendix B-1
Tesoro Integration and Compliance Project

Onsite Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day)											
		25	26	27	28	29	30	31	32	33	34	35	36
Cars	2	0	0	0	0	0	0	0	0	0	0	0	0
Pickup Trucks	2	93	93	88	88	88	59	59	49	49	49	49	38
Total Light Vehicle Miles		186	186	176	176	176	118	118	98	98	98	98	76
Water Truck	2	12	12	7	7	7	7	7	7	7	7	7	7
Delivery Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	2	10	10	9	9	9	6	6	5	5	5	5	3
Misc. MD Truck	5	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		44	44	32	32	32	26	26	24	24	24	24	20
Truck, Dump Ford LT8000	2	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Semi-Tractor, Diesel 20 Ton	2	0	0	0	0	0	0	0	0	0	0	0	0
Misc. HD Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Total Heavy Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.0000636	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Medium Duty	0.0002639	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty	0.0005354	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
CO	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.0024424	0.45	0.45	0.43	0.43	0.43	0.29	0.29	0.24	0.24	0.24	0.24	0.19
Medium Duty	0.0019739	0.09	0.09	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.04
Heavy Duty	0.0038177	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.54	0.54	0.49	0.49	0.49	0.34	0.34	0.29	0.29	0.29	0.29	0.23
NOx	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.0003881	0.07	0.07	0.07	0.07	0.07	0.05	0.05	0.04	0.04	0.04	0.04	0.03
Medium Duty	0.0053355	0.23	0.23	0.17	0.17	0.17	0.14	0.14	0.13	0.13	0.13	0.13	0.11
Heavy Duty	0.0114857	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.31	0.31	0.24	0.24	0.24	0.18	0.18	0.17	0.17	0.17	0.17	0.14
SOx	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.0000090	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000359	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty Exhaust	0.0001058	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Medium Duty Exhaust	0.0004105	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty Exhaust	0.0004029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.04	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Light Duty Fugitive(2)	0.000221	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Medium Duty Fugitve(2)	0.000467	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty Fugitive(2)	0.002314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03
Total		0.10	0.10	0.09	0.09	0.09	0.06	0.06	0.05	0.05	0.05	0.05	0.04
CO_{2EQ}	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.908	168.87	168.87	159.79	159.79	159.79	107.13	107.13	88.97	88.97	88.97	88.97	69.00
Medium Duty	2.256	99.25	99.25	72.18	72.18	72.18	58.65	58.65	54.14	54.14	54.14	54.14	45.11
Heavy Duty	3.759	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		268.12	268.12	231.97	231.97	231.97	165.78	165.78	143.11	143.11	143.11	143.11	114.11

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks, and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

	2018		
Chemical	**Light**	**Medium**	**Heavy**
CO2 (lb/mi)	0.8965	2.2522	3.7551
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.908	2.256	3.759

Appendix B-1
Tesoro Integration and Compliance Project

Onsite Construction Vehicle Trip Emissions

		Month (Vehicles per day)											
Vehicle	**Miles per Day**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Cars	2	0	0	0	0	0	0	0	0	0	0	0	0
Pickup Trucks	2	12	12	12	12	12	12	12	12	12	12	12	12
Total Light Vehicle Miles		24	24	24	24	24	24	24	24	24	24	24	24
Water Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Delivery Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	2	1	1	1	1	1	1	1	1	1	1	1	1
Misc. MD Truck	5	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		2	2	2	2	2	2	2	2	2	2	2	2
Truck, Dump Ford LT8000	2	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Semi-Tractor, Diesel 20 Ton	2	0	0	0	0	0	0	0	0	0	0	0	0
Misc. HD Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Total Heavy Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)[1]	Month (lb/day)											
VOC	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0000548	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0002379	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0005283	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CO	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0022305	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Medium Duty	0.0017339	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0037678	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06

NOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0003585	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Medium Duty	0.0046291	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty	0.0107049	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

SOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0000090	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000215	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000357	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PM10	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty Exhaust	0.0001057	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0003940	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0004031	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Duty Fugitive[2]	0.000221	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Medium Duty Fugitve[2]	0.000467	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive[2]	0.002314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

CO_{2EQ}	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.906	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75	21.75
Medium Duty	2.247	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49
Heavy Duty	3.745	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		26.24	26.24	26.24	26.24	26.24	26.24	26.24	26.24	26.24	26.24	26.24	26.24

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,

and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

	2019		
Chemical	**Light**	**Medium**	**Heavy**
CO2 (lb/mi)	0.8949	2.2430	3.7418
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.906	2.247	3.745

Onsite Construction Vehicle Trip Emissions

		Month (Vehicles per day)											
Vehicle	**Miles per Day**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Cars	2												
Pickup Trucks	2	12	12	12	12	12	12	12	12	12	12	12	12
Total Light Vehicle Miles		24	24	24	24	24	24	24	24	24	24	24	24
Water Truck	2	1	1	1	1	1	1	1	1	1	1	1	1
Delivery Truck	2												
1 Ton Truck	2	1	1	1	1	1	1	1	1	1	1	1	1
Misc. MD Truck	5												
Total Medium Truck Miles		4	4	4	4	4	4	4	4	4	4	4	4
Truck, Dump Ford LT8000	2												
Concrete Truck	2												
Semi-Tractor, Diesel 20 Ton	2												
Misc. HD Truck	2												
Total Heavy Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)[1]	Month (lb/day)											
VOC	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0001152	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0002072	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0010485	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0007041	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Medium Duty	0.0018984	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty	0.0566489	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
NOx	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0026401	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Medium Duty	0.0032831	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty	0.0097261	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
SOx	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0000082	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000202	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty Exhaust	0.0001814	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0003283	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0001312	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Light Duty Fugitive[2]	0.000221	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Medium Duty Fugitve[2]	0.000467	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive[2]	0.002314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
CO_{2EQ}	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.872	20.92	20.92	20.92	20.92	20.92	20.92	20.92	20.92	20.92	20.92	20.92	20.92
Medium Duty	2.104	8.42	8.42	8.42	8.42	8.42	8.42	8.42	8.42	8.42	8.42	8.42	8.42
Heavy Duty	3.742	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		29.34	29.34	29.34	29.34	29.34	29.34	29.34	29.34	29.34	29.34	29.34	29.34

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,

and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

	2020		
Chemical	**Light**	**Medium**	**Heavy**
CO2 (lb/mi)	0.8604	2.1003	3.7388
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.872	2.104	3.742

Appendix B-1
Tesoro Integration and Compliance Project

Onsite Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day)											
		61	62	63	64	65	66	67	68	69	70	71	72
Cars	2												
Pickup Trucks	2	12	12	12									
Total Light Vehicle Miles		24	24	24	0	0	0	0	0	0	0	0	0
Water Truck	2	1	1	1									
Delivery Truck	2												
1 Ton Truck	2	1	1	1									
Misc. MD Truck	5												
Total Medium Truck Miles		4	4	4	0	0	0	0	0	0	0	0	0
Truck, Dump Ford LT8000	2												
Concrete Truck	2												
Semi-Tractor, Diesel 20 Ton	2												
Misc. HD Truck	2												
Total Heavy Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.0001103	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0001878	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0010069	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.0006885	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0016798	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0563965	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.0024874	0.06	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0024226	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0094888	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.07	0.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.0000082	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000202	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty Exhaust	0.0001798	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0003061	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0001308	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Duty Fugitive(2)	0.000230	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Fugitve(2)	0.000515	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive(2)	0.002314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_{2EQ}	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.872	20.93	20.93	20.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	2.095	8.38	8.38	8.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	3.741	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		29.31	29.31	29.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,

and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

Chemical	2021 Light	Medium	Heavy
CO2 (lb/mi)	0.8606	2.0915	3.7375
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.872	2.095	3.741

Appendix B-1
Tesoro Integration and Compliance Project

Offsite Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day) 1	2	3	4	5	6	7	8	9	10	11	12
Tradesmen	29.4	0	0	0	0	0	298	298	298	396	479	523	523
Construction Staff	29.4						40	40	40	40	40	40	40
Total Light Vehicle Miles		0	0	0	0	0	9937.2	9937.2	9937.2	12818.4	15258.6	16552.2	16552.2
Water Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Delivery Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Misc. MD Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0
Truck, Dump Ford LT8000	40	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Dump Trucks	400	0	0	0	0	0	21	15	15	15	6	6	6
Non-Haz Dump Trucks	200	0	0	0	0	0	11	13	12	12	18	18	18
Misc. HD Truck	40	0	0	0	0	0	47	27	19	19	30	25	25
Total Heavy Truck Miles		0	0	0	0	0	12480	9680	9160	9160	7200	7000	7000

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	2016	1	2	3	4	5	6	7	8	9	10	11	12
Light Duty	0.0001035	0.00	0.00	0.00	0.00	0.00	1.03	1.03	1.03	1.33	1.58	1.71	1.71
Medium Duty	0.0003717	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0006131	0.00	0.00	0.00	0.00	0.00	7.65	5.93	5.62	5.62	4.41	4.29	4.29
Total		0.00	0.00	0.00	0.00	0.00	8.68	6.96	6.64	6.94	5.99	6.00	6.00

CO	2016	1	2	3	4	5	6	7	8	9	10	11	12
Light Duty	0.0033327	0.00	0.00	0.00	0.00	0.00	33.12	33.12	33.12	42.72	50.85	55.16	55.16
Medium Duty	0.0030301	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0043046	0.00	0.00	0.00	0.00	0.00	53.72	41.67	39.43	39.43	30.99	30.13	30.13
Total		0.00	0.00	0.00	0.00	0.00	86.84	74.79	72.55	82.15	81.85	85.30	85.30

NOx	2016	1	2	3	4	5	6	7	8	9	10	11	12
Light Duty	0.0005080	0.00	0.00	0.00	0.00	0.00	5.05	5.05	5.05	6.51	7.75	8.41	8.41
Medium Duty	0.0082326	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0154328	0.00	0.00	0.00	0.00	0.00	192.60	149.39	141.36	141.36	111.12	108.03	108.03
Total		0.00	0.00	0.00	0.00	0.00	197.65	154.44	146.41	147.88	118.87	116.44	116.44

SOx	2016	1	2	3	4	5	6	7	8	9	10	11	12
Light Duty	0.0000090	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.09	0.12	0.14	0.15	0.15
Medium Duty	0.0000217	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000359	0.00	0.00	0.00	0.00	0.00	0.45	0.35	0.33	0.33	0.26	0.25	0.25
Total		0.00	0.00	0.00	0.00	0.00	0.54	0.44	0.42	0.44	0.40	0.40	0.40

PM10	2016	1	2	3	4	5	6	7	8	9	10	11	12
Light Duty Exhaust	0.0001064	0.00	0.00	0.00	0.00	0.00	1.06	1.06	1.06	1.36	1.62	1.76	1.76
Medium Duty Exhaust	0.0004787	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0004727	0.00	0.00	0.00	0.00	0.00	5.90	4.58	4.33	4.33	3.40	3.31	3.31
Total Exhaust PM		0.00	0.00	0.00	0.00	0.00	6.96	5.63	5.39	5.69	5.03	5.07	5.07
Light Duty Fugitive(2)	0.000221	0.00	0.00	0.00	0.00	0.00	2.20	2.20	2.20	2.83	3.37	3.66	3.66
Medium Duty Fugitve(2)	0.000467	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive(2)	0.002314	0.00	0.00	0.00	0.00	0.00	28.88	22.40	21.20	21.20	16.66	16.20	16.20
Total Fugitive PM		0.00	0.00	0.00	0.00	0.00	31.08	24.60	23.40	24.03	20.04	19.86	19.86
Total		0.00	0.00	0.00	0.00	0.00	38.04	30.23	28.78	29.73	25.06	24.93	24.93

CO_{2EQ}	2016	1	2	3	4	5	6	7	8	9	10	11	12
Light Duty	0.907	0.00	0.00	0.00	0.00	0.00	9013.31	9013.31	9013.31	11626.64	13839.97	15013.30	15013.30
Medium Duty	2.261	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	3.768	0.00	0.00	0.00	0.00	0.00	47021.52	36471.82	34512.59	34512.59	27127.80	26374.25	26374.25
Total		0.00	0.00	0.00	0.00	0.00	56034.83	45485.13	43525.90	46139.23	40967.77	41387.55	41387.55

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,

and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CQ) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

Chemical	2015 Light	Medium	Heavy
CO2 (lb/mi)	0.8956	2.2575	3.7642
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.907	2.261	3.768

Appendix B-1
Tesoro Integration and Compliance Project

Offsite Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day) 13	14	15	16	17	18	19	20	21	22	23	24
Tradesmen	29.4	576	603	539	546	525	621	622	656	586	453	453	392
Construction Staff	29.4	40	40	40	40	40	40	40	40	40	40	40	40
Total Light Vehicle Miles		18110.4	18904.2	17022.6	17228.4	16611	19433.4	19462.8	20462.4	18404.4	14494.2	14494.2	12700.8
Water Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Delivery Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Misc. MD Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0
Truck, Dump Ford LT8000	40	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Dump Trucks	400	9	9	9	9	9	9	4	4	4	1	1	1
Non-Haz Dump Trucks	200	20	20	20	20	20	20	10	10	10	6	6	6
Misc. HD Truck	40	38	36	36	44	44	44	47	47	47	62	62	62
Total Heavy Truck Miles		9120	9040	9040	9360	9360	9360	5480	5480	5480	4080	4080	4080

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Light Duty	0.0001035	1.87	1.96	1.76	1.78	1.72	2.01	2.01	2.12	1.90	1.50	1.50	1.31
Medium Duty	0.0003717	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0006131	5.59	5.54	5.54	5.74	5.74	5.74	3.36	3.36	3.36	2.50	2.50	2.50
Total		7.46	7.50	7.30	7.52	7.46	7.75	5.37	5.48	5.26	4.00	4.00	3.82

CO	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty	0.0033327	60.36	63.00	56.73	57.42	55.36	64.77	64.86	68.19	61.34	48.30	48.30	42.33
Medium Duty	0.0030301	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0043046	39.26	38.91	38.91	40.29	40.29	40.29	23.59	23.59	23.59	17.56	17.56	17.56
Total		99.61	101.92	95.65	97.71	95.65	105.06	88.45	91.78	84.93	65.87	65.87	59.89

NOx	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty	0.0005080	9.20	9.60	8.65	8.75	8.44	9.87	9.89	10.40	9.35	7.36	7.36	6.45
Medium Duty	0.0082326	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0154328	140.75	139.51	139.51	144.45	144.45	144.45	84.57	84.57	84.57	62.97	62.97	62.97
Total		149.95	149.12	148.16	153.20	152.89	154.32	94.46	94.97	93.92	70.33	70.33	69.42

SOx	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty	0.0000090	0.16	0.17	0.15	0.15	0.15	0.17	0.17	0.18	0.17	0.13	0.13	0.11
Medium Duty	0.0000217	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000359	0.33	0.32	0.32	0.34	0.34	0.34	0.20	0.20	0.20	0.15	0.15	0.15
Total		0.49	0.49	0.48	0.49	0.49	0.51	0.37	0.38	0.36	0.28	0.28	0.26

PM10	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty Exhaust	0.0001064	1.93	2.01	1.81	1.83	1.77	2.07	2.07	2.18	1.96	1.54	1.54	1.35
Medium Duty Exhaust	0.0004787	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0004727	4.31	4.27	4.27	4.42	4.42	4.42	2.59	2.59	2.59	1.93	1.93	1.93
Total Exhaust PM		6.24	6.28	6.08	6.26	6.19	6.49	4.66	4.77	4.55	3.47	3.47	3.28
Light Duty Fugitive(2)	0.000221	4.00	4.18	3.76	3.81	3.67	4.30	4.30	4.52	4.07	3.20	3.20	2.81
Medium Duty Fugitve(2)	0.000467	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive(2)	0.002314	21.11	20.92	20.92	21.66	21.66	21.66	12.68	12.68	12.68	9.44	9.44	9.44
Total Fugitive PM		25.11	25.10	24.68	25.47	25.33	25.96	16.98	17.20	16.75	12.65	12.65	12.25
Total		31.35	31.38	30.77	31.73	31.52	32.45	21.64	21.97	21.30	16.12	16.12	15.53

CO_{2EQ}	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty	0.907	16426.63	17146.62	15439.96	15626.63	15066.63	17626.62	17653.29	18559.95	16693.29	13146.63	13146.63	11519.97
Medium Duty	2.261	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	3.768	34361.88	34060.46	34060.46	35266.14	35266.14	35266.14	20647.27	20647.27	20647.27	15372.42	15372.42	15372.42
Total		50788.51	51207.08	49500.42	50892.77	50332.77	52892.76	38300.56	39207.22	37340.56	28519.05	28519.05	26892.39

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$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,

and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CQ) = $CO_2 + CH_4 * 21 + N2O*310$

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

Chemical	2017 Light	Medium	Heavy
CO2 (lb/mi)	0.8956	2.2575	3.7642
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.907	2.261	3.768

Appendix B-1
Tesoro Integration and Compliance Project

Offsite Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day)											
		25	26	27	28	29	30	31	32	33	34	35	36
Tradesmen	29.4	569	569	512	512	512	249	249	208	208	208	208	114
Construction Staff	29.4	40	40	40	40	40	40	40	40	40	40	40	40
Total Light Vehicle Miles		17904.6	17904.6	16228.8	16228.8	16228.8	8496.6	8496.6	7291.2	7291.2	7291.2	7291.2	4527.6
Water Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Delivery Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Misc. MD Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0
Truck, Dump Ford LT8000	40	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Dump Trucks	400	1	1	1	2	2	2	1	1	1	0	0	0
Non-Haz Dump Trucks	200	4	4	4	1	1	1	1	1	1	1	1	1
Misc. HD Truck	40	66	62	62	55	55	55	10	10	10	7	7	7
Total Heavy Truck Miles		3840	3680	3680	3200	3200	3200	1000	1000	1000	480	480	480

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.0000636	1.14	1.14	1.03	1.03	1.03	0.54	0.54	0.46	0.46	0.46	0.46	0.29
Medium Duty	0.0002639	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0005354	2.06	1.97	1.97	1.71	1.71	1.71	0.54	0.54	0.54	0.26	0.26	0.26
Total		3.19	3.11	3.00	2.74	2.74	2.25	1.08	1.00	1.00	0.72	0.72	0.54
CO	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.0024424	43.73	43.73	39.64	39.64	39.64	20.75	20.75	17.81	17.81	17.81	17.81	11.06
Medium Duty	0.0019739	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0038177	14.66	14.05	14.05	12.22	12.22	12.22	3.82	3.82	3.82	1.83	1.83	1.83
Total		58.39	57.78	53.69	51.85	51.85	32.97	24.57	21.63	21.63	19.64	19.64	12.89
NOx	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.0003881	6.95	6.95	6.30	6.30	6.30	3.30	3.30	2.83	2.83	2.83	2.83	1.76
Medium Duty	0.0053355	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0114857	44.11	42.27	42.27	36.75	36.75	36.75	11.49	11.49	11.49	5.51	5.51	5.51
Total		51.05	49.22	48.57	43.05	43.05	40.05	14.78	14.32	14.32	8.34	8.34	7.27
SOx	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.0000090	0.16	0.16	0.15	0.15	0.15	0.08	0.08	0.07	0.07	0.07	0.07	0.04
Medium Duty	0.0000216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000359	0.14	0.13	0.13	0.11	0.11	0.11	0.04	0.04	0.04	0.02	0.02	0.02
Total		0.30	0.29	0.28	0.26	0.26	0.19	0.11	0.10	0.10	0.08	0.08	0.06
PM10	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty Exhaust	0.0001058	1.89	1.89	1.72	1.72	1.72	0.90	0.90	0.77	0.77	0.77	0.77	0.48
Medium Duty Exhaust	0.0004105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0004029	1.55	1.48	1.48	1.29	1.29	1.29	0.40	0.40	0.40	0.19	0.19	0.19
Total Exhaust PM		3.44	3.38	3.20	3.01	3.01	2.19	1.30	1.17	1.17	0.96	0.96	0.67
Light Duty Fugitive(2)	0.000221	3.96	3.96	3.59	3.59	3.59	1.88	1.88	1.61	1.61	1.61	1.61	1.00
Medium Duty Fugitve(2)	0.000467	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive(2)	0.002314	8.89	8.52	8.52	7.41	7.41	7.41	2.31	2.31	2.31	1.11	1.11	1.11
Total Fugitive PM		12.84	12.47	12.10	10.99	10.99	9.28	4.19	3.93	3.93	2.72	2.72	2.11
Total		16.29	15.85	15.30	14.00	14.00	11.47	5.49	5.10	5.10	3.69	3.69	2.78
CO_{2EQ}	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.908	16255.63	16255.63	14734.16	14734.16	14734.16	7714.08	7714.08	6619.70	6619.70	6619.70	6619.70	4110.62
Medium Duty	2.256	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	3.759	14432.92	13831.55	13831.55	12027.43	12027.43	12027.43	3758.57	3758.57	3758.57	1804.11	1804.11	1804.11
Total		30688.54	30087.17	28565.71	26761.59	26761.59	19741.51	11472.65	10378.27	10378.27	8423.81	8423.81	5914.73

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,

and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_2) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

Chemical	2018		
	Light	Medium	Heavy
CO2 (lb/mi)	0.8965	2.2522	3.7551
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.908	2.256	3.759

Appendix B-1
Tesoro Integration and Compliance Project

Offsite Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day) 37	38	39	40	41	42	43	44	45	46	47	48
Tradesmen	29.4	58	58	58	58	58	58	58	58	58	58	58	58
Construction Staff	29.4	40	40	40	40	40	40	40	40	40	40	40	40
Total Light Vehicle Miles		2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2
Water Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Delivery Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Misc. MD Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0
Truck, Dump Ford LT8000	40	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Dump Trucks	400	0	0	0	0	0	0	0	0	0	0	0	0
Non-Haz Dump Trucks	200	0	0	0	0	0	0	0	0	0	0	0	0
Misc. HD Truck	40	5	5	5	5	5	5	5	5	5	5	5	5
Total Heavy Truck Miles		200	200	200	200	200	200	200	200	200	200	200	200

	Emission Rate (lb/mi)[1]	Month (lb/day)											
VOC	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0000548	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Medium Duty	0.0002379	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0005283	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Total		0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
CO	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0022305	6.43	6.43	6.43	6.43	6.43	6.43	6.43	6.43	6.43	6.43	6.43	6.43
Medium Duty	0.0017339	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0037678	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Total		7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18	7.18
NOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0003585	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
Medium Duty	0.0046291	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0107049	2.14	2.14	2.14	2.14	2.14	2.14	2.14	2.14	2.14	2.14	2.14	2.14
Total		3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.17
SOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0000090	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Medium Duty	0.0000215	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000357	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total		0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
PM10	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty Exhaust	0.0001057	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Medium Duty Exhaust	0.0003940	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0004031	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Total Exhaust PM		0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Light Duty Fugitive[2]	0.000230	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Medium Duty Fugitve[2]	0.000515	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive[2]	0.002314	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Total Fugitive PM		1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Total		1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
CO_{2EQ}	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.906	2611.29	2611.29	2611.29	2611.29	2611.29	2611.29	2611.29	2611.29	2611.29	2611.29	2611.29	2611.29
Medium Duty	2.247	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	3.745	749.05	749.05	749.05	749.05	749.05	749.05	749.05	749.05	749.05	749.05	749.05	749.05
Total		3360.34	3360.34	3360.34	3360.34	3360.34	3360.34	3360.34	3360.34	3360.34	3360.34	3360.34	3360.34

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks, and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_2) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

	2019		
Chemical	**Light**	**Medium**	**Heavy**
CO2 (lb/mi)	0.8949	2.2430	3.7418
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.906	2.247	3.745

Appendix B-1
Tesoro Integration and Compliance Project

Offsite Construction Vehicle Trip Emissions

		Month (Vehicles per day)											
Vehicle	**Miles per Day**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Tradesmen	29.4	58	58	58	58	58	58	58	58	58	58	58	58
Construction Staff	29.4	40	40	40	40	40	40	40	40	40	40	40	40
Total Light Vehicle Miles		2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2
Water Truck	40	1	1	1	1	1	1	1	1	1	1	1	1
Delivery Truck	40												
1 Ton Truck	40												
Misc. MD Truck	40												
Total Medium Truck Miles		40	40	40	40	40	40	40	40	40	40	40	40
Truck, Dump Ford LT8000	40												
Hazardous Dump Trucks	400												
Non-Haz Dump Trucks	200												
Misc. HD Truck	40	5	5	5	5	5	5	5	5	5	5	5	5
Total Heavy Truck Miles		200	200	200	200	200	200	200	200	200	200	200	200

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0001152	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Medium Duty	0.0002072	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty	0.0010485	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Total		0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
CO	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0007041	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03
Medium Duty	0.0018984	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Heavy Duty	0.0566489	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33
Total		13.43	13.43	13.43	13.43	13.43	13.43	13.43	13.43	13.43	13.43	13.43	13.43
NOx	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0026401	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61	7.61
Medium Duty	0.0032831	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Heavy Duty	0.0097261	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95
Total		9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68
SOx	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0000082	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Medium Duty	0.0000202	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
PM10	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty Exhaust	0.0001814	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Medium Duty Exhaust	0.0003283	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty Exhaust	0.0001312	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Total Exhaust PM		0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
Light Duty Fugitive(2)	0.000221	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Medium Duty Fugitve(2)	0.000467	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Heavy Duty Fugitive(2)	0.002314	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Total Fugitive PM		1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
Total		1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
CO_{2EQ}	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.872	2511.87	2511.87	2511.87	2511.87	2511.87	2511.87	2511.87	2511.87	2511.87	2511.87	2511.87	2511.87
Medium Duty	2.104	84.15	84.15	84.15	84.15	84.15	84.15	84.15	84.15	84.15	84.15	84.15	84.15
Heavy Duty	3.742	748.46	748.46	748.46	748.46	748.46	748.46	748.46	748.46	748.46	748.46	748.46	748.46
Total		3344.49	3344.49	3344.49	3344.49	3344.49	3344.49	3344.49	3344.49	3344.49	3344.49	3344.49	3344.49

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)
(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,
and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_{2}) = CO_2 + CH_4 * 21 + N2O*310
where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.
where light vehicle are gasoline light duty trucks.
where medium/heavy duty vehicle are diesel heavy duty trucks.

	2019		
Chemical	**Light**	**Medium**	**Heavy**
CO2 (lb/mi)	0.8604	2.1003	3.7388
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.872	2.104	3.742

Appendix B-1
Tesoro Integration and Compliance Project

Offsite Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day) 61	62	63	64	65	66	67	68	69	70	71	72
Tradesmen	29.4	58	58	58									
Construction Staff	29.4	40	40	40									
Total Light Vehicle Miles		2881.2	2881.2	2881.2	0	0	0	0	0	0	0	0	0
Water Truck	40	0	0	0									
Delivery Truck	40	0	0	0									
1 Ton Truck	40	0	0	0									
Misc. MD Truck	40	0	0	0									
Total Medium Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0
Truck, Dump Ford LT8000	40	0	0	0									
Hazardous Dump Trucks	400	0	0	0									
Non-Haz Dump Trucks	200	0	0	0									
Misc. HD Truck	40	5	5	5									
Total Heavy Truck Miles		200	200	200	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.0001103	0.32	0.32	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0001878	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0010069	0.20	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.52	0.52	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CO	2021	61	62	63	64	65	66	67	68	69	70	71	72
Light Duty	0.0006885	1.98	1.98	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0016798	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0563965	11.28	11.28	11.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		13.26	13.26	13.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOx	2021	61	62	63	64	65	66	67	68	69	70	71	72
Light Duty	0.0024874	7.17	7.17	7.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0024226	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0094888	1.90	1.90	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		9.06	9.06	9.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SOx	2021	61	62	63	64	65	66	67	68	69	70	71	72
Light Duty	0.0000082	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000202	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PM10	2021	61	62	63	64	65	66	67	68	69	70	71	72
Light Duty Exhaust	0.0001798	0.52	0.52	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0003061	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0001308	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.54	0.54	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Duty Fugitive(2)	0.000230	0.66	0.66	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Fugitve(2)	0.000515	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive(2)	0.002314	0.46	0.46	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		1.13	1.13	1.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		1.67	1.67	1.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CO_{2EQ}	2021	61	62	63	64	65	66	67	68	69	70	71	72
Light Duty	0.872	2512.37	2512.37	2512.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	2.095	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	3.741	748.21	748.21	748.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		3260.58	3260.58	3260.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)
(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,
and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_2) = CO_2 + CH_4 * 21 + N2O*310
where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.
where light vehicle are gasoline light duty trucks.
where medium/heavy duty vehicle are diesel heavy duty trucks.

Chemical	2021 Light	Medium	Heavy
CO2 (lb/mi)	0.8606	2.0915	3.7375
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.872	2.095	3.741

Appendix B-1
Tesoro Integration and Compliance Project

Offroad Construction Vehicle Dust Emissions

Vehicle	Miles/Trip	Trips/Day
Light Vehicles	0.05	10
Total Light Vehicle Miles		0.5
Delivey Trucks	0.05	0
Water Trucks	0.1	10
Total Medium Truck Miles		1
Concrete Truck	0.05	0
Dump Trucks	0.05	40
Total Heavy Truck Miles		2
Tractors	0.05	13
Fork Lifts	0.05	10
Loader/Backhoe	0.05	6
Total Heavy-Heavy Duty Miles		1.45

PM10	Emission Rate (lb/mi)(1)	Emissions (lb/day)
Light Duty	0.9021196	0.45
Medium Duty	1.2863357	1.29
Heavy Duty	2.1931267	4.39
Heavy Heavy Duty	2.4962390	3.62
Uncontrolled Total		9.74
Controlled Total(2)		3.80

(1) Based on Section 13.2.2 of EPA's Compilation of Air Pollutant Emission Factors (AP-42).
Emission Rate = 1.5((s/12)^.9)*((W/3)^.45)
s = silt content = 8.5%
W = Vehicle Weight (ton) =2.5 for light, 5.5 for medium, 15 for heavy,
and 24 for heavy heavy (EMFAC2007).

(2) Controlled Emissions assume that watering 3 times per day reduces emissions by 61 percent (Uncontrolled Emissions x 0.39)

Appendix B-1
Tesoro Integration and Compliance Project

Paint Emissions

Month	6	7	8	9	10	11	12	13	14	25	26	27	43	44	45
Volume paint applied per day (gal)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	75.0	75.0	75.0	75.0	75.0	75.0
VOC content (lb/gal)[(1)]	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
VOC Emissions (lb/day)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	62.3	62.3	62.3	62.3	62.3	62.3

(1) Based on SCAQMD Rule 1113 VOC limit of 100g/L for industrial maintenance coatings.

Appendix B-1
Tesoro Integration and Compliance Project

Peak Monthly Fugitive PM Construction Emissions

Grading Operations	Average Pieces of Equipment Operating	Peak Pieces of Equipment Operating	Hours of Operation	PM10 Emission Factor (lb/hour)	Water Control Factor(5)	Controlled Emissions: Average PM10 Emissions (lbs/day)	Controlled Emissions: Peak PM10 Emissions (lbs/day)	Uncontrolled Emissions: Average PM10 Emissions (lbs/day)	Uncontrolled Emissions: Peak PM10 Emissions (lbs/day)	SCAQMD Emission Factor Source
Construction Activities(1)	2	2	8	0.348	0.39	2.17	2.17	5.56218435	5.56218435	Table A9-9-F

Stockpiles	Average Tons of Materials Handled Per Day	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor(5)	Controlled Emissions: Average PM10 Emissions Pounds/day	Controlled Emissions: Peak PM10 Emissions Pounds/day	Uncontrolled Emissions: Average PM10 Emissions Pounds/day	Uncontrolled Emissions: Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Construction Activities(2)	1200	1200	0.00005	0.39	0.02411771	0.02411771	0.06184029	0.06184029	Table A9-9-G

Assumptions: 1cubic yard trench spoils = 1 ton

WIND EROSION Disturbed Area and Temporary Stockpiles	Days of Construction	Average Acreage Disturbed Per Day	Peak Acreage Disturbed Per Day	PM10 Emission Factor (lb/day/acre)	Average PM10 Emissions Pounds/day	Peak PM10 Emissions Pounds/day	Average PM10 Emissions Tons/Year	Peak PM10 Emissions Tons/Year	SCAQMD Emission Factor Source
Construction Activities(3)	20	1	1	0.120	0.120	0.120	0.001	0.001	Table A9-9-E

Filling and Dumping	Estimated Materials Handled Per Day (tons)	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor(5)	Controlled Emissions: Average PM10 Emissions Pounds/day	Controlled Emissions: Peak PM10 Emissions Pounds/day	Uncontrolled Emissions: Average PM10 Emissions Pounds/day	Uncontrolled Emissions: Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Truck Filling(4)	1200.0	1200.0	5.15E-05	0.39	0.02411771	0.02411771	0.06184029	0.06184029	Table A9-9
Truck Dumping	1200.0	1200.0	5.15E-05	0.39	0.02411771	0.02411771	0.06184029	0.06184029	Table A9-9

TOTAL PM10 Pounds/day	Average	Peak
(Controlled Emissions)	2.3613	2.36133
(Uncontrolled Emissions)	5.749	5.749

(1) Emissions (lbs/hr) = [0.75 x ($G^{1.5}$)/($H^{1.4}$) x J
where G = silt content (7.5%), H = moisture content (15.0%) and J = hrs of operation (EPA AP-42 Table 11.9-1 for bulldozing overburden).
(2) Emissions (lbs/ton) = 0.00112 x [$(G/5)^{1.3}/(H/2)^{1.4}$] x I/J
where G=mean wind speed (4.1 mph), H=moisture content of surface material (15%); I=lbs of dirt handled per day; and J=2,000 lbs/ton. Wind speed data acquired from Long Beach 2005-2007 SCAQMD meteorological file.
(3) Emissions (lbs/day/acre) = 1.7 x [(G/1.5)*(365-H)/235] x I/15 x J
where G = silt content (7.5%); H = days with >0.01 inch of rain (34); I = percentage of time wind speed exceeds 12 mph (0.3%) and J= fraction of TSP (0.5). Wind speed data acquired from Long Beach 2005-2007 SCAQMD meteorological file.
(4) Used SCAQMD Table 9-9 Default emission factors.
(5) Mitigated Emissions assume that watering 3 times per day controls emissions by 61 percent (Uncontrolled Emissions x 0.39). www.AQMD.gov/CEQA/handbook/mitigation/fugitive/Table XI-A.doc

Appendix B-1
Tesoro Integration and Compliance Project
Total Project Component
Crude Tank Construction Emission Summary

	Year 1												Year 2												Year 3											
Emissions from Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.44	6.38	6.78	7.40	4.51	4.56	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	3.48	2.34	1.81	1.51	2.40	2.72	3.58	4.11	4.15	4.06	4.06	4.06
CO (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52.08	57.06	62.34	72.79	48.58	49.82	48.61	48.61	48.61	48.61	48.61	48.61	48.61	45.29	45.29	35.96	25.85	22.11	21.14	25.65	31.05	40.40	44.14	45.53	44.34	44.34	44.34
NOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	78.71	80.23	87.05	93.56	48.75	49.68	48.54	48.54	48.54	48.54	48.54	48.54	48.54	41.27	41.27	33.72	24.89	21.95	22.74	25.08	30.45	41.15	44.09	44.91	43.89	43.89	43.89
SOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.17	0.19	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.08	0.06	0.05	0.06	0.05	0.08	0.09	0.10	0.10	0.10	0.10	0.10
PM10 (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.92	4.34	4.59	5.16	3.26	3.28	3.20	3.20	3.20	3.20	3.20	3.20	3.20	2.85	2.85	2.25	1.63	1.38	1.27	1.69	1.87	2.63	2.88	2.90	2.82	2.82	2.82
PM2.5 (lb/day)(1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.88	4.30	4.55	5.10	3.22	3.25	3.16	3.16	3.16	3.16	3.16	3.16	3.16	2.82	2.82	2.23	1.61	1.36	1.26	1.67	1.85	2.60	2.85	2.87	2.79	2.79	2.79
CO_2 (MT/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.70	3.57	4.13	4.49	2.39	2.48	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.15	2.15	1.91	1.36	1.21	1.45	1.32	1.88	2.24	2.39	2.48	2.43	2.43	2.43

	Year 1												Year 2												Year 3											
Offroad Fugitive PM - Peak	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
PM10 (lb/day)(2)										4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22
PM2.5 (lb/day)(1)(2)						0.00	0.00	0.00	0.00	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89

	Year 1												Year 2												Year 3											
Paint	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Year 1												Year 2												Year 3											
Total Emissions	**Thresholds**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
VOC (lb/day)	75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.44	6.38	6.78	7.40	4.51	4.56	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	3.48	2.34	1.81	1.51	2.40	2.72	3.58	4.11	4.15	4.06	4.06	4.06
CO (lb/day)	550	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52.08	57.06	62.34	72.79	48.58	49.82	48.61	48.61	48.61	48.61	48.61	48.61	48.61	45.29	45.29	35.96	25.85	22.11	21.14	25.65	31.05	40.40	44.14	45.53	44.34	44.34	44.34
NOx (lb/day)	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	78.71	80.23	87.05	93.56	48.75	49.68	48.54	48.54	48.54	48.54	48.54	48.54	48.54	41.27	41.27	33.72	24.89	21.95	22.74	25.08	30.45	41.15	44.09	44.91	43.89	43.89	43.89
SOx (lb/day)	150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.17	0.19	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.08	0.06	0.05	0.06	0.05	0.08	0.09	0.10	0.10	0.10	0.10	0.10
PM10 (lb/day)(2)	150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.14	8.56	8.82	9.38	7.48	7.51	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.08	7.08	6.47	5.85	5.60	5.50	5.91	6.09	6.85	7.10	7.12	7.04	7.04	7.04
PM2.5 (lb/day)(1)(2)	55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.76	5.18	5.43	5.99	4.11	4.14	4.05	4.05	4.05	4.05	4.05	4.05	4.05	3.71	3.71	3.11	2.50	2.25	2.15	2.56	2.74	3.49	3.73	3.75	3.68	3.68	3.68
CO_2 (tonnes/day)	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.70	3.57	4.13	4.49	2.39	2.48	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.15	2.15	1.91	1.36	1.21	1.45	1.32	1.88	2.24	2.39	2.48	2.43	2.43	2.43
CO_2 (tonnes/yr)	NA												256.40												690.49												529.81

	Year 4												Year 5												Year 6											
Emissions from Equipment	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
VOC (lb/day)	3.91	3.91	3.91	3.91	3.91	3.91	3.34	2.25	1.72	1.41	2.29	2.60	3.25	3.74	3.78	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	2.96	2.01	1.55									
CO (lb/day)	43.53	43.53	43.53	43.53	40.35	40.35	35.34	25.41	21.77	20.93	25.22	30.60	40.62	44.17	45.53	44.35	44.35	44.35	44.35	44.35	44.35	44.35	41.21	41.21	35.76	26.12	22.66									
NOx (lb/day)	41.11	41.11	41.11	41.11	35.32	35.32	31.64	23.29	20.40	20.87	23.45	28.39	36.31	39.12	39.86	38.97	38.97	38.97	38.97	38.97	38.97	38.97	33.68	33.68	28.22	20.80	18.07									
SOx (lb/day)	0.10	0.10	0.10	0.10	0.09	0.09	0.08	0.06	0.05	0.06	0.05	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.08	0.06	0.05									
PM10 (lb/day)	2.60	2.60	2.60	2.60	2.33	2.33	2.08	1.50	1.26	1.15	1.56	1.72	2.22	2.44	2.45	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.15	2.15	1.74	1.27	1.05									
PM2.5 (lb/day)(1)	2.58	2.58	2.58	2.58	2.31	2.31	2.05	1.49	1.24	1.14	1.54	1.71	2.19	2.42	2.43	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.12	2.12	1.72	1.25	1.04									
CO_2 (MT/day)	2.43	2.43	2.43	2.43	2.15	2.15	1.91	1.36	1.21	1.45	1.32	1.88	2.29	2.44	2.53	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.20	2.20	1.96	1.41	1.26									

	Year 4												Year 5												Year 6											
Offroad Fugitive PM - Peak	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
PM10 (lb/day)(2)	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22									
PM2.5 (lb/day)(1)(2)	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89									

	Year 4												Year 5												Year 6											
Paint	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									

	2018												2018												2018											
Fugitive VOC	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Year 4												Year 5												Year 6											
Total Emissions	**Thresholds**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
VOC (lb/day)	75	3.91	3.91	3.91	3.91	3.91	3.91	3.34	2.25	1.72	1.41	2.29	2.60	3.25	3.74	3.78	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	2.96	2.01	1.55									
CO (lb/day)	550	43.53	43.53	43.53	43.53	40.35	40.35	35.34	25.41	21.77	20.93	25.22	30.60	40.62	44.17	45.53	44.35	44.35	44.35	44.35	44.35	44.35	44.35	41.21	41.21	35.76	26.12	22.66									
NOx (lb/day)	100	41.11	41.11	41.11	41.11	35.32	35.32	31.64	23.29	20.40	20.87	23.45	28.39	36.31	39.12	39.86	38.97	38.97	38.97	38.97	38.97	38.97	38.97	33.68	33.68	28.22	20.80	18.07									
SOx (lb/day)	150	0.10	0.10	0.10	0.10	0.09	0.09	0.08	0.06	0.05	0.06	0.05	0.08	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.08	0.06	0.05									
PM10 (lb/day)(2)	150	6.83	6.83	6.83	6.83	6.56	6.56	6.30	5.72	5.48	5.37	5.78	5.95	6.44	6.67	6.68	6.61	6.61	6.61	6.61	6.61	6.61	6.61	6.37	6.37	5.96	5.49	5.28									
PM2.5 (lb/day)(1)(2)	55	3.46	3.46	3.46	3.46	3.20	3.20	2.94	2.37	2.13	2.02	2.43	2.59	3.08	3.30	3.32	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.01	3.01	2.61	2.14	1.93									
CO_2 (tonnes/day)	NA	2.43	2.43	2.43	2.43	2.15	2.15	1.91	1.36	1.21	1.45	1.32	1.88	2.29	2.44	2.53	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.20	2.20	1.96	1.41	1.26									
CO_2 (tonnes/yr)	NA												521.11												652.83												104.36
30yr amortized CO_2 (tonnes/yr)	NA																																				91.83

(1) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_5ratio.xls

(2) Mitigated PM.

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Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emission Rates

		2016 Emission Factors lb/hr[1]					
Equipment Type	Hp	VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.07023	0.4263	0.97905	0.00147	0.04659	0.03534
>40T Cranes	500	0.07815	0.4431	1.20587	0.00213	0.04978	0.05136
Pile/Drill Rig	Composite	0.04246	0.5016	0.72299	0.00244	0.02698	0.05882
Tractors	Composite	0.03268	0.3689	0.38566	0.00080	0.02590	0.01922
Welders	50	0.03684	0.2483	0.19141	0.00039	0.01712	0.00938
Light Plants	50	0.03684	0.3134	0.19141	0.00039	0.01712	0.00938
Genertors	120	0.04342	0.4767	0.47247	0.00074	0.03702	0.01795
Hydro Vacs/Pumps	120	0.04342	0.4842	0.47247	0.00074	0.03702	0.01795
Fork Lifts	Composite	0.02152	0.4549	0.33240	0.00089	0.01769	0.02146
Loader/Backhoe	Composite	0.03268	0.3689	0.38566	0.00080	0.02590	0.01922
Air Compressors	50	0.03684	0.2281	0.19141	0.00039	0.01712	0.00938
Manlifts	Composite	0.00659	0.1592	0.12905	0.00044	0.00466	0.01066
Crawler Tractors	Composite	0.08267	0.5549	1.17033	0.00201	0.05691	0.04842
Scrapers	Composite	0.14749	0.9053	2.23679	0.00390	0.09265	0.094
Rubber Tired Loaders	Composite	0.06226	0.4557	0.83657	0.00161	0.03834	0.03869
Graders	Composite	0.07501	0.5883	1.05709	0.00170	0.04714	0.04104
Rollers	Composite	0.03401	0.3944	0.33113	0.00068	0.02159	0.01636
Excavators	Composite	0.03425	0.5213	0.47432	0.00133	0.02074	0.03212

		2017 Emission Factors lb/hr[1]					
Equipment Type	Hp	VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.06537	0.4152	0.90923	0.00147	0.04291	0.03535
>40T Cranes	500	0.07236	0.4243	1.11689	0.00213	0.04535	0.05139
Pile/Drill Rig	Composite	0.04029	0.5013	0.67483	0.00244	0.02483	0.05882
Tractors	Composite	0.03046	0.3666	0.35832	0.00080	0.02366	0.0192
Welders	50	0.03579	0.2408	0.18867	0.00039	0.01662	0.00938
Light Plants	50	0.03579	0.3047	0.18867	0.00039	0.01662	0.00938
Genertors	120	0.04173	0.4728	0.45336	0.00074	0.03547	0.01794
Hydro Vacs/Pumps	120	0.04173	0.4802	0.45336	0.00074	0.03547	0.01794
Fork Lifts	Composite	0.01948	0.4522	0.29726	0.00089	0.01519	0.02146
Loader/Backhoe	Composite	0.03046	0.3666	0.35832	0.00080	0.02366	0.0192
Air Compressors	50	0.03579	0.2209	0.18867	0.00039	0.01662	0.00938
Manlifts	Composite	0.00586	0.1548	0.11635	0.00044	0.00353	0.01066
Crawler Tractors	Composite	0.08013	0.5464	1.12114	0.00201	0.05470	0.04843
Scrapers	Composite	0.13882	0.8713	2.07961	0.00390	0.08569	0.094
Rubber Tired Loaders	Composite	0.05859	0.4510	0.77443	0.00161	0.03545	0.03869
Graders	Composite	0.07261	0.5844	1.01224	0.00170	0.04497	0.04101
Rollers	Composite	0.03177	0.3913	0.30830	0.00068	0.01994	0.01635
Excavators	Composite	0.03202	0.5184	0.42996	0.00133	0.01874	0.03212

		2018 Emission Factors lb/hr[1]					
Equipment Type	Hp	VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.05782	0.4060	0.80171	0.00147	0.03738	0.03536
>40T Cranes	500	0.06523	0.4085	0.98933	0.00213	0.03992	0.05142
Pile/Drill Rig	Composite	0.03501	0.5011	0.56864	0.00243	0.02055	0.05865
Tractors	Composite	0.02557	0.3647	0.30639	0.00080	0.01923	0.01917
Welders	50	0.03361	0.2339	0.18349	0.00039	0.01563	0.00938
Light Plants	50	0.03361	0.2966	0.18349	0.00039	0.01563	0.00938
Genertors	120	0.03690	0.4694	0.40643	0.00075	0.03112	0.01796
Hydro Vacs/Pumps	120	0.03690	0.4767	0.40643	0.00075	0.03112	0.01796
Fork Lifts	Composite	0.01616	0.2173	0.24736	0.00089	0.01150	0.02146
Loader/Backhoe	Composite	0.02557	0.3647	0.30639	0.00080	0.01923	0.01917
Air Compressors	50	0.03361	0.2142	0.18349	0.00039	0.01563	0.00938
Manlifts	Composite	0.00499	0.1740	0.10274	0.00044	0.00238	0.01066
Crawler Tractors	Composite	0.07346	0.5387	1.00899	0.00201	0.04950	0.04837
Scrapers	Composite	0.12245	0.8418	1.80997	0.00390	0.07335	0.09401
Rubber Tired Loaders	Composite	0.05178	0.4470	0.67139	0.00161	0.03036	0.03868
Graders	Composite	0.06730	0.5812	0.92988	0.00170	0.04074	0.04096
Rollers	Composite	0.02717	0.3885	0.26566	0.00068	0.01663	0.01636
Excavators	Composite	0.02715	0.5160	0.35232	0.00133	0.01498	0.03212

		2019 Emission Factors lb/hr[1]					
Equipment Type	Hp	VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.05255	0.3982	0.72435	0.00147	0.03337	0.03536
>40T Cranes	500	0.06159	0.3951	0.91722	0.00213	0.03694	0.05143
Pile/Drill Rig	Composite	0.03316	0.5009	0.51942	0.00243	0.01889	0.05862
Tractors	Composite	0.02277	0.3630	0.27390	0.00080	0.01634	0.01916
Welders	50	0.03313	0.2271	0.18111	0.00039	0.01522	0.00937
Light Plants	50	0.03313	0.2890	0.18111	0.00039	0.01522	0.00937
Genertors	120	0.03398	0.4663	0.37708	0.00075	0.02830	0.01796
Hydro Vacs/Pumps	120	0.03398	0.4736	0.37708	0.00075	0.02830	0.01796
Fork Lifts	Composite	0.01468	0.2166	0.22583	0.00089	0.00988	0.02146
Loader/Backhoe	Composite	0.02277	0.3630	0.27390	0.00080	0.01634	0.01916
Air Compressors	50	0.03313	0.2078	0.18111	0.00039	0.01522	0.00937
Manlifts	Composite	0.00475	0.1715	0.09788	0.00044	0.00194	0.01066
Crawler Tractors	Composite	0.06860	0.5319	0.92566	0.00201	0.04558	0.04837
Scrapers	Composite	0.11433	0.8161	1.65588	0.00390	0.06690	0.09398
Rubber Tired Loaders	Composite	0.04734	0.4436	0.60035	0.00161	0.02688	0.0387
Graders	Composite	0.06321	0.5787	0.86117	0.00170	0.03744	0.0409
Rollers	Composite	0.02435	0.3859	0.23986	0.00068	0.01451	0.01636
Excavators	Composite	0.02485	0.5140	0.31031	0.00133	0.01294	0.03212

		2020 Emission Factors lb/hr[1]					
Equipment Type	Hp	VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.04866	0.3917	0.66105	0.00147	0.03031	0.03535
>40T Cranes	500	0.05656	0.3839	0.82455	0.00213	0.03305	0.05142
Pile/Drill Rig	Composite	0.07483	0.5008	0.93803	0.00277	0.03763	0.0668
Tractors	Composite	0.03343	0.6517	0.33335	0.00120	0.01797	0.029
Welders	50	0.03084	0.2219	0.17530	0.00039	0.01410	0.00937
Light Plants	50	0.03084	0.2833	0.17530	0.00039	0.01410	0.00937
Genertors	120	0.03204	0.4641	0.35638	0.00075	0.02642	0.01798
Hydro Vacs/Pumps	120	0.03204	0.4713	0.35638	0.00075	0.02642	0.01798
Fork Lifts	Composite	0.01383	0.2160	0.21047	0.00089	0.00873	0.02147
Loader/Backhoe	Composite	0.02060	0.3616	0.24635	0.00080	0.01403	0.01915
Air Compressors	50	0.03084	0.2030	0.17530	0.00039	0.01410	0.00937
Manlifts	Composite	0.00463	0.1696	0.09324	0.00044	0.00161	0.01066
Crawler Tractors	Composite	0.06477	0.5260	0.86009	0.00201	0.04230	0.04838
Scrapers	Composite	0.10693	0.7938	1.51072	0.00390	0.06101	0.09396
Rubber Tired Loaders	Composite	0.04449	0.4406	0.55197	0.00161	0.02448	0.03871
Graders	Composite	0.06068	0.5765	0.81642	0.00170	0.03517	0.04087
Rollers	Composite	0.02288	0.3837	0.22494	0.00068	0.01333	0.01636
Excavators	Composite	0.02341	0.5124	0.28128	0.00133	0.01158	0.03211

		2021 Emission Factors lb/hr[1]					
Equipment Type	Hp	VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.04494	0.3865	0.59772	0.00147	0.02738	0.03535
>40T Cranes	500	0.05211	0.3747	0.73491	0.00213	0.02957	0.05141
Pile/Drill Rig	Composite	0.07076	0.5007	0.84125	0.00277	0.03403	0.06676
Tractors	Composite	0.03012	0.6413	0.29307	0.00120	0.01547	0.029
Welders	50	0.02904	0.2163	0.17063	0.00039	0.01328	0.00936
Light Plants	50	0.02904	0.2789	0.17063	0.00039	0.01328	0.00936
Genertors	120	0.02973	0.4617	0.33282	0.00075	0.02416	0.01798
Hydro Vacs/Pumps	120	0.02973	0.4687	0.33282	0.00075	0.02416	0.01798
Fork Lifts	Composite	0.01279	0.2148	0.19482	0.00089	0.00757	0.02147
Loader/Backhoe	Composite	0.01858	0.3606	0.22118	0.00080	0.01191	0.01916
Air Compressors	50	0.02904	0.1979	0.17063	0.00039	0.01328	0.00936
Manlifts	Composite	0.00446	0.1677	0.08926	0.00044	0.00132	0.01066
Crawler Tractors	Composite	0.06067	0.5208	0.78831	0.00201	0.03885	0.04834
Scrapers	Composite	0.09948	0.7745	1.37187	0.00390	0.05517	0.094
Rubber Tired Loaders	Composite	0.04079	0.4381	0.48855	0.00161	0.02150	0.03874
Graders	Composite	0.05664	0.5747	0.75163	0.00170	0.03199	0.04084
Rollers	Composite	0.02085	0.3816	0.20626	0.00068	0.01180	0.01636
Excavators	Composite	0.02185	0.5113	0.24844	0.00133	0.01017	0.03209

(1) Off-Road 2011. CO emissions from SCAQMD, 2006 : http://www.aqmd.gov/ceqa/handbook/offroad/offroadEF07_25.xls

(2) Carbon Dioxide Equivalents (CO_{EQ}) are based on default emission factors for diesel. Metric tons per hour.

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	8	0	0	0	0	0	0	0	0	0	1	1	1
>40T Cranes	0	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	0	0	0	0	0	0	1	0	1
Tractors	5	0	0	0	0	0	0	0	0	0	1	1	1
Welders	8	0	0	0	0	0	0	0	0	0	1	4	4
Light Plants	3	0	0	0	0	0	0	0	0	0	2	2	2
Genertors	8	0	0	0	0	0	0	0	0	0	1	1	1
Hydro Vacs/Pumps	5	0	0	0	0	0	0	0	0	0	0	0.5	0.5
Fork Lifts	8	0	0	0	0	0	0	0	0	0	1	1	1
Loader/Backhoe	8	0	0	0	0	0	0	0	0	0	1	1	1
Air Compressors	8	0	0	0	0	0	0	0	0	0	0	1	1
Manlifts	8	0	0	0	0	0	0	0	0	0	0	0	1
Crawler Tractors	8	0	0	0	0	0	0	0	0	0	1	1	1
Scrapers	8	0	0	0	0	0	0	0	0	0	1	1	1
Rubber Tired Loaders	8	0	0	0	0	0	0	0	0	0	1	1	1
Graders	10	0	0	0	0	0	0	0	0	0	1	1	1
Rollers	8	0	0	0	0	0	0	0	0	0	1	1	1
Excavators	8	0	0	0	0	0	0	0	0	0	1	1	1

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.070	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.56	0.56
>40T Cranes	0.078	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.34
Tractors	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.16	0.16
Welders	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	1.18	1.18
Light Plants	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.22	0.22
Genertors	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.35	0.35
Hydro Vacs/Pumps	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.11
Fork Lifts	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.17	0.17
Loader/Backhoe	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.26
Air Compressors	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.29
Manlifts	0.007	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
Crawler Tractors	0.083	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.66	0.66
Scrapers	0.147	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	1.18	1.18
Rubber Tired Loaders	0.062	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.50
Graders	0.075	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.75	0.75
Rollers	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.27	0.27
Excavators	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.27	0.27
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.44	6.38	6.78

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.426	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.41	3.41	3.41
>40T Cranes	0.443	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.502	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.01	0.00	4.01
Tractors	0.369	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84	1.84	1.84
Welders	0.248	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.99	7.95	7.95
Light Plants	0.313	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.88	1.88	1.88
Genertors	0.477	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.81	3.81	3.81
Hydro Vacs/Pumps	0.484	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.21	1.21
Fork Lifts	0.455	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.64	3.64	3.64
Loader/Backhoe	0.369	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.95	2.95	2.95
Air Compressors	0.228	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.82	1.82
Manlifts	0.159	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.27
Crawler Tractors	0.555	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.44	4.44	4.44
Scrapers	0.905	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.24	7.24	7.24
Rubber Tired Loaders	0.456	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.65	3.65	3.65
Graders	0.588	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.88	5.88	5.88
Rollers	0.394	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.16	3.16	3.16
Excavators	0.521	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.17	4.17	4.17
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52.08	57.06	62.34

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.979	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.83	7.83	7.83
>40T Cranes	1.206	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.723	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.78	0.00	5.78
Tractors	0.386	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.93	1.93	1.93
Welders	0.191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.53	6.13	6.13
Light Plants	0.191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.15	1.15	1.15
Genertors	0.472	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.78	3.78	3.78
Hydro Vacs/Pumps	0.472	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	1.18
Fork Lifts	0.332	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.66	2.66	2.66
Loader/Backhoe	0.386	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.09	3.09	3.09
Air Compressors	0.191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.53	1.53
Manlifts	0.129	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.03
Crawler Tractors	1.170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.36	9.36	9.36
Scrapers	2.237	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.89	17.89	17.89
Rubber Tired Loaders	0.837	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.69	6.69	6.69
Graders	1.057	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.57	10.57	10.57
Rollers	0.331	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.65	2.65	2.65
Excavators	0.474	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.79	3.79	3.79
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	78.71	80.23	87.05

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Air Compressors	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02
Scrapers	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03
Rubber Tired Loaders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Graders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02
Rollers	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Excavators	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.17

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.047	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.37	0.37
>40T Cranes	0.050	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.22
Tractors	0.026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.13
Welders	0.017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.55	0.55
Light Plants	0.017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.10
Genertors	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.30	0.30
Hydro Vacs/Pumps	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09
Fork Lifts	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.14	0.14
Loader/Backhoe	0.026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.21	0.21
Air Compressors	0.017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.14
Manlifts	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
Crawler Tractors	0.057	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.46	0.46
Scrapers	0.093	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.74	0.74	0.74
Rubber Tired Loaders	0.038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.31	0.31
Graders	0.047	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.47	0.47
Rollers	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.17	0.17
Excavators	0.021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.17	0.17
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.92	4.34	4.59

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.28	0.28
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.059	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.47
Tractors	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.10
Welders	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.30	0.30
Light Plants	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.06
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.14	0.14
Hydro Vacs/Pumps	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04
Fork Lifts	0.021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.17	0.17
Loader/Backhoe	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.15
Air Compressors	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08
Manlifts	0.011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
Crawler Tractors	0.048	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.39	0.39
Scrapers	0.094	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.75	0.75
Rubber Tired Loaders	0.039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.31	0.31
Graders	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.41	0.41
Rollers	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.13
Excavators	0.032	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.26
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.70	3.57	4.13

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	8	2	2	2	2	2	2	2	2	2	2	1	1
>40T Cranes	0	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	0	0	0	0	0	0	0	0	0
Tractors	5	1	1	1	1	1	1	1	1	1	1	1	1
Welders	8	6	8	8	8	8	8	8	8	8	8	8	8
Light Plants	3	2	2	2	2	2	2	2	2	2	2	2	2
Genertors	8	1	1	1	1	1	1	1	1	1	1	1	1
Hydro Vacs/Pumps	5	0.5	0.5	0.5	0	0	0	0	0	0	0	0	0
Fork Lifts	8	2	2	2	2	2	2	2	2	2	2	2	2
Loader/Backhoe	8	2	2	2	2	2	2	2	2	2	2	2	2
Air Compressors	8	2	2	2	2	2	2	2	2	2	2	2	2
Manlifts	8	1	1	2	2	2	2	2	2	2	2	2	2
Crawler Tractors	8	1	0	0	0	0	0	0	0	0	0	0	0
Scrapers	8	1	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Loaders	8	1	0	0	0	0	0	0	0	0	0	0	0
Graders	10	1	0	0	0	0	0	0	0	0	0	0	0
Rollers	8	1	0	0	0	0	0	0	0	0	0	0	0
Excavators	8	1	0	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	2017	13	14	15	16	17	18	19	20	21	22	23	24
<40 T Cranes	0.065	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	0.52	0.52
>40T Cranes	0.072	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.030	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Welders	0.036	1.72	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29
Light Plants	0.036	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Genertors	0.042	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hydro Vacs/Pumps	0.042	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.019	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Loader/Backhoe	0.030	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Air Compressors	0.036	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
Manlifts	0.006	0.05	0.05	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Crawler Tractors	0.080	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.139	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.059	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.073	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.032	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.032	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		7.40	4.51	4.56	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.415	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	3.32	3.32
>40T Cranes	0.424	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.501	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.367	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
Welders	0.241	11.56	15.41	15.41	15.41	15.41	15.41	15.41	15.41	15.41	15.41	15.41	15.41
Light Plants	0.305	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
Genertors	0.473	3.78	3.78	3.78	3.78	3.78	3.78	3.78	3.78	3.78	3.78	3.78	3.78
Hydro Vacs/Pumps	0.480	1.20	1.20	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.452	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24
Loader/Backhoe	0.367	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87
Air Compressors	0.221	3.53	3.53	3.53	3.53	3.53	3.53	3.53	3.53	3.53	3.53	3.53	3.53
Manlifts	0.155	1.24	1.24	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48
Crawler Tractors	0.546	4.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.871	6.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.451	3.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.584	5.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.391	3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.518	4.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		72.79	48.58	49.82	48.61	48.61	48.61	48.61	48.61	48.61	48.61	45.29	45.29

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.909	14.55	14.55	14.55	14.55	14.55	14.55	14.55	14.55	14.55	14.55	7.27	7.27
>40T Cranes	1.117	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.675	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.358	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
Welders	0.189	9.06	12.08	12.08	12.08	12.08	12.08	12.08	12.08	12.08	12.08	12.08	12.08
Light Plants	0.189	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Genertors	0.453	3.63	3.63	3.63	3.63	3.63	3.63	3.63	3.63	3.63	3.63	3.63	3.63
Hydro Vacs/Pumps	0.453	1.13	1.13	1.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.297	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76
Loader/Backhoe	0.358	5.73	5.73	5.73	5.73	5.73	5.73	5.73	5.73	5.73	5.73	5.73	5.73
Air Compressors	0.189	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02
Manlifts	0.116	0.93	0.93	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
Crawler Tractors	1.121	8.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	2.080	16.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.774	6.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	1.012	10.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.308	2.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.430	3.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		93.56	48.75	49.68	48.54	48.54	48.54	48.54	48.54	48.54	48.54	41.27	41.27

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.001	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Loader/Backhoe	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Air Compressors	0.000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Manlifts	0.000	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Crawler Tractors	0.002	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.004	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.002	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.002	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.001	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.001	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.19	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.043	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.34	0.34
>40T Cranes	0.045	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.024	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Welders	0.017	0.80	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Light Plants	0.017	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Genertors	0.035	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Hydro Vacs/Pumps	0.035	0.09	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.015	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Loader/Backhoe	0.024	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Air Compressors	0.017	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Manlifts	0.004	0.03	0.03	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Crawler Tractors	0.055	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.086	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.035	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.045	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.020	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.019	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		5.16	3.26	3.28	3.20	3.20	3.20	3.20	3.20	3.20	3.20	2.85	2.85

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.035	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.28	0.28
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.059	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.019	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Welders	0.009	0.45	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Light Plants	0.009	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Genertors	0.018	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Hydro Vacs/Pumps	0.018	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.021	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Loader/Backhoe	0.019	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Air Compressors	0.009	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Manlifts	0.011	0.09	0.09	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Crawler Tractors	0.048	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.094	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.039	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.041	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.016	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.032	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		4.49	2.39	2.48	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.15	2.15

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	8	1	1	1	1	1	1	2	2	2	2	2	2
>40T Cranes	0	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	1	0	1	0	0	0	0	0	0
Tractors	5	1	1	1	1	1	1	1	1	1	1	1	1
Welders	8	6	4	2	1	4	4	6	8	8	8	8	8
Light Plants	3	2	2	2	2	2	2	2	2	2	2	2	2
Genertors	8	1	1	1	1	1	1	1	1	1	1	1	1
Hydro Vacs/Pumps	5	0	0	0	0	0.5	0.5	0.5	0.5	0.5	0	0	0
Fork Lifts	8	2	1	1	1	1	1	2	2	2	2	2	2
Loader/Backhoe	8	2	1	1	1	1	1	2	2	2	2	2	2
Air Compressors	8	2	1	1	0	1	1	2	2	2	2	2	2
Manlifts	8	1	1	1	0	0	1	1	1	2	2	2	2
Crawler Tractors	8	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers	8	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Loaders	8	0	0	0	0	0	0	0	0	0	0	0	0
Graders	10	0	0	0	0	0	0	0	0	0	0	0	0
Rollers	8	0	0	0	0	0	0	0	0	0	0	0	0
Excavators	8	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.058	0.46	0.46	0.46	0.46	0.46	0.46	0.93	0.93	0.93	0.93	0.93	0.93
>40T Cranes	0.065	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.035	0.00	0.00	0.00	0.28	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.026	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Welders	0.034	1.61	1.08	0.54	0.27	1.08	1.08	1.61	2.15	2.15	2.15	2.15	2.15
Light Plants	0.034	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Genertors	0.037	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Hydro Vacs/Pumps	0.037	0.00	0.00	0.00	0.00	0.09	0.09	0.09	0.09	0.09	0.00	0.00	0.00
Fork Lifts	0.016	0.26	0.13	0.13	0.13	0.13	0.13	0.26	0.26	0.26	0.26	0.26	0.26
Loader/Backhoe	0.026	0.41	0.20	0.20	0.20	0.20	0.20	0.41	0.41	0.41	0.41	0.41	0.41
Air Compressors	0.034	0.54	0.27	0.27	0.00	0.27	0.27	0.54	0.54	0.54	0.54	0.54	0.54
Manlifts	0.005	0.04	0.04	0.04	0.00	0.00	0.04	0.04	0.04	0.08	0.08	0.08	0.08
Crawler Tractors	0.073	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.122	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.067	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		3.48	2.34	1.81	1.51	2.40	2.72	3.58	4.11	4.15	4.06	4.06	4.06

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.406	3.25	3.25	3.25	3.25	3.25	3.25	6.50	6.50	6.50	6.50	6.50	6.50
>40T Cranes	0.409	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.501	0.00	0.00	0.00	4.01	0.00	4.01	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.365	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
Welders	0.234	11.22	7.48	3.74	1.87	7.48	7.48	11.22	14.97	14.97	14.97	14.97	14.97
Light Plants	0.297	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
Genertors	0.469	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76
Hydro Vacs/Pumps	0.477	0.00	0.00	0.00	0.00	1.19	1.19	1.19	1.19	1.19	0.00	0.00	0.00
Fork Lifts	0.217	3.48	1.74	1.74	1.74	1.74	1.74	3.48	3.48	3.48	3.48	3.48	3.48
Loader/Backhoe	0.365	5.83	2.92	2.92	2.92	2.92	2.92	5.83	5.83	5.83	5.83	5.83	5.83
Air Compressors	0.214	3.43	1.71	1.71	0.00	1.71	1.71	3.43	3.43	3.43	3.43	3.43	3.43
Manlifts	0.174	1.39	1.39	1.39	0.00	0.00	1.39	1.39	1.39	2.78	2.78	2.78	2.78
Crawler Tractors	0.539	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.842	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.447	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.581	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.388	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.516	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		35.96	25.85	22.11	21.14	25.65	31.05	40.40	44.14	45.53	44.34	44.34	44.34

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.802	6.41	6.41	6.41	6.41	6.41	6.41	12.83	12.83	12.83	12.83	12.83	12.83
>40T Cranes	0.989	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.569	0.00	0.00	0.00	4.55	0.00	4.55	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.306	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
Welders	0.183	8.81	5.87	2.94	1.47	5.87	5.87	8.81	11.74	11.74	11.74	11.74	11.74
Light Plants	0.183	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Genertors	0.406	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
Hydro Vacs/Pumps	0.406	0.00	0.00	0.00	0.00	1.02	1.02	1.02	1.02	1.02	0.00	0.00	0.00
Fork Lifts	0.247	3.96	1.98	1.98	1.98	1.98	1.98	3.96	3.96	3.96	3.96	3.96	3.96
Loader/Backhoe	0.306	4.90	2.45	2.45	2.45	2.45	2.45	4.90	4.90	4.90	4.90	4.90	4.90
Air Compressors	0.183	2.94	1.47	1.47	0.00	1.47	1.47	2.94	2.94	2.94	2.94	2.94	2.94
Manlifts	0.103	0.82	0.82	0.82	0.00	0.00	0.82	0.82	0.82	1.64	1.64	1.64	1.64
Crawler Tractors	1.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	1.810	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.671	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.930	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.266	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.352	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		33.72	24.89	21.95	22.74	25.08	30.45	41.15	44.09	44.91	43.89	43.89	43.89

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.02	0.01	0.01	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Loader/Backhoe	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Air Compressors	0.000	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
Manlifts	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Crawler Tractors	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.08	0.06	0.05	0.06	0.05	0.08	0.09	0.10	0.10	0.10	0.10	0.10

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.037	0.30	0.30	0.30	0.30	0.30	0.30	0.60	0.60	0.60	0.60	0.60	0.60
>40T Cranes	0.040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.021	0.00	0.00	0.00	0.16	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.019	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Welders	0.016	0.75	0.50	0.25	0.13	0.50	0.50	0.75	1.00	1.00	1.00	1.00	1.00
Light Plants	0.016	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Genertors	0.031	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Hydro Vacs/Pumps	0.031	0.00	0.00	0.00	0.00	0.08	0.08	0.08	0.08	0.08	0.00	0.00	0.00
Fork Lifts	0.012	0.18	0.09	0.09	0.09	0.09	0.09	0.18	0.18	0.18	0.18	0.18	0.18
Loader/Backhoe	0.019	0.31	0.15	0.15	0.15	0.15	0.15	0.31	0.31	0.31	0.31	0.31	0.31
Air Compressors	0.016	0.25	0.13	0.13	0.00	0.13	0.13	0.25	0.25	0.25	0.25	0.25	0.25
Manlifts	0.002	0.02	0.02	0.02	0.00	0.00	0.02	0.02	0.02	0.04	0.04	0.04	0.04
Crawler Tractors	0.049	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.073	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.030	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.25	1.63	1.38	1.27	1.69	1.87	2.63	2.88	2.90	2.82	2.82	2.82

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.035	0.28	0.28	0.28	0.28	0.28	0.28	0.57	0.57	0.57	0.57	0.57	0.57
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.059	0.00	0.00	0.00	0.47	0.00	0.47	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.019	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Welders	0.009	0.45	0.30	0.15	0.08	0.30	0.30	0.45	0.60	0.60	0.60	0.60	0.60
Light Plants	0.009	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Genertors	0.018	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Hydro Vacs/Pumps	0.018	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.04	0.04	0.00	0.00	0.00
Fork Lifts	0.021	0.34	0.17	0.17	0.17	0.17	0.17	0.34	0.34	0.34	0.34	0.34	0.34
Loader/Backhoe	0.019	0.31	0.15	0.15	0.15	0.15	0.15	0.31	0.31	0.31	0.31	0.31	0.31
Air Compressors	0.009	0.15	0.08	0.08	0.00	0.08	0.08	0.15	0.15	0.15	0.15	0.15	0.15
Manlifts	0.011	0.09	0.09	0.09	0.00	0.00	0.09	0.09	0.09	0.17	0.17	0.17	0.17
Crawler Tractors	0.048	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.094	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.032	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		1.91	1.36	1.21	1.45	1.32	1.88	2.24	2.39	2.48	2.43	2.43	2.43

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	8	2	2	2	2	1	1	1	1	1	1	1	1
>40T Cranes	0	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	0	0	0	0	0	0	1	0	1
Tractors	5	1	1	1	1	1	1	1	1	1	1	1	1
Welders	8	8	8	8	8	8	8	6	4	2	1	4	4
Light Plants	3	2	2	2	2	2	2	2	2	2	2	2	2
Genertors	8	1	1	1	1	1	1	1	1	1	1	1	1
Hydro Vacs/Pumps	5	0	0	0	0	0	0	0	0	0	0	0.5	0.5
Fork Lifts	8	2	2	2	2	2	2	2	1	1	1	1	1
Loader/Backhoe	8	2	2	2	2	2	2	2	1	1	1	1	1
Air Compressors	8	2	2	2	2	2	2	2	1	1	0	1	1
Manlifts	8	2	2	2	2	2	2	1	1	1	0	0	1
Crawler Tractors	8	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers	8	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Loaders	8	0	0	0	0	0	0	0	0	0	0	0	0
Graders	10	0	0	0	0	0	0	0	0	0	0	0	0
Rollers	8	0	0	0	0	0	0	0	0	0	0	0	0
Excavators	8	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.053	0.84	0.84	0.84	0.84	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
>40T Cranes	0.062	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.27
Tractors	0.023	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Welders	0.033	2.12	2.12	2.12	2.12	2.12	2.12	1.59	1.06	0.53	0.27	1.06	1.06
Light Plants	0.033	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Genertors	0.034	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Hydro Vacs/Pumps	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08
Fork Lifts	0.015	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.12	0.12	0.12	0.12	0.12
Loader/Backhoe	0.023	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.18	0.18	0.18	0.18	0.18
Air Compressors	0.033	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.27	0.27	0.00	0.27	0.27
Manlifts	0.005	0.08	0.08	0.08	0.08	0.08	0.08	0.04	0.04	0.04	0.00	0.00	0.04
Crawler Tractors	0.069	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.114	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.047	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.063	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.024	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		3.91	3.91	3.91	3.91	3.91	3.91	3.34	2.25	1.72	1.41	2.29	2.60

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.398	6.37	6.37	6.37	6.37	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19
>40T Cranes	0.395	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.501	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.01	0.00	4.01
Tractors	0.363	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
Welders	0.227	14.54	14.54	14.54	14.54	14.54	14.54	10.90	7.27	3.63	1.82	7.27	7.27
Light Plants	0.289	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
Genertors	0.466	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73
Hydro Vacs/Pumps	0.474	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	1.18
Fork Lifts	0.217	3.47	3.47	3.47	3.47	3.47	3.47	3.47	1.73	1.73	1.73	1.73	1.73
Loader/Backhoe	0.363	5.81	5.81	5.81	5.81	5.81	5.81	5.81	2.90	2.90	2.90	2.90	2.90
Air Compressors	0.208	3.33	3.33	3.33	3.33	3.33	3.33	3.33	1.66	1.66	0.00	1.66	1.66
Manlifts	0.172	2.74	2.74	2.74	2.74	2.74	2.74	1.37	1.37	1.37	0.00	0.00	1.37
Crawler Tractors	0.532	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.816	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.444	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.579	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.386	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.514	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		43.53	43.53	43.53	43.53	40.35	40.35	35.34	25.41	21.77	20.93	25.22	30.60

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.724	11.59	11.59	11.59	11.59	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79
>40T Cranes	0.917	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.519	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.16	0.00	4.16
Tractors	0.274	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Welders	0.181	11.59	11.59	11.59	11.59	11.59	11.59	8.69	5.80	2.90	1.45	5.80	5.80
Light Plants	0.181	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Genertors	0.377	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02	3.02
Hydro Vacs/Pumps	0.377	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.94
Fork Lifts	0.226	3.61	3.61	3.61	3.61	3.61	3.61	3.61	1.81	1.81	1.81	1.81	1.81
Loader/Backhoe	0.274	4.38	4.38	4.38	4.38	4.38	4.38	4.38	2.19	2.19	2.19	2.19	2.19
Air Compressors	0.181	2.90	2.90	2.90	2.90	2.90	2.90	2.90	1.45	1.45	0.00	1.45	1.45
Manlifts	0.098	1.57	1.57	1.57	1.57	1.57	1.57	0.78	0.78	0.78	0.00	0.00	0.78
Crawler Tractors	0.926	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	1.656	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.600	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.861	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.310	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		41.11	41.11	41.11	41.11	35.32	35.32	31.64	23.29	20.40	20.87	23.45	28.39

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.001	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.00	0.01	0.01
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Loader/Backhoe	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Air Compressors	0.000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Manlifts	0.000	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.10	0.10	0.10	0.10	0.09	0.09	0.08	0.06	0.05	0.06	0.05	0.08

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.033	0.53	0.53	0.53	0.53	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
>40T Cranes	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.15
Tractors	0.016	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Welders	0.015	0.97	0.97	0.97	0.97	0.97	0.97	0.73	0.49	0.24	0.12	0.49	0.49
Light Plants	0.015	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Genertors	0.028	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Hydro Vacs/Pumps	0.028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07
Fork Lifts	0.010	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.08	0.08	0.08	0.08	0.08
Loader/Backhoe	0.016	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.13	0.13	0.13	0.13	0.13
Air Compressors	0.015	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.12	0.12	0.00	0.12	0.12
Manlifts	0.002	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.00	0.00	0.02
Crawler Tractors	0.046	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.067	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.60	2.60	2.60	2.60	2.33	2.33	2.08	1.50	1.26	1.15	1.56	1.72

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.035	0.57	0.57	0.57	0.57	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.059	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.47
Tractors	0.019	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Welders	0.009	0.60	0.60	0.60	0.60	0.60	0.60	0.45	0.30	0.15	0.07	0.30	0.30
Light Plants	0.009	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Genertors	0.018	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Hydro Vacs/Pumps	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04
Fork Lifts	0.021	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.17	0.17	0.17	0.17	0.17
Loader/Backhoe	0.019	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.15	0.15	0.15	0.15	0.15
Air Compressors	0.009	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.07	0.07	0.00	0.07	0.07
Manlifts	0.011	0.17	0.17	0.17	0.17	0.17	0.17	0.09	0.09	0.09	0.00	0.00	0.09
Crawler Tractors	0.048	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.094	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.032	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.43	2.43	2.43	2.43	2.15	2.15	1.91	1.36	1.21	1.45	1.32	1.88

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
<40 T Cranes	8	2	2	2	2	2	2	2	2	2	2	1	1
>40T Cranes	0	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	0	0	0	0	0	0	0	0	0
Tractors	5	1	1	1	1	1	1	1	1	1	1	1	1
Welders	8	6	8	8	8	8	8	8	8	8	8	8	8
Light Plants	3	2	2	2	2	2	2	2	2	2	2	2	2
Genertors	8	1	1	1	1	1	1	1	1	1	1	1	1
Hydro Vacs/Pumps	5	0.5	0.5	0.5	0	0	0	0	0	0	0	0	0
Fork Lifts	8	2	2	2	2	2	2	2	2	2	2	2	2
Loader/Backhoe	8	2	2	2	2	2	2	2	2	2	2	2	2
Air Compressors	8	2	2	2	2	2	2	2	2	2	2	2	2
Manlifts	8	1	1	2	2	2	2	2	2	2	2	2	2
Crawler Tractors	8	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers	8	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Loaders	8	0	0	0	0	0	0	0	0	0	0	0	0
Graders	10	0	0	0	0	0	0	0	0	0	0	0	0
Rollers	8	0	0	0	0	0	0	0	0	0	0	0	0
Excavators	8	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
<40 T Cranes	0.049	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.39	0.39
>40T Cranes	0.057	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.075	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.033	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Welders	0.031	1.48	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97
Light Plants	0.031	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Genertors	0.032	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Hydro Vacs/Pumps	0.032	0.08	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.014	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Loader/Backhoe	0.021	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Air Compressors	0.031	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Manlifts	0.005	0.04	0.04	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Crawler Tractors	0.065	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.107	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.044	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.061	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		3.25	3.74	3.78	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
<40 T Cranes	0.392	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	3.13	3.13
>40T Cranes	0.384	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.501	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.652	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26
Welders	0.222	10.65	14.20	14.20	14.20	14.20	14.20	14.20	14.20	14.20	14.20	14.20	14.20
Light Plants	0.283	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Genertors	0.464	3.71	3.71	3.71	3.71	3.71	3.71	3.71	3.71	3.71	3.71	3.71	3.71
Hydro Vacs/Pumps	0.471	1.18	1.18	1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.216	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46
Loader/Backhoe	0.362	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79
Air Compressors	0.203	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
Manlifts	0.170	1.36	1.36	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71
Crawler Tractors	0.526	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.794	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.441	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.577	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.384	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.512	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		40.62	44.17	45.53	44.35	44.35	44.35	44.35	44.35	44.35	44.35	41.21	41.21

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	2020	49	50	51	52	53	54	55	56	57	58	59	60
<40 T Cranes	0.661	10.58	10.58	10.58	10.58	10.58	10.58	10.58	10.58	10.58	10.58	5.29	5.29
>40T Cranes	0.825	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.938	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.333	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
Welders	0.175	8.41	11.22	11.22	11.22	11.22	11.22	11.22	11.22	11.22	11.22	11.22	11.22
Light Plants	0.175	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Genertors	0.356	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85	2.85
Hydro Vacs/Pumps	0.356	0.89	0.89	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.210	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37
Loader/Backhoe	0.246	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94	3.94
Air Compressors	0.175	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
Manlifts	0.093	0.75	0.75	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
Crawler Tractors	0.860	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	1.511	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.552	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.816	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.225	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.281	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		36.31	39.12	39.86	38.97	38.97	38.97	38.97	38.97	38.97	38.97	33.68	33.68

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
<40 T Cranes	0.001	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Welders	0.000	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Loader/Backhoe	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Air Compressors	0.000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Manlifts	0.000	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Crawler Tractors	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
<40 T Cranes	0.030	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.24	0.24
>40T Cranes	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.018	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Welders	0.014	0.68	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Light Plants	0.014	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Genertors	0.026	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Hydro Vacs/Pumps	0.026	0.07	0.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.009	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Loader/Backhoe	0.014	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Air Compressors	0.014	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Manlifts	0.002	0.01	0.01	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Crawler Tractors	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.061	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.024	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.22	2.44	2.45	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.15	2.15

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
<40 T Cranes	0.035	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.28	0.28
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.067	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.029	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Welders	0.009	0.45	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Light Plants	0.009	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Genertors	0.018	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Hydro Vacs/Pumps	0.018	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.021	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Loader/Backhoe	0.019	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Air Compressors	0.009	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Manlifts	0.011	0.09	0.09	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Crawler Tractors	0.048	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.094	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.032	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.29	2.44	2.53	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.20	2.20

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	8	1	1	1	0	0	0	0	0	0	0	0	0
>40T Cranes	0	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	0	0	0	0	0	0	0	0	0
Tractors	5	1	1	1	0	0	0	0	0	0	0	0	0
Welders	8	6	4	2	0	0	0	0	0	0	0	0	0
Light Plants	3	2	2	2	0	0	0	0	0	0	0	0	0
Genertors	8	1	1	1	0	0	0	0	0	0	0	0	0
Hydro Vacs/Pumps	5	0	0	0	0	0	0	0	0	0	0	0	0
Fork Lifts	8	2	1	1	0	0	0	0	0	0	0	0	0
Loader/Backhoe	8	2	1	1	0	0	0	0	0	0	0	0	0
Air Compressors	8	2	1	1	0	0	0	0	0	0	0	0	0
Manlifts	8	1	1	1	0	0	0	0	0	0	0	0	0
Crawler Tractors	8	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers	8	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Loaders	8	0	0	0	0	0	0	0	0	0	0	0	0
Graders	10	0	0	0	0	0	0	0	0	0	0	0	0
Rollers	8	0	0	0	0	0	0	0	0	0	0	0	0
Excavators	8	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	0.045	0.36	0.36	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.071	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.030	0.15	0.15	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.029	1.39	0.93	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.029	0.17	0.17	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.030	0.24	0.24	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.030	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.013	0.20	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.019	0.30	0.15	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.029	0.46	0.23	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.004	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.061	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.099	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.057	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.96	2.01	1.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	0.387	3.09	3.09	3.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.501	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.641	3.21	3.21	3.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.216	10.38	6.92	3.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.279	1.67	1.67	1.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.462	3.69	3.69	3.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.469	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.215	3.44	1.72	1.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.361	5.77	2.88	2.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.198	3.17	1.58	1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.168	1.34	1.34	1.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.521	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.775	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.438	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.575	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.382	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.511	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		35.76	26.12	22.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	0.598	4.78	4.78	4.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.735	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.841	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.293	1.47	1.47	1.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.171	8.19	5.46	2.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.171	1.02	1.02	1.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.333	2.66	2.66	2.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.333	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.195	3.12	1.56	1.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.221	3.54	1.77	1.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.171	2.73	1.37	1.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.089	0.71	0.71	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.788	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	1.372	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.489	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.752	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.206	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.248	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		28.22	20.80	18.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	0.001	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.001	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.000	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.08	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	0.027	0.22	0.22	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.030	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.015	0.08	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.013	0.64	0.42	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.013	0.08	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.024	0.19	0.19	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.024	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.008	0.12	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.012	0.19	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.013	0.21	0.11	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.001	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.055	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.032	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		1.74	1.27	1.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	0.035	0.28	0.28	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.067	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.029	0.14	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.009	0.45	0.30	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.009	0.06	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.018	0.14	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.021	0.34	0.17	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.019	0.31	0.15	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.009	0.15	0.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.011	0.09	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.048	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.094	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.032	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		1.96	1.41	1.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Crude Tank Offroad Construction Vehicle Dust Emissions

Vehicle	Miles/Trip	Trips/Day
Light Vehicles	0.1	2
Total Light Vehicle Miles		0.2
Delivey Trucks	0.1	0
Water Trucks	0.1	1
Total Medium Truck Miles		0.1
Concrete Truck	0.1	0
Dump Trucks	0.1	40
Total Heavy Truck Miles		4
Tractors	0.1	3
Fork Lifts	0.1	2
Loader/Backhoe	0.1	2
Total Heavy-Heavy Duty Miles		0.7

PM10	Emission Rate (lb/mi)(1)	Emissions (lb/day)
Light Duty	0.9021196	0.18
Medium Duty	1.2863357	0.13
Heavy Duty	2.1931267	8.77
Heavy Heavy Duty	2.4962390	1.75
Uncontrolled Total		10.83
Controlled Total(2)		4.22

(1) Based on Section 13.2.2 of EPA's Compilation of Air Pollutant Emission Factors (AP-42).
Emission Rate = 1.5((s/12)^.9)*((W/3)^.45)
s = silt content = 8.5%
W = Vehicle Weight (ton) =2.5 for light, 5.5 for medium, 15 for heavy,
and 24 for heavy heavy (EMFAC2007).

(2) Controlled Emissions assume that watering 3 times per day reduces emissions by 61 percent (Uncontrolled Emissions x 0.39)

APPENDIX B-1

MITIGATED EMISSION CALCULATIONS

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Appendix B-1
Tesoro Integration and Compliance Project
Total Project Component
Mitigated Construction Emission Summary

	Year 1												Year 2												Year 3											
Emissions from Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	20.25	16.90	17.29	18.82	28.21	28.26	32.33	32.09	28.31	21.68	23.30	18.46	24.42	24.12	28.75	21.89	19.05	19.05	13.78	22.31	19.90	14.56	14.68	14.39	8.24	8.37	7.34	7.97	7.51	7.51	5.52
CO (lb/day)	0.00	0.00	0.00	0.00	0.00	176.64	138.06	140.27	157.18	245.03	246.74	283.23	289.58	260.40	207.31	218.27	173.97	234.11	230.87	272.52	212.08	193.10	189.78	139.21	234.98	206.27	156.10	158.71	155.90	85.80	87.31	72.10	75.53	72.30	72.30	47.24
NOx (lb/day)	0.00	0.00	0.00	0.00	0.00	155.40	119.54	123.38	137.16	214.41	220.92	252.30	247.16	222.02	178.53	185.88	151.16	204.68	199.91	235.48	179.65	161.11	156.88	114.48	183.83	164.20	123.67	125.66	123.45	63.66	66.17	55.71	59.82	55.92	55.92	35.31
SOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.52	0.32	0.33	0.37	0.62	0.63	0.75	0.76	0.69	0.59	0.61	0.50	0.68	0.66	0.77	0.60	0.55	0.54	0.41	0.73	0.59	0.46	0.47	0.45	0.25	0.26	0.22	0.24	0.22	0.22	0.14
PM10 (lb/day)	0.00	0.00	0.00	0.00	0.00	7.21	5.81	5.98	6.63	14.45	14.70	16.09	15.83	14.68	12.52	12.94	11.30	13.76	13.57	15.32	12.67	11.69	11.49	9.56	12.39	11.58	9.75	9.84	9.78	7.07	7.20	6.78	6.94	6.75	6.75	5.94
PM2.5 (lb/day)(1)	0.00	0.00	0.00	0.00	0.00	7.14	5.76	5.92	6.56	11.01	11.26	12.63	12.38	11.24	9.10	9.52	7.90	10.33	10.14	11.88	9.25	8.28	8.08	6.17	8.97	8.17	6.36	6.45	6.39	3.70	3.83	3.42	3.58	3.39	3.39	2.59
CO_2 (MT/day)	0.00	0.00	0.00	0.00	0.00	12.58	7.73	7.99	8.97	15.06	15.28	18.12	18.42	16.73	14.25	14.81	12.04	16.32	15.92	18.61	14.45	13.32	13.03	9.77	17.55	14.29	11.06	11.26	10.95	5.99	6.25	5.27	5.71	5.39	5.39	3.36

	Year 1												Year 2												Year 3											
Emission from Trips - Onsite/Offsite	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	7.01	5.58	5.31	5.49	4.64	4.62	4.62	5.83	5.84	5.72	5.89	5.85	6.03	4.03	4.10	3.97	3.00	3.00	2.89	2.59	2.51	2.44	2.21	2.21	1.89	0.84	0.79	0.79	0.54	0.54	0.42
CO (lb/day)	0.00	0.00	0.00	0.00	0.00	71.92	60.74	58.67	65.08	62.65	64.70	64.70	76.46	77.92	73.72	75.44	74.02	80.27	65.00	67.22	62.63	48.35	48.35	44.34	46.10	45.51	42.52	40.76	40.76	26.99	18.92	16.75	16.75	14.85	14.85	9.92
NOx (lb/day)	0.00	0.00	0.00	0.00	0.00	125.41	98.03	92.95	93.90	75.54	74.01	74.01	95.44	94.92	94.25	97.45	97.23	98.14	60.13	60.46	59.78	44.78	44.78	44.19	34.88	33.63	33.15	29.39	29.39	27.36	10.14	9.82	9.82	5.75	5.75	5.02
SOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.53	0.43	0.42	0.44	0.40	0.40	0.40	0.49	0.49	0.48	0.49	0.48	0.51	0.37	0.38	0.36	0.28	0.28	0.26	0.30	0.29	0.28	0.26	0.26	0.19	0.11	0.10	0.10	0.08	0.08	0.06
PM10 (lb/day)	0.00	0.00	0.00	0.00	0.00	35.61	28.25	26.88	27.70	23.23	23.07	23.07	29.09	29.10	28.57	29.47	29.29	30.07	19.87	20.15	19.58	14.79	14.79	14.29	14.99	14.57	14.10	12.85	12.85	10.70	4.99	4.65	4.65	3.30	3.30	2.53
Exhaust PM (lb/day)	0.00	0.00	0.00	0.00	0.00	4.48	3.60	3.43	3.60	3.12	3.13	3.13	3.90	3.92	3.81	3.92	3.89	4.04	2.82	2.87	2.76	2.10	2.10	2.00	2.08	2.03	1.94	1.80	1.80	1.38	0.76	0.69	0.69	0.54	0.54	0.39
Fugitive PM (lb/day)	0.00	0.00	0.00	0.00	0.00	31.13	24.65	23.45	24.10	20.11	19.94	19.94	25.19	25.19	24.76	25.55	25.40	26.03	17.06	17.28	16.82	12.69	12.69	12.29	12.91	12.54	12.16	11.05	11.05	9.32	4.23	3.96	3.96	2.76	2.76	2.14
PM2.5 (lb/day)(1)	0.00	0.00	0.00	0.00	0.00	9.77	7.79	7.42	7.69	6.54	6.52	6.52	8.18	8.20	8.02	8.26	8.20	8.47	5.72	5.81	5.62	4.26	4.26	4.09	4.27	4.17	4.01	3.68	3.68	2.96	1.48	1.36	1.36	1.01	1.01	0.75
Exhaust PM (lb/day)	0.00	0.00	0.00	0.00	0.00	4.48	3.60	3.43	3.60	3.12	3.13	3.13	3.90	3.92	3.81	3.92	3.89	4.04	2.82	2.87	2.76	2.10	2.10	2.00	2.08	2.03	1.94	1.80	1.80	1.38	0.76	0.69	0.69	0.54	0.54	0.39
Fugitive PM (lb/day)	0.00	0.00	0.00	0.00	0.00	5.29	4.19	3.99	4.10	3.42	3.39	3.39	4.28	4.28	4.21	4.34	4.32	4.43	2.90	2.94	2.86	2.16	2.16	2.09	2.19	2.13	2.07	1.88	1.88	1.58	0.72	0.67	0.67	0.47	0.47	0.36
CO_2 (lb/day)	0.00	0.00	0.00	0.00	0.00	55665.69	45238.68	43302.24	45959.01	40895.13	41331.39	41329.59	50686.49	51118.42	49374.97	50757.02	50169.68	52733.43	38284.42	39197.44	37311.18	28490.91	28490.91	26843.22	30734.49	30138.38	28589.73	26801.39	26801.39	19756.41	11559.86	10449.31	10449.31	8511.94	8511.94	5988.63

	Year 1												Year 2												Year 3											
Fugitive Earthmoving PM - Peak	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
PM10 (lb/day)(2)	0.00	0.00	0.00	0.00	0.00	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36
PM2.5 (lb/day)(1)(2)	0.00	0.00	0.00	0.00	0.00	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68

	Year 1												Year 2												Year 3											
Offroad Fugitive PM - Peak	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
PM10 (lb/day)(2)	0.00	0.00	0.00	0.00	0.00	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
PM2.5 (lb/day)(1)(2)	0.00	0.00	0.00	0.00	0.00	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80

	Year 1												Year 2												Year 3											
Paint	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62.25	62.25	62.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 1												Year 2												Year 3											
Operational Mitigation Reductions(3)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
NOx (lb/day)	0.00	0.00	0.00	0.00	0.00	(27.00)	(27.00)	(27.00)	(27.00)	(27.00)	(27.00)	(27.00)	(27.00)	(27.00)	(27.00)	(54.00)	(54.00)	(54.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)

		Year 1												Year 2												Year 3											
Total Emissions	**Thresholds**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	75	0.00	0.00	0.00	0.00	0.00	28.91	24.14	24.26	25.97	34.51	34.54	38.61	39.57	35.81	27.39	29.19	24.31	30.44	28.16	32.84	25.86	22.05	22.05	16.67	87.15	84.66	79.25	16.89	16.60	10.13	9.21	8.13	8.76	8.05	8.05	5.94
CO (lb/day)	550	0.00	0.00	0.00	0.00	0.00	248.57	198.80	198.94	222.25	307.68	311.45	347.93	366.04	338.32	281.03	293.71	248.00	314.38	295.87	339.74	274.71	241.45	238.13	183.55	281.08	251.78	198.62	199.47	196.66	112.78	106.23	88.85	92.29	87.15	87.15	57.16
NOx (lb/day)	100	0.00	0.00	0.00	0.00	0.00	253.81	190.58	189.33	204.06	262.95	267.92	299.30	315.60	289.94	245.78	229.33	194.39	248.82	151.04	186.94	130.43	96.90	92.67	49.67	109.71	88.83	47.82	46.06	43.85	-17.97	-32.68	-43.47	-39.36	-47.33	-47.33	-68.68
SOx (lb/day)	150	0.00	0.00	0.00	0.00	0.00	1.06	0.76	0.75	0.81	1.02	1.03	1.15	1.25	1.19	1.07	1.10	0.98	1.19	1.03	1.15	0.96	0.83	0.82	0.67	1.03	0.89	0.74	0.73	0.72	0.44	0.37	0.32	0.34	0.31	0.31	0.20
PM10 (lb/day)(2)	150	0.00	0.00	0.00	0.00	0.00	48.98	40.23	39.03	40.49	43.84	43.93	45.31	51.08	49.94	47.25	48.57	46.75	49.99	39.61	41.64	38.40	32.65	32.45	30.01	33.53	32.31	30.01	28.85	28.79	23.93	18.35	17.59	17.75	16.22	16.22	14.64
PM2.5 (lb/day)(1)(2)	55	0.00	0.00	0.00	0.00	0.00	18.39	15.03	14.82	15.74	19.03	19.26	20.63	22.04	20.92	18.60	19.26	17.58	20.28	17.34	19.17	16.35	14.02	13.82	11.74	14.72	13.82	11.85	11.61	11.55	8.15	6.79	6.26	6.42	5.89	5.89	4.83
CO_2 (tonnes/day)	NA	0.00	0.00	0.00	0.00	0.00	37.83	28.25	27.63	29.81	33.61	34.03	36.87	41.42	39.92	36.64	37.83	34.80	40.24	33.28	36.39	31.37	26.24	25.96	21.95	31.49	27.96	24.03	23.41	23.10	14.95	11.50	10.01	10.45	9.25	9.25	6.08
CO_2 (tonnes/yr)	NA												5130.57												9135.73												4533.57

(1) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_5ratio.xls
(2) Mitigated PM.

Appendix B-1
Tesoro Integration and Compliance Project
Total Project Component
Mitigated Construction Emission Summary

	Year 4												Year 5												Year 6											
Emissions from Equipment	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
VOC (lb/day)	2.57	2.57	2.57	2.57	2.57	2.57	2.27	1.55	1.55	1.67	1.38	2.10	2.39	2.39	2.69	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.22	1.53	1.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	21.94	21.94	21.94	21.94	18.75	18.75	17.38	12.74	12.74	15.38	12.56	17.93	23.00	23.00	24.36	23.18	23.18	23.18	23.18	23.18	23.18	23.18	20.05	20.05	18.52	13.92	13.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	15.52	15.52	15.52	15.52	12.03	12.03	11.25	8.73	8.73	10.56	8.51	11.91	14.51	14.51	15.25	14.71	14.71	14.71	14.71	14.71	14.71	14.71	11.47	11.47	9.99	7.80	7.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	0.09	0.09	0.09	0.09	0.08	0.08	0.07	0.05	0.05	0.06	0.04	0.07	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.07	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	4.94	4.94	4.94	4.94	4.78	4.78	4.77	4.63	4.63	4.72	4.66	4.78	4.91	4.91	4.93	4.89	4.89	4.89	4.89	4.89	4.89	4.89	4.74	4.74	4.67	4.57	4.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)(1)	1.60	1.60	1.60	1.60	1.44	1.44	1.42	1.29	1.29	1.38	1.32	1.44	1.57	1.57	1.58	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.40	1.40	1.33	1.23	1.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (MT/day)	2.09	2.09	2.09	2.09	1.81	1.81	1.63	1.18	1.18	1.37	1.07	1.62	2.00	2.00	2.19	2.12	2.12	2.12	2.12	2.12	2.12	2.12	1.84	1.84	1.65	1.21	1.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 4												Year 5												Year 6											
Emission from Trips - Onsite/Offsite	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
VOC (lb/day)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.33	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	5.59	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	8.73	8.73	8.73	8.73	8.73	8.73	8.73	8.73	8.73	8.73	8.73	8.73	8.66	8.66	8.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	2.22	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.53	5.18	5.18	5.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exhuast PM (lb/day)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.30	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive PM (lb/day)	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)(1)	0.41	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.49	0.49	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exhuast PM (lb/day)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.30	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive PM (lb/day)	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (lb/day)	3375.24	3366.26	3366.26	3366.26	3366.26	3366.26	3366.26	3366.26	3366.26	3366.26	3366.26	3366.26	3408.84	3408.84	3408.84	3408.84	3408.84	3408.84	3408.84	3408.84	3408.84	3408.84	3408.84	3408.84	3327.33	3327.33	3327.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 4												Year 5												Year 6											
Fugitive Earthmoving PM - Peak	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
PM10 (lb/day)(2)	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)(1)(2)	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 4												Year 5												Year 6											
Offroad Fugitive PM - Peak	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
PM10 (lb/day)(2)	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)(1)(2)	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 4												Year 5												Year 6											
Paint	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	62.25	62.25	62.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62.25	62.25	62.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 4												Year 5												Year 6											
Operational Mitigation Reductions(3)	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
NOx (lb/day)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	(109.00)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Year 4												Year 5												Year 6											
Total Emissions	**Thresholds**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
VOC (lb/day)	75	2.77	2.77	2.77	2.77	2.77	2.77	64.72	64.01	64.01	1.87	1.59	2.30	2.74	2.74	3.04	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	64.81	64.12	64.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	550	27.52	27.52	27.52	27.52	24.33	24.33	22.96	18.32	18.32	20.96	18.14	23.51	31.73	31.73	33.09	31.91	31.91	31.91	31.91	31.91	31.91	31.91	28.78	28.78	27.18	22.57	22.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	100	-91.27	-91.28	-91.28	-91.28	-94.77	-94.77	-95.55	-98.07	-98.07	-96.24	-98.28	-94.88	-88.97	-88.97	-88.22	-88.77	-88.77	-88.77	-88.77	-88.77	-88.77	-88.77	-92.00	-92.00	-93.83	-96.01	-96.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	150	0.12	0.12	0.12	0.12	0.11	0.11	0.10	0.08	0.08	0.09	0.08	0.10	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.11	0.11	0.10	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)(2)	150	12.43	12.43	12.43	12.43	12.26	12.26	12.25	12.12	12.12	12.20	12.14	12.26	12.51	12.51	12.52	12.48	12.48	12.48	12.48	12.48	12.48	12.48	12.33	12.33	12.27	12.16	12.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)(1)(2)	55	3.49	3.49	3.49	3.49	3.33	3.33	3.31	3.18	3.18	3.27	3.21	3.32	3.55	3.55	3.56	3.53	3.53	3.53	3.53	3.53	3.53	3.53	3.38	3.38	3.31	3.20	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (tonnes/day)	NA	3.63	3.62	3.62	3.62	3.34	3.34	3.15	2.71	2.71	2.90	2.59	3.15	3.55	3.55	3.73	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.38	3.38	3.16	2.72	2.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (tonnes/yr)	NA												863.65												973.10												193.37
30yr amortized CO_2 (tonnes/yr)	NA																																				694.33

(1) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_5ratio.xls

(2) Mitigated PM.

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emission Rates

Percent Mitigated 50%

		2016 Emission Factors lb/hr(1)					
Equipment Type	Hp	VOC	CO	NOx	SOx	PM10	CO2e(2)
<40 T Cranes	Composite	0.0702	0.4263	0.5637	0.0015	0.0270	0.0353
>40T Cranes	500	0.0782	0.4431	0.7670	0.0021	0.0331	0.0514
Pile/Drill Rig	Composite	0.0425	0.5016	0.4290	0.0024	0.0169	0.0588
Tractors	Composite	0.0327	0.3689	0.2250	0.0008	0.0146	0.0192
Welders	50	0.0368	0.2483	0.1914	0.0004	0.0098	0.0094
Light Plants	50	0.0368	0.3134	0.1914	0.0004	0.0098	0.0094
Genertors	120	0.0434	0.4767	0.2756	0.0007	0.0205	0.0179
Hydro Vacs/Pumps	120	0.0434	0.4842	0.2756	0.0007	0.0205	0.0179
Fork Lifts	Composite	0.0215	0.4549	0.1992	0.0009	0.0105	0.0215
Loader/Backhoe	Composite	0.0327	0.3689	0.2250	0.0008	0.0146	0.0192
Air Compressors	50	0.0368	0.2281	0.1914	0.0004	0.0098	0.0094
Manlifts	Composite	0.0066	0.1592	0.1290	0.0004	0.0039	0.0107

		2017 Emission Factors lb/hr(1)					
Equipment Type	Hp	VOC	CO	NOx	SOx	PM10	CO2e(2)
<40 T Cranes	Composite	0.0654	0.4152	0.5288	0.0015	0.0252	0.0354
>40T Cranes	500	0.0724	0.4243	0.7225	0.0021	0.0309	0.0514
Pile/Drill Rig	Composite	0.0403	0.5013	0.4050	0.0024	0.0158	0.0588
Tractors	Composite	0.0305	0.3666	0.2113	0.0008	0.0134	0.0192
Welders	50	0.0358	0.2408	0.1887	0.0004	0.0095	0.0094
Light Plants	50	0.0358	0.3047	0.1887	0.0004	0.0095	0.0094
Genertors	120	0.0417	0.4728	0.2661	0.0007	0.0197	0.0179
Hydro Vacs/Pumps	120	0.0417	0.4802	0.2661	0.0007	0.0197	0.0179
Fork Lifts	Composite	0.0195	0.4522	0.1816	0.0009	0.0092	0.0215
Loader/Backhoe	Composite	0.0305	0.3666	0.2113	0.0008	0.0134	0.0192
Air Compressors	50	0.0358	0.2209	0.1887	0.0004	0.0095	0.0094
Manlifts	Composite	0.0059	0.1548	0.1163	0.0004	0.0033	0.0107

		2018 Emission Factors lb/hr(1)					
Equipment Type	Hp	VOC	CO	NOx	SOx	PM10	CO2e(2)
<40 T Cranes	Composite	0.0578	0.4060	0.4751	0.0015	0.0224	0.0354
>40T Cranes	500	0.0652	0.4085	0.6587	0.0021	0.0282	0.0514
Pile/Drill Rig	Composite	0.0350	0.5011	0.3519	0.0024	0.0137	0.0587
Tractors	Composite	0.0256	0.3647	0.1853	0.0008	0.0112	0.0192
Welders	50	0.0336	0.2339	0.1835	0.0004	0.0090	0.0094
Light Plants	50	0.0336	0.2966	0.1835	0.0004	0.0090	0.0094
Genertors	120	0.0369	0.4694	0.2426	0.0007	0.0175	0.0180
Hydro Vacs/Pumps	120	0.0369	0.4767	0.2426	0.0007	0.0175	0.0180
Fork Lifts	Composite	0.0162	0.2173	0.1566	0.0009	0.0074	0.0215
Loader/Backhoe	Composite	0.0256	0.3647	0.1853	0.0008	0.0112	0.0192
Air Compressors	50	0.0336	0.2142	0.1835	0.0004	0.0090	0.0094
Manlifts	Composite	0.0050	0.1740	0.1027	0.0004	0.0024	0.0107

		2019 Emission Factors lb/hr(1)					
Equipment Type	Hp	VOC	CO	NOx	SOx	PM10	CO2e(2)
<40 T Cranes	Composite	0.0526	0.3982	0.4364	0.0015	0.0204	0.0354
>40T Cranes	500	0.0616	0.3951	0.6227	0.0021	0.0267	0.0514
Pile/Drill Rig	Composite	0.0332	0.5009	0.3272	0.0024	0.0128	0.0586
Tractors	Composite	0.0228	0.3630	0.1691	0.0008	0.0098	0.0192
Welders	50	0.0331	0.2271	0.1811	0.0004	0.0088	0.0094
Light Plants	50	0.0331	0.2890	0.1811	0.0004	0.0088	0.0094
Genertors	120	0.0340	0.4663	0.2279	0.0007	0.0161	0.0180
Hydro Vacs/Pumps	120	0.0340	0.4736	0.2279	0.0007	0.0161	0.0180
Fork Lifts	Composite	0.0147	0.2166	0.1459	0.0009	0.0066	0.0215
Loader/Backhoe	Composite	0.0228	0.3630	0.1691	0.0008	0.0098	0.0192
Air Compressors	50	0.0331	0.2078	0.1811	0.0004	0.0088	0.0094
Manlifts	Composite	0.0047	0.1715	0.0979	0.0004	0.0019	0.0107

(1) Off-Road 2011. CO emissions from SCAQMD, 2006 : http://www.aqmd.gov/ceqa/handbook/offroad/offroadEF07_25.xls

(2) Carbon Dioxide Equivalents (CO_{EQ}) are based on default emission factors for diesel. Metric tons per hour.

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Unmitigated Construction Equipment Emission Rates

Equipment Type	Hp	2016 Emission Factors lb/hr[1]					
		VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.07023	0.4263	0.97905	0.00147	0.04659	0.03534
>40T Cranes	500	0.07815	0.4431	1.20587	0.00213	0.04978	0.05136
Pile/Drill Rig	Composite	0.04246	0.5016	0.72299	0.00244	0.02698	0.05882
Tractors	Composite	0.03268	0.3689	0.38566	0.00080	0.02590	0.01922
Welders	50	0.03684	0.2483	0.19141	0.00039	0.01712	0.00938
Light Plants	50	0.03684	0.3134	0.19141	0.00039	0.01712	0.00938
Genertors	120	0.04342	0.4767	0.47247	0.00074	0.03702	0.01795
Hydro Vacs/Pumps	120	0.04342	0.4842	0.47247	0.00074	0.03702	0.01795
Fork Lifts	Composite	0.02152	0.4549	0.33240	0.00089	0.01769	0.02146
Loader/Backhoe	Composite	0.03268	0.3689	0.38566	0.00080	0.02590	0.01922
Air Compressors	50	0.03684	0.2281	0.19141	0.00039	0.01712	0.00938
Manlifts	Composite	0.00659	0.1592	0.12905	0.00044	0.00466	0.01066

Equipment Type	Hp	2017 Emission Factors lb/hr[1]					
		VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.06537	0.4152	0.90923	0.00147	0.04291	0.03535
>40T Cranes	500	0.07236	0.4243	1.11689	0.00213	0.04535	0.05139
Pile/Drill Rig	Composite	0.04029	0.5013	0.67483	0.00244	0.02483	0.05882
Tractors	Composite	0.03046	0.3666	0.35832	0.00080	0.02366	0.0192
Welders	50	0.03579	0.2408	0.18867	0.00039	0.01662	0.00938
Light Plants	50	0.03579	0.3047	0.18867	0.00039	0.01662	0.00938
Genertors	120	0.04173	0.4728	0.45336	0.00074	0.03547	0.01794
Hydro Vacs/Pumps	120	0.04173	0.4802	0.45336	0.00074	0.03547	0.01794
Fork Lifts	Composite	0.01948	0.4522	0.29726	0.00089	0.01519	0.02146
Loader/Backhoe	Composite	0.03046	0.3666	0.35832	0.00080	0.02366	0.0192
Air Compressors	50	0.03579	0.2209	0.18867	0.00039	0.01662	0.00938
Manlifts	Composite	0.00586	0.1548	0.11635	0.00044	0.00353	0.01066

Equipment Type	Hp	2018 Emission Factors lb/hr[1]					
		VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.05782	0.4060	0.80171	0.00147	0.03738	0.03536
>40T Cranes	500	0.06523	0.4085	0.98933	0.00213	0.03992	0.05142
Pile/Drill Rig	Composite	0.03501	0.5011	0.56864	0.00243	0.02055	0.05865
Tractors	Composite	0.02557	0.3647	0.30639	0.00080	0.01923	0.01917
Welders	50	0.03361	0.2339	0.18349	0.00039	0.01563	0.00938
Light Plants	50	0.03361	0.2966	0.18349	0.00039	0.01563	0.00938
Genertors	120	0.03690	0.4694	0.40643	0.00075	0.03112	0.01796
Hydro Vacs/Pumps	120	0.03690	0.4767	0.40643	0.00075	0.03112	0.01796
Fork Lifts	Composite	0.01616	0.2173	0.24736	0.00089	0.01150	0.02146
Loader/Backhoe	Composite	0.02557	0.3647	0.30639	0.00080	0.01923	0.01917
Air Compressors	50	0.03361	0.2142	0.18349	0.00039	0.01563	0.00938
Manlifts	Composite	0.00499	0.1740	0.10274	0.00044	0.00238	0.01066

Equipment Type	Hp	2019 Emission Factors lb/hr[1]					
		VOC	CO	NOx	SOx	PM10	CO2e[2]
<40 T Cranes	Composite	0.05255	0.3982	0.72435	0.00147	0.03337	0.03536
>40T Cranes	500	0.06159	0.3951	0.91722	0.00213	0.03694	0.05143
Pile/Drill Rig	Composite	0.03316	0.5009	0.51942	0.00243	0.01889	0.05862
Tractors	Composite	0.02277	0.3630	0.27390	0.00080	0.01634	0.01916
Welders	50	0.03313	0.2271	0.18111	0.00039	0.01522	0.00937
Light Plants	50	0.03313	0.2890	0.18111	0.00039	0.01522	0.00937
Genertors	120	0.03398	0.4663	0.37708	0.00075	0.02830	0.01796
Hydro Vacs/Pumps	120	0.03398	0.4736	0.37708	0.00075	0.02830	0.01796
Fork Lifts	Composite	0.01468	0.2166	0.22583	0.00089	0.00988	0.02146
Loader/Backhoe	Composite	0.02277	0.3630	0.27390	0.00080	0.01634	0.01916
Air Compressors	50	0.03313	0.2078	0.18111	0.00039	0.01522	0.00937
Manlifts	Composite	0.00475	0.1715	0.09788	0.00044	0.00194	0.01066

(1) Off-Road 2011. CO emissions from SCAQMD, 2006 : http://www.aqmd.gov/ceqa/handbook/offroad/offroadEF07_25.xls

(2) Carbon Dioxide Equivalents (CO_{EQ}) are based on default emission factors for diesel. Metric tons per hour.

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Mitigated Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	7	0	0	0	0	0	7	7	7	8	9	11	11
>40T Cranes	5	0	0	0	0	0	5	4	5	5	5	8	8
Pile/Drill Rig	8	0	0	0	0	0	11	1	1	1	1	1	2
Tractors	5	0	0	0	0	0	2	2	2	3	3	4	4
Welders	8	0	0	0	0	0	23	23	23	23	23	23	23
Light Plants	3	0	0	0	0	0	8	12	12	13	14	14	14
Genertors	3	0	0	0	0	0	6	6	6	7	7	8	8
Hydro Vacs/Pumps	5	0	0	0	0	0	1	1	1	2	2	3	2
Fork Lifts	4	0	0	0	0	0	5	5	5	5	6	8	8
Loader/Backhoe	5	0	0	0	0	0	2	2	2	2	3	3	3
Air Compressors	4	0	0	0	0	0	5	5	5	6	6	6	6
Manlifts	8	0	0	0	0	0	12	12	12	17	23	30	30

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.070	0.00	0.00	0.00	0.00	0.00	3.44	3.44	3.44	3.93	4.42	5.41	5.41
>40T Cranes	0.078	0.00	0.00	0.00	0.00	0.00	1.95	1.56	1.95	1.95	1.95	3.13	3.13
Pile/Drill Rig	0.042	0.00	0.00	0.00	0.00	0.00	3.74	0.34	0.34	0.34	0.34	0.34	0.68
Tractors	0.033	0.00	0.00	0.00	0.00	0.00	0.33	0.33	0.33	0.49	0.49	0.65	0.65
Welders	0.037	0.00	0.00	0.00	0.00	0.00	6.78	6.78	6.78	6.78	6.78	6.78	6.78
Light Plants	0.037	0.00	0.00	0.00	0.00	0.00	0.88	1.33	1.33	1.44	1.55	1.55	1.55
Genertors	0.043	0.00	0.00	0.00	0.00	0.00	0.78	0.78	0.78	0.91	0.91	1.04	1.04
Hydro Vacs/Pumps	0.043	0.00	0.00	0.00	0.00	0.00	0.22	0.22	0.22	0.43	0.43	0.65	0.43
Fork Lifts	0.022	0.00	0.00	0.00	0.00	0.00	0.43	0.43	0.43	0.43	0.52	0.69	0.69
Loader/Backhoe	0.033	0.00	0.00	0.00	0.00	0.00	0.33	0.33	0.33	0.33	0.49	0.49	0.49
Air Compressors	0.037	0.00	0.00	0.00	0.00	0.00	0.74	0.74	0.74	0.88	0.88	0.88	0.88
Manlifts	0.007	0.00	0.00	0.00	0.00	0.00	0.63	0.63	0.63	0.90	1.21	1.58	1.58
Total		0.00	0.00	0.00	0.00	0.00	20.25	16.90	17.29	18.82	19.98	23.19	23.31

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Equipment 2016

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.426	0.00	0.00	0.00	0.00	0.00	20.89	20.89	20.89	23.87	26.86	32.83	32.83
>40T Cranes	0.443	0.00	0.00	0.00	0.00	0.00	11.08	8.86	11.08	11.08	11.08	17.72	17.72
Pile/Drill Rig	0.502	0.00	0.00	0.00	0.00	0.00	44.14	4.01	4.01	4.01	4.01	4.01	8.03
Tractors	0.369	0.00	0.00	0.00	0.00	0.00	3.69	3.69	3.69	5.53	5.53	7.38	7.38
Welders	0.248	0.00	0.00	0.00	0.00	0.00	45.69	45.69	45.69	45.69	45.69	45.69	45.69
Light Plants	0.313	0.00	0.00	0.00	0.00	0.00	7.52	11.28	11.28	12.22	13.16	13.16	13.16
Genertors	0.477	0.00	0.00	0.00	0.00	0.00	8.58	8.58	8.58	10.01	10.01	11.44	11.44
Hydro Vacs/Pumps	0.484	0.00	0.00	0.00	0.00	0.00	2.42	2.42	2.42	4.84	4.84	7.26	4.84
Fork Lifts	0.455	0.00	0.00	0.00	0.00	0.00	9.10	9.10	9.10	9.10	10.92	14.56	14.56
Loader/Backhoe	0.369	0.00	0.00	0.00	0.00	0.00	3.69	3.69	3.69	3.69	5.53	5.53	5.53
Air Compressors	0.228	0.00	0.00	0.00	0.00	0.00	4.56	4.56	4.56	5.47	5.47	5.47	5.47
Manlifts	0.159	0.00	0.00	0.00	0.00	0.00	15.28	15.28	15.28	21.65	29.29	38.21	38.21
Total		0.00	0.00	0.00	0.00	0.00	176.64	138.06	140.27	157.18	172.41	203.27	204.86

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Equipment 2016

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.564	0.00	0.00	0.00	0.00	0.00	27.62	27.62	27.62	31.57	35.52	43.41	43.41
>40T Cranes	0.767	0.00	0.00	0.00	0.00	0.00	19.17	15.34	19.17	19.17	19.17	30.68	30.68
Pile/Drill Rig	0.429	0.00	0.00	0.00	0.00	0.00	37.75	3.43	3.43	3.43	3.43	3.43	6.86
Tractors	0.225	0.00	0.00	0.00	0.00	0.00	2.25	2.25	2.25	3.37	3.37	4.50	4.50
Welders	0.191	0.00	0.00	0.00	0.00	0.00	35.22	35.22	35.22	35.22	35.22	35.22	35.22
Light Plants	0.191	0.00	0.00	0.00	0.00	0.00	4.59	6.89	6.89	7.46	8.04	8.04	8.04
Genertors	0.276	0.00	0.00	0.00	0.00	0.00	4.96	4.96	4.96	5.79	5.79	6.61	6.61
Hydro Vacs/Pumps	0.276	0.00	0.00	0.00	0.00	0.00	1.38	1.38	1.38	2.76	2.76	4.13	2.76
Fork Lifts	0.199	0.00	0.00	0.00	0.00	0.00	3.98	3.98	3.98	3.98	4.78	6.37	6.37
Loader/Backhoe	0.225	0.00	0.00	0.00	0.00	0.00	2.25	2.25	2.25	2.25	3.37	3.37	3.37
Air Compressors	0.191	0.00	0.00	0.00	0.00	0.00	3.83	3.83	3.83	4.59	4.59	4.59	4.59
Manlifts	0.129	0.00	0.00	0.00	0.00	0.00	12.39	12.39	12.39	17.55	23.74	30.97	30.97
Total		0.00	0.00	0.00	0.00	0.00	155.40	119.54	123.38	137.16	149.79	181.34	183.39

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Equipment 2016

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.001	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.07	0.08	0.09	0.11	0.11
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.05	0.04	0.05	0.05	0.05	0.09	0.09
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.21	0.02	0.02	0.02	0.02	0.02	0.04
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Welders	0.000	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.02
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.02
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.03	0.03
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Air Compressors	0.000	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Manlifts	0.000	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.06	0.08	0.11	0.11
Total		0.00	0.00	0.00	0.00	0.00	0.52	0.32	0.33	0.37	0.41	0.51	0.52

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Equipment 2016

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.027	0.00	0.00	0.00	0.00	0.00	1.32	1.32	1.32	1.51	1.70	2.08	2.08
>40T Cranes	0.033	0.00	0.00	0.00	0.00	0.00	0.83	0.66	0.83	0.83	0.83	1.32	1.32
Pile/Drill Rig	0.017	0.00	0.00	0.00	0.00	0.00	1.48	0.13	0.13	0.13	0.13	0.13	0.27
Tractors	0.015	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.15	0.22	0.22	0.29	0.29
Welders	0.010	0.00	0.00	0.00	0.00	0.00	1.80	1.80	1.80	1.80	1.80	1.80	1.80
Light Plants	0.010	0.00	0.00	0.00	0.00	0.00	0.24	0.35	0.35	0.38	0.41	0.41	0.41
Genertors	0.020	0.00	0.00	0.00	0.00	0.00	0.37	0.37	0.37	0.43	0.43	0.49	0.49
Hydro Vacs/Pumps	0.020	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.20	0.20	0.31	0.20
Fork Lifts	0.010	0.00	0.00	0.00	0.00	0.00	0.21	0.21	0.21	0.21	0.25	0.34	0.34
Loader/Backhoe	0.015	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.15	0.15	0.22	0.22	0.22
Air Compressors	0.010	0.00	0.00	0.00	0.00	0.00	0.20	0.20	0.20	0.24	0.24	0.24	0.24
Manlifts	0.004	0.00	0.00	0.00	0.00	0.00	0.37	0.37	0.37	0.53	0.71	0.93	0.93
Total		0.00	0.00	0.00	0.00	0.00	7.21	5.81	5.98	6.63	7.15	8.56	8.59

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.035	0.00	0.00	0.00	0.00	0.00	1.73	1.73	1.73	1.98	2.23	2.72	2.72
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	1.28	1.03	1.28	1.28	1.28	2.05	2.05
Pile/Drill Rig	0.059	0.00	0.00	0.00	0.00	0.00	5.18	0.47	0.47	0.47	0.47	0.47	0.94
Tractors	0.019	0.00	0.00	0.00	0.00	0.00	0.19	0.19	0.19	0.29	0.29	0.38	0.38
Welders	0.009	0.00	0.00	0.00	0.00	0.00	1.73	1.73	1.73	1.73	1.73	1.73	1.73
Light Plants	0.009	0.00	0.00	0.00	0.00	0.00	0.23	0.34	0.34	0.37	0.39	0.39	0.39
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.32	0.32	0.32	0.38	0.38	0.43	0.43
Hydro Vacs/Pumps	0.018	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.09	0.18	0.18	0.27	0.18
Fork Lifts	0.021	0.00	0.00	0.00	0.00	0.00	0.43	0.43	0.43	0.43	0.52	0.69	0.69
Loader/Backhoe	0.019	0.00	0.00	0.00	0.00	0.00	0.19	0.19	0.19	0.19	0.29	0.29	0.29
Air Compressors	0.009	0.00	0.00	0.00	0.00	0.00	0.19	0.19	0.19	0.23	0.23	0.23	0.23
Manlifts	0.011	0.00	0.00	0.00	0.00	0.00	1.02	1.02	1.02	1.45	1.96	2.56	2.56
Total		0.00	0.00	0.00	0.00	0.00	12.58	7.73	7.99	8.97	9.94	12.21	12.59

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	7	11	12	10	10	10	16	16	16	14	11	11	10
>40T Cranes	5	8	9	8	8	8	10	9	9	7	5	5	4
Pile/Drill Rig	8	1	1	1	2	1	2	2	2	2	1	1	1
Tractors	5	4	4	4	6	6	7	7	7	7	6	6	5
Welders	8	23	23	8	8	8	8	8	8	8	0	0	0
Light Plants	3	14	13	7	9	7	11	15	15	14	10	10	9
Genertors	3	8	8	6	6	6	10	9	9	8	4	4	4
Hydro Vacs/Pumps	5	2	3	2	1	1	1	1	1	1	1	1	1
Fork Lifts	4	8	9	8	9	9	13	13	13	12	10	10	9
Loader/Backhoe	5	3	3	3	3	3	5	5	5	5	4	4	4
Air Compressors	4	6	6	6	6	6	6	5	5	4	0	0	0
Manlifts	8	30	31	27	21	22	32	30	30	27	25	25	21

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Equipment 2017

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.065	5.03	5.49	4.58	4.58	4.58	7.32	7.32	7.32	6.41	5.03	5.03	4.58
>40T Cranes	0.072	2.89	3.26	2.89	2.89	2.89	3.62	3.26	3.26	2.53	1.81	1.81	1.45
Pile/Drill Rig	0.040	0.32	0.32	0.32	0.64	0.32	0.64	0.64	0.64	0.64	0.32	0.32	0.32
Tractors	0.030	0.61	0.61	0.61	0.91	0.91	1.07	1.07	1.07	1.07	0.91	0.91	0.76
Welders	0.036	6.59	6.59	2.29	2.29	2.29	2.29	2.29	2.29	2.29	0.00	0.00	0.00
Light Plants	0.036	1.50	1.40	0.75	0.97	0.75	1.18	1.61	1.61	1.50	1.07	1.07	0.97
Genertors	0.042	1.00	1.00	0.75	0.75	0.75	1.25	1.13	1.13	1.00	0.50	0.50	0.50
Hydro Vacs/Pumps	0.042	0.42	0.63	0.42	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Fork Lifts	0.019	0.62	0.70	0.62	0.70	0.70	1.01	1.01	1.01	0.94	0.78	0.78	0.70
Loader/Backhoe	0.030	0.46	0.46	0.46	0.46	0.46	0.76	0.76	0.76	0.76	0.61	0.61	0.61
Air Compressors	0.036	0.86	0.86	0.86	0.86	0.86	0.86	0.72	0.72	0.57	0.00	0.00	0.00
Manlifts	0.006	1.41	1.45	1.27	0.98	1.03	1.50	1.41	1.41	1.27	1.17	1.17	0.98
Total		21.71	22.76	15.82	16.25	15.76	21.71	21.42	21.42	19.19	12.42	12.42	11.08

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.415	31.97	34.88	29.07	29.07	29.07	46.51	46.51	46.51	40.69	31.97	31.97	29.07
>40T Cranes	0.424	16.97	19.09	16.97	16.97	16.97	21.21	19.09	19.09	14.85	10.61	10.61	8.49
Pile/Drill Rig	0.501	4.01	4.01	4.01	8.02	4.01	8.02	8.02	8.02	8.02	4.01	4.01	4.01
Tractors	0.367	7.33	7.33	7.33	11.00	11.00	12.83	12.83	12.83	12.83	11.00	11.00	9.17
Welders	0.241	44.32	44.32	15.41	15.41	15.41	15.41	15.41	15.41	15.41	0.00	0.00	0.00
Light Plants	0.305	12.80	11.88	6.40	8.23	6.40	10.06	13.71	13.71	12.80	9.14	9.14	8.23
Genertors	0.473	11.35	11.35	8.51	8.51	8.51	14.19	12.77	12.77	11.35	5.67	5.67	5.67
Hydro Vacs/Pumps	0.480	4.80	7.20	4.80	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
Fork Lifts	0.452	14.47	16.28	14.47	16.28	16.28	23.52	23.52	23.52	21.71	18.09	18.09	16.28
Loader/Backhoe	0.367	5.50	5.50	5.50	5.50	5.50	9.17	9.17	9.17	9.17	7.33	7.33	7.33
Air Compressors	0.221	5.30	5.30	5.30	5.30	5.30	5.30	4.42	4.42	3.53	0.00	0.00	0.00
Manlifts	0.155	37.14	38.38	33.43	26.00	27.24	39.62	37.14	37.14	33.43	30.95	30.95	26.00
Total		195.97	205.53	151.21	152.69	148.09	208.23	204.99	204.99	186.19	131.18	131.18	116.64

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Equipment 2017

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.529	40.72	44.42	37.02	37.02	37.02	59.23	59.23	59.23	51.83	40.72	40.72	37.02
>40T Cranes	0.723	28.90	32.51	28.90	28.90	28.90	36.13	32.51	32.51	25.29	18.06	18.06	14.45
Pile/Drill Rig	0.405	3.24	3.24	3.24	6.48	3.24	6.48	6.48	6.48	6.48	3.24	3.24	3.24
Tractors	0.211	4.23	4.23	4.23	6.34	6.34	7.40	7.40	7.40	7.40	6.34	6.34	5.28
Welders	0.189	34.72	34.72	12.08	12.08	12.08	12.08	12.08	12.08	12.08	0.00	0.00	0.00
Light Plants	0.189	7.92	7.36	3.96	5.09	3.96	6.23	8.49	8.49	7.92	5.66	5.66	5.09
Genertors	0.266	6.39	6.39	4.79	4.79	4.79	7.98	7.18	7.18	6.39	3.19	3.19	3.19
Hydro Vacs/Pumps	0.266	2.66	3.99	2.66	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
Fork Lifts	0.182	5.81	6.54	5.81	6.54	6.54	9.44	9.44	9.44	8.72	7.26	7.26	6.54
Loader/Backhoe	0.211	3.17	3.17	3.17	3.17	3.17	5.28	5.28	5.28	5.28	4.23	4.23	4.23
Air Compressors	0.189	4.53	4.53	4.53	4.53	4.53	4.53	3.77	3.77	3.02	0.00	0.00	0.00
Manlifts	0.116	27.92	28.85	25.13	19.55	20.48	29.79	27.92	27.92	25.13	23.27	23.27	19.55
Total		170.20	179.94	135.51	135.81	132.37	185.88	181.12	181.12	160.85	113.30	113.30	99.92

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.001	0.11	0.12	0.10	0.10	0.10	0.16	0.16	0.16	0.14	0.11	0.11	0.10
>40T Cranes	0.002	0.09	0.10	0.09	0.09	0.09	0.11	0.10	0.10	0.07	0.05	0.05	0.04
Pile/Drill Rig	0.002	0.02	0.02	0.02	0.04	0.02	0.04	0.04	0.04	0.04	0.02	0.02	0.02
Tractors	0.001	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.02	0.02
Welders	0.000	0.07	0.07	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00
Light Plants	0.000	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01
Genertors	0.001	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01
Hydro Vacs/Pumps	0.001	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.03	0.03	0.03	0.03	0.03	0.05	0.05	0.05	0.04	0.04	0.04	0.03
Loader/Backhoe	0.001	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Air Compressors	0.000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Manlifts	0.000	0.11	0.11	0.10	0.07	0.08	0.11	0.11	0.11	0.10	0.09	0.09	0.07
Total		0.50	0.53	0.42	0.43	0.41	0.59	0.57	0.57	0.51	0.37	0.37	0.33

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.025	1.94	2.11	1.76	1.76	1.76	2.82	2.82	2.82	2.47	1.94	1.94	1.76
>40T Cranes	0.031	1.24	1.39	1.24	1.24	1.24	1.54	1.39	1.39	1.08	0.77	0.77	0.62
Pile/Drill Rig	0.016	0.13	0.13	0.13	0.25	0.13	0.25	0.25	0.25	0.25	0.13	0.13	0.13
Tractors	0.013	0.27	0.27	0.27	0.40	0.40	0.47	0.47	0.47	0.47	0.40	0.40	0.34
Welders	0.010	1.76	1.76	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.00	0.00	0.00
Light Plants	0.010	0.40	0.37	0.20	0.26	0.20	0.31	0.43	0.43	0.40	0.29	0.29	0.26
Genertors	0.020	0.47	0.47	0.35	0.35	0.35	0.59	0.53	0.53	0.47	0.24	0.24	0.24
Hydro Vacs/Pumps	0.020	0.20	0.30	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Fork Lifts	0.009	0.30	0.33	0.30	0.33	0.33	0.48	0.48	0.48	0.44	0.37	0.37	0.33
Loader/Backhoe	0.013	0.20	0.20	0.20	0.20	0.20	0.34	0.34	0.34	0.34	0.27	0.27	0.27
Air Compressors	0.010	0.23	0.23	0.23	0.23	0.23	0.23	0.19	0.19	0.15	0.00	0.00	0.00
Manlifts	0.003	0.80	0.82	0.72	0.56	0.58	0.85	0.80	0.80	0.72	0.66	0.66	0.56
Total		7.91	8.38	6.20	6.29	6.14	8.59	8.40	8.40	7.50	5.16	5.16	4.59

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.035	2.72	2.97	2.47	2.47	2.47	3.96	3.96	3.96	3.46	2.72	2.72	2.47
>40T Cranes	0.051	2.06	2.31	2.06	2.06	2.06	2.57	2.31	2.31	1.80	1.28	1.28	1.03
Pile/Drill Rig	0.059	0.47	0.47	0.47	0.94	0.47	0.94	0.94	0.94	0.94	0.47	0.47	0.47
Tractors	0.019	0.38	0.38	0.38	0.58	0.58	0.67	0.67	0.67	0.67	0.58	0.58	0.48
Welders	0.009	1.73	1.73	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.00	0.00	0.00
Light Plants	0.009	0.39	0.37	0.20	0.25	0.20	0.31	0.42	0.42	0.39	0.28	0.28	0.25
Genertors	0.018	0.43	0.43	0.32	0.32	0.32	0.54	0.48	0.48	0.43	0.22	0.22	0.22
Hydro Vacs/Pumps	0.018	0.18	0.27	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Fork Lifts	0.021	0.69	0.77	0.69	0.77	0.77	1.12	1.12	1.12	1.03	0.86	0.86	0.77
Loader/Backhoe	0.019	0.29	0.29	0.29	0.29	0.29	0.48	0.48	0.48	0.48	0.38	0.38	0.38
Air Compressors	0.009	0.23	0.23	0.23	0.23	0.23	0.23	0.19	0.19	0.15	0.00	0.00	0.00
Manlifts	0.011	2.56	2.64	2.30	1.79	1.88	2.73	2.56	2.56	2.30	2.13	2.13	1.79
Total		12.12	12.86	10.19	10.39	9.95	14.23	13.82	13.82	12.35	9.01	9.01	7.96

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Equipment 2017

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	7	13	13	12	12	12	4	4	3	3	3	3	1
>40T Cranes	5	5	5	4	4	4	1	1	1	2	1	1	0
Pile/Drill Rig	8	7	1	1	1	1	1	1	1	1	1	1	0
Tractors	5	8	8	8	8	8	4	4	3	3	3	3	2
Welders	8	4	4	4	4	4	4	4	4	4	4	4	4
Light Plants	3	10	10	9	9	9	6	6	5	5	5	5	4
Genertors	3	4	4	4	4	4	0	0	0	0	0	0	0
Hydro Vacs/Pumps	5	1	1	1	1	1	1	0	0	0	0	0	0
Fork Lifts	4	11	11	10	10	10	3	3	2	2	2	2	1
Loader/Backhoe	5	5	5	5	5	5	2	2	1	1	1	1	1
Air Compressors	4	4	4	4	4	4	4	4	4	4	4	4	4
Manlifts	8	29	29	27	27	27	13	13	8	8	8	8	1

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.058	5.26	5.26	4.86	4.86	4.86	1.62	1.62	1.21	1.21	1.21	1.21	0.40
>40T Cranes	0.065	1.63	1.63	1.30	1.30	1.30	0.33	0.33	0.33	0.65	0.33	0.33	0.00
Pile/Drill Rig	0.035	1.96	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.00
Tractors	0.026	1.02	1.02	1.02	1.02	1.02	0.51	0.51	0.38	0.38	0.38	0.38	0.26
Welders	0.034	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
Light Plants	0.034	1.01	1.01	0.91	0.91	0.91	0.61	0.61	0.50	0.50	0.50	0.50	0.40
Genertors	0.037	0.44	0.44	0.44	0.44	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.037	0.18	0.18	0.18	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.016	0.71	0.71	0.65	0.65	0.65	0.19	0.19	0.13	0.13	0.13	0.13	0.06
Loader/Backhoe	0.026	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.13	0.13	0.13	0.13	0.13
Air Compressors	0.034	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Manlifts	0.005	1.16	1.16	1.08	1.08	1.08	0.52	0.52	0.32	0.32	0.32	0.32	0.04
Total		15.63	13.95	12.98	12.98	12.98	6.11	5.92	4.90	5.22	4.90	4.90	2.91

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.406	36.94	36.94	34.10	34.10	34.10	11.37	11.37	8.52	8.52	8.52	8.52	2.84
>40T Cranes	0.409	10.21	10.21	8.17	8.17	8.17	2.04	2.04	2.04	4.09	2.04	2.04	0.00
Pile/Drill Rig	0.501	28.06	4.01	4.01	4.01	4.01	4.01	4.01	4.01	4.01	4.01	4.01	0.00
Tractors	0.365	14.59	14.59	14.59	14.59	14.59	7.29	7.29	5.47	5.47	5.47	5.47	3.65
Welders	0.234	7.48	7.48	7.48	7.48	7.48	7.48	7.48	7.48	7.48	7.48	7.48	7.48
Light Plants	0.297	8.90	8.90	8.01	8.01	8.01	5.34	5.34	4.45	4.45	4.45	4.45	3.56
Genertors	0.469	5.63	5.63	5.63	5.63	5.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.477	2.38	2.38	2.38	2.38	2.38	2.38	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.217	9.56	9.56	8.69	8.69	8.69	2.61	2.61	1.74	1.74	1.74	1.74	0.87
Loader/Backhoe	0.365	9.12	9.12	9.12	9.12	9.12	3.65	3.65	1.82	1.82	1.82	1.82	1.82
Air Compressors	0.214	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43
Manlifts	0.174	40.37	40.37	37.59	37.59	37.59	18.10	18.10	11.14	11.14	11.14	11.14	1.39
Total		176.68	152.63	143.20	143.20	143.20	67.70	65.31	50.10	52.15	50.10	50.10	25.04

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Equipment 2018

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.475	43.23	43.23	39.91	39.91	39.91	13.30	13.30	9.98	9.98	9.98	9.98	3.33
>40T Cranes	0.659	16.47	16.47	13.17	13.17	13.17	3.29	3.29	3.29	6.59	3.29	3.29	0.00
Pile/Drill Rig	0.352	19.70	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	2.81	0.00
Tractors	0.185	7.41	7.41	7.41	7.41	7.41	3.71	3.71	2.78	2.78	2.78	2.78	1.85
Welders	0.183	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87
Light Plants	0.183	5.50	5.50	4.95	4.95	4.95	3.30	3.30	2.75	2.75	2.75	2.75	2.20
Genertors	0.243	2.91	2.91	2.91	2.91	2.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.243	1.21	1.21	1.21	1.21	1.21	1.21	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.157	6.89	6.89	6.27	6.27	6.27	1.88	1.88	1.25	1.25	1.25	1.25	0.63
Loader/Backhoe	0.185	4.63	4.63	4.63	4.63	4.63	1.85	1.85	0.93	0.93	0.93	0.93	0.93
Air Compressors	0.183	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2.94
Manlifts	0.103	23.84	23.84	22.19	22.19	22.19	10.68	10.68	6.58	6.58	6.58	6.58	0.82
Total		140.61	123.72	114.28	114.28	114.28	50.86	49.64	39.18	42.47	39.18	39.18	18.56

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Equipment 2018

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.001	0.13	0.13	0.12	0.12	0.12	0.04	0.04	0.03	0.03	0.03	0.03	0.01
>40T Cranes	0.002	0.05	0.05	0.04	0.04	0.04	0.01	0.01	0.01	0.02	0.01	0.01	0.00
Pile/Drill Rig	0.002	0.14	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00
Tractors	0.001	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01
Welders	0.000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Light Plants	0.000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Genertors	0.001	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Loader/Backhoe	0.001	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Manlifts	0.000	0.10	0.10	0.10	0.10	0.10	0.05	0.05	0.03	0.03	0.03	0.03	0.00
Total		0.56	0.44	0.41	0.41	0.41	0.18	0.18	0.14	0.15	0.14	0.14	0.05

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Equipment 2018

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.022	2.04	2.04	1.88	1.88	1.88	0.63	0.63	0.47	0.47	0.47	0.47	0.16
>40T Cranes	0.028	0.70	0.70	0.56	0.56	0.56	0.14	0.14	0.14	0.28	0.14	0.14	0.00
Pile/Drill Rig	0.014	0.76	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.00
Tractors	0.011	0.45	0.45	0.45	0.45	0.45	0.22	0.22	0.17	0.17	0.17	0.17	0.11
Welders	0.009	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Light Plants	0.009	0.27	0.27	0.24	0.24	0.24	0.16	0.16	0.14	0.14	0.14	0.14	0.11
Genertors	0.018	0.21	0.21	0.21	0.21	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.018	0.09	0.09	0.09	0.09	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.007	0.33	0.33	0.30	0.30	0.30	0.09	0.09	0.06	0.06	0.06	0.06	0.03
Loader/Backhoe	0.011	0.28	0.28	0.28	0.28	0.28	0.11	0.11	0.06	0.06	0.06	0.06	0.06
Air Compressors	0.009	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Manlifts	0.002	0.55	0.55	0.52	0.52	0.52	0.25	0.25	0.15	0.15	0.15	0.15	0.02
Total		6.12	5.46	5.07	5.07	5.07	2.24	2.15	1.73	1.87	1.73	1.73	0.92

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Equipment 2018

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.035	3.22	3.22	2.97	2.97	2.97	0.99	0.99	0.74	0.74	0.74	0.74	0.25
>40T Cranes	0.051	1.29	1.29	1.03	1.03	1.03	0.26	0.26	0.26	0.51	0.26	0.26	0.00
Pile/Drill Rig	0.059	3.28	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.00
Tractors	0.019	0.77	0.77	0.77	0.77	0.77	0.38	0.38	0.29	0.29	0.29	0.29	0.19
Welders	0.009	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Light Plants	0.009	0.28	0.28	0.25	0.25	0.25	0.17	0.17	0.14	0.14	0.14	0.14	0.11
Genertors	0.018	0.22	0.22	0.22	0.22	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.018	0.09	0.09	0.09	0.09	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.021	0.94	0.94	0.86	0.86	0.86	0.26	0.26	0.17	0.17	0.17	0.17	0.09
Loader/Backhoe	0.019	0.48	0.48	0.48	0.48	0.48	0.19	0.19	0.10	0.10	0.10	0.10	0.10
Air Compressors	0.009	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Manlifts	0.011	2.47	2.47	2.30	2.30	2.30	1.11	1.11	0.68	0.68	0.68	0.68	0.09
Total		13.49	10.67	9.88	9.88	9.88	4.37	4.28	3.30	3.55	3.30	3.30	1.27

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Equipment 2018

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	7	0	0	0	0	0	0	0	0	0	0	0	0
>40T Cranes	5	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	0	0	0	0	0	0	0	0	0
Tractors	5	0	0	0	0	0	0	0	0	0	0	0	0
Welders	8	0	0	0	0	0	0	0	0	0	0	0	0
Light Plants	3	0	0	0	0	0	0	0	0	0	0	0	0
Genertors	3	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Vacs/Pumps	5	0	0	0	0	0	0	0	0	0	0	0	0
Fork Lifts	4	0	0	0	0	0	0	0	0	0	0	0	0
Loader/Backhoe	5	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors	4	0	0	0	0	0	0	0	0	0	0	0	0
Manlifts	8	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.053	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.062	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.398	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.395	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.501	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.363	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.227	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.289	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.466	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.474	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.217	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.363	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.172	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.436	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.623	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.327	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.169	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.228	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.228	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.146	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.169	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.098	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.007	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Equipment 2019

Mitigated Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	2019	37	38	39	40	41	42	43	44	45	46	47	48
<40 T Cranes	0.035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.059	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	7	0	0	0	0	0	0	0	0	0	1	0	1
>40T Cranes	5	0	0	0	0	0	0	0	0	0	1	0	1
Pile Rig	8	0	0	0	0	0	0	0	0	0	1	0	1
Tractors	5	0	0	0	0	0	0	0	0	0	1	0	1
Welders	8	0	0	0	0	0	0	0	0	0	1	0	2
Light Plants	12	0	0	0	0	0	0	0	0	0	1	0	1
Genertors	12	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Vacs	5	0	0	0	0	0	0	0	0	0	1	0	1
Fork Lifts	4	0	0	0	0	0	0	0	0	0	1	0	1
Loader/Backhoe	5	0	0	0	0	0	0	0	0	0	1	0	1
Air Compressors	4	0	0	0	0	0	0	0	0	0	1	0	1
Manlifts	8	0	0	0	0	0	0	0	0	0	2	0	3

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.070	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.49
>40T Cranes	0.078	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.39
Pile Rig	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.34
Tractors	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Welders	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.59
Light Plants	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.44
Genertors	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.22
Fork Lifts	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.09
Loader/Backhoe	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Air Compressors	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.15
Manlifts	0.007	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.16
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.84	0.00	3.19

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.426	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.98	0.00	2.98
>40T Cranes	0.443	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.22	0.00	2.22
Pile Rig	0.502	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.01	0.00	4.01
Tractors	0.369	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84	0.00	1.84
Welders	0.248	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.99	0.00	3.97
Light Plants	0.313	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.76	0.00	3.76
Genertors	0.477	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.484	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.42	0.00	2.42
Fork Lifts	0.455	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.82	0.00	1.82
Loader/Backhoe	0.369	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84	0.00	1.84
Air Compressors	0.228	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.00	0.91
Manlifts	0.159	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.55	0.00	3.82
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.35	0.00	29.61

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.564	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.95	0.00	3.95
>40T Cranes	0.767	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.83	0.00	3.83
Pile Rig	0.429	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.43	0.00	3.43
Tractors	0.225	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12	0.00	1.12
Welders	0.191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.53	0.00	3.06
Light Plants	0.191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.30	0.00	2.30
Genertors	0.276	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.276	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.38	0.00	1.38
Fork Lifts	0.199	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	0.80
Loader/Backhoe	0.225	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12	0.00	1.12
Air Compressors	0.191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77	0.00	0.77
Manlifts	0.129	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.06	0.00	3.10
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.30	0.00	24.86

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: TAR Equipment 2016

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Pile Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.08

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.19
>40T Cranes	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.17
Pile Rig	0.017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.13
Tractors	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.07
Welders	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.16
Light Plants	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.12
Genertors	0.020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10
Fork Lifts	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04
Loader/Backhoe	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.07
Air Compressors	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04
Manlifts	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.09
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.08	0.00	1.19

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: TAR Equipment 2016

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.25
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.26
Pile Rig	0.059	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.47
Tractors	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10
Welders	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.15
Light Plants	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.11
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.09
Fork Lifts	0.021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.09
Loader/Backhoe	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10
Air Compressors	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04
Manlifts	0.011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.26
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.74	0.00	1.90

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: TAR Equipment 2016

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	7	1	1	1	1	0	0	0	2	0	1	1	0
>40T Cranes	5	1	1	1	1	0	0	0	2	0	1	1	0
Pile Rig	8	1	1	1	1	0	0	0	1	0	1	1	0
Tractors	5	1	1	1	1	0	0	0	1	0	1	1	0
Welders	8	5	2	2	5	0	0	0	3	0	5	5	0
Light Plants	12	2	1	1	2	0	0	0	1	0	1	1	0
Genertors	12	0	0	0	0	0	0	0	1	0	0	0	0
Hydro Vacs	5	1	1	1	1	0	0	0	1	0	1	1	0
Fork Lifts	4	1	1	1	1	0	0	0	1	0	1	1	0
Loader/Backhoe	5	1	1	1	1	0	0	0	1	0	1	1	0
Air Compressors	4	1	1	1	1	0	0	0	1	0	1	1	0
Manlifts	8	4	3	3	4	0	0	0	3	0	4	4	0

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.065	0.46	0.46	0.46	0.46	0.00	0.00	0.00	0.92	0.00	0.46	0.46	0.00
>40T Cranes	0.072	0.36	0.36	0.36	0.36	0.00	0.00	0.00	0.72	0.00	0.36	0.36	0.00
Pile Rig	0.040	0.32	0.32	0.32	0.32	0.00	0.00	0.00	0.32	0.00	0.32	0.32	0.00
Tractors	0.030	0.15	0.15	0.15	0.15	0.00	0.00	0.00	0.15	0.00	0.15	0.15	0.00
Welders	0.036	1.43	0.57	0.57	1.43	0.00	0.00	0.00	0.86	0.00	1.43	1.43	0.00
Light Plants	0.036	0.86	0.43	0.43	0.86	0.00	0.00	0.00	0.43	0.00	0.43	0.43	0.00
Genertors	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00
Hydro Vacs	0.042	0.21	0.21	0.21	0.21	0.00	0.00	0.00	0.21	0.00	0.21	0.21	0.00
Fork Lifts	0.019	0.08	0.08	0.08	0.08	0.00	0.00	0.00	0.08	0.00	0.08	0.08	0.00
Loader/Backhoe	0.030	0.15	0.15	0.15	0.15	0.00	0.00	0.00	0.15	0.00	0.15	0.15	0.00
Air Compressors	0.036	0.14	0.14	0.14	0.14	0.00	0.00	0.00	0.14	0.00	0.14	0.14	0.00
Manlifts	0.006	0.19	0.14	0.14	0.19	0.00	0.00	0.00	0.14	0.00	0.19	0.19	0.00
Total		4.35	3.02	3.02	4.35	0.00	0.00	0.00	4.63	0.00	3.92	3.92	0.00

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: TAR Equipment 2017

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.415	2.91	2.91	2.91	2.91	0.00	0.00	0.00	5.81	0.00	2.91	2.91	0.00
>40T Cranes	0.424	2.12	2.12	2.12	2.12	0.00	0.00	0.00	4.24	0.00	2.12	2.12	0.00
Pile Rig	0.501	4.01	4.01	4.01	4.01	0.00	0.00	0.00	4.01	0.00	4.01	4.01	0.00
Tractors	0.367	1.83	1.83	1.83	1.83	0.00	0.00	0.00	1.83	0.00	1.83	1.83	0.00
Welders	0.241	9.63	3.85	3.85	9.63	0.00	0.00	0.00	5.78	0.00	9.63	9.63	0.00
Light Plants	0.305	7.31	3.66	3.66	7.31	0.00	0.00	0.00	3.66	0.00	3.66	3.66	0.00
Genertors	0.473	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.67	0.00	0.00	0.00	0.00
Hydro Vacs	0.480	2.40	2.40	2.40	2.40	0.00	0.00	0.00	2.40	0.00	2.40	2.40	0.00
Fork Lifts	0.452	1.81	1.81	1.81	1.81	0.00	0.00	0.00	1.81	0.00	1.81	1.81	0.00
Loader/Backhoe	0.367	1.83	1.83	1.83	1.83	0.00	0.00	0.00	1.83	0.00	1.83	1.83	0.00
Air Compressors	0.221	0.88	0.88	0.88	0.88	0.00	0.00	0.00	0.88	0.00	0.88	0.88	0.00
Manlifts	0.155	4.95	3.71	3.71	4.95	0.00	0.00	0.00	3.71	0.00	4.95	4.95	0.00
Total		39.70	29.02	29.02	39.70	0.00	0.00	0.00	41.65	0.00	36.04	36.04	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.529	3.70	3.70	3.70	3.70	0.00	0.00	0.00	7.40	0.00	3.70	3.70	0.00
>40T Cranes	0.723	3.61	3.61	3.61	3.61	0.00	0.00	0.00	7.23	0.00	3.61	3.61	0.00
Pile Rig	0.405	3.24	3.24	3.24	3.24	0.00	0.00	0.00	3.24	0.00	3.24	3.24	0.00
Tractors	0.211	1.06	1.06	1.06	1.06	0.00	0.00	0.00	1.06	0.00	1.06	1.06	0.00
Welders	0.189	7.55	3.02	3.02	7.55	0.00	0.00	0.00	4.53	0.00	7.55	7.55	0.00
Light Plants	0.189	4.53	2.26	2.26	4.53	0.00	0.00	0.00	2.26	0.00	2.26	2.26	0.00
Genertors	0.266	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.19	0.00	0.00	0.00	0.00
Hydro Vacs	0.266	1.33	1.33	1.33	1.33	0.00	0.00	0.00	1.33	0.00	1.33	1.33	0.00
Fork Lifts	0.182	0.73	0.73	0.73	0.73	0.00	0.00	0.00	0.73	0.00	0.73	0.73	0.00
Loader/Backhoe	0.211	1.06	1.06	1.06	1.06	0.00	0.00	0.00	1.06	0.00	1.06	1.06	0.00
Air Compressors	0.189	0.75	0.75	0.75	0.75	0.00	0.00	0.00	0.75	0.00	0.75	0.75	0.00
Manlifts	0.116	3.72	2.79	2.79	3.72	0.00	0.00	0.00	2.79	0.00	3.72	3.72	0.00
Total		31.28	23.55	23.55	31.28	0.00	0.00	0.00	35.57	0.00	29.01	29.01	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.001	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.02	0.00	0.01	0.01	0.00
>40T Cranes	0.002	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.02	0.00	0.01	0.01	0.00
Pile Rig	0.002	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.02	0.00	0.02	0.02	0.00
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.02	0.01	0.01	0.02	0.00	0.00	0.00	0.01	0.00	0.02	0.02	0.00
Light Plants	0.000	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Hydro Vacs	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.000	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00
Total		0.10	0.08	0.08	0.10	0.00	0.00	0.00	0.11	0.00	0.09	0.09	0.00

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: TAR Equipment 2017

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.025	0.18	0.18	0.18	0.18	0.00	0.00	0.00	0.35	0.00	0.18	0.18	0.00
>40T Cranes	0.031	0.15	0.15	0.15	0.15	0.00	0.00	0.00	0.31	0.00	0.15	0.15	0.00
Pile Rig	0.016	0.13	0.13	0.13	0.13	0.00	0.00	0.00	0.13	0.00	0.13	0.13	0.00
Tractors	0.013	0.07	0.07	0.07	0.07	0.00	0.00	0.00	0.07	0.00	0.07	0.07	0.00
Welders	0.010	0.38	0.15	0.15	0.38	0.00	0.00	0.00	0.23	0.00	0.38	0.38	0.00
Light Plants	0.010	0.23	0.11	0.11	0.23	0.00	0.00	0.00	0.11	0.00	0.11	0.11	0.00
Genertors	0.020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00
Hydro Vacs	0.020	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.10	0.00	0.10	0.10	0.00
Fork Lifts	0.009	0.04	0.04	0.04	0.04	0.00	0.00	0.00	0.04	0.00	0.04	0.04	0.00
Loader/Backhoe	0.013	0.07	0.07	0.07	0.07	0.00	0.00	0.00	0.07	0.00	0.07	0.07	0.00
Air Compressors	0.010	0.04	0.04	0.04	0.04	0.00	0.00	0.00	0.04	0.00	0.04	0.04	0.00
Manlifts	0.003	0.11	0.08	0.08	0.11	0.00	0.00	0.00	0.08	0.00	0.11	0.11	0.00
Total		1.48	1.11	1.11	1.48	0.00	0.00	0.00	1.75	0.00	1.37	1.37	0.00

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: TAR Equipment 2017

Mitigated Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.035	0.25	0.25	0.25	0.25	0.00	0.00	0.00	0.49	0.00	0.25	0.25	0.00
>40T Cranes	0.051	0.26	0.26	0.26	0.26	0.00	0.00	0.00	0.51	0.00	0.26	0.26	0.00
Pile Rig	0.059	0.47	0.47	0.47	0.47	0.00	0.00	0.00	0.47	0.00	0.47	0.47	0.00
Tractors	0.019	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.10	0.00	0.10	0.10	0.00
Welders	0.009	0.38	0.15	0.15	0.38	0.00	0.00	0.00	0.23	0.00	0.38	0.38	0.00
Light Plants	0.009	0.23	0.11	0.11	0.23	0.00	0.00	0.00	0.11	0.00	0.11	0.11	0.00
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00
Hydro Vacs	0.018	0.09	0.09	0.09	0.09	0.00	0.00	0.00	0.09	0.00	0.09	0.09	0.00
Fork Lifts	0.021	0.09	0.09	0.09	0.09	0.00	0.00	0.00	0.09	0.00	0.09	0.09	0.00
Loader/Backhoe	0.019	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.10	0.00	0.10	0.10	0.00
Air Compressors	0.009	0.04	0.04	0.04	0.04	0.00	0.00	0.00	0.04	0.00	0.04	0.04	0.00
Manlifts	0.011	0.34	0.26	0.26	0.34	0.00	0.00	0.00	0.26	0.00	0.34	0.34	0.00
Total		2.32	1.90	1.90	2.32	0.00	0.00	0.00	2.69	0.00	2.21	2.21	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	7	1	1	0	0	0	0	0	0	0	0	0	0
>40T Cranes	5	1	1	0	0	0	0	0	0	0	0	0	0
Pile Rig	8	1	1	0	0	0	0	0	0	0	0	0	0
Tractors	5	1	1	0	0	0	0	0	0	0	0	0	0
Welders	8	8	8	0	0	0	0	0	0	0	0	0	0
Light Plants	12	1	1	0	0	0	0	0	0	0	0	0	0
Genertors	12	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Vacs	5	1	1	0	0	0	0	0	0	0	0	0	0
Fork Lifts	4	1	1	0	0	0	0	0	0	0	0	0	0
Loader/Backhoe	5	1	1	0	0	0	0	0	0	0	0	0	0
Air Compressors	4	1	1	0	0	0	0	0	0	0	0	0	0
Manlifts	8	4	4	0	0	0	0	0	0	0	0	0	0

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: TAR Equipment 2018

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.058	0.40	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.065	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.035	0.28	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.026	0.13	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.034	2.15	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.034	0.40	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.037	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.016	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.026	0.13	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.034	0.13	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.005	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		4.36	4.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.406	2.84	2.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.409	2.04	2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.501	4.01	4.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.365	1.82	1.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.234	14.97	14.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.297	3.56	3.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.469	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.477	2.38	2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.217	0.87	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.365	1.82	1.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.214	0.86	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.174	5.57	5.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		40.74	40.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: TAR Equipment 2018

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.475	3.33	3.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.659	3.29	3.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.352	2.81	2.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.185	0.93	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.183	11.74	11.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.183	2.20	2.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.243	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.243	1.21	1.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.157	0.63	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.185	0.93	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.183	0.73	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.103	3.29	3.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		31.09	31.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.001	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.002	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.002	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.000	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: TAR Equipment 2018

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.022	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.028	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.014	0.11	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.011	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.009	0.58	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.009	0.11	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.018	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.007	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.011	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.009	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.002	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		1.44	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.035	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.051	0.26	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.059	0.47	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.019	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.009	0.60	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.009	0.11	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.018	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.021	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.019	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.009	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.011	0.34	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.43	2.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	7	0	0	0	0	0	0	0	0	0	0	0	0
>40T Cranes	5	0	0	0	0	0	0	0	0	0	0	0	0
Pile Rig	8	0	0	0	0	0	0	0	0	0	0	0	0
Tractors	5	0	0	0	0	0	0	0	0	0	0	0	0
Welders	8	0	0	0	0	0	0	0	0	0	0	0	0
Light Plants	12	0	0	0	0	0	0	0	0	0	0	0	0
Genertors	12	0	0	0	0	0	0	0	0	0	0	0	0
Hydro Vacs	5	0	0	0	0	0	0	0	0	0	0	0	0
Fork Lifts	4	0	0	0	0	0	0	0	0	0	0	0	0
Loader/Backhoe	5	0	0	0	0	0	0	0	0	0	0	0	0
Air Compressors	4	0	0	0	0	0	0	0	0	0	0	0	0
Manlifts	8	0	0	0	0	0	0	0	0	0	0	0	0

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: TAR Equipment 2019

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.053	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.062	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.398	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.395	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.501	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.363	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.227	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.289	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.466	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.474	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.217	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.363	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.172	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.436	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.623	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.327	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.169	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.228	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.228	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.146	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.169	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.098	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: TAR Equipment 2019

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.007	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Rig	0.059	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: TAR Equipment 2019

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Onroad Emission Rates

Percent Mitigated **50%**

	Unmitigated Default Fleet Emission Rate (lb/mi) (1)						Modern (2010+) Fleet Emission Rate (lb/mi) (1)						Mitigated Fleet Emission Rate (lb/mi) (1)					
VOC	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Light Duty	0.0001035	0.0001035	0.0000636	0.0000548	0.0001152	0.0001103	1.88E-05	1.93E-05	1.98E-05	2.01E-05	2.05E-05	2.09E-05	6.11E-05	6.1E-05	4.2E-05	3.7E-05	6.8E-05	6.6E-05
Medium Duty	0.0003717	0.0003717	0.0002639	0.0002379	0.0002072	0.0001878	0.000143	0.000145	0.000146	0.000146	0.000147	0.00015	0.000258	0.00026	0.0002	0.00019	0.00018	0.00017
Heavy Duty	0.0006131	0.0006131	0.0005354	0.0005283	0.0010485	0.0010069	0.000409	0.000414	0.000416	0.000412	0.000412	0.000414	0.000511	0.00051	0.00048	0.00047	0.00073	0.00071
CO	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Light Duty	0.0033327	0.0033327	0.0024424	0.0022305	0.0007041	0.0006885	0.001031	0.001064	0.001092	0.001113	0.001134	0.001156	0.002182	0.0022	0.00177	0.00167	0.00092	0.00092
Medium Duty	0.0030301	0.0030301	0.0019739	0.0017339	0.0018984	0.0016798	0.000678	0.000684	0.000686	0.00069	0.000697	0.000707	0.001854	0.00186	0.00133	0.00121	0.0013	0.00119
Heavy Duty	0.0043046	0.0043046	0.0038177	0.0037678	0.0566489	0.0563965	0.00368	0.003586	0.003513	0.003446	0.003375	0.003313	0.003993	0.00395	0.00367	0.00361	0.03001	0.02985
NOx	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Light Duty	0.0005080	0.0005080	0.0003881	0.0003585	0.0026401	0.0024874	0.000123	0.000126	0.000128	0.000131	0.000133	0.000135	0.000315	0.00032	0.00026	0.00024	0.00139	0.00131
Medium Duty	0.0082326	0.0082326	0.0053355	0.0046291	0.0032831	0.0024226	0.001597	0.001607	0.00161	0.001613	0.001642	0.001683	0.004915	0.00492	0.00347	0.00312	0.00246	0.00205
Heavy Duty	0.0154328	0.0154328	0.0114857	0.0107049	0.0097261	0.0094888	0.00412	0.004159	0.004169	0.004156	0.004163	0.004184	0.009776	0.0098	0.00783	0.00743	0.00694	0.00684
SOx	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Light Duty	0.0000090	0.0000090	0.0000090	0.0000090	0.0000082	0.0000082	8.83E-06	8.84E-06	8.85E-06	8.85E-06	8.85E-06	8.89E-06	8.91E-06	8.9E-06	8.9E-06	8.9E-06	8.5E-06	8.6E-06
Medium Duty	0.0000217	0.0000217	0.0000216	0.0000215	0.0000202	0.0000202	2.15E-05	2.16E-05	2.16E-05	2.15E-05	2.15E-05	2.16E-05	2.16E-05	2.2E-05	2.2E-05	2.2E-05	2.1E-05	2.1E-05
Heavy Duty	0.0000359	0.0000359	0.0000359	0.0000357	0.0000165	0.0000165	3.51E-05	3.52E-05	3.52E-05	3.52E-05	3.52E-05	3.53E-05	3.55E-05	3.6E-05	3.6E-05	3.5E-05	2.6E-05	2.6E-05
PM10	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Light Duty Exhaust	0.0001064	0.0001064	0.0001058	0.0001057	0.0001814	0.0001798	2.86E-06	3.22E-06	3.52E-06	3.74E-06	3.94E-06	4.12E-06	5.46E-05	5.5E-05	5.5E-05	5.5E-05	9.3E-05	9.2E-05
Medium Duty Exhaust	0.0004787	0.0004787	0.0004105	0.0003940	0.0003283	0.0003061	6.38E-05	6.48E-05	6.52E-05	6.61E-05	6.72E-05	6.86E-05	0.000271	0.00027	0.00024	0.00023	0.0002	0.00019
Heavy Duty Exhaust	0.0004727	0.0004727	0.0004029	0.0004031	0.0001312	0.0001308	0.000154	0.000158	0.00016	0.000162	0.000162	0.000163	0.000313	0.00032	0.00028	0.00028	0.00015	0.00015
Light Duty Fugitive(2)	0.000221	0.000221	0.000221	0.000221	0.000221	0.000230	0.000221	0.000221	0.000221	0.000221	0.000221	0.000230	0.000221	0.00022	0.00022	0.00022	0.00022	0.00023
Medium Duty Fugitve(2)	0.000467	0.000467	0.000467	0.000467	0.000467	0.000515	0.000467	0.000467	0.000467	0.000467	0.000467	0.000515	0.000467	0.00047	0.00047	0.00047	0.00047	0.00051
Heavy Duty Fugitive(2)	0.002314	0.002314	0.002314	0.002314	0.002314	0.002314	0.002314	0.002314	0.002314	0.002314	0.002314	0.002314	0.002314	0.00231	0.00231	0.00231	0.00231	0.00231
CO2e(3)	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Light Duty	0.907027	0.907027	0.907902	0.906320	0.871815	0.871989	0.895264	0.896271	0.897304	0.896459	0.897277	0.900453	0.901145	0.90165	0.9026	0.90139	0.88455	0.88622
Medium Duty	2.261047	2.261047	2.255679	2.246504	2.103853	2.095047	2.248014	2.251782	2.251657	2.245243	2.249754	2.258657	2.25453	2.25641	2.25367	2.24587	2.1768	2.17685
Heavy Duty	3.767750	3.767750	3.758572	3.745268	3.742311	3.741032	3.680111	3.687814	3.692833	3.685259	3.690409	3.698658	3.72393	3.72778	3.7257	3.71526	3.71636	3.71984
CO2	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Light Duty	0.896	0.895612	0.896487	0.894905	0.860400	0.860574	0.883849	0.884856	0.885889	0.885044	0.885863	0.889038	0.889731	0.89023	0.89119	0.88997	0.87313	0.87481
Medium Duty	2.258	2.257530	2.252163	2.242988	2.100337	2.091531	2.244498	2.248265	2.248141	2.241726	2.246238	2.255141	2.251014	2.2529	2.25015	2.24236	2.17329	2.17334
Heavy Duty	3.764	3.764233	3.755056	3.741752	3.738794	3.737515	3.676594	3.684297	3.689317	3.681742	3.686892	3.695141	3.720414	3.72427	3.72219	3.71175	3.71284	3.71633
Total																		

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,

and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CQ) = $CO_2 + CH_4 * 21 + N2O*310$

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

	2016		
Chemical	**Light**	**Medium**	**Heavy**
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048

Appendix B-1
Tesoro Integration and Compliance Project

Onsite Mitigated Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day) 1	2	3	4	5	6	7	8	9	10	11	12
Cars	2	0	0	0	0	0	0	0	0	0	0	0	0
Pickup Trucks	2	0	0	0	0	0	76	76	76	102	117	123	122
Total Light Vehicle Miles		0	0	0	0	0	152	152	152	204	234	246	244
Water Truck	2	0	0	0	0	0	15	15	15	15	15	15	15
Delivery Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	2	0	0	0	0	0	7	7	7	10	12	13	13
Misc. MD Truck	5	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		0	0	0	0	0	44	44	44	50	54	56	56
Truck, Dump Ford LT8000	2	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Semi-Tractor, Diesel 20 Ton	2	0	0	0	0	0	0	0	0	0	0	0	0
Misc. HD Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Total Heavy Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0000611	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.01
Medium Duty	0.0002576	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty	0.0005111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.03	0.03	0.03	0.03
CO	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0021819	0.00	0.00	0.00	0.00	0.00	0.33	0.33	0.33	0.45	0.51	0.54	0.53
Medium Duty	0.0018541	0.00	0.00	0.00	0.00	0.00	0.08	0.08	0.08	0.09	0.10	0.10	0.10
Heavy Duty	0.0039926	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.41	0.41	0.41	0.54	0.61	0.64	0.64
NOx	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0003153	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.06	0.07	0.08	0.08
Medium Duty	0.0049148	0.00	0.00	0.00	0.00	0.00	0.22	0.22	0.22	0.25	0.27	0.28	0.28
Heavy Duty	0.0097764	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.26	0.31	0.34	0.35	0.35
SOx	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0000089	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000355	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty Exhaust	0.0000546	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Medium Duty Exhaust	0.0002713	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Heavy Duty Exhaust	0.0003135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.03	0.03	0.03
Light Duty Fugitive(2)	0.000221	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.05	0.05	0.05	0.05
Medium Duty Fugitve(2)	0.000467	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.03	0.03	0.03
Heavy Duty Fugitive(2)	0.002314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.07	0.08	0.08	0.08
Total		0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.07	0.09	0.10	0.11	0.11
CO_{2EQ}	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.901	0.00	0.00	0.00	0.00	0.00	136.97	136.97	136.97	183.83	210.87	221.68	219.88
Medium Duty	2.255	0.00	0.00	0.00	0.00	0.00	99.20	99.20	99.20	112.73	121.74	126.25	126.25
Heavy Duty	3.724	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	236.17	236.17	236.17	296.56	332.61	347.94	346.13

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,

and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Onsite Trips 2016

Appendix B-1
Tesoro Integration and Compliance Project

Onsite Mitigated Construction Vehicle Trip Emissions

		Month (Vehicles per day)											
Vehicle	**Miles per Day**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Cars	2	0	0	0	0	0	0	0	0	0	0	0	0
Pickup Trucks	2	127	135	124	126	114	122	118	122	110	73	73	61
Total Light Vehicle Miles		254	270	248	252	228	244	236	244	220	146	146	122
Water Truck	2	15	15	10	10	10	10	10	10	10	10	10	10
Delivery Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	2	14	14	13	13	11	12	11	12	10	8	8	6
Misc. MD Truck	5	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		58	58	46	46	42	44	42	44	40	36	36	32
Truck, Dump Ford LT8000	2	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Semi-Tractor, Diesel 20 Ton	2	0	0	0	0	0	0	0	0	0	0	0	0
Misc. HD Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Total Heavy Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Light Duty	0.0000614	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Medium Duty	0.0002584	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty	0.0005136	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.02
CO	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Light Duty	0.0021982	0.56	0.59	0.55	0.55	0.50	0.54	0.52	0.54	0.48	0.32	0.32	0.27
Medium Duty	0.0018571	0.11	0.11	0.09	0.09	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.06
Heavy Duty	0.0039454	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.67	0.70	0.63	0.64	0.58	0.62	0.60	0.62	0.56	0.39	0.39	0.33
NOx	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Light Duty	0.0003168	0.08	0.09	0.08	0.08	0.07	0.08	0.07	0.08	0.07	0.05	0.05	0.04
Medium Duty	0.0049198	0.29	0.29	0.23	0.23	0.21	0.22	0.21	0.22	0.20	0.18	0.18	0.16
Heavy Duty	0.0097959	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.37	0.37	0.30	0.31	0.28	0.29	0.28	0.29	0.27	0.22	0.22	0.20
SOx	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Light Duty	0.0000089	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000356	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Light Duty Exhaust	0.0000548	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Medium Duty Exhaust	0.0002718	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty Exhaust	0.0003153	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.03	0.02	0.02	0.02	0.02
Light Duty Fugitive(2)	0.000221	0.06	0.06	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.03	0.03	0.03
Medium Duty Fugitve(2)	0.000467	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
Heavy Duty Fugitive(2)	0.002314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.08	0.09	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.05	0.05	0.04
Total		0.11	0.12	0.10	0.10	0.09	0.10	0.10	0.10	0.09	0.07	0.07	0.06
CO_{2EQ}	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Light Duty	0.902	229.02	243.45	223.61	227.22	205.58	220.00	212.79	220.00	198.36	131.64	131.64	110.00
Medium Duty	2.256	130.87	130.87	103.80	103.80	94.77	99.28	94.77	99.28	90.26	81.23	81.23	72.21
Heavy Duty	3.728	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		359.89	374.32	327.40	331.01	300.35	319.28	307.56	319.28	288.62	212.87	212.87	182.21

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,

and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

Onsite Mitigated Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day) 25	26	27	28	29	30	31	32	33	34	35	36
Cars	2	0	0	0	0	0	0	0	0	0	0	0	0
Pickup Trucks	2	93	93	88	88	88	59	59	49	49	49	49	38
Total Light Vehicle Miles		186	186	176	176	176	118	118	98	98	98	98	76
Water Truck	2	12	12	7	7	7	7	7	7	7	7	7	7
Delivery Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	2	10	10	9	9	9	6	6	5	5	5	5	3
Misc. MD Truck	5	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		44	44	32	32	32	26	26	24	24	24	24	20
Truck, Dump Ford LT8000	2	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Semi-Tractor, Diesel 20 Ton	2	0	0	0	0	0	0	0	0	0	0	0	0
Misc. HD Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Total Heavy Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.0000417	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0002047	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0004755	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
CO	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.0017671	0.33	0.33	0.31	0.31	0.31	0.21	0.21	0.17	0.17	0.17	0.17	0.13
Medium Duty	0.0013302	0.06	0.06	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Heavy Duty	0.0036653	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.39	0.39	0.35	0.35	0.35	0.24	0.24	0.21	0.21	0.21	0.21	0.16
NOx	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.0002582	0.05	0.05	0.05	0.05	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.02
Medium Duty	0.0034725	0.15	0.15	0.11	0.11	0.11	0.09	0.09	0.08	0.08	0.08	0.08	0.07
Heavy Duty	0.0078275	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.20	0.20	0.16	0.16	0.16	0.12	0.12	0.11	0.11	0.11	0.11	0.09
SOx	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.0000089	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000355	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty Exhaust	0.0000546	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Medium Duty Exhaust	0.0002379	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Heavy Duty Exhaust	0.0002813	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Light Duty Fugitive(2)	0.000221	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Medium Duty Fugitve(2)	0.000467	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty Fugitive(2)	0.002314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03	0.03	0.03
Total		0.08	0.08	0.07	0.07	0.07	0.05	0.05	0.04	0.04	0.04	0.04	0.04
CO_{2EQ}	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.903	167.88	167.88	158.86	158.86	158.86	106.51	106.51	88.46	88.46	88.46	88.46	68.60
Medium Duty	2.254	99.16	99.16	72.12	72.12	72.12	58.60	58.60	54.09	54.09	54.09	54.09	45.07
Heavy Duty	3.726	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		267.05	267.05	230.98	230.98	230.98	165.10	165.10	142.54	142.54	142.54	142.54	113.67

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks, and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

Appendix B-1
Tesoro Integration and Compliance Project

Onsite Mitigated Construction Vehicle Trip Emissions

		Month (Vehicles per day)											
Vehicle	**Miles per Day**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Cars	2	0	0	0	0	0	0	0	0	0	0	0	0
Pickup Trucks	2	12	12	12	12	12	12	12	12	12	12	12	12
Total Light Vehicle Miles		24	24	24	24	24	24	24	24	24	24	24	24
Water Truck	2	2	0	0	0	0	0	0	0	0	0	0	0
Delivery Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	2	1	1	1	1	1	1	1	1	1	1	1	1
Misc. MD Truck	5	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		6	2	2	2	2	2	2	2	2	2	2	2
Truck, Dump Ford LT8000	2	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Semi-Tractor, Diesel 20 Ton	2	0	0	0	0	0	0	0	0	0	0	0	0
Misc. HD Truck	2	0	0	0	0	0	0	0	0	0	0	0	0
Total Heavy Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0000374	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0001917	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0004702	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CO	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0016716	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Medium Duty	0.0012121	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0036071	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04

NOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0002446	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Medium Duty	0.0031210	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty	0.0074303	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

SOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0000089	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000215	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000354	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PM10	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty Exhaust	0.0000547	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0002301	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0002824	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Duty Fugitive(2)	0.000221	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Medium Duty Fugitve(2)	0.000467	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive(2)	0.002314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

CO_{2EQ}	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.9013893	21.63	21.63	21.63	21.63	21.63	21.63	21.63	21.63	21.63	21.63	21.63	21.63
Medium Duty	2.246	13.48	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49
Heavy Duty	3.715	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		35.11	26.13	26.13	26.13	26.13	26.13	26.13	26.13	26.13	26.13	26.13	26.13

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)
(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,
and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310
where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.
where light vehicle are gasoline light duty trucks.
where medium/heavy duty vehicle are diesel heavy duty trucks.

Appendix B-1
Tesoro Integration and Compliance Project

Onsite Mitigated Construction Vehicle Trip Emissions

		Month (Vehicles per day)											
Vehicle	**Miles per Day**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Cars	2												
Pickup Trucks	2	12	12	12	12	12	12	12	12	12	12	12	12
Total Light Vehicle Miles		24	24	24	24	24	24	24	24	24	24	24	24
Water Truck	2	1	1	1	1	1	1	1	1	1	1	1	1
Delivery Truck	2												
1 Ton Truck	2	1	1	1	1	1	1	1	1	1	1	1	1
Misc. MD Truck	5												
Total Medium Truck Miles		4	4	4	4	4	4	4	4	4	4	4	4
Truck, Dump Ford LT8000	2												
Concrete Truck	2												
Semi-Tractor, Diesel 20 Ton	2												
Misc. HD Truck	2												
Total Heavy Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)[1]	Month (lb/day)											
VOC	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0000678	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0001773	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0007303	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CO	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0009190	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Medium Duty	0.0012979	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty	0.0300122	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03

NOx	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0013865	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Medium Duty	0.0024624	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty	0.0069447	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04

SOx	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0000085	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000209	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000259	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PM10	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty Exhaust	0.0000927	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0001978	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0001468	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Duty Fugitive[2]	0.000221	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Medium Duty Fugitve[2]	0.000467	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive[2]	0.002314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

CO_{2EQ}	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.885	21.23	21.23	21.23	21.23	21.23	21.23	21.23	21.23	21.23	21.23	21.23	21.23
Medium Duty	2.177	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71
Heavy Duty	3.716	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		29.94	29.94	29.94	29.94	29.94	29.94	29.94	29.94	29.94	29.94	29.94	29.94

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks, and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Onsite Trips 2020

Appendix B-1
Tesoro Integration and Compliance Project

Onsite Mitigated Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day) 61	62	63	64	65	66	67	68	69	70	71	72
Cars	2												
Pickup Trucks	2	12	12	12									
Total Light Vehicle Miles		24	24	24	0	0	0	0	0	0	0	0	0
Water Truck	2	1	1	1									
Delivery Truck	2												
1 Ton Truck	2	1	1	1									
Misc. MD Truck	5												
Total Medium Truck Miles		4	4	4	0	0	0	0	0	0	0	0	0
Truck, Dump Ford LT8000	2												
Concrete Truck	2												
Semi-Tractor, Diesel 20 Ton	2												
Misc. HD Truck	2												
Total Heavy Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.0000656	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0001691	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0007107	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.0009223	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0011932	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0298546	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.0013112	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0020527	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0068365	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.0000086	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000209	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000259	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty Exhaust	0.0000919	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0001873	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0001470	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Duty Fugitive(2)	0.000230	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Fugitve(2)	0.000515	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive(2)	0.002314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_{2EQ}	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.886	21.27	21.27	21.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	2.177	8.71	8.71	8.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	3.720	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		29.98	29.98	29.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,

and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

Appendix B-1
Tesoro Integration and Compliance Project

Offsite Mitigated Construction Vehicle Trip Emissions

Vehicle	Miles per Day	1	2	3	4	5	6	7	8	9	10	11	12
		Month (Vehicles per day)											
Tradesmen	29.4	0	0	0	0	0	298	298	298	396	479	523	523
Construction Staff	29.4						40	40	40	40	40	40	40
Total Light Vehicle Miles		0	0	0	0	0	9937.2	9937.2	9937.2	12818.4	15258.6	16552.2	16552.2
Water Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Delivery Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Misc. MD Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0
Truck, Dump Ford LT8000	40	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Dump Trucks	400	0	0	0	0	0	21	15	15	15	6	6	6
Non-Haz Dump Trucks	200	0	0	0	0	0	11	13	12	12	18	18	18
Misc. HD Truck	40	0	0	0	0	0	47	27	19	19	30	25	25
Total Heavy Truck Miles		0	0	0	0	0	12480	9680	9160	9160	7200	7000	7000
							496	448	430	528	627	661	661

	Emission Rate (lb/mi)[1]	Month (lb/day)											
VOC	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0000611	0.00	0.00	0.00	0.00	0.00	0.61	0.61	0.61	0.78	0.93	1.01	1.01
Medium Duty	0.0002576	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0005111	0.00	0.00	0.00	0.00	0.00	6.38	4.95	4.68	4.68	3.68	3.58	3.58
Total		0.00	0.00	0.00	0.00	0.00	6.99	5.55	5.29	5.47	4.61	4.59	4.59

CO	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0021819	0.00	0.00	0.00	0.00	0.00	21.68	21.68	21.68	27.97	33.29	36.11	36.11
Medium Duty	0.0018541	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0039926	0.00	0.00	0.00	0.00	0.00	49.83	38.65	36.57	36.57	28.75	27.95	27.95
Total		0.00	0.00	0.00	0.00	0.00	71.51	60.33	58.25	64.54	62.04	64.06	64.06

NOx	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0003153	0.00	0.00	0.00	0.00	0.00	3.13	3.13	3.13	4.04	4.81	5.22	5.22
Medium Duty	0.0049148	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0097764	0.00	0.00	0.00	0.00	0.00	122.01	94.64	89.55	89.55	70.39	68.43	68.43
Total		0.00	0.00	0.00	0.00	0.00	125.14	97.77	92.69	93.59	75.20	73.65	73.65

SOx	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0000089	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.09	0.11	0.14	0.15	0.15
Medium Duty	0.0000216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000355	0.00	0.00	0.00	0.00	0.00	0.44	0.34	0.33	0.33	0.26	0.25	0.25
Total		0.00	0.00	0.00	0.00	0.00	0.53	0.43	0.41	0.44	0.39	0.40	0.40

PM10	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty Exhaust	0.0000546	0.00	0.00	0.00	0.00	0.00	0.54	0.54	0.54	0.70	0.83	0.90	0.90
Medium Duty Exhaust	0.0002713	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0003135	0.00	0.00	0.00	0.00	0.00	3.91	3.03	2.87	2.87	2.26	2.19	2.19
Total Exhaust PM		0.00	0.00	0.00	0.00	0.00	4.46	3.58	3.41	3.57	3.09	3.10	3.10
Light Duty Fugitive[2]	0.000221	0.00	0.00	0.00	0.00	0.00	2.20	2.20	2.20	2.83	3.37	3.66	3.66
Medium Duty Fugitve[2]	0.000467	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive[2]	0.002314	0.00	0.00	0.00	0.00	0.00	28.88	22.40	21.20	21.20	16.66	16.20	16.20
Total Fugitive PM		0.00	0.00	0.00	0.00	0.00	31.08	24.60	23.40	24.03	20.04	19.86	19.86
Total		0.00	0.00	0.00	0.00	0.00	35.53	28.18	26.81	27.60	23.13	22.96	22.96

CO_{2EQ}	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.901	0.00	0.00	0.00	0.00	0.00	8954.86	8954.86	8954.86	11551.24	13750.22	14915.94	14915.94
Medium Duty	2.255	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	3.724	0.00	0.00	0.00	0.00	0.00	46474.65	36047.65	34111.20	34111.20	26812.30	26067.51	26067.51
Total		0.00	0.00	0.00	0.00	0.00	55429.51	45002.51	43066.07	45662.45	40562.52	40983.45	40983.45

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks, and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_{2E}) = $CO_2 + CH_4 * 21 + N2O*310$

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Offsite Trips 2016

Appendix B-1
Tesoro Integration and Compliance Project

Offsite Mitigated Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day) 13	14	15	16	17	18	19	20	21	22	23	24
Tradesmen	29.4	576	603	539	546	525	621	622	656	586	453	453	392
Construction Staff	29.4	40	40	40	40	40	40	40	40	40	40	40	40
Total Light Vehicle Miles		18110.4	18904.2	17022.6	17228.4	16611	19433.4	19462.8	20462.4	18404.4	14494.2	14494.2	12700.8
Water Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Delivery Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Misc. MD Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0
Truck, Dump Ford LT8000	40	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Dump Trucks	400	9	9	9	9	9	9	4	4	4	1	1	1
Non-Haz Dump Trucks	200	20	20	20	20	20	20	10	10	10	6	6	6
Misc. HD Truck	40	38	36	36	44	44	44	47	47	47	62	62	62
Total Heavy Truck Miles		9120	9040	9040	9360	9360	9360	5480	5480	5480	4080	4080	4080
		750	773	709	732	711	807	784	818	748	631	631	570

	Emission Rate (lb/mi)[1]	Month (lb/day)											
VOC	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Light Duty	0.0000614	1.11	1.16	1.04	1.06	1.02	1.19	1.19	1.26	1.13	0.89	0.89	0.78
Medium Duty	0.0002584	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0005136	4.68	4.64	4.64	4.81	4.81	4.81	2.81	2.81	2.81	2.10	2.10	2.10
Total		5.80	5.80	5.69	5.87	5.83	6.00	4.01	4.07	3.94	2.99	2.99	2.88

CO	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty	0.0021982	39.81	41.55	37.42	37.87	36.51	42.72	42.78	44.98	40.46	31.86	31.86	27.92
Medium Duty	0.0018571	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0039454	35.98	35.67	35.67	36.93	36.93	36.93	21.62	21.62	21.62	16.10	16.10	16.10
Total		75.79	77.22	73.09	74.80	73.44	79.65	64.40	66.60	62.08	47.96	47.96	44.02

NOx	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty	0.0003168	5.74	5.99	5.39	5.46	5.26	6.16	6.17	6.48	5.83	4.59	4.59	4.02
Medium Duty	0.0049198	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0097959	89.34	88.56	88.56	91.69	91.69	91.69	53.68	53.68	53.68	39.97	39.97	39.97
Total		95.08	94.54	93.95	97.15	96.95	97.85	59.85	60.17	59.51	44.56	44.56	43.99

SOx	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty	0.0000089	0.16	0.17	0.15	0.15	0.15	0.17	0.17	0.18	0.16	0.13	0.13	0.11
Medium Duty	0.0000216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000356	0.32	0.32	0.32	0.33	0.33	0.33	0.19	0.19	0.19	0.15	0.15	0.15
Total		0.49	0.49	0.47	0.49	0.48	0.51	0.37	0.38	0.36	0.27	0.27	0.26

PM10	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty Exhaust	0.0000548	0.99	1.04	0.93	0.94	0.91	1.06	1.07	1.12	1.01	0.79	0.79	0.70
Medium Duty Exhaust	0.0002718	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0003153	2.88	2.85	2.85	2.95	2.95	2.95	1.73	1.73	1.73	1.29	1.29	1.29
Total Exhaust PM		3.87	3.89	3.78	3.90	3.86	4.02	2.79	2.85	2.74	2.08	2.08	1.98
Light Duty Fugitive[2]	0.000221	4.00	4.18	3.76	3.81	3.67	4.30	4.30	4.52	4.07	3.20	3.20	2.81
Medium Duty Fugitve[2]	0.000467	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive[2]	0.002314	21.11	20.92	20.92	21.66	21.66	21.66	12.68	12.68	12.68	9.44	9.44	9.44
Total Fugitive PM		25.11	25.10	24.68	25.47	25.33	25.96	16.98	17.20	16.75	12.65	12.65	12.25
Total		28.98	28.99	28.47	29.37	29.19	29.97	19.78	20.05	19.49	14.73	14.73	14.23

CO_{2EQ}	2017	13	14	15	16	17	18	19	20	21	22	23	24
Light Duty	0.902	16329.23	17044.96	15348.41	15533.97	14977.30	17522.11	17548.62	18449.91	16594.31	13068.68	13068.68	11451.67
Medium Duty	2.256	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	3.728	33997.37	33699.15	33699.15	34892.04	34892.04	34892.04	20428.24	20428.24	20428.24	15209.35	15209.35	15209.35
Total		50326.60	50744.10	49047.56	50426.01	49869.33	52414.15	37976.86	38878.15	37022.56	28278.03	28278.03	26661.02

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks, and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_{2E}) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Offsite Trips 2017

Appendix B-1
Tesoro Integration and Compliance Project

Offsite Mitigated Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day) 25	26	27	28	29	30	31	32	33	34	35	36
Tradesmen	29.4	569	569	512	512	512	249	249	208	208	208	208	114
Construction Staff	29.4	40	40	40	40	40	40	40	40	40	40	40	40
Total Light Vehicle Miles		17904.6	17904.6	16228.8	16228.8	16228.8	8496.6	8496.6	7291.2	7291.2	7291.2	7291.2	4527.6
Water Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Delivery Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Misc. MD Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0
Truck, Dump Ford LT8000	40	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Dump Trucks	400	1	1	1	2	2	2	1	1	1	0	0	0
Non-Haz Dump Trucks	200	4	4	4	1	1	1	1	1	1	1	1	1
Misc. HD Truck	40	66	62	62	55	55	55	10	10	10	7	7	7
Total Heavy Truck Miles		3840	3680	3680	3200	3200	3200	1000	1000	1000	480	480	480
		751	743	686	668	668	405	313	272	272	264	264	170

	Emission Rate (lb/mi)[1]	Month (lb/day)											
VOC	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Light Duty	0.0000417	0.75	0.75	0.68	0.68	0.68	0.35	0.35	0.30	0.30	0.30	0.30	0.19
Medium Duty	0.0002047	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0004755	1.83	1.75	1.75	1.52	1.52	1.52	0.48	0.48	0.48	0.23	0.23	0.23
Total		2.57	2.50	2.43	2.20	2.20	1.88	0.83	0.78	0.78	0.53	0.53	0.42

CO	2018	25	26	27	28	29	30	31	32	33	34	35	36
Light Duty	0.0017671	31.64	31.64	28.68	28.68	28.68	15.01	15.01	12.88	12.88	12.88	12.88	8.00
Medium Duty	0.0013302	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0036653	14.07	13.49	13.49	11.73	11.73	11.73	3.67	3.67	3.67	1.76	1.76	1.76
Total		45.71	45.13	42.17	40.41	40.41	26.74	18.68	16.55	16.55	14.64	14.64	9.76

NOx	2018	25	26	27	28	29	30	31	32	33	34	35	36
Light Duty	0.0002582	4.62	4.62	4.19	4.19	4.19	2.19	2.19	1.88	1.88	1.88	1.88	1.17
Medium Duty	0.0034725	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0078275	30.06	28.81	28.81	25.05	25.05	25.05	7.83	7.83	7.83	3.76	3.76	3.76
Total		34.68	33.43	33.00	29.24	29.24	27.24	10.02	9.71	9.71	5.64	5.64	4.93

SOx	2018	25	26	27	28	29	30	31	32	33	34	35	36
Light Duty	0.0000089	0.16	0.16	0.14	0.14	0.14	0.08	0.08	0.07	0.07	0.07	0.07	0.04
Medium Duty	0.0000216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000355	0.14	0.13	0.13	0.11	0.11	0.11	0.04	0.04	0.04	0.02	0.02	0.02
Total		0.30	0.29	0.28	0.26	0.26	0.19	0.11	0.10	0.10	0.08	0.08	0.06

PM10	2018	25	26	27	28	29	30	31	32	33	34	35	36
Light Duty Exhaust	0.0000546	0.98	0.98	0.89	0.89	0.89	0.46	0.46	0.40	0.40	0.40	0.40	0.25
Medium Duty Exhaust	0.0002379	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0002813	1.08	1.04	1.04	0.90	0.90	0.90	0.28	0.28	0.28	0.14	0.14	0.14
Total Exhaust PM		2.06	2.01	1.92	1.79	1.79	1.36	0.75	0.68	0.68	0.53	0.53	0.38
Light Duty Fugitive[2]	0.000221	3.96	3.96	3.59	3.59	3.59	1.88	1.88	1.61	1.61	1.61	1.61	1.00
Medium Duty Fugitve[2]	0.000467	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive[2]	0.002314	8.89	8.52	8.52	7.41	7.41	7.41	2.31	2.31	2.31	1.11	1.11	1.11
Total Fugitive PM		12.84	12.47	12.10	10.99	10.99	9.28	4.19	3.93	3.93	2.72	2.72	2.11
Total		14.90	14.49	14.03	12.78	12.78	10.65	4.94	4.61	4.61	3.26	3.26	2.49

CO_{2EQ}	2018	25	26	27	28	29	30	31	32	33	34	35	36
Light Duty	0.903	16160.75	16160.75	14648.17	14648.17	14648.17	7669.06	7669.06	6581.06	6581.06	6581.06	6581.06	4086.63
Medium Duty	2.254	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	3.726	14306.70	13710.59	13710.59	11922.25	11922.25	11922.25	3725.70	3725.70	3725.70	1788.34	1788.34	1788.34
Total		30467.45	29871.33	28358.75	26570.41	26570.41	19591.31	11394.76	10306.76	10306.76	8369.40	8369.40	5874.96

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,

and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

M:\MC\2844 Tesoro - Synergy\Construction2844 - 0-2 - Total Mitigated Construction Emissions (50) + Operational Mitigation.xlsx: Offsite Trips 2018

Appendix B-1
Tesoro Integration and Compliance Project

Offsite Mitigated Construction Vehicle Trip Emissions

		Month (Vehicles per day)											
Vehicle	**Miles per Day**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Tradesmen	29.4	58	58	58	58	58	58	58	58	58	58	58	58
Construction Staff	29.4	40	40	40	40	40	40	40	40	40	40	40	40
Total Light Vehicle Miles		2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2
Water Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Delivery Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
1 Ton Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Misc. MD Truck	40	0	0	0	0	0	0	0	0	0	0	0	0
Total Medium Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0
Truck, Dump Ford LT8000	40	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Dump Trucks	400	0	0	0	0	0	0	0	0	0	0	0	0
Non-Haz Dump Trucks	200	0	0	0	0	0	0	0	0	0	0	0	0
Misc. HD Truck	40	5	5	5	5	5	5	5	5	5	5	5	5
Total Heavy Truck Miles		200	200	200	200	200	200	200	200	200	200	200	200

	Emission Rate (lb/mi)[1]	Month (lb/day)											
VOC	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0000374	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Medium Duty	0.0001917	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0004702	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Total		0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
CO	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0016716	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Medium Duty	0.0012121	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0036071	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Total		5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54
NOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0002446	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Medium Duty	0.0031210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0074303	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
Total		2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19
SOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.0000089	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Medium Duty	0.0000215	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000354	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total		0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
PM10	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty Exhaust	0.0000547	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Medium Duty Exhaust	0.0002301	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0002824	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Total Exhaust PM		0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Light Duty Fugitive[2]	0.000221	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Medium Duty Fugitve[2]	0.000467	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive[2]	0.002314	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Total Fugitive PM		1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Total		1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31
CO_{2EQ}	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Light Duty	0.9013893	2597.08	2597.08	2597.08	2597.08	2597.08	2597.08	2597.08	2597.08	2597.08	2597.08	2597.08	2597.08
Medium Duty	2.246	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	3.715	743.05	743.05	743.05	743.05	743.05	743.05	743.05	743.05	743.05	743.05	743.05	743.05
Total		3340.14	3340.14	3340.14	3340.14	3340.14	3340.14	3340.14	3340.14	3340.14	3340.14	3340.14	3340.14

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} x (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks, and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

Appendix B-1
Tesoro Integration and Compliance Project

Offsite Mitigated Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Month (Vehicles per day)											
		49	50	51	52	53	54	55	56	57	58	59	60
Tradesmen	29.4	58	58	58	58	58	58	58	58	58	58	58	58
Construction Staff	29.4	40	40	40	40	40	40	40	40	40	40	40	40
Total Light Vehicle Miles		2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2	2881.2
Water Truck	40	1	1	1	1	1	1	1	1	1	1	1	1
Delivery Truck	40												
1 Ton Truck	40												
Misc. MD Truck	40												
Total Medium Truck Miles		40	40	40	40	40	40	40	40	40	40	40	40
Truck, Dump Ford LT8000	40	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Dump Trucks	400	0	0	0	0	0	0	0	0	0	0	0	0
Non-Haz Dump Trucks	200	0	0	0	0	0	0	0	0	0	0	0	0
Misc. HD Truck	40	5	5	5	5	5	5	5	5	5	5	5	5
Total Heavy Truck Miles		200	200	200	200	200	200	200	200	200	200	200	200

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0000678	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Medium Duty	0.0001773	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty	0.0007303	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Total		0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
CO	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0009190	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
Medium Duty	0.0012979	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Heavy Duty	0.0300122	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Total		8.70	8.70	8.70	8.70	8.70	8.70	8.70	8.70	8.70	8.70	8.70	8.70
NOx	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0013865	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99
Medium Duty	0.0024624	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Heavy Duty	0.0069447	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39
Total		5.48	5.48	5.48	5.48	5.48	5.48	5.48	5.48	5.48	5.48	5.48	5.48
SOx	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.0000085	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Medium Duty	0.0000209	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000259	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total		0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
PM10	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty Exhaust	0.0000927	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Medium Duty Exhaust	0.0001978	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty Exhaust	0.0001468	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Total Exhaust PM		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Light Duty Fugitive(2)	0.000221	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Medium Duty Fugitve(2)	0.000467	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Heavy Duty Fugitive(2)	0.002314	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Total Fugitive PM		1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
Total		1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42
CO_{2EQ}	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Light Duty	0.885	2548.56	2548.56	2548.56	2548.56	2548.56	2548.56	2548.56	2548.56	2548.56	2548.56	2548.56	2548.56
Medium Duty	2.177	87.07	87.07	87.07	87.07	87.07	87.07	87.07	87.07	87.07	87.07	87.07	87.07
Heavy Duty	3.716	743.27	743.27	743.27	743.27	743.27	743.27	743.27	743.27	743.27	743.27	743.27	743.27
Total		3378.90	3378.90	3378.90	3378.90	3378.90	3378.90	3378.90	3378.90	3378.90	3378.90	3378.90	3378.90

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,

and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

Appendix B-1
Tesoro Integration and Compliance Project

Offsite Mitigated Construction Vehicle Trip Emissions

		Month (Vehicles per day)											
Vehicle	**Miles per Day**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Tradesmen	29.4	58	58	58									
Construction Staff	29.4	40	40	40									
Total Light Vehicle Miles		2881.2	2881.2	2881.2	0	0	0	0	0	0	0	0	0
Water Truck	40	0	0	0									
Delivery Truck	40	0	0	0									
1 Ton Truck	40	0	0	0									
Misc. MD Truck	40	0	0	0									
Total Medium Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0
Truck, Dump Ford LT8000	40	0	0	0									
Hazardous Dump Trucks	400	0	0	0									
Non-Haz Dump Trucks	200	0	0	0									
Misc. HD Truck	40	5	5	5									
Total Heavy Truck Miles		200	200	200	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)(1)	Month (lb/day)											
VOC	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.0000656	0.19	0.19	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0001691	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0007107	0.14	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.33	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.0009223	2.66	2.66	2.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0011932	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0298546	5.97	5.97	5.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		8.63	8.63	8.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.0013112	3.78	3.78	3.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0020527	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0068365	1.37	1.37	1.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		5.15	5.15	5.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.0000086	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000209	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000259	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty Exhaust	0.0000919	0.26	0.26	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0001873	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0001470	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.29	0.29	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Duty Fugitive(2)	0.000230	0.66	0.66	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Fugitve(2)	0.000515	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive(2)	0.002314	0.46	0.46	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		1.13	1.13	1.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		1.42	1.42	1.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_{2EQ}	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
Light Duty	0.886	2553.38	2553.38	2553.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	2.177	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	3.720	743.97	743.97	743.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		3297.35	3297.35	3297.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks,

and 24 for heavy trucks)

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

Appendix B-1
Tesoro Integration and Compliance Project

Offroad Mitigated Construction Vehicle Dust Emissions

Vehicle	Miles/Trip	Trips/Day
Light Vehicles	0.05	10
Total Light Vehicle Miles		0.5
Delivey Trucks	0.05	0
Water Trucks	0.1	10
Total Medium Truck Miles		1
Concrete Truck	0.05	0
Dump Trucks	0.05	40
Total Heavy Truck Miles		2
Tractors	0.05	13
Fork Lifts	0.05	10
Loader/Backhoe	0.05	6
Total Heavy-Heavy Duty Miles		1.45

PM10	Emission Rate (lb/mi)(1)	Emissions (lb/day)
Light Duty	0.9021196	0.45
Medium Duty	1.2863357	1.29
Heavy Duty	2.1931267	4.39
Heavy Heavy Duty	2.4962390	3.62
Uncontrolled Total		9.74
Controlled Total(2)		3.80

(1) Based on Section 13.2.2 of EPA's Compilation of Air Pollutant Emission Factors (AP-42).
Emission Rate = 1.5((s/12)^.9)*((W/3)^.45)
s = silt content = 8.5%
W = Vehicle Weight (ton) =2.5 for light, 5.5 for medium, 15 for heavy,
and 24 for heavy heavy (EMFAC2007).

(2) Controlled Emissions assume that watering 3 times per day reduces emissions by 61 percent (Uncontrolled Emissions x 0.39)

Appendix B-1
Tesoro Integration and Compliance Project
Mitigated Construction
Paint Emissions

Month	6	7	8	9	10	11	12	13	14	25	26	27	43	44	45
Volume paint applied per day (gal)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	75.0	75.0	75.0	75.0	75.0	75.0
VOC content (lb/gal)[(1)]	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
VOC Emissions (lb/day)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	62.3	62.3	62.3	62.3	62.3	62.3

(1) Based on SCAQMD Rule 1113 VOC limit of 100g/L for industrial maintenance coatings.

Appendix B-1
Tesoro Integration and Compliance Project

Peak Monthly Fugitive PM Mitigated Construction Emissions

Grading Operations	Average Pieces of Equipment Operating	Peak Pieces of Equipment Operating	Hours of Operation	PM10 Emission Factor (lb/hour)	Water Control Factor(5)	Controlled Emissions Average PM10 Emissions (lbs/day)	Controlled Emissions Peak PM10 Emissions (lbs/day)	Uncontrolled Emissions Average PM10 Emissions (lbs/day)	Uncontrolled Emissions Peak PM10 Emissions (lbs/day)	SCAQMD Emission Factor Source
Construction Activities(1)	2	2	8	0.348	0.39	2.17	2.17	5.56218435	5.56218435	Table A9-9-F

Stockpiles	Average Tons of Materials Handled Per Day	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor(5)	Controlled Emissions Average PM10 Emissions Pounds/day	Controlled Emissions Peak PM10 Emissions Pounds/day	Uncontrolled Emissions Average PM10 Emissions Pounds/day	Uncontrolled Emissions Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Construction Activities(2)	1200	1200	0.00005	0.39	0.02411771	0.02411771	0.06184029	0.06184029	Table A9-9-G

Assumptions: 1cubic yard trench spoils = 1 ton

WIND EROSION Disturbed Area and Temporary Stockpiles	Days of Construction	Average Acreage Disturbed Per Day	Peak Acreage Disturbed Per Day	PM10 Emission Factor (lb/day/acre)	Average PM10 Emissions Pounds/day	Peak PM10 Emissions Pounds/day	Average PM10 Emissions Tons/Year	Peak PM10 Emissions Tons/Year	SCAQMD Emission Factor Source
Construction Activities(3)	20	1	1	0.120	0.120	0.120	0.001	0.001	Table A9-9-E

Filling and Dumping	Estimated Materials Handled Per Day (tons)	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor(5)	Controlled Emissions Average PM10 Emissions Pounds/day	Controlled Emissions Peak PM10 Emissions Pounds/day	Uncontrolled Emissions Average PM10 Emissions Pounds/day	Uncontrolled Emissions Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Truck Filling(4)	1200.0	1200.0	5.15E-05	0.39	0.02411771	0.02411771	0.06184029	0.06184029	Table A9-9
Truck Dumping	1200.0	1200.0	5.15E-05	0.39	0.02411771	0.02411771	0.06184029	0.06184029	Table A9-9

TOTAL PM10 Pounds/day	Average	Peak
(Controlled Emissions)	2.3613	2.36133
(Uncontrolled Emissions)	5.749	5.749

(1) Emissions (lbs/hr) = $[0.75 \times (G^{1.5})/(H^{1.4}) \times J$
where G = silt content (7.5%), H = moisture content (15.0%) and J = hrs of operation (EPA AP-42 Table 11.9-1 for bulldozing overburden).

(2) Emissions (lbs/ton) = $0.00112 \times [(G/5)^{1.3}/(H/2)^{1.4}] \times I/J$
where G=mean wind speed (4.1 mph), H=moisture content of surface material (15%); I=lbs of dirt handled per day; and J=2,000 lbs/ton. Wind speed data acquired from Long Beach 2005-2007 SCAQMD meteorological file.

(3) Emissions (lbs/day/acre) = $1.7 \times [(G/1.5)*(365-H)/235] \times I/15 \times J$
where G = silt content (7.5%); H = days with >0.01 inch of rain (34); I = percentage of time wind speed exceeds 12 mph (0.3%) and J= fraction of TSP (0.5). Wind speed data acquired from Long Beach 2005-2007 SCAQMD meteorological file.

(4) Used SCAQMD Table 9-9 Default emission factors.

(5) Mitigated Emissions assume that watering 3 times per day controls emissions by 61 percent (Uncontrolled Emissions x 0.39). www.AQMD.gov/CEQA/handbook/mitigation/fugitive/Table XI-A.doc

Appendix B-1
Tesoro Integration and Compliance Project
Total Project Component
Mitigated Crude Tank Construction Emission Summary

	Year 1												Year 2												Year 3											
Emissions from Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.38	5.07	5.83	6.02	2.54	2.84	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.31	1.58	1.58	1.70	1.41	2.14	2.44	2.44	2.74	2.61	2.61	2.61
CO (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.28	43.47	48.76	53.92	25.85	27.08	25.88	25.88	25.88	25.88	25.88	25.88	25.88	22.56	22.56	17.55	12.90	12.90	15.52	12.70	18.10	21.99	21.99	23.39	22.19	22.19	22.19
NOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.32	39.58	44.04	45.68	18.53	19.46	18.80	18.80	18.80	18.80	18.80	18.80	18.80	14.57	14.57	12.12	9.39	9.39	11.38	9.17	12.81	16.53	16.53	17.35	16.74	16.74	16.74
SOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.13	0.15	0.17	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.07	0.05	0.05	0.06	0.04	0.07	0.08	0.08	0.09	0.09	0.09	0.09
PM10 (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	1.92	2.08	2.21	0.97	0.99	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.74	0.74	0.61	0.46	0.46	0.55	0.48	0.61	0.83	0.83	0.85	0.80	0.80	0.80
PM2.5 (lb/day)(1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.98	1.90	2.06	2.19	0.96	0.98	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.73	0.73	0.60	0.45	0.45	0.54	0.48	0.60	0.82	0.82	0.84	0.80	0.80	0.80
CO_2 (MT/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.38	3.07	3.63	3.98	1.98	2.16	2.09	2.09	2.09	2.09	2.09	2.09	2.09	1.81	1.81	1.63	1.18	1.18	1.37	1.07	1.63	1.98	1.98	2.16	2.09	2.09	2.09

	Year 1												Year 2												Year 3											
Offroad Fugitive PM - Peak	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
PM10 (lb/day)(2)										4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22
PM2.5 (lb/day)(1)(2)						0.00	0.00	0.00	0.00	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89

		Year 1												Year 2												Year 3											
Total Emissions	**Thresholds**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
VOC (lb/day)	75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.38	5.07	5.83	6.02	2.54	2.84	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.31	1.58	1.58	1.70	1.41	2.14	2.44	2.44	2.74	2.61	2.61	2.61
CO (lb/day)	550	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.28	43.47	48.76	53.92	25.85	27.08	25.88	25.88	25.88	25.88	25.88	25.88	25.88	22.56	22.56	17.55	12.90	12.90	15.52	12.70	18.10	21.99	21.99	23.39	22.19	22.19	22.19
NOx (lb/day)	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.32	39.58	44.04	45.68	18.53	19.46	18.80	18.80	18.80	18.80	18.80	18.80	18.80	14.57	14.57	12.12	9.39	9.39	11.38	9.17	12.81	16.53	16.53	17.35	16.74	16.74	16.74
SOx (lb/day)	150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.13	0.15	0.17	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.07	0.05	0.05	0.06	0.04	0.07	0.08	0.08	0.09	0.09	0.09	0.09
PM10 (lb/day)(2)	150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.22	6.14	6.31	6.43	5.19	5.22	5.17	5.17	5.17	5.17	5.17	5.17	5.17	4.96	4.96	4.83	4.68	4.68	4.77	4.71	4.83	5.05	5.05	5.07	5.03	5.03	5.03
PM2.5 (lb/day)(1)(2)	55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.87	2.79	2.95	3.07	1.84	1.87	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.62	1.62	1.49	1.34	1.34	1.43	1.36	1.49	1.71	1.71	1.73	1.68	1.68	1.68
CO_2 (tonnes/day)	NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.38	3.07	3.63	3.98	1.98	2.16	2.09	2.09	2.09	2.09	2.09	2.09	2.09	1.81	1.81	1.63	1.18	1.18	1.37	1.07	1.63	1.98	1.98	2.16	2.09	2.09	2.09
CO_2 (tonnes/yr)	NA												226.98												594.24												460.26

	Year 4												Year 5												Year 6											
Emissions from Equipment	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
VOC (lb/day)	2.57	2.57	2.57	2.57	2.57	2.57	2.27	1.55	1.55	1.67	1.38	2.10	2.39	2.39	2.69	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.22	1.53	1.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	21.94	21.94	21.94	21.94	18.75	18.75	17.38	12.74	12.74	15.38	12.56	17.93	23.00	23.00	24.36	23.18	23.18	23.18	23.18	23.18	23.18	23.18	20.05	20.05	18.52	13.92	13.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	15.52	15.52	15.52	15.52	12.03	12.03	11.25	8.73	8.73	10.56	8.51	11.91	14.51	14.51	15.25	14.71	14.71	14.71	14.71	14.71	14.71	14.71	11.47	11.47	9.99	7.80	7.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	0.09	0.09	0.09	0.09	0.08	0.08	0.07	0.05	0.05	0.06	0.04	0.07	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.07	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	0.72	0.72	0.72	0.72	0.56	0.56	0.54	0.41	0.41	0.50	0.44	0.55	0.69	0.69	0.70	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.51	0.51	0.45	0.35	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)(1)	0.71	0.71	0.71	0.71	0.55	0.55	0.54	0.41	0.41	0.49	0.43	0.55	0.68	0.68	0.70	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.51	0.51	0.45	0.34	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (MT/day)	2.09	2.09	2.09	2.09	1.81	1.81	1.63	1.18	1.18	1.37	1.07	1.62	2.00	2.00	2.19	2.12	2.12	2.12	2.12	2.12	2.12	2.12	1.84	1.84	1.65	1.21	1.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 4												Year 5												Year 6											
Offroad Fugitive PM - Peak	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
PM10 (lb/day)(2)	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22	4.22									
PM2.5 (lb/day)(1)(2)	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89									

		Year 4												Year 5												Year 6											
Total Emissions	**Thresholds**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
VOC (lb/day)	75	2.57	2.57	2.57	2.57	2.57	2.57	2.27	1.55	1.55	1.67	1.38	2.10	2.39	2.39	2.69	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.22	1.53	1.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	550	21.94	21.94	21.94	21.94	18.75	18.75	17.38	12.74	12.74	15.38	12.56	17.93	23.00	23.00	24.36	23.18	23.18	23.18	23.18	23.18	23.18	23.18	20.05	20.05	18.52	13.92	13.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	100	15.52	15.52	15.52	15.52	12.03	12.03	11.25	8.73	8.73	10.56	8.51	11.91	14.51	14.51	15.25	14.71	14.71	14.71	14.71	14.71	14.71	14.71	11.47	11.47	9.99	7.80	7.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	150	0.09	0.09	0.09	0.09	0.08	0.08	0.07	0.05	0.05	0.06	0.04	0.07	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.07	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)(2)	150	4.94	4.94	4.94	4.94	4.78	4.78	4.77	4.63	4.63	4.72	4.66	4.78	4.91	4.91	4.93	4.89	4.89	4.89	4.89	4.89	4.89	4.89	4.74	4.74	4.67	4.57	4.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)(1)(2)	55	1.60	1.60	1.60	1.60	1.44	1.44	1.42	1.29	1.29	1.38	1.32	1.44	1.57	1.57	1.58	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.40	1.40	1.33	1.23	1.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (tonnes/day)	NA	2.09	2.09	2.09	2.09	1.81	1.81	1.63	1.18	1.18	1.37	1.07	1.62	2.00	2.00	2.19	2.12	2.12	2.12	2.12	2.12	2.12	2.12	1.84	1.84	1.65	1.21	1.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (tonnes/yr)	NA												451.29												555.61												91.49
30yr amortized CO_2 (tonnes/yr)	NA																																				79.33

(1) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_5ratio.xls

(2) Mitigated PM.

M:\MC\2778 P66 - Crude Capacity Project\2844 - Carson Tank Mitigated Construction Emissions (50).xlsx: Total Emissions 2/8/2016

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Appendix B-1
Tesoro Integration and Compliance Project

Unmitigated Crude Tank Construction Equipment Emission Rates

		2016 Emission Factors lb/hr[1]					
Equipment Type	**Hp**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**CO2e[2]**
<40 T Cranes	Composite	0.07023	0.4263	0.97905	0.00147	0.04659	0.03534
>40T Cranes	500	0.07815	0.4431	1.20587	0.00213	0.04978	0.05136
Pile/Drill Rig	Composite	0.04246	0.5016	0.72299	0.00244	0.02698	0.05882
Tractors	Composite	0.03268	0.3689	0.38566	0.00080	0.02590	0.01922
Welders	50	0.03684	0.2483	0.19141	0.00039	0.01712	0.00938
Light Plants	50	0.03684	0.3134	0.19141	0.00039	0.01712	0.00938
Genertors	120	0.04342	0.4767	0.47247	0.00074	0.03702	0.01795
Hydro Vacs/Pumps	120	0.04342	0.4842	0.47247	0.00074	0.03702	0.01795
Fork Lifts	Composite	0.02152	0.4549	0.33240	0.00089	0.01769	0.02146
Loader/Backhoe	Composite	0.03268	0.3689	0.38566	0.00080	0.02590	0.01922
Air Compressors	50	0.03684	0.2281	0.19141	0.00039	0.01712	0.00938
Manlifts	Composite	0.00659	0.1592	0.12905	0.00044	0.00466	0.01066
Crawler Tractors	Composite	0.08267	0.5549	1.17033	0.00201	0.05691	0.04842
Scrapers	Composite	0.14749	0.9053	2.23679	0.00390	0.09265	0.094
Rubber Tired Loaders	Composite	0.06226	0.4557	0.83657	0.00161	0.03834	0.03869
Graders	Composite	0.07501	0.5883	1.05709	0.00170	0.04714	0.04104
Rollers	Composite	0.03401	0.3944	0.33113	0.00068	0.02159	0.01636
Excavators	Composite	0.03425	0.5213	0.47432	0.00133	0.02074	0.03212

		2017 Emission Factors lb/hr[1]					
Equipment Type	**Hp**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**CO2e[2]**
<40 T Cranes	Composite	0.06537	0.4152	0.90923	0.00147	0.04291	0.03535
>40T Cranes	500	0.07236	0.4243	1.11689	0.00213	0.04535	0.05139
Pile/Drill Rig	Composite	0.04029	0.5013	0.67483	0.00244	0.02483	0.05882
Tractors	Composite	0.03046	0.3666	0.35832	0.00080	0.02366	0.0192
Welders	50	0.03579	0.2408	0.18867	0.00039	0.01662	0.00938
Light Plants	50	0.03579	0.3047	0.18867	0.00039	0.01662	0.00938
Genertors	120	0.04173	0.4728	0.45336	0.00074	0.03547	0.01794
Hydro Vacs/Pumps	120	0.04173	0.4802	0.45336	0.00074	0.03547	0.01794
Fork Lifts	Composite	0.01948	0.4522	0.29726	0.00089	0.01519	0.02146
Loader/Backhoe	Composite	0.03046	0.3666	0.35832	0.00080	0.02366	0.0192
Air Compressors	50	0.03579	0.2209	0.18867	0.00039	0.01662	0.00938
Manlifts	Composite	0.00586	0.1548	0.11635	0.00044	0.00353	0.01066
Crawler Tractors	Composite	0.08013	0.5464	1.12114	0.00201	0.05470	0.04843
Scrapers	Composite	0.13882	0.8713	2.07961	0.00390	0.08569	0.094
Rubber Tired Loaders	Composite	0.05859	0.4510	0.77443	0.00161	0.03545	0.03869
Graders	Composite	0.07261	0.5844	1.01224	0.00170	0.04497	0.04101
Rollers	Composite	0.03177	0.3913	0.30830	0.00068	0.01994	0.01635
Excavators	Composite	0.03202	0.5184	0.42996	0.00133	0.01874	0.03212

		2018 Emission Factors lb/hr[1]					
Equipment Type	**Hp**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**CO2e[2]**
<40 T Cranes	Composite	0.05782	0.4060	0.80171	0.00147	0.03738	0.03536
>40T Cranes	500	0.06523	0.4085	0.98933	0.00213	0.03992	0.05142
Pile/Drill Rig	Composite	0.03501	0.5011	0.56864	0.00243	0.02055	0.05865
Tractors	Composite	0.02557	0.3647	0.30639	0.00080	0.01923	0.01917
Welders	50	0.03361	0.2339	0.18349	0.00039	0.01563	0.00938
Light Plants	50	0.03361	0.2966	0.18349	0.00039	0.01563	0.00938
Genertors	120	0.03690	0.4694	0.40643	0.00075	0.03112	0.01796
Hydro Vacs/Pumps	120	0.03690	0.4767	0.40643	0.00075	0.03112	0.01796
Fork Lifts	Composite	0.01616	0.2173	0.24736	0.00089	0.01150	0.02146
Loader/Backhoe	Composite	0.02557	0.3647	0.30639	0.00080	0.01923	0.01917
Air Compressors	50	0.03361	0.2142	0.18349	0.00039	0.01563	0.00938
Manlifts	Composite	0.00499	0.1740	0.10274	0.00044	0.00238	0.01066
Crawler Tractors	Composite	0.07346	0.5387	1.00899	0.00201	0.04950	0.04837
Scrapers	Composite	0.12245	0.8418	1.80997	0.00390	0.07335	0.09401
Rubber Tired Loaders	Composite	0.05178	0.4470	0.67139	0.00161	0.03036	0.03868
Graders	Composite	0.06730	0.5812	0.92988	0.00170	0.04074	0.04096
Rollers	Composite	0.02717	0.3885	0.26566	0.00068	0.01663	0.01636
Excavators	Composite	0.02715	0.5160	0.35232	0.00133	0.01498	0.03212

		2019 Emission Factors lb/hr[1]					
Equipment Type	**Hp**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**CO2e[2]**
<40 T Cranes	Composite	0.05255	0.3982	0.72435	0.00147	0.03337	0.03536
>40T Cranes	500	0.06159	0.3951	0.91722	0.00213	0.03694	0.05143
Pile/Drill Rig	Composite	0.03316	0.5009	0.51942	0.00243	0.01889	0.05862
Tractors	Composite	0.02277	0.3630	0.27390	0.00080	0.01634	0.01916
Welders	50	0.03313	0.2271	0.18111	0.00039	0.01522	0.00937
Light Plants	50	0.03313	0.2890	0.18111	0.00039	0.01522	0.00937
Genertors	120	0.03398	0.4663	0.37708	0.00075	0.02830	0.01796
Hydro Vacs/Pumps	120	0.03398	0.4736	0.37708	0.00075	0.02830	0.01796
Fork Lifts	Composite	0.01468	0.2166	0.22583	0.00089	0.00988	0.02146
Loader/Backhoe	Composite	0.02277	0.3630	0.27390	0.00080	0.01634	0.01916
Air Compressors	50	0.03313	0.2078	0.18111	0.00039	0.01522	0.00937
Manlifts	Composite	0.00475	0.1715	0.09788	0.00044	0.00194	0.01066
Crawler Tractors	Composite	0.06860	0.5319	0.92566	0.00201	0.04558	0.04837
Scrapers	Composite	0.11433	0.8161	1.65588	0.00390	0.06690	0.09398
Rubber Tired Loaders	Composite	0.04734	0.4436	0.60035	0.00161	0.02688	0.0387
Graders	Composite	0.06321	0.5787	0.86117	0.00170	0.03744	0.0409
Rollers	Composite	0.02435	0.3859	0.23986	0.00068	0.01451	0.01636
Excavators	Composite	0.02485	0.5140	0.31031	0.00133	0.01294	0.03212

		2020 Emission Factors lb/hr[1]					
Equipment Type	**Hp**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**CO2e[2]**
<40 T Cranes	Composite	0.04866	0.3917	0.66105	0.00147	0.03031	0.03535
>40T Cranes	500	0.05656	0.3839	0.82455	0.00213	0.03305	0.05142
Pile/Drill Rig	Composite	0.07483	0.5008	0.93803	0.00277	0.03763	0.0668
Tractors	Composite	0.03343	0.6517	0.33335	0.00120	0.01797	0.029
Welders	50	0.03084	0.2219	0.17530	0.00039	0.01410	0.00937
Light Plants	50	0.03084	0.2833	0.17530	0.00039	0.01410	0.00937
Genertors	120	0.03204	0.4641	0.35638	0.00075	0.02642	0.01798
Hydro Vacs/Pumps	120	0.03204	0.4713	0.35638	0.00075	0.02642	0.01798
Fork Lifts	Composite	0.01383	0.2160	0.21047	0.00089	0.00873	0.02147
Loader/Backhoe	Composite	0.02060	0.3616	0.24635	0.00080	0.01403	0.01915
Air Compressors	50	0.03084	0.2030	0.17530	0.00039	0.01410	0.00937
Manlifts	Composite	0.00463	0.1696	0.09324	0.00044	0.00161	0.01066
Crawler Tractors	Composite	0.06477	0.5260	0.86009	0.00201	0.04230	0.04838
Scrapers	Composite	0.10693	0.7938	1.51072	0.00390	0.06101	0.09396
Rubber Tired Loaders	Composite	0.04449	0.4406	0.55197	0.00161	0.02448	0.03871
Graders	Composite	0.06068	0.5765	0.81642	0.00170	0.03517	0.04087
Rollers	Composite	0.02288	0.3837	0.22494	0.00068	0.01333	0.01636
Excavators	Composite	0.02341	0.5124	0.28128	0.00133	0.01158	0.03211

		2021 Emission Factors lb/hr[1]					
Equipment Type	**Hp**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**CO2e[2]**
<40 T Cranes	Composite	0.04494	0.3865	0.59772	0.00147	0.02738	0.03535
>40T Cranes	500	0.05211	0.3747	0.73491	0.00213	0.02957	0.05141
Pile/Drill Rig	Composite	0.07076	0.5007	0.84125	0.00277	0.03403	0.06676
Tractors	Composite	0.03012	0.6413	0.29307	0.00120	0.01547	0.029
Welders	50	0.02904	0.2163	0.17063	0.00039	0.01328	0.00936
Light Plants	50	0.02904	0.2789	0.17063	0.00039	0.01328	0.00936
Genertors	120	0.02973	0.4617	0.33282	0.00075	0.02416	0.01798
Hydro Vacs/Pumps	120	0.02973	0.4687	0.33282	0.00075	0.02416	0.01798
Fork Lifts	Composite	0.01279	0.2148	0.19482	0.00089	0.00757	0.02147
Loader/Backhoe	Composite	0.01858	0.3606	0.22118	0.00080	0.01191	0.01916
Air Compressors	50	0.02904	0.1979	0.17063	0.00039	0.01328	0.00936
Manlifts	Composite	0.00446	0.1677	0.08926	0.00044	0.00132	0.01066
Crawler Tractors	Composite	0.06067	0.5208	0.78831	0.00201	0.03885	0.04834
Scrapers	Composite	0.09948	0.7745	1.37187	0.00390	0.05517	0.094
Rubber Tired Loaders	Composite	0.04079	0.4381	0.48855	0.00161	0.02150	0.03874
Graders	Composite	0.05664	0.5747	0.75163	0.00170	0.03199	0.04084
Rollers	Composite	0.02085	0.3816	0.20626	0.00068	0.01180	0.01636
Excavators	Composite	0.02185	0.5113	0.24844	0.00133	0.01017	0.03209

(1) Off-Road 2011. CO emissions from SCAQMD, 2006 : http://www.aqmd.gov/ceqa/handbook/offroad/offroadEF07_25.xls

(2) Carbon Dioxide Equivalents (CO_{EQ}) are based on default emission factors for diesel. Metric tons per hour.

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emission Rates

Percent Mitigated **50%**

		2016 Emission Factors lb/hr [1]					
Equipment Type	**Hp**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**CO2e[2]**
<40 T Cranes	Composite	0.0702	0.4263	0.5637	0.0015	0.0270	0.0353
>40T Cranes	500	0.0742	0.4431	0.7670	0.0018	0.0331	0.0434
Pile/Drill Rig	Composite	0.0563	0.5016	0.4290	0.0020	0.0169	0.0471
Tractors	Composite	0.0515	0.3689	0.2250	0.0011	0.0146	0.0273
Welders	50	0.0535	0.2483	0.1914	0.0009	0.0098	0.0224
Light Plants	50	0.0535	0.3134	0.1914	0.0009	0.0098	0.0224
Genertors	120	0.0568	0.4767	0.2756	0.0011	0.0205	0.0266
Hydro Vacs/Pumps	120	0.0568	0.4842	0.2756	0.0011	0.0205	0.0266
Fork Lifts	Composite	0.0459	0.4549	0.1992	0.0012	0.0105	0.0284
Loader/Backhoe	Composite	0.0515	0.3689	0.2250	0.0011	0.0146	0.0273
Air Compressors	50	0.0535	0.2281	0.1914	0.0009	0.0098	0.0224
Manlifts	Composite	0.0384	0.1592	0.1290	0.0010	0.0039	0.0230
Crawler Tractors	Composite	0.0765	0.5549	0.6535	0.0017	0.0319	0.0419
Scrapers	Composite	0.1089	0.9053	1.2370	0.0027	0.0523	0.0647
Rubber Tired Loaders	Composite	0.0662	0.4557	0.4838	0.0015	0.0224	0.0370
Graders	Composite	0.0726	0.5883	0.5859	0.0016	0.0264	0.0382
Rollers	Composite	0.0521	0.3944	0.1920	0.0011	0.0121	0.0259
Excavators	Composite	0.0522	0.5213	0.2905	0.0014	0.0130	0.0337

		2017 Emission Factors lb/hr [1]					
Equipment Type	**Hp**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**CO2e[2]**
<40 T Cranes	Composite	0.0678	0.4152	0.5288	0.0015	0.0252	0.0353
>40T Cranes	500	0.0713	0.4243	0.7225	0.0018	0.0309	0.0434
Pile/Drill Rig	Composite	0.0553	0.5013	0.4050	0.0020	0.0158	0.0471
Tractors	Composite	0.0503	0.3666	0.2113	0.0011	0.0134	0.0273
Welders	50	0.0530	0.2408	0.1887	0.0009	0.0095	0.0224
Light Plants	50	0.0530	0.3047	0.1887	0.0009	0.0095	0.0224
Genertors	120	0.0560	0.4728	0.2661	0.0011	0.0197	0.0266
Hydro Vacs/Pumps	120	0.0560	0.4802	0.2661	0.0011	0.0197	0.0266
Fork Lifts	Composite	0.0449	0.4522	0.1816	0.0012	0.0092	0.0284
Loader/Backhoe	Composite	0.0503	0.3666	0.2113	0.0011	0.0134	0.0273
Air Compressors	50	0.0530	0.2209	0.1887	0.0009	0.0095	0.0224
Manlifts	Composite	0.0380	0.1548	0.1163	0.0010	0.0033	0.0230
Crawler Tractors	Composite	0.0752	0.5464	0.6289	0.0017	0.0308	0.0419
Scrapers	Composite	0.1045	0.8713	1.1584	0.0027	0.0488	0.0647
Rubber Tired Loaders	Composite	0.0644	0.4510	0.4527	0.0015	0.0210	0.0370
Graders	Composite	0.0714	0.5844	0.5634	0.0016	0.0254	0.0382
Rollers	Composite	0.0510	0.3913	0.1806	0.0011	0.0113	0.0258
Excavators	Composite	0.0511	0.5184	0.2684	0.0014	0.0120	0.0337

		2018 Emission Factors lb/hr [1]					
Equipment Type	**Hp**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**CO2e[2]**
<40 T Cranes	Composite	0.0640	0.4060	0.4751	0.0015	0.0224	0.0353
>40T Cranes	500	0.0677	0.4085	0.6587	0.0018	0.0282	0.0434
Pile/Drill Rig	Composite	0.0526	0.5011	0.3519	0.0020	0.0137	0.0470
Tractors	Composite	0.0479	0.3647	0.1853	0.0011	0.0112	0.0273
Welders	50	0.0519	0.2339	0.1835	0.0009	0.0090	0.0224
Light Plants	50	0.0519	0.2966	0.1835	0.0009	0.0090	0.0224
Genertors	120	0.0536	0.4694	0.2426	0.0011	0.0175	0.0267
Hydro Vacs/Pumps	120	0.0536	0.4767	0.2426	0.0011	0.0175	0.0267
Fork Lifts	Composite	0.0432	0.2173	0.1566	0.0012	0.0074	0.0284
Loader/Backhoe	Composite	0.0479	0.3647	0.1853	0.0011	0.0112	0.0273
Air Compressors	50	0.0519	0.2142	0.1835	0.0009	0.0090	0.0224
Manlifts	Composite	0.0376	0.1740	0.1027	0.0010	0.0024	0.0230
Crawler Tractors	Composite	0.0718	0.5387	0.5728	0.0017	0.0282	0.0419
Scrapers	Composite	0.0963	0.8418	1.0236	0.0027	0.0426	0.0647
Rubber Tired Loaders	Composite	0.0610	0.4470	0.4012	0.0015	0.0185	0.0370
Graders	Composite	0.0688	0.5812	0.5223	0.0016	0.0232	0.0381
Rollers	Composite	0.0487	0.3885	0.1592	0.0011	0.0096	0.0258
Excavators	Composite	0.0487	0.5160	0.2295	0.0014	0.0102	0.0337

		2019 Emission Factors lb/hr [1]					
Equipment Type	**Hp**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**CO2e[2]**
<40 T Cranes	Composite	0.0614	0.3982	0.4364	0.0015	0.0204	0.0353
>40T Cranes	500	0.0659	0.3951	0.6227	0.0018	0.0267	0.0434
Pile/Drill Rig	Composite	0.0517	0.5009	0.3272	0.0020	0.0128	0.0470
Tractors	Composite	0.0465	0.3630	0.1691	0.0011	0.0098	0.0273
Welders	50	0.0517	0.2271	0.1811	0.0009	0.0088	0.0224
Light Plants	50	0.0517	0.2890	0.1811	0.0009	0.0088	0.0224
Genertors	120	0.0521	0.4663	0.2279	0.0011	0.0161	0.0267
Hydro Vacs/Pumps	120	0.0521	0.4736	0.2279	0.0011	0.0161	0.0267
Fork Lifts	Composite	0.0425	0.2166	0.1459	0.0012	0.0066	0.0284
Loader/Backhoe	Composite	0.0465	0.3630	0.1691	0.0011	0.0098	0.0273
Air Compressors	50	0.0517	0.2078	0.1811	0.0009	0.0088	0.0224
Manlifts	Composite	0.0375	0.1715	0.0979	0.0010	0.0019	0.0230
Crawler Tractors	Composite	0.0694	0.5319	0.5312	0.0017	0.0262	0.0419
Scrapers	Composite	0.0923	0.8161	0.9466	0.0027	0.0394	0.0647
Rubber Tired Loaders	Composite	0.0588	0.4436	0.3657	0.0015	0.0167	0.0370
Graders	Composite	0.0667	0.5787	0.4879	0.0016	0.0216	0.0381
Rollers	Composite	0.0473	0.3859	0.1463	0.0011	0.0086	0.0259
Excavators	Composite	0.0475	0.5140	0.2085	0.0014	0.0091	0.0337

		2020 Emission Factors lb/hr [1]					
Equipment Type	**Hp**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**CO2e[2]**
<40 T Cranes	Composite	0.0594	0.3917	0.4047	0.0015	0.0189	0.0353
>40T Cranes	500	0.0634	0.3839	0.5763	0.0018	0.0247	0.0434
Pile/Drill Rig	Composite	0.0725	0.5008	0.5366	0.0021	0.0222	0.0511
Tractors	Composite	0.0518	0.6517	0.1988	0.0013	0.0106	0.0322
Welders	50	0.0505	0.2219	0.1753	0.0009	0.0083	0.0224
Light Plants	50	0.0505	0.2833	0.1753	0.0009	0.0083	0.0224
Genertors	120	0.0511	0.4641	0.2176	0.0011	0.0152	0.0267
Hydro Vacs/Pumps	120	0.0511	0.4713	0.2176	0.0011	0.0152	0.0267
Fork Lifts	Composite	0.0420	0.2160	0.1382	0.0012	0.0060	0.0284
Loader/Backhoe	Composite	0.0454	0.3616	0.1553	0.0011	0.0086	0.0272
Air Compressors	50	0.0505	0.2030	0.1753	0.0009	0.0083	0.0224
Manlifts	Composite	0.0374	0.1696	0.0932	0.0010	0.0016	0.0230
Crawler Tractors	Composite	0.0675	0.5260	0.4984	0.0017	0.0246	0.0419
Scrapers	Composite	0.0886	0.7938	0.8740	0.0027	0.0364	0.0647
Rubber Tired Loaders	Composite	0.0574	0.4406	0.3415	0.0015	0.0155	0.0370
Graders	Composite	0.0655	0.5765	0.4655	0.0016	0.0205	0.0381
Rollers	Composite	0.0466	0.3837	0.1389	0.0011	0.0080	0.0259
Excavators	Composite	0.0468	0.5124	0.1940	0.0014	0.0085	0.0337

		2021 Emission Factors lb/hr [1]					
Equipment Type	**Hp**	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**CO2e[2]**
<40 T Cranes	Composite	0.0576	0.3865	0.3731	0.0015	0.0174	0.0353
>40T Cranes	500	0.0612	0.3747	0.5315	0.0018	0.0230	0.0434
Pile/Drill Rig	Composite	0.0705	0.5007	0.4882	0.0021	0.0204	0.0511
Tractors	Composite	0.0502	0.6413	0.1787	0.0013	0.0093	0.0322
Welders	50	0.0496	0.2163	0.1706	0.0009	0.0079	0.0224
Light Plants	50	0.0496	0.2789	0.1706	0.0009	0.0079	0.0224
Genertors	120	0.0500	0.4617	0.2058	0.0011	0.0140	0.0267
Hydro Vacs/Pumps	120	0.0500	0.4687	0.2058	0.0011	0.0140	0.0267
Fork Lifts	Composite	0.0415	0.2148	0.1304	0.0012	0.0054	0.0284
Loader/Backhoe	Composite	0.0444	0.3606	0.1427	0.0011	0.0076	0.0273
Air Compressors	50	0.0496	0.1979	0.1706	0.0009	0.0079	0.0224
Manlifts	Composite	0.0373	0.1677	0.0893	0.0010	0.0013	0.0230
Crawler Tractors	Composite	0.0654	0.5208	0.4625	0.0017	0.0228	0.0418
Scrapers	Composite	0.0849	0.7745	0.8046	0.0027	0.0335	0.0647
Rubber Tired Loaders	Composite	0.0555	0.4381	0.3098	0.0015	0.0140	0.0370
Graders	Composite	0.0634	0.5747	0.4331	0.0016	0.0189	0.0381
Rollers	Composite	0.0455	0.3816	0.1296	0.0011	0.0072	0.0259
Excavators	Composite	0.0460	0.5113	0.1776	0.0014	0.0078	0.0337

(1) Off-Road 2011. CO emissions from SCAQMD, 2006 : http://www.aqmd.gov/ceqa/handbook/offroad/offroadEF07_25.xls
(2) Carbon Dioxide Equivalents (CO_{EQ}) are based on default emission factors for diesel. Metric tons per hour.

Appendix B-1
Tesoro Integration and Compliance Project

Offroad Construction Vehicle Dust Emissions

		Month											
Equipment	**Hours (hr/day)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	8	0	0	0	0	0	0	0	0	0	1	1	1
>40T Cranes	0	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	0	0	0	0	0	0	1	0	1
Tractors	5	0	0	0	0	0	0	0	0	0	1	1	1
Welders	8												
Light Plants	3	0	0	0	0	0	0	0	0	0	2	2	2
Genertors	8												
Hydro Vacs/Pumps	5	0	0	0	0	0	0	0	0	0	0	0.5	0.5
Fork Lifts	8	0	0	0	0	0	0	0	0	0	1	1	1
Loader/Backhoe	8	0	0	0	0	0	0	0	0	0	1	1	1
Air Compressors	8												
Manlifts	8	0	0	0	0	0	0	0	0	0	0	0	1
Crawler Tractors	8	0	0	0	0	0	0	0	0	0	1	1	1
Scrapers	8	0	0	0	0	0	0	0	0	0	1	1	1
Rubber Tired Loaders	8	0	0	0	0	0	0	0	0	0	1	1	1
Graders	10	0	0	0	0	0	0	0	0	0	1	1	1
Rollers	8	0	0	0	0	0	0	0	0	0	1	1	1
Excavators	8	0	0	0	0	0	0	0	0	0	1	1	1

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.070	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.56	0.56
>40T Cranes	0.074	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.056	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.45
Tractors	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.26
Welders	0.054	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.054	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.32	0.32
Genertors	0.057	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.057	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.14
Fork Lifts	0.046	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.37	0.37
Loader/Backhoe	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.41	0.41
Air Compressors	0.054	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31
Crawler Tractors	0.076	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.61	0.61
Scrapers	0.109	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87	0.87	0.87
Rubber Tired Loaders	0.066	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.53	0.53
Graders	0.073	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.73	0.73
Rollers	0.052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.42	0.42
Excavators	0.052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.42	0.42
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.38	5.07	5.83

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.426	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.41	3.41	3.41
>40T Cranes	0.443	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.502	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.01	0.00	4.01
Tractors	0.369	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.84	1.84	1.84
Welders	0.248	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.313	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.88	1.88	1.88
Genertors	0.477	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.484	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.21	1.21
Fork Lifts	0.455	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.64	3.64	3.64
Loader/Backhoe	0.369	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.95	2.95	2.95
Air Compressors	0.228	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.159	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.27
Crawler Tractors	0.555	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.44	4.44	4.44
Scrapers	0.905	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.24	7.24	7.24
Rubber Tired Loaders	0.456	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.65	3.65	3.65
Graders	0.588	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.88	5.88	5.88
Rollers	0.394	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.16	3.16	3.16
Excavators	0.521	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.17	4.17	4.17
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.28	43.47	48.76

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.564	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.51	4.51	4.51
>40T Cranes	0.767	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.429	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.43	0.00	3.43
Tractors	0.225	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12	1.12	1.12
Welders	0.191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.15	1.15	1.15
Genertors	0.276	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.276	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.69
Fork Lifts	0.199	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.59	1.59	1.59
Loader/Backhoe	0.225	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.80	1.80	1.80
Air Compressors	0.191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.129	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.03
Crawler Tractors	0.653	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.23	5.23	5.23
Scrapers	1.237	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.90	9.90	9.90
Rubber Tired Loaders	0.484	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.87	3.87	3.87
Graders	0.586	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.86	5.86	5.86
Rollers	0.192	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.54	1.54	1.54
Excavators	0.291	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.32	2.32	2.32
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.32	39.58	44.04

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Welders	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Air Compressors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Crawler Tractors	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Scrapers	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02
Rubber Tired Loaders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Graders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02
Rollers	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Excavators	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.13	0.15

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.22	0.22
>40T Cranes	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.13
Tractors	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.07
Welders	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.06
Genertors	0.020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
Fork Lifts	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08	0.08
Loader/Backhoe	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.12	0.12
Air Compressors	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Crawler Tractors	0.032	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.25
Scrapers	0.052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.42	0.42
Rubber Tired Loaders	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.18	0.18
Graders	0.026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.26
Rollers	0.012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.10
Excavators	0.013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.10
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	1.92	2.08

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2016**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.28	0.28
>40T Cranes	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.047	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.38
Tractors	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.14	0.14
Welders	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.13
Genertors	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07
Fork Lifts	0.028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.23	0.23
Loader/Backhoe	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.22	0.22
Air Compressors	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18
Crawler Tractors	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.34	0.34
Scrapers	0.065	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.52	0.52
Rubber Tired Loaders	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.30	0.30
Graders	0.038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.38	0.38
Rollers	0.026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.21	0.21
Excavators	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.27	0.27
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.38	3.07	3.63

Appendix B-1
Tesoro Integration and Compliance Project

Offroad Construction Vehicle Dust Emissions

		Month											
Equipment	**Hours (hr/day)**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	8	2	2	2	2	2	2	2	2	2	2	1	1
>40T Cranes	0	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	0	0	0	0	0	0	0	0	0
Tractors	5	1	1	1	1	1	1	1	1	1	1	1	1
Welders	8												
Light Plants	3	2	2	2	2	2	2	2	2	2	2	2	2
Genertors	8												
Hydro Vacs/Pumps	5	0.5	0.5	0.5	0	0	0	0	0	0	0	0	0
Fork Lifts	8	2	2	2	2	2	2	2	2	2	2	2	2
Loader/Backhoe	8	2	2	2	2	2	2	2	2	2	2	2	2
Air Compressors	8												
Manlifts	8	1	1	2	2	2	2	2	2	2	2	2	2
Crawler Tractors	8	1	0	0	0	0	0	0	0	0	0	0	0
Scrapers	8	1	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Loaders	8	1	0	0	0	0	0	0	0	0	0	0	0
Graders	10	1	0	0	0	0	0	0	0	0	0	0	0
Rollers	8	1	0	0	0	0	0	0	0	0	0	0	0
Excavators	8	1	0	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.068	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	0.54	0.54
>40T Cranes	0.071	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.055	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.050	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Welders	0.053	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.053	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Genertors	0.056	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.056	0.14	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.045	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Loader/Backhoe	0.050	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Air Compressors	0.053	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.038	0.30	0.30	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Crawler Tractors	0.075	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.105	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.064	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.071	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.051	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.051	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		6.02	2.54	2.84	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.415	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	3.32	3.32
>40T Cranes	0.424	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.501	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.367	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
Welders	0.241	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.305	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
Genertors	0.473	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.480	1.20	1.20	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.452	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24
Loader/Backhoe	0.367	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87
Air Compressors	0.221	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.155	1.24	1.24	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48
Crawler Tractors	0.546	4.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.871	6.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.451	3.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.584	5.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.391	3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.518	4.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		53.92	25.85	27.08	25.88	25.88	25.88	25.88	25.88	25.88	25.88	22.56	22.56

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.529	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	4.23	4.23
>40T Cranes	0.723	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.405	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.211	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Welders	0.189	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.189	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Genertors	0.266	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.266	0.67	0.67	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.182	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91	2.91
Loader/Backhoe	0.211	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38
Air Compressors	0.189	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.116	0.93	0.93	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
Crawler Tractors	0.629	5.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	1.158	9.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.453	3.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.563	5.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.181	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.268	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		45.68	18.53	19.46	18.80	18.80	18.80	18.80	18.80	18.80	18.80	14.57	14.57

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.001	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Welders	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Loader/Backhoe	0.001	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Air Compressors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.001	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Crawler Tractors	0.002	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.003	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.002	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.002	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.001	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.001	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.17	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.025	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.20	0.20
>40T Cranes	0.031	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.013	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Welders	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.010	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Genertors	0.020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.020	0.05	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.009	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Loader/Backhoe	0.013	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Air Compressors	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.003	0.03	0.03	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Crawler Tractors	0.031	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.049	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.021	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.025	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.011	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.012	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.21	0.97	0.99	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.74	0.74

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2017**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
<40 T Cranes	0.035	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.28	0.28
>40T Cranes	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.047	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.027	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Welders	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.022	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Genertors	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.027	0.07	0.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.028	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Loader/Backhoe	0.027	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Air Compressors	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.023	0.18	0.18	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
Crawler Tractors	0.042	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.065	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.037	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.038	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.026	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.034	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		3.98	1.98	2.16	2.09	2.09	2.09	2.09	2.09	2.09	2.09	1.81	1.81

Appendix B-1
Tesoro Integration and Compliance Project

Offroad Construction Vehicle Dust Emissions

		Month											
Equipment	**Hours (hr/day)**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	8	1	1	1	1	1	1	2	2	2	2	2	2
>40T Cranes	0	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	1	0	1	0	0	0	0	0	0
Tractors	5	1	1	1	1	1	1	1	1	1	1	1	1
Welders	8												
Light Plants	3	2	2	2	2	2	2	2	2	2	2	2	2
Genertors	8												
Hydro Vacs/Pumps	5	0	0	0	0	0.5	0.5	0.5	0.5	0.5	0	0	0
Fork Lifts	8	2	1	1	1	1	1	2	2	2	2	2	2
Loader/Backhoe	8	2	1	1	1	1	1	2	2	2	2	2	2
Air Compressors	8												
Manlifts	8	1	1	1	0	0	1	1	1	2	2	2	2
Crawler Tractors	8	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers	8	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Loaders	8	0	0	0	0	0	0	0	0	0	0	0	0
Graders	10	0	0	0	0	0	0	0	0	0	0	0	0
Rollers	8	0	0	0	0	0	0	0	0	0	0	0	0
Excavators	8	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.064	0.51	0.51	0.51	0.51	0.51	0.51	1.02	1.02	1.02	1.02	1.02	1.02
>40T Cranes	0.068	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.053	0.00	0.00	0.00	0.42	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.048	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Welders	0.052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.052	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Genertors	0.054	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.054	0.00	0.00	0.00	0.00	0.13	0.13	0.13	0.13	0.13	0.00	0.00	0.00
Fork Lifts	0.043	0.69	0.35	0.35	0.35	0.35	0.35	0.69	0.69	0.69	0.69	0.69	0.69
Loader/Backhoe	0.048	0.77	0.38	0.38	0.38	0.38	0.38	0.77	0.77	0.77	0.77	0.77	0.77
Air Compressors	0.052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.038	0.30	0.30	0.30	0.00	0.00	0.30	0.30	0.30	0.60	0.60	0.60	0.60
Crawler Tractors	0.072	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.096	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.061	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.069	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.049	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.049	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.31	1.58	1.58	1.70	1.41	2.14	2.44	2.44	2.74	2.61	2.61	2.61

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.406	3.25	3.25	3.25	3.25	3.25	3.25	6.50	6.50	6.50	6.50	6.50	6.50
>40T Cranes	0.409	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.501	0.00	0.00	0.00	4.01	0.00	4.01	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.365	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
Welders	0.234	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.297	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
Genertors	0.469	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.477	0.00	0.00	0.00	0.00	1.19	1.19	1.19	1.19	1.19	0.00	0.00	0.00
Fork Lifts	0.217	3.48	1.74	1.74	1.74	1.74	1.74	3.48	3.48	3.48	3.48	3.48	3.48
Loader/Backhoe	0.365	5.83	2.92	2.92	2.92	2.92	2.92	5.83	5.83	5.83	5.83	5.83	5.83
Air Compressors	0.214	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.174	1.39	1.39	1.39	0.00	0.00	1.39	1.39	1.39	2.78	2.78	2.78	2.78
Crawler Tractors	0.539	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.842	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.447	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.581	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.388	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.516	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		17.55	12.90	12.90	15.52	12.70	18.10	21.99	21.99	23.39	22.19	22.19	22.19

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.475	3.80	3.80	3.80	3.80	3.80	3.80	7.60	7.60	7.60	7.60	7.60	7.60
>40T Cranes	0.659	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.352	0.00	0.00	0.00	2.81	0.00	2.81	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.185	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Welders	0.183	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.183	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Genertors	0.243	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.243	0.00	0.00	0.00	0.00	0.61	0.61	0.61	0.61	0.61	0.00	0.00	0.00
Fork Lifts	0.157	2.51	1.25	1.25	1.25	1.25	1.25	2.51	2.51	2.51	2.51	2.51	2.51
Loader/Backhoe	0.185	2.97	1.48	1.48	1.48	1.48	1.48	2.97	2.97	2.97	2.97	2.97	2.97
Air Compressors	0.183	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.103	0.82	0.82	0.82	0.00	0.00	0.82	0.82	0.82	1.64	1.64	1.64	1.64
Crawler Tractors	0.573	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	1.024	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.401	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.522	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.159	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.230	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		12.12	9.39	9.39	11.38	9.17	12.81	16.53	16.53	17.35	16.74	16.74	16.74

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Welders	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
Loader/Backhoe	0.001	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
Air Compressors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.001	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.02
Crawler Tractors	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.07	0.05	0.05	0.06	0.04	0.07	0.08	0.08	0.09	0.09	0.09	0.09

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.022	0.18	0.18	0.18	0.18	0.18	0.18	0.36	0.36	0.36	0.36	0.36	0.36
>40T Cranes	0.028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.014	0.00	0.00	0.00	0.11	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.011	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Welders	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.009	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Genertors	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.018	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.04	0.04	0.00	0.00	0.00
Fork Lifts	0.007	0.12	0.06	0.06	0.06	0.06	0.06	0.12	0.12	0.12	0.12	0.12	0.12
Loader/Backhoe	0.011	0.18	0.09	0.09	0.09	0.09	0.09	0.18	0.18	0.18	0.18	0.18	0.18
Air Compressors	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.002	0.02	0.02	0.02	0.00	0.00	0.02	0.02	0.02	0.04	0.04	0.04	0.04
Crawler Tractors	0.028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.61	0.46	0.46	0.55	0.48	0.61	0.83	0.83	0.85	0.80	0.80	0.80

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2018**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
<40 T Cranes	0.035	0.28	0.28	0.28	0.28	0.28	0.28	0.57	0.57	0.57	0.57	0.57	0.57
>40T Cranes	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.047	0.00	0.00	0.00	0.38	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.027	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Welders	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.022	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Genertors	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.027	0.00	0.00	0.00	0.00	0.07	0.07	0.07	0.07	0.07	0.00	0.00	0.00
Fork Lifts	0.028	0.45	0.23	0.23	0.23	0.23	0.23	0.45	0.45	0.45	0.45	0.45	0.45
Loader/Backhoe	0.027	0.44	0.22	0.22	0.22	0.22	0.22	0.44	0.44	0.44	0.44	0.44	0.44
Air Compressors	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.023	0.18	0.18	0.18	0.00	0.00	0.18	0.18	0.18	0.37	0.37	0.37	0.37
Crawler Tractors	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.065	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		1.63	1.18	1.18	1.37	1.07	1.63	1.98	1.98	2.16	2.09	2.09	2.09

Appendix B-1
Tesoro Integration and Compliance Project

Offroad Construction Vehicle Dust Emissions

		Month											
Equipment	**Hours (hr/day)**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	8	2	2	2	2	1	1	1	1	1	1	1	1
>40T Cranes	0	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	0	0	0	0	0	0	1	0	1
Tractors	5	1	1	1	1	1	1	1	1	1	1	1	1
Welders	8												
Light Plants	3	2	2	2	2	2	2	2	2	2	2	2	2
Genertors	8												
Hydro Vacs/Pumps	5	0	0	0	0	0	0	0	0	0	0	0.5	0.5
Fork Lifts	8	2	2	2	2	2	2	2	1	1	1	1	1
Loader/Backhoe	8	2	2	2	2	2	2	2	1	1	1	1	1
Air Compressors	8												
Manlifts	8	2	2	2	2	2	2	1	1	1	0	0	1
Crawler Tractors	8	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers	8	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Loaders	8	0	0	0	0	0	0	0	0	0	0	0	0
Graders	10	0	0	0	0	0	0	0	0	0	0	0	0
Rollers	8	0	0	0	0	0	0	0	0	0	0	0	0
Excavators	8	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.061	0.98	0.98	0.98	0.98	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
>40T Cranes	0.066	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.41
Tractors	0.046	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Welders	0.052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.052	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Genertors	0.052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.13
Fork Lifts	0.042	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.34	0.34	0.34	0.34	0.34
Loader/Backhoe	0.046	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.37	0.37	0.37	0.37	0.37
Air Compressors	0.052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.037	0.60	0.60	0.60	0.60	0.60	0.60	0.30	0.30	0.30	0.00	0.00	0.30
Crawler Tractors	0.069	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.092	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.059	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.067	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.047	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.048	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.57	2.57	2.57	2.57	2.57	2.57	2.27	1.55	1.55	1.67	1.38	2.10

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.398	6.37	6.37	6.37	6.37	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19
>40T Cranes	0.395	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.501	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.01	0.00	4.01
Tractors	0.363	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
Welders	0.227	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.289	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
Genertors	0.466	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.474	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	1.18
Fork Lifts	0.217	3.47	3.47	3.47	3.47	3.47	3.47	3.47	1.73	1.73	1.73	1.73	1.73
Loader/Backhoe	0.363	5.81	5.81	5.81	5.81	5.81	5.81	5.81	2.90	2.90	2.90	2.90	2.90
Air Compressors	0.208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.172	2.74	2.74	2.74	2.74	2.74	2.74	1.37	1.37	1.37	0.00	0.00	1.37
Crawler Tractors	0.532	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.816	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.444	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.579	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.386	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.514	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		21.94	21.94	21.94	21.94	18.75	18.75	17.38	12.74	12.74	15.38	12.56	17.93

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.436	6.98	6.98	6.98	6.98	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49
>40T Cranes	0.623	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.327	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.62	0.00	2.62
Tractors	0.169	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Welders	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.181	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Genertors	0.228	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.228	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.57
Fork Lifts	0.146	2.33	2.33	2.33	2.33	2.33	2.33	2.33	1.17	1.17	1.17	1.17	1.17
Loader/Backhoe	0.169	2.71	2.71	2.71	2.71	2.71	2.71	2.71	1.35	1.35	1.35	1.35	1.35
Air Compressors	0.181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.098	1.57	1.57	1.57	1.57	1.57	1.57	0.78	0.78	0.78	0.00	0.00	0.78
Crawler Tractors	0.531	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.947	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.366	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.488	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.146	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.209	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		15.52	15.52	15.52	15.52	12.03	12.03	11.25	8.73	8.73	10.56	8.51	11.91

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.001	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
Tractors	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Welders	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01
Loader/Backhoe	0.001	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01
Air Compressors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.001	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.01
Crawler Tractors	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.09	0.09	0.09	0.09	0.08	0.08	0.07	0.05	0.05	0.06	0.04	0.07

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.020	0.33	0.33	0.33	0.33	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
>40T Cranes	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10
Tractors	0.010	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Welders	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.009	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Genertors	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04
Fork Lifts	0.007	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.05	0.05	0.05	0.05	0.05
Loader/Backhoe	0.010	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.08	0.08	0.08	0.08	0.08
Air Compressors	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.002	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.00	0.00	0.02
Crawler Tractors	0.026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.72	0.72	0.72	0.72	0.56	0.56	0.54	0.41	0.41	0.50	0.44	0.55

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2019**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
<40 T Cranes	0.035	0.57	0.57	0.57	0.57	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
>40T Cranes	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.047	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.38
Tractors	0.027	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Welders	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.022	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Genertors	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07
Fork Lifts	0.028	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.23	0.23	0.23	0.23	0.23
Loader/Backhoe	0.027	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.22	0.22	0.22	0.22	0.22
Air Compressors	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.023	0.37	0.37	0.37	0.37	0.37	0.37	0.18	0.18	0.18	0.00	0.00	0.18
Crawler Tractors	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.065	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.09	2.09	2.09	2.09	1.81	1.81	1.63	1.18	1.18	1.37	1.07	1.62

Appendix B-1
Tesoro Integration and Compliance Project

Offroad Construction Vehicle Dust Emissions

		Month											
Equipment	**Hours (hr/day)**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
<40 T Cranes	8	2	2	2	2	2	2	2	2	2	2	1	1
>40T Cranes	0	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	0	0	0	0	0	0	0	0	0
Tractors	5	1	1	1	1	1	1	1	1	1	1	1	1
Welders	8												
Light Plants	3	2	2	2	2	2	2	2	2	2	2	2	2
Genertors	8												
Hydro Vacs/Pumps	5	0.5	0.5	0.5	0	0	0	0	0	0	0	0	0
Fork Lifts	8	2	2	2	2	2	2	2	2	2	2	2	2
Loader/Backhoe	8	2	2	2	2	2	2	2	2	2	2	2	2
Air Compressors	8												
Manlifts	8	1	1	2	2	2	2	2	2	2	2	2	2
Crawler Tractors	8	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers	8	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Loaders	8	0	0	0	0	0	0	0	0	0	0	0	0
Graders	10	0	0	0	0	0	0	0	0	0	0	0	0
Rollers	8	0	0	0	0	0	0	0	0	0	0	0	0
Excavators	8	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
<40 T Cranes	0.059	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.48	0.48
>40T Cranes	0.063	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.073	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.052	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Welders	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.051	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Genertors	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.051	0.13	0.13	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.042	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Loader/Backhoe	0.045	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Air Compressors	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.037	0.30	0.30	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Crawler Tractors	0.068	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.089	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.057	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.065	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.047	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.047	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.39	2.39	2.69	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
<40 T Cranes	0.392	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	3.13	3.13
>40T Cranes	0.384	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.501	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.652	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26
Welders	0.222	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.283	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Genertors	0.464	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.471	1.18	1.18	1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.216	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46
Loader/Backhoe	0.362	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79
Air Compressors	0.203	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.170	1.36	1.36	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71
Crawler Tractors	0.526	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.794	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.441	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.577	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.384	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.512	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		23.00	23.00	24.36	23.18	23.18	23.18	23.18	23.18	23.18	23.18	20.05	20.05

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
<40 T Cranes	0.405	6.48	6.48	6.48	6.48	6.48	6.48	6.48	6.48	6.48	6.48	3.24	3.24
>40T Cranes	0.576	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.537	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.199	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Welders	0.175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.175	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Genertors	0.218	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.218	0.54	0.54	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.138	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21	2.21
Loader/Backhoe	0.155	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48
Air Compressors	0.175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.093	0.75	0.75	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
Crawler Tractors	0.498	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.874	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.342	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.466	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.139	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.194	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		14.51	14.51	15.25	14.71	14.71	14.71	14.71	14.71	14.71	14.71	11.47	11.47

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
<40 T Cranes	0.001	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Welders	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Loader/Backhoe	0.001	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Air Compressors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.001	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Crawler Tractors	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
<40 T Cranes	0.019	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.15	0.15
>40T Cranes	0.025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.011	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Welders	0.008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.008	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Genertors	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.015	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.006	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Loader/Backhoe	0.009	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Air Compressors	0.008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.002	0.01	0.01	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Crawler Tractors	0.025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.036	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.69	0.69	0.70	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.51	0.51

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2020**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
<40 T Cranes	0.035	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.28	0.28
>40T Cranes	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.032	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Welders	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.022	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Genertors	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.027	0.07	0.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.028	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Loader/Backhoe	0.027	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Air Compressors	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.023	0.18	0.18	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
Crawler Tractors	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.065	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.00	2.00	2.19	2.12	2.12	2.12	2.12	2.12	2.12	2.12	1.84	1.84

Appendix B-1
Tesoro Integration and Compliance Project

Offroad Construction Vehicle Dust Emissions

		Month											
Equipment	**Hours (hr/day)**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	8	1	1	1	0	0	0	0	0	0	0	0	0
>40T Cranes	0	0	0	0	0	0	0	0	0	0	0	0	0
Pile/Drill Rig	8	0	0	0	0	0	0	0	0	0	0	0	0
Tractors	5	1	1	1	0	0	0	0	0	0	0	0	0
Welders	8												
Light Plants	3	2	2	2	0	0	0	0	0	0	0	0	0
Genertors	8												
Hydro Vacs/Pumps	5	0	0	0	0	0	0	0	0	0	0	0	0
Fork Lifts	8	2	1	1	0	0	0	0	0	0	0	0	0
Loader/Backhoe	8	2	1	1	0	0	0	0	0	0	0	0	0
Air Compressors	8												
Manlifts	8	1	1	1	0	0	0	0	0	0	0	0	0
Crawler Tractors	8	0	0	0	0	0	0	0	0	0	0	0	0
Scrapers	8	0	0	0	0	0	0	0	0	0	0	0	0
Rubber Tired Loaders	8	0	0	0	0	0	0	0	0	0	0	0	0
Graders	10	0	0	0	0	0	0	0	0	0	0	0	0
Rollers	8	0	0	0	0	0	0	0	0	0	0	0	0
Excavators	8	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
VOC	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	0.058	0.46	0.46	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.061	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.070	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.050	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.050	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.050	0.30	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.050	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.050	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.042	0.66	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.044	0.71	0.36	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.050	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.037	0.30	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.065	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.085	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.056	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.063	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.046	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.046	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.22	1.53	1.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	0.387	3.09	3.09	3.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.501	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.641	3.21	3.21	3.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.279	1.67	1.67	1.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.462	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.469	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.215	3.44	1.72	1.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.361	5.77	2.88	2.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.198	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.168	1.34	1.34	1.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.521	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.775	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.438	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.575	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.382	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.511	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		18.52	13.92	13.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	0.373	2.98	2.98	2.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.532	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.488	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.179	0.89	0.89	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.171	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.171	1.02	1.02	1.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.206	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.206	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.130	2.09	1.04	1.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.143	2.28	1.14	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.171	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.089	0.71	0.71	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.462	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.805	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.310	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.433	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.178	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		9.99	7.80	7.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	0.001	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.001	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.001	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.001	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.07	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	0.017	0.14	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.009	0.05	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.008	0.05	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.005	0.09	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.008	0.12	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.001	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.007	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.45	0.35	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Construction Equipment Emissions

	Emission Rate (MT/hr)	Month											
CO2EQ	**2021**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
<40 T Cranes	0.035	0.28	0.28	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>40T Cranes	0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.051	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.032	0.16	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.022	0.13	0.13	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Vacs/Pumps	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.028	0.45	0.23	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.027	0.44	0.22	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manlifts	0.023	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Tractors	0.042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scrapers	0.065	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Tired Loaders	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Graders	0.038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rollers	0.026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Excavators	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		1.65	1.21	1.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B-1
Tesoro Integration and Compliance Project

Mitigated Crude Tank Offroad Construction Vehicle Dust Emissions

Vehicle	Miles/Trip	Trips/Day
Light Vehicles	0.1	2
Total Light Vehicle Miles		0.2
Delivey Trucks	0.1	0
Water Trucks	0.1	1
Total Medium Truck Miles		0.1
Concrete Truck	0.1	0
Dump Trucks	0.1	40
Total Heavy Truck Miles		4
Tractors	0.1	3
Fork Lifts	0.1	2
Loader/Backhoe	0.1	2
Total Heavy-Heavy Duty Miles		0.7

PM10	Emission Rate (lb/mi)[(1)]	Emissions (lb/day)
Light Duty	0.9021196	0.18
Medium Duty	1.2863357	0.13
Heavy Duty	2.1931267	8.77
Heavy Heavy Duty	2.4962390	1.75
Uncontrolled Total		10.83
Controlled Total[(2)]		4.22

(1) Based on Section 13.2.2 of EPA's Compilation of Air Pollutant Emission Factors (AP-42).
Emission Rate = 1.5((s/12)^.9)*((W/3)^.45)
s = silt content = 8.5%
W = Vehicle Weight (ton) =2.5 for light, 5.5 for medium, 15 for heavy,
and 24 for heavy heavy (EMFAC2007).

(2) Controlled Emissions assume that watering 3 times per day reduces emissions by 61 percent (Uncontrolled Emissions x 0.39)

Appendix B-1
Tesoro Integration and Compliance Project
NOx Reduction from Mitigation Measure A-9

Priority	Project	Scope	Timing	MIN NOx Red lb/yr	lb/day	2015 Emissions lb/yr	2015 Concentration NOX, ppm @ 3% O2 (Cogen at 15%)	Expected Concentration NOX, ppm @ 3% O2 (Cogen at 15%)	Reduction %	Reduction lb/yr	Reduction lb/day
1	**So H2 Plant** SCR catalyst changeout and lower NOx target.	SCR catalyst replacement (est 3 ppm). Currently at 5-6 ppm.	Start of construction	10,000	27	26,215	5.8	3.0	48%	12,609	35
2	**HGU-2** SCR catalyst changeout and lower NOx target.	SCR catalyst replacement (est 3 ppm) Currently at 7-8 ppm. Limit is 12 ppm	3/31/2017	10,000	27	20,796	7.6	3.0	60%	12,533	34
3	**Cogen GTG** Unit 91 SCR catalyst changeout and lower NOx target.	SCR catalyst replacement (est 2.5 ppm) Currently at 3-4 ppm.	6/30/2017	20,000	55	118,543	3.2	2.5	21%	24,759	68
				40,000	**109**					**49,900**	**137**

Catalyst has a 9 month delivery schedule.

APPENDIX B-1

MISCELLANEOUS VOC EMISSION CALCULATIONS

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Appendix B-1
Tesoro Integration and Compliance Project

Fugitive VOC Emissions During Excavation

Soil Assuptions

β - Soil Bulk Density	1.5 g/cm3	Moisture Content	20%	moisture content
ρ - Particle Density	2.65 g/cm3	Soil Density	1	ton/yd3
Θm - Soil Moisture	0.24 cm3/g	Soil Density	74.1	lb/cuft
Pt - Soil Porosity (total)	0.434	Soil Density	1.19	g/cm3
Pa - Soil Porosity (air filled)	0.074			
A - Area	7524900 cm2			
T - Exposure Interval	86400 seconds			
foc - Fraction of Organic Carbon	0.02 g/g			

Chemical Properties

	Henry's Constant	Soil/Organic Carbon Partition Coefficient	Soil/Water Partition Coefficient	Soil/Air Partition Coefficient	Diffusivity in Air	Effective Diffusivity	Conversion Factor
Carbon Range	**Hc**	**Koc**	**Kd**	**Kas**	**Di**	**Dei**	α
C5-C6	41	630	12.6	3.2540	0.0857	0.0001	0.0000
C7-C8	77	3160	63.2	1.2184	0.0669	0.0001	0.0000
C9-C10	160	31600	632	0.2532	0.0644	0.0001	0.0000
C11-C12	160	316000	6320	0.0253	0.0460	0.0000	0.0000
C13-C16	160	5000000	100000	0.0016	0.0395	0.0000	0.0000
C17-C21	110	400000000	8000000	0.0000	0.0328	0.0000	0.0000
C22-C35	110	400000000	8000000	0.0000	0.0328	0.0000	0.0000

Fugitve VOC Emissions

Chemical	TPH Fraction	mg/kg	mg/kg	g/g	E (mg/sec)
C5-C6	0.0015625	11000	17.1875	1.71875E-05	3.53123634
C7-C8	0.0046875	11000	51.5625	5.15625E-05	5.565012283
C9-C10	0.0484375	11000	532.8125	0.000532813	25.35542018
C11-C12	0.4078125	11000	4485.9375	0.004485938	56.85918567
C13-C16	0.067571429	9600	648.6857143	0.000648686	1.914717769
C17-C21	0.153142857	9600	1470.171429	0.001470171	0.366570712
C22-C35	0.427214286	9600	4101.257143	0.004101257	1.022602345
Total Emission (lb/day)					**18.02197447**

Note: Equation for emissions from US EPA PEA Guidance, 1999.
Chemical Properies from Utah Department of Environmental Quality TPH Fractionation at Leaking UGST Sites, July 2001.

APPENDIX B-2

LST ANALYSIS

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Tesoro Refining & Marketing Company LLC
Los Angeles Refinery Integration and Compliance Project
Revised SCAQMD Localized Significance Threshold Analysis

~~February 5, 2016~~ April 25, 2017

Prepared for: Tesoro Refining & Marketing Company LLC

By: Environmental Audit, Inc.
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INTRODUCTION

This Localized Significance Threshold (LST) analysis has been prepared to evaluate the potential impacts of the criteria pollutants carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter less than 10 microns in diameter (PM10), and particulate matter less than 2.5 microns in diameter (PM2.5) emitted by the construction activities associated with the proposed Tesoro Refining & Marketing Company LLC Los Angeles Refinery (Refinery) Integration and Compliance (I&C) Project.

In June 2013, Tesoro purchased the adjacent BP West Coast Products LLC (BP) Carson Refinery, which, as part of the proposed project will be more fully integrated with the Tesoro Los Angeles Refinery – Wilmington Operations to form the Tesoro Los Angeles Refinery (Refinery). The proposed project will be designed to better integrate the Wilmington Operations and Carson Operations.

In addition to further Refinery integration, the proposed project will be designed to comply with the federally mandated Tier 3 gasoline specifications and with State and local regulations mandating emission reductions. The Refinery I&C Project is expected to shut down the Fluid Catalytic Cracking Unit (FCCU) at the Wilmington Operations and reconfigure the combined Refinery complex. Additionally, heat recovery will be optimized by installing new heat exchangers and modifying specified units to further minimize GHG and other emissions. Facilities will be added to remove impurities such as sulfur, nitrogen compounds, and organic acids from distillates. The modifications will be designed so that the combined Refinery operates within the existing capacity of the Sulfur Recovery Plants (SRPs). There will be no modifications at any of the marine terminals associated with the Tesoro Los Angeles Refinery.

As part of the proposed project, Environmental Audit, Inc. (EAI) has calculated construction emissions to evaluate the potential impacts from construction activities associated with the proposed project. Based on information provided by Tesoro, the LST analysis includes a ~~a~~ modeled analysis of the criteria pollutants for the peak daily emissions from the I&C Project. The results of this analysis are provided below.

FACILITY LOCATION

The proposed project will occur at both the Wilmington and Carson Operations of the Tesoro Los Angeles Refinery (see Figure 1). Tesoro will more fully integrate the recently purchased adjacent BP Carson Refinery (referred to as the Carson Operations) with the existing Wilmington Operations, to become a more efficient single entity owned and operated by Tesoro. The Refinery will be comprised of approximately 950 contiguous acres in size and operate within the Cities of Los Angeles (Wilmington District) and Carson, California.

The Wilmington Operations are located within Wilmington, a community under the jurisdiction of the City of Los Angeles, at 2101 East Pacific Coast Highway, Wilmington, Los Angeles County, California 90744. The Carson Operations are located at 2350 East 223rd Street, Carson, California, 90745. Both new and modified equipment, as well as connecting piping, will be located within portions of the Refinery under both the City of Carson jurisdiction and the City of Los Angeles jurisdiction.

The Wilmington Operations are bounded to the north by Sepulveda Boulevard (as well as other tank farms and refinery activities), to the west by Alameda Street (as well as the Alameda Corridor and other tank farms), to the south by railroad tracks (as well as tank farms and metal recycling/scrap yards), and to the east by the Dominguez Channel (as well as other tank farms and rail yard activities). The Wilmington Operations are bisected by Pacific Coast Highway, with the larger portion of the Wilmington Operations to the north of Pacific Coast Highway and the smaller portion to the south. The closest residential area to the Wilmington Operations is about 200 feet southwest of the Truck Loading Rack.

The Carson Operations are bounded by Wilmington Avenue to the west, 223rd Avenue to the north, Alameda Street to the east, and Sepulveda Boulevard to the south. The Dominguez Channel flows through the Carson Operations, dividing the property into two sections: Northeastern and Southern. Several industrial/commercial facilities and the 405 Freeway border the Carson Operations to the north. The Alameda Corridor and other industrial facilities, including the Tesoro Coke Barn, the Air Products Hydrogen Plant, and the Tesoro Sulfur Recovery Plant, are located to the east of the Carson Operations. Commercial and residential areas are located to the west of the Carson Operations. The Phillips 66 Refinery and tank farms occupy the area located to the south of the Carson Operations.

The Carson Operations and all adjacent facilities and properties are zoned manufacturing heavy (MH) according to the City of Carson's Land Use element of its General Plan. The closest residential area to the Carson Operations is approximately 250 feet southwest of the Refinery on the southwest corner of the Sepulveda Boulevard/Wilmington Avenue intersection.

Additionally, the SRP (considered to be a portion of the Wilmington Operations) is located at 23208 South Alameda Street in the City of Carson (see Figure 1). The SRP is zoned MH according to the City of Carson's Land Use element of its General Plan. Adjacent land uses to the SRP also are heavy industrial and include other refineries, a hydrogen plant, undeveloped lots, and container storage areas.

EMISSION ESTIMATES

Construction emission estimates for the peak day are calculated by each project component that will be under construction during that peak period for the proposed project. A summary of construction emissions is found on Table 1. More detailed construction emissions can be found in Attachment 1. Construction emissions vary based on activities and the worst-case scenario has been evaluated. It is expected that the calculated peak day emissions estimates will occur infrequently during the proposed project construction activities and, most of the time, construction emissions will be less.

Based on information provided by Tesoro, construction activities by month for the proposed project are calculated to determine the peak construction day. Only on-site emissions sources are included, and though equipment (such as cranes) would be shared between project components, no equipment sharing was assumed for this LST analysis. The peak on-site construction day for most project components is spread over 12 hours and is expected to occur during Month 20. Project components that would be in turnaround (hydrotreating unit) are based on two shifts which cover 24 hours of construction. Construction activities included in this evaluation are the use of construction equipment and fugitive dust emissions from earth moving activities.

CRITERIA POLLUTANT IMPACT MODELING

In order to determine the groundlevel concentrations, the U.S. EPA AERMOD air dispersion model was used to model the peak day construction emissions (see Table 1) and calculate the annual average and maximum 1-hour, 8-hour, and 24-hour concentrations. NO_2 emissions were estimated using the U.S. EPA recommended ambient ratio method (ARM), which converts NOx to NO_2 based on a fixed ratio (U.S EPA, 2014).

The location of the source is identified based on data provided by Tesoro and the Long Beach USGS Quadrangle (see Figure 2). The model is run using the Long Beach meteorological data available from the SCAQMD. The dispersion model was run using regulatory defaults.

The model is not set to include algorithms to model the effects of building downwash on emissions since area sources are not influenced by building downwash.

Terrain elevations are taken into account even though the facility and the vicinity are in a relatively flat area.

The AERMOD model is run using a coarse receptor grid of 500 meters, that extends at least 1,000 meters in every cardinal direction from the boundaries of the Refinery, and a fine receptor grid of 100 meters in the residential area most affected by the construction emissions (see Figure 2). The maximum impact location is determined for the applicable averaging periods from the AERMOD model output. The maximum groundlevel concentration and the Universal Tranverse Mercator (NAD 83) coordinates for each maximum impact point at a sensitive receptor are presented in Table 2.

MODELED CRITERIA POLLUTANT IMPACT ANALYSIS

The proposed project maximum groundlevel concentrations are compared to the localized significance thresholds to demonstrate that if the project would cause or contribute to a violation of any state ambient air quality standard. The ambient air quality data for South Coastal Los Angeles County (Station No. 033 and 077) is used to establish background levels of the pollutants. Table 3 identifies the ambient air quality data for CO, NO_2, PM10, and PM2.5 published by the SCAQMD in the last three years (2012, 2013, and 2014), as well as federal NO_2 ambient background concentration data published by SCAQMD.

The CO and NO_2 concentrations are combined with the ambient background concentrations and compared to the Most Stringent Air Quality Standard. The PM10 and PM2.5 24-hour, and PM10 and PM2.5 annual average concentrations are compared to the Significant Change in Air Quality Concentration thresholds. Impacts from other criteria pollutants are regional in nature or in attainment and, therefore, are not included as part of the localized air quality analysis. The maximum impact locations are shown in Figure 2.

State Standards

The maximum CO impact concentrations for 1-hour and 8-hour averages are 8,221.1 and 4,967.4 micrograms per cubic meter ($\mu g/m^3$), respectively. The maximum NO_2 impact concentrations for 1-hour and annual averages are 455.9 and 52.7 $\mu g/m^3$, respectively. The maximum PM10 impact concentrations for 24-hour and annual averages are 3.5 and 0.9 $\mu g/m^3$, respectively. The maximum PM2.5 impact concentrations for 24-hour and annual averages are 3.5 and 0.9 $\mu g/m^3$, respectively. Therefore, the proposed project modeling results only exceed State criteria pollutant significance thresholds for 1-hour NO_2. The results are presented in Table 4.

Federal Standards

The maximum CO impact concentrations for 1-hour and 8-hour averages are 8,221.1 and 4,967.4 $\mu g/m^3$, respectively. The maximum NO_2 impact concentrations for 1-hour and annual averages are 302.8 and 52.7 $\mu g/m^3$, respectively. The maximum PM10 impact concentrations for 24-hour and annual averages are 3.5 and 0.9 $\mu g/m^3$, respectively. The maximum PM2.5 impact concentrations for 24-hour and annual averages are 3.5 and 0.9 $\mu g/m^3$, respectively. Therefore, the proposed project modeling results only exceed Federal criteria pollutant significance thresholds for 1-hour NO_2. The results are presented in Table 4.

CONCLUSIONS

The emissions for the proposed project results in a significant change in air quality and exceedances of both state and federal air quality standards for 1-hour NO_2 during the peak on-site construction. The emissions for the proposed project do not result~~s~~ in a significant change in air quality for CO, annual NO_2, or PM emission during the construction phase.

TABLES

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Tesoro Integration and Compliance Project
Localized Significance Threshold Analysis

Table 1. Onsite Construction Emission Summary

	2017 - Month 20								
	33.84	30.81	30.44	30.44	29.31	112.84	38.42	79.11	155.19
PM10 (lb/day)	2.12	1.76	1.86	1.86	1.72	6.68	2.54	5.38	8.44
PM2.5 (lb/day)(1)	2.07	1.73	1.82	1.82	1.68	6.55	2.49	5.27	8.27

	2017 - Month 20								
Emission from Trips - Onsite	**C-No51**	**C-Wet**	**Pipe1**	**Pipe2**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**	**TAR-WHTU**
CO (lb/day)	0.10	0.10	0.16	0.16	0.08	0.09	0.12	0.18	0.12
NOx (lb/day)	0.11	0.11	0.09	0.09	0.11	0.11	0.11	0.14	0.13
PM10 (lb/day)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.06	0.05
Exhuast PM (lb/day)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fugitive PM (lb/day)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.04
PM2.5 (lb/day)(1)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Exhuast PM (lb/day)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fugitive PM (lb/day)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

	2017 - Month 20								
Fugitive Earthmoving PM - Peak	**C-No51**	**C-Wet**	**Pipe1**	**Pipe2**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**	**TAR-WHTU**
PM10 (lb/day)(2)	0.00	2.36	2.36	2.36	0.00	2.36	2.36	0.00	0.00
PM2.5 (lb/day)(1)(2)	0.00	1.37	1.37	1.37	0.00	1.37	1.37	0.00	0.00

	2017 - Month 20								
Offroad Fugitive PM - Peak	**C-No51**	**C-Wet**	**Pipe1**	**Pipe2**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**	**TAR-WHTU**
PM10 (lb/day)(2)	0.00	0.00	0.37	0.37	0.00	0.00	0.00	0.74	0.00
PM2.5 (lb/day)(1)(2)	0.00	0.00	0.08	0.08	0.00	0.00	0.00	0.16	0.00

		2017 - Month 20								
Total Emissions	**Thresholds**	**C-No51**	**C-Wet**	**Pipe1**	**Pipe2**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**	**TAR-WHTU**
CO (lb/day)	550	32.77	30.59	25.67	25.67	26.97	99.65	37.95	82.11	114.37
NOx (lb/day)	100	33.95	30.92	30.53	30.53	29.42	112.95	38.53	79.25	155.32
PM10 (lb/day)(2)	150	2.16	4.17	4.63	4.63	1.76	9.08	4.94	6.17	8.49
PM2.5 (lb/day)(1)(2)	55	2.09	3.11	3.29	3.29	1.70	7.93	3.87	5.44	8.29
CO (lb/hr)	NA	3.28	3.06	2.57	2.57	2.70	9.96	3.80	8.21	5.72
NOx (lb/hr)	NA	3.39	3.09	3.05	3.05	2.94	11.29	3.85	7.93	7.77
PM10 (lb/hr)(2)	NA	0.22	0.42	0.46	0.46	0.18	0.91	0.49	0.62	0.42
PM2.5 (lb/hr)(1)(2)	NA	0.21	0.31	0.33	0.33	0.17	0.79	0.39	0.54	0.41

(1) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_5ratio.xls

(2) Mitigated PM.

M:\MC\2844 Tesoro - Synergy\Construction\LST\2844 - LST Report Tables (rev4).xlsx: Peak Emissions

Tesoro Integration and Compliance Project
Localized Significance Threshold Analysis

Table 2. Modeling Results

Criteria Pollutant	Averaging Period	Max (µg/m3)	UTME	UTMN
CO	1-hr	291.38	385250	3739503
	8-hr	58.46	385250	3739503
NO_2	1-hr	200.43	385250	3739503
	1-hr (98%)	156.51	385250	3739503
	Annual	4.99	385250	3739503
PM10	24-hr	3.46	385250	3739503
	Annual	0.86	384900	3740000
PM2.5	24-hr	3.46	385250	3739503
	Annual	0.86	384900	3740000

Model results based on the last 5 years of available meterological data from SCAQMD for Long Beach.

Assumes PM2.5 is 100% of PM10.

Table 3. Ambient Concentrations

Criteria Pollutant	Averaging Period	Concentration (ppm)			Max Conc.	
		2012	2013	2014	(ppm)	(µg/m^3)
CO	1-hr	4.2	4.1	3.7	4.2	7929.8
	8-hr	2.6	2.6	2.6	2.6	4908.9
NO_2	1-hr	0.0978	0.0813	0.1359	0.1359	255.5
	1-hr (98%)	0.0774	0.0713	0.0848	0.0778	146.3
	AAM	0.0253	0.0215	0.0207	0.0253	47.7
		Concentration (µg/m^3)				
PM10	24-hr	54	54	59		59.0
	AAM	25.5	27.3	26.6		27.3
PM2.5	24-hr	46.7	42.9	59		59.0
	AAM	10.57	10.97	26.6		26.6

Data from South Coastal LA County Station number 33 and 77. Missing PM2.5 substituted with PM10.

AAM = Annual Arithmetic Mean

Table 4. Localized Significance Threshold Summary

Criteria Pollutant	Averaging Period	Max Modeled GLC Conc. (µg/m^3)	Background GLC Conc. (µg/m^3)	Total GLC Conc. (µg/m^3)	Most Stringent Air Quality Standard (µg/m^3)	Significant
CO	1-hour	291.38	7929.8	8221.1	23000	NO
	8-hour	58.46	4908.9	4967.4	10000	NO
NO_2	1-hour	200.43	255.5	455.9	339	YES
	1-hour (Federal)	156.51	146.30	302.8	188	YES
	Annual	4.99	47.7	52.7	57	NO
PM10	24-hour	3.46	--	--	10.4	NO
	Annual	0.86	--	--	1	NO
PM2.5	24-hour	3.46	--	--	10.4	NO
	Annual	0.86	--	--	1	NO

FIGURE

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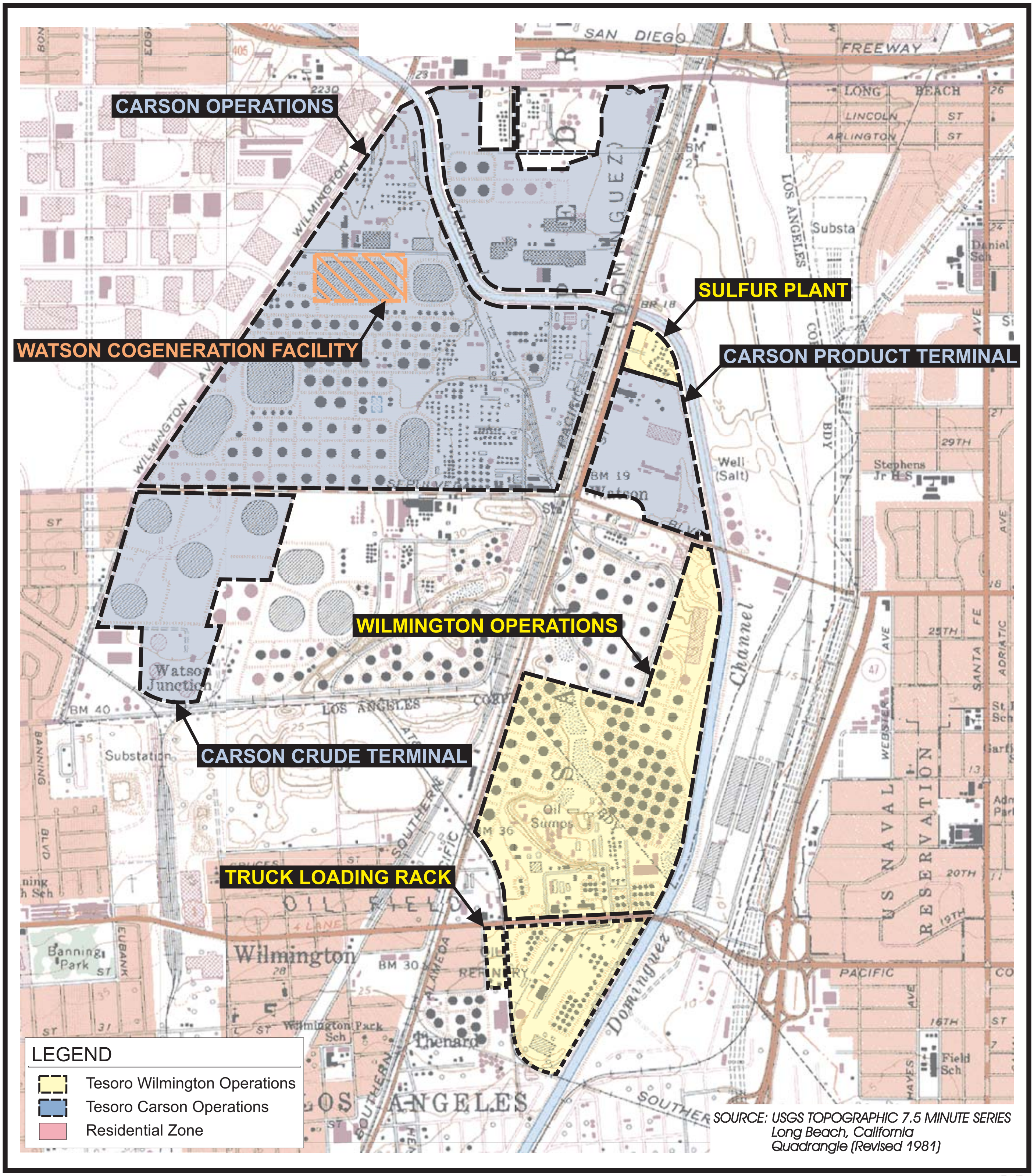

Environmental Audit, Inc.

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FIGURE 1
SITE LOCATION MAP
TESORO LOS ANGELES REFINERY

Project No. 2844

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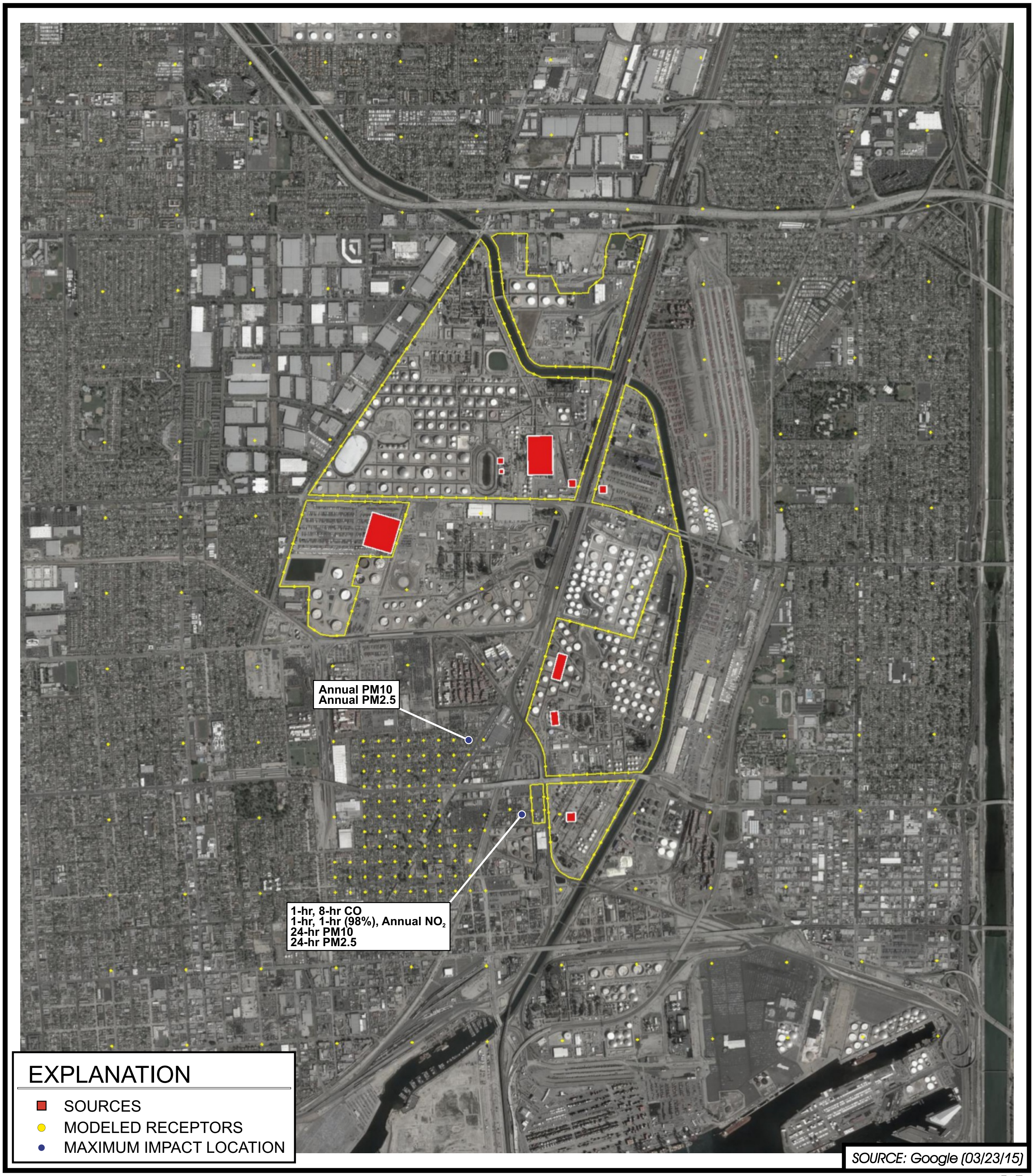

Environmental Audit, Inc.

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FIGURE 2
LST MAXIMUM IMPACT LOCATION MAP
TESORO LOS ANGELES REFINERY

Project No. 2844

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ATTACHMENT A

PEAK EMISSION CALCULATIONS

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Attachment A
Tesoro Integration and Compliance Project
Peak Project Component
Construction Emission Summary

Emissions from Equipment	Component								
	C-No51	C-Wet	Pipe1	Pipe2	C-Alk	W-Tank	C-Tank	W-SAR	TAR-WHTU
VOC (lb/day)	3.93	3.00	3.22	3.22	3.07	11.83	4.54	10.18	13.93
CO (lb/day)	32.67	30.49	25.50	25.50	26.89	99.56	37.84	81.93	114.25
NOx (lb/day)	33.84	30.81	30.44	30.44	29.31	112.84	38.42	79.11	155.19
SOx (lb/day)	0.07	0.08	0.06	0.06	0.06	0.24	0.08	0.18	0.31
PM10 (lb/day)	2.12	1.76	1.86	1.86	1.72	6.68	2.54	5.38	8.44
PM2.5 (lb/day)(1)	2.07	1.73	1.82	1.82	1.68	6.55	2.49	5.27	8.27
CO_2 (lb/day)	1.79	1.88	1.43	1.43	1.56	5.82	1.91	4.22	7.41

Emission from Trips - Onsite	Component								
	C-No51	C-Wet	Pipe1	Pipe2	C-Alk	W-Tank	C-Tank	W-SAR	TAR-WHTU
CO (lb/day)	0.10	0.10	0.16	0.16	0.08	0.09	0.12	0.18	0.12
NOx (lb/day)	0.11	0.11	0.09	0.09	0.11	0.11	0.11	0.14	0.13
SOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.06	0.05
Exhuast PM (lb/day)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fugitive PM (lb/day)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.04
PM2.5 (lb/day)(1)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Exhuast PM (lb/day)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fugitive PM (lb/day)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Fugitive Earthmoving PM - Peak	Component								
	C-No51	C-Wet	Pipe1	Pipe2	C-Alk	W-Tank	C-Tank	W-SAR	TAR-WHTU
PM10 (lb/day)(2)		2.36	2.36	2.36		2.36	2.36		
PM2.5 (lb/day)(1)(2)		1.37	1.37	1.37		1.37	1.37		

Offroad Fugitive PM - Peak	Component								
	C-No51	C-Wet	Pipe1	Pipe2	C-Alk	W-Tank	C-Tank	W-SAR	TAR-WHTU
PM10 (lb/day)(2)			0.37	0.37				0.74	
PM2.5 (lb/day)(1)(2)			0.08	0.08				0.16	

Total Emissions	Thresholds	Component								
		C-No51	C-Wet	Pipe1	Pipe2	C-Alk	W-Tank	C-Tank	W-SAR	TAR-WHTU
CO (lb/day)	550	32.77	30.59	25.67	25.67	26.97	99.65	37.95	82.11	114.37
NOx (lb/day)	100	33.95	30.92	30.53	30.53	29.42	112.95	38.53	79.25	155.32
SOx (lb/day)	150	0.07	0.08	0.06	0.06	0.07	0.24	0.08	0.18	0.31
PM10 (lb/day)(2)	150	2.16	4.17	4.63	4.63	1.76	9.08	4.94	6.17	8.49
PM2.5 (lb/day)(1)(2)	55	2.09	3.11	3.29	3.29	1.70	7.93	3.87	5.44	8.29
CO (lb/hr)	NA	3.28	3.06	2.57	2.57	2.70	9.96	3.80	8.21	5.72
NOx (lb/hr)	NA	3.39	3.09	3.05	3.05	2.94	11.29	3.85	7.93	7.77
SOx (lb/hr)	NA	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02
PM10 (lb/hr)(2)	NA	0.22	0.42	0.46	0.46	0.18	0.91	0.49	0.62	0.42
PM2.5 (lb/hr)(1)(2)	NA	0.21	0.31	0.33	0.33	0.17	0.79	0.39	0.54	0.41

(1) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_5ratio.xls

(2) Mitigated PM.

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment - Peak CO

Equipment	C-No51	C-Wet	Pipe	C-Alk	W-Tank	C-Tank	W-SAR	TAR-WHTU
<40 T Cranes	1	1	3	0.75	6	2	2	2
>40T Cranes	1		2	0.75	2		1	2
Pile Rig		0.1			0.5		1	
Tractors	0.5	0.5	1	0.2	1	1	3	0.5
Welders	8	4	8	5	20	8	24	3
Light Plants	0.5	1	4	1	4	2	3	1
Genertors	0		4		4	1		1
Hydro Vacs		0.25					0.5	
Fork Lifts	0.75	1	2	1	4	2	3	0.5
Loader/Backhoe	0.1	0.2	1	0.2	2	2	1	0.2
Air Compressors	0.1	0.1	4	0.3	1	2	0.75	0.1
Manlifts	4	5	2	4	10	2	4	3
Crawler Tractors								
Scrapers								
Rubber Tired Loaders								
Graders								
Rollers								
Excavators								

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

		Component						
Equipment	**Hours (hr/day)**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
<40 T Cranes	7	1	1	3	1	6	2	2
>40T Cranes	5	1	0	2	1	2	0	1
Pile Rig	8	0	1	0	0	1	0	1
Tractors	5	1	1	1	1	1	1	3
Welders	8	8	4	8	5	20	8	24
Light Plants	3	1	1	4	1	4	2	3
Genertors	3	0	0	4	0	4	1	0
Hydro Vacs	5	0	1	0	0	0	0	1
Fork Lifts	4	1	1	2	1	4	2	3
Loader/Backhoe	5	1	1	1	1	2	2	1
Air Compressors	4	1	1	4	1	1	2	1
Manlifts	8	4	5	2	4	10	2	4

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Component						
VOC	**2017**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
<40 T Cranes	0.065	0.46	0.46	1.37	0.46	2.75	0.92	0.92
>40T Cranes	0.072	0.36	0.00	0.72	0.36	0.72	0.00	0.36
Pile Rig	0.040	0.00	0.32	0.00	0.00	0.32	0.00	0.32
Tractors	0.030	0.15	0.15	0.15	0.15	0.15	0.15	0.46
Welders	0.036	2.29	1.15	2.29	1.43	5.73	2.29	6.87
Light Plants	0.036	0.11	0.11	0.43	0.11	0.43	0.21	0.32
Genertors	0.042	0.00	0.00	0.50	0.00	0.50	0.13	0.00
Hydro Vacs	0.042	0.00	0.21	0.00	0.00	0.00	0.00	0.21
Fork Lifts	0.019	0.08	0.08	0.16	0.08	0.31	0.16	0.23
Loader/Backhoe	0.030	0.15	0.15	0.15	0.15	0.30	0.30	0.15
Air Compressors	0.036	0.14	0.14	0.57	0.14	0.14	0.29	0.14
Manlifts	0.006	0.19	0.23	0.09	0.19	0.47	0.09	0.19
Total		3.93	3.00	6.44	3.07	11.83	4.54	10.18

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Component						
CO	**2017**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
<40 T Cranes	0.415	2.91	2.91	8.72	2.91	17.44	5.81	5.81
>40T Cranes	0.424	2.12	0.00	4.24	2.12	4.24	0.00	2.12
Pile Rig	0.501	0.00	4.01	0.00	0.00	4.01	0.00	4.01
Tractors	0.367	1.83	1.83	1.83	1.83	1.83	1.83	5.50
Welders	0.241	15.41	7.71	15.41	9.63	38.53	15.41	46.24
Light Plants	0.305	0.91	0.91	3.66	0.91	3.66	1.83	2.74
Genertors	0.473	0.00	0.00	5.67	0.00	5.67	1.42	0.00
Hydro Vacs	0.480	0.00	2.40	0.00	0.00	0.00	0.00	2.40
Fork Lifts	0.452	1.81	1.81	3.62	1.81	7.24	3.62	5.43
Loader/Backhoe	0.367	1.83	1.83	1.83	1.83	3.67	3.67	1.83
Air Compressors	0.221	0.88	0.88	3.53	0.88	0.88	1.77	0.88
Manlifts	0.155	4.95	6.19	2.48	4.95	12.38	2.48	4.95
Total		32.67	30.49	51.00	26.89	99.56	37.84	81.93

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Component						
NOX	**2017**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
<40 T Cranes	0.909	6.36	6.36	19.09	6.36	38.19	12.73	12.73
>40T Cranes	1.117	5.58	0.00	11.17	5.58	11.17	0.00	5.58
Pile Rig	0.675	0.00	5.40	0.00	0.00	5.40	0.00	5.40
Tractors	0.358	1.79	1.79	1.79	1.79	1.79	1.79	5.37
Welders	0.189	12.08	6.04	12.08	7.55	30.19	12.08	36.23
Light Plants	0.189	0.57	0.57	2.26	0.57	2.26	1.13	1.70
Genertors	0.453	0.00	0.00	5.44	0.00	5.44	1.36	0.00
Hydro Vacs	0.453	0.00	2.27	0.00	0.00	0.00	0.00	2.27
Fork Lifts	0.297	1.19	1.19	2.38	1.19	4.76	2.38	3.57
Loader/Backhoe	0.358	1.79	1.79	1.79	1.79	3.58	3.58	1.79
Air Compressors	0.189	0.75	0.75	3.02	0.75	0.75	1.51	0.75
Manlifts	0.116	3.72	4.65	1.86	3.72	9.31	1.86	3.72
Total		33.84	30.81	60.88	29.31	112.84	38.42	79.11

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Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Component						
SOx	**2017**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
<40 T Cranes	0.001	0.01	0.01	0.03	0.01	0.06	0.02	0.02
>40T Cranes	0.002	0.01	0.00	0.02	0.01	0.02	0.00	0.01
Pile Rig	0.002	0.00	0.02	0.00	0.00	0.02	0.00	0.02
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Welders	0.000	0.02	0.01	0.02	0.02	0.06	0.02	0.07
Light Plants	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Genertors	0.001	0.00	0.00	0.01	0.00	0.01	0.00	0.00
Hydro Vacs	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.001	0.00	0.00	0.01	0.00	0.01	0.01	0.01
Loader/Backhoe	0.001	0.00	0.00	0.00	0.00	0.01	0.01	0.00
Air Compressors	0.000	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Manlifts	0.000	0.01	0.02	0.01	0.01	0.04	0.01	0.01
Total		0.07	0.08	0.12	0.06	0.24	0.08	0.18

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

PM10	Emission Rate (lb/hr) 2017	Component C-No51	C-Wet	Pipe	C-Alk	W-Tank	C-Tank	W-SAR
<40 T Cranes	0.043	0.30	0.30	0.90	0.30	1.80	0.60	0.60
>40T Cranes	0.045	0.23	0.00	0.45	0.23	0.45	0.00	0.23
Pile Rig	0.025	0.00	0.20	0.00	0.00	0.20	0.00	0.20
Tractors	0.024	0.12	0.12	0.12	0.12	0.12	0.12	0.35
Welders	0.017	1.06	0.53	1.06	0.66	2.66	1.06	3.19
Light Plants	0.017	0.05	0.05	0.20	0.05	0.20	0.10	0.15
Genertors	0.035	0.00	0.00	0.43	0.00	0.43	0.11	0.00
Hydro Vacs	0.035	0.00	0.18	0.00	0.00	0.00	0.00	0.18
Fork Lifts	0.015	0.06	0.06	0.12	0.06	0.24	0.12	0.18
Loader/Backhoe	0.024	0.12	0.12	0.12	0.12	0.24	0.24	0.12
Air Compressors	0.017	0.07	0.07	0.27	0.07	0.07	0.13	0.07
Manlifts	0.004	0.11	0.14	0.06	0.11	0.28	0.06	0.11
Total		2.12	1.76	3.72	1.72	6.68	2.54	5.38

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (MT/hr)	Component						
CO2EQ	**2017**	**C-No51**	**C-Wet**	**Pipe**	**C-Alk**	**W-Tank**	**C-Tank**	**W-SAR**
<40 T Cranes	0.035	0.25	0.25	0.74	0.25	1.48	0.49	0.49
>40T Cranes	0.051	0.26	0.00	0.51	0.26	0.51	0.00	0.26
Pile Rig	0.059	0.00	0.47	0.00	0.00	0.47	0.00	0.47
Tractors	0.019	0.10	0.10	0.10	0.10	0.10	0.10	0.29
Welders	0.009	0.60	0.30	0.60	0.38	1.50	0.60	1.80
Light Plants	0.009	0.03	0.03	0.11	0.03	0.11	0.06	0.08
Genertors	0.018	0.00	0.00	0.22	0.00	0.22	0.05	0.00
Hydro Vacs	0.018	0.00	0.09	0.00	0.00	0.00	0.00	0.09
Fork Lifts	0.021	0.09	0.09	0.17	0.09	0.34	0.17	0.26
Loader/Backhoe	0.019	0.10	0.10	0.10	0.10	0.19	0.19	0.10
Air Compressors	0.009	0.04	0.04	0.15	0.04	0.04	0.08	0.04
Manlifts	0.011	0.34	0.43	0.17	0.34	0.85	0.17	0.34
Total		1.79	1.88	2.87	1.56	5.82	1.91	4.22

Onsite Construction Vehicle Trip Emissions

Vehicle	Miles per Day	C-No51	C-Wet	Pipe	C-Alk	W-Tank	C-Tank	W-SAR
		Component (Vehicles per day)						
Cars	2							
Pickup Trucks	2	10	10	42	7	8	12	21
Total Light Vehicle Miles		20	20	84	14	16	24	42
Water Truck	10	1	1	1	1	1	1	1
Delivery Truck	2							
1 Ton Truck	2	1	1	3	1	1	1	2
Misc. MD Truck	5							
Total Medium Truck Miles		12	12	16	12	12	12	14
Truck, Dump Ford LT8000	2		0	0	0	0	0	0
Concrete Truck	2		0	0	0	0	0	0
Semi-Tractor, Diesel 20 Ton	2		0	0	0	0	0	0
Misc. HD Truck	2		0	0	0	0	0	0
Total Heavy Truck Miles		0	0	0	0	0	0	0

	Emission Rate (lb/mi)(1)	Component (lb/day)						
VOC	**2017**	**C-No51**	**CNHDS**	**Pipe**	**C-Alk**	**W-Tank**	**W-PST**	**W-SAR**
Light Duty	0.0001035	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Medium Duty	0.0003717	0.00	0.00	0.01	0.00	0.00	0.00	0.01
Heavy Duty	0.0006131	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.01	0.01	0.01	0.01	0.01	0.01	0.01

CO	2017	C-No51	CNHDS	Pipe	C-Alk	W-Tank	W-PST	W-SAR
Light Duty	0.0033327	0.07	0.07	0.28	0.05	0.05	0.08	0.14
Medium Duty	0.0030301	0.04	0.04	0.05	0.04	0.04	0.04	0.04
Heavy Duty	0.0043046	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.10	0.10	0.33	0.08	0.09	0.12	0.18

NOx	2017	C-No51	CNHDS	Pipe	C-Alk	W-Tank	W-PST	W-SAR
Light Duty	0.0005080	0.01	0.01	0.04	0.01	0.01	0.01	0.02
Medium Duty	0.0082326	0.10	0.10	0.13	0.10	0.10	0.10	0.12
Heavy Duty	0.0154328	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.11	0.11	0.17	0.11	0.11	0.11	0.14

SOx	2017	C-No51	CNHDS	Pipe	C-Alk	W-Tank	W-PST	W-SAR
Light Duty	0.0000090	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000217	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000359	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00

PM10	2017	C-No51	CNHDS	Pipe	C-Alk	W-Tank	W-PST	W-SAR
Light Duty Exhaust	0.0001064	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0004787	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Heavy Duty Exhaust	0.0004727	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.01	0.01	0.02	0.01	0.01	0.01	0.01
Light Duty Fugitive(2)	0.000386	0.01	0.01	0.03	0.01	0.01	0.01	0.02
Medium Duty Fugitve(2)	0.002104	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Heavy Duty Fugitive(2)	0.020119	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.03	0.03	0.07	0.03	0.03	0.03	0.05
Total		0.04	0.04	0.08	0.04	0.04	0.04	0.06

CO_{2EQ}	2017	C-No51	CNHDS	Pipe	C-Alk	W-Tank	W-PST	W-SAR
Light Duty	0.907	18.14	18.14	76.19	12.70	14.51	21.77	38.10
Medium Duty	2.261	27.13	27.13	36.18	27.13	27.13	27.13	31.65
Heavy Duty	3.768	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		45.27	45.27	112.37	39.83	41.64	48.90	69.75

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, December 2003

$E = k(sL/2)^{0.65} \times (W/3)^{1.5} - C$

Where: k = 0.016 lb/VMT for PM10, sL = road silt loading (gms/m2) from CARB Methodology 7.9 for paved roads (0.240 for local roads and 0.037 for major/collector roads), W = weight of vehicles (2.4 tons for light; 5 for medium trucks, and 20 for heavy trucks), and C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (0.00047 lbs/VMT).

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

	2017		
Chemical	**Light**	**Medium**	**Heavy**
CO2 (lb/mi)	0.8956	2.2575	3.7642
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.907	2.261	3.768

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

Equipment	Hours (hr/day)	Wilmington HTU Turnaround
<40 T Cranes	14	4
>40T Cranes	10	4
Pile Rig	16	0
Tractors	10	1
Welders	16	6
Light Plants	15	2
Genertors	15	2
Hydro Vacs	10	0
Fork Lifts	8	1
Loader/Backhoe	10	1
Air Compressors	8	1
Manlifts	16	6

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Wilmington HTU Turnaround
VOC	**2017**	
<40 T Cranes	0.065	3.66
>40T Cranes	0.072	2.89
Pile Rig	0.040	0.00
Tractors	0.030	0.30
Welders	0.036	3.44
Light Plants	0.036	1.07
Genertors	0.042	1.25
Hydro Vacs	0.042	0.00
Fork Lifts	0.019	0.16
Loader/Backhoe	0.030	0.30
Air Compressors	0.036	0.29
Manlifts	0.006	0.56
Total		13.93

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

	Emission Rate (lb/hr)	Wilmington HTU Turnaround
CO	**2017**	
<40 T Cranes	0.415	23.25
>40T Cranes	0.424	16.97
Pile Rig	0.501	0.00
Tractors	0.367	3.67
Welders	0.241	23.12
Light Plants	0.305	9.14
Genertors	0.473	14.19
Hydro Vacs	0.480	0.00
Fork Lifts	0.452	3.62
Loader/Backhoe	0.367	3.67
Air Compressors	0.221	1.77
Manlifts	0.155	14.86
Total		114.25

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

NOX	Emission Rate (lb/hr) 2017	Wilmington HTU Turnaround
<40 T Cranes	0.909	50.92
>40T Cranes	1.117	44.68
Pile Rig	0.675	0.00
Tractors	0.358	3.58
Welders	0.189	18.11
Light Plants	0.189	5.66
Genertors	0.453	13.60
Hydro Vacs	0.453	0.00
Fork Lifts	0.297	2.38
Loader/Backhoe	0.358	3.58
Air Compressors	0.189	1.51
Manlifts	0.116	11.17
Total		155.19

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

SOx	Emission Rate (lb/hr) 2017	Wilmington HTU Turnaround
<40 T Cranes	0.001	0.08
>40T Cranes	0.002	0.09
Pile Rig	0.002	0.00
Tractors	0.001	0.01
Welders	0.000	0.04
Light Plants	0.000	0.01
Genertors	0.001	0.02
Hydro Vacs	0.001	0.00
Fork Lifts	0.001	0.01
Loader/Backhoe	0.001	0.01
Air Compressors	0.000	0.00
Manlifts	0.000	0.04
Total		0.31

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

PM10	Emission Rate (lb/hr) 2017	Wilmington HTU Turnaround
<40 T Cranes	0.043	2.40
>40T Cranes	0.045	1.81
Pile Rig	0.025	0.00
Tractors	0.024	0.24
Welders	0.017	1.60
Light Plants	0.017	0.50
Genertors	0.035	1.06
Hydro Vacs	0.035	0.00
Fork Lifts	0.015	0.12
Loader/Backhoe	0.024	0.24
Air Compressors	0.017	0.13
Manlifts	0.004	0.34
Total		8.44

Attachment A
Tesoro Integration and Compliance Project

Construction Equipment Emissions

CO2EQ	Emission Rate (MT/hr) 2017	Wilmington HTU Turnaround
<40 T Cranes	0.035	1.98
>40T Cranes	0.051	2.06
Pile Rig	0.059	0.00
Tractors	0.019	0.19
Welders	0.009	0.90
Light Plants	0.009	0.28
Genertors	0.018	0.54
Hydro Vacs	0.018	0.00
Fork Lifts	0.021	0.17
Loader/Backhoe	0.019	0.19
Air Compressors	0.009	0.08
Manlifts	0.011	1.02
Total		7.41

Attachment A
Tesoro Integration and Compliance Project

Onsite Construction Vehicle Trip Emissions

Vehicle	Miles per Day	Vehicles W-HTU
Cars	2	
Pickup Trucks	2	12
Total Light Vehicle Miles		24
Water Truck	10	1
Delivery Truck	2	
1 Ton Truck	2	2
Misc. MD Truck	5	
Total Medium Truck Miles		14
Truck, Dump Ford LT8000	2	0
Concrete Truck	2	0
Semi-Tractor, Diesel 20 Ton	2	0
Misc. HD Truck	2	0
Total Heavy Truck Miles		0

	Emission Rate (lb/mi)(1)	W-HCU
VOC	**2017**	**(lb/day)**
Light Duty	0.0001035	0.00
Medium Duty	0.0003717	0.01
Heavy Duty	0.0006131	0.00
Total		0.01

CO	**2017**	**W-HCU**
Light Duty	0.0033327	0.08
Medium Duty	0.0030301	0.04
Heavy Duty	0.0043046	0.00
Total		0.12

NOx	**2017**	**W-HCU**
Light Duty	0.0005080	0.01
Medium Duty	0.0082326	0.12
Heavy Duty	0.0154328	0.00
Total		0.13

SOx	**2017**	**W-HCU**
Light Duty	0.0000090	0.00
Medium Duty	0.0000217	0.00
Heavy Duty	0.0000359	0.00
Total		0.00

PM10	**2017**	**W-HCU**
Light Duty Exhaust	0.0001064	0.00
Medium Duty Exhaust	0.0004787	0.01
Heavy Duty Exhaust	0.0004727	0.00
Total Exhaust PM		0.01
Light Duty Fugitive(2)	0.000386	0.01
Medium Duty Fugitve(2)	0.002104	0.03
Heavy Duty Fugitive(2)	0.020119	0.00
Total Fugitive PM		0.04
Total		0.05

CO_{2EQ}	**2017**	**W-HCU**
Light Duty	0.907	21.77
Medium Duty	2.261	31.65
Heavy Duty	3.768	0.00
Total		53.42

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, December 2003

$E = k(sL/2)^{0.65} \times (W/3)^{1.5} - C$

Where: k = 0.016 lb/VMT for PM10, sL = road silt loading (gms/m2) from CARB Methodology 7.9 for paved roads (0.240 for local roads and 0.037 for major/collector roads), W = weight of vehicles (2.4 tons for light; 5 for medium trucks, and 20 for heavy trucks), and C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (0.00047 lbs/VMT).

(3) Carbon Dioxide Equivalence (CO_E) = CO_2 + CH_4 * 21 + N2O*310

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

	2017		
Chemical	**Light**	**Medium**	**Heavy**
CO2 (lb/mi)	0.8956	2.2575	3.7642
CH4 (g/mi)	0.0148	0.0051	0.0051
N2O (g/mi)	0.0157	0.0048	0.0048
CO2e (lb/mi)	0.907	2.261	3.768

Attachment A
Tesoro Integration and Compliance Project

Offroad Construction Vehicle Dust Emissions

Vehicle	Miles/Trip	Trips/Day
Light Vehicles	0.05	1
Total Light Vehicle Miles		0.05

Delivey Trucks	0.05	0
Water Trucks	0.1	1
Total Medium Truck Miles		0.1

Concrete Truck	0.05	0
Dump Trucks	0.05	10
Total Heavy Truck Miles		0.5

Tractors	0.05	1
Fork Lifts	0.05	2
Loader/Backhoe	0.05	2
Total Heavy-Heavy Duty Miles		0.25

PM10	Emission Rate (lb/mi)(1)	Emissions (lb/day)
Light Duty	0.9021196	0.05
Medium Duty	1.2863357	0.13
Heavy Duty	2.1931267	1.10
Heavy Heavy Duty	2.4962390	0.62
Uncontrolled Total		1.89
Controlled Total(2)		0.74

(1) Based on Section 13.2.2 of EPA's Compilation of Air Pollutant Emission Factors (AP-42).
Emission Rate = 1.5((s/12)^.9)*((W/3)^.45)
s = silt content = 8.5%
W = Vehicle Weight (ton) =2.5 for light, 5.5 for medium, 15 for heavy,
and 24 for heavy heavy (EMFAC2007).

(2) Controlled Emissions assume that watering 3 times per day reduces emissions by
61 percent (Uncontrolled Emissions x 0.39)

Attachment A
Tesoro Integration and Compliance Project

Peak Monthly Fugitive PM Construction Emissions

Grading Operations	Average Pieces of Equipment Operating	Peak Pieces of Equipment Operating	Hours of Operation	PM10 Emission Factor (lb/hour)	Water Control Factor[5]	Controlled Emissions Average PM10 Emissions (lbs/day)	Controlled Emissions Peak PM10 Emissions (lbs/day)	Uncontrolled Emissions Average PM10 Emissions (lbs/day)	Uncontrolled Emissions Peak PM10 Emissions (lbs/day)	SCAQMD Emission Factor Source
Construction Activities[1]	2	2	8	0.348	0.39	2.17	2.17	5.56218435	5.56218435	Table A9-9-F

Stockpiles	Average Tons of Materials Handled Per Day	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor[5]	Controlled Emissions Average PM10 Emissions Pounds/day	Controlled Emissions Peak PM10 Emissions Pounds/day	Uncontrolled Emissions Average PM10 Emissions Pounds/day	Uncontrolled Emissions Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Construction Activities[2]	1200	1200	0.00005	0.39	0.02411771	0.02411771	0.06184029	0.06184029	Table A9-9-G

Assumptions: 1cubic yard trench spoils = 1 ton

WIND EROSION Disturbed Area and Temporary Stockpiles	Days of Construction	Average Acreage Disturbed Per Day	Peak Acreage Disturbed Per Day	PM10 Emission Factor (lb/day/acre)	Average PM10 Emissions Pounds/day	Peak PM10 Emissions Pounds/day	Average PM10 Emissions Tons/Year	Peak PM10 Emissions Tons/Year	SCAQMD Emission Factor Source
Construction Activities[3]	20	0.25	1	0.120	0.030	0.120	0.000	0.001	Table A9-9-E

Filling and Dumping	Estimated Materials Handled Per Day (tons)	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor[5]	Controlled Emissions Average PM10 Emissions Pounds/day	Controlled Emissions Peak PM10 Emissions Pounds/day	Uncontrolled Emissions Average PM10 Emissions Pounds/day	Uncontrolled Emissions Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Truck Filling[4]	1200.0	1200.0	5.153E-05	0.39	0.02411771	0.02411771	0.06184029	0.06184029	Table A9-9
Truck Dumping	1200.0	1200.0	5.153E-05	0.39	0.02411771	0.02411771	0.06184029	0.06184029	Table A9-9

TOTAL PM10 Pounds/day	Average	Peak
(Controlled Emissions)	2.2715	2.36133
(Uncontrolled Emissions)	5.748	5.749

(1) Emissions (lbs/hr) = $[0.75 \times (G^{1.5})/(H^{1.4}) \times J$
where G = silt content (7.5%), H = moisture content (15.0%) and J = hrs of operation (EPA AP-42 Table 11.9-1 for bulldozing overburden).
(2) Emissions (lbs/ton) = $0.00112 \times [(G/5)^{1.3}/(H/2)^{1.4}] \times I/J$
where G=mean wind speed (4.1 mph), H=moisture content of surface material (15%); I=lbs of dirt handled per day; and J=2,000 lbs/ton. Wind speed data acquired from Long Beach 2005-2007 SCAQMD meteorological file.
(3) Emissions (lbs/day/acre) = 1.7 x [(G/1.5)*(365-H)/235] x I/15 x J
where G = silt content (7.5%); H = days with >0.01 inch of rain (34); I = percentage of time wind speed exceeds 12 mph (0.3%) and J= fraction of TSP (0.5). Wind speed data acquired from Long Beach 2005-2007 SCAQMD meteorological file.
(4) Used SCAQMD Table 9-9 Default emission factors.
(5) Mitigated Emissions assume that watering 3 times per day controls emissions by 61 percent (Uncontrolled Emissions x 0.39). www.AQMD.gov/CEQA/handbook/mitigation/fugitive/Table XI-A.doc

APPENDIX B-3

OPERATIONAL EMISSION CALCULATIONS

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ASHWORTH LEININGER GROUP

Tesoro Refining & Marketing Company, LLC

Air Quality Analysis
Los Angeles Refinery Integration & Compliance Project

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~~March 2016~~ February 2017

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PREFACE

Criteria Pollutant Air Quality Impact Analysis

In March 2016, Ashworth Leininger Group prepared a criteria pollutant air quality analysis to evaluate the proposed Tesoro Los Angeles Refinery Integration and Compliance Project. The analysis considered criteria pollutant (NO_2, SO_2, CO, PM_{10} and $PM_{2.5}$) emission increases associated with the proposed project. This analysis was used to support the March 2016 draft EIR (DEIR).

The analysis has been revised for the final EIR (FEIR) to include updates and technical corrections identified during review of the document to respond to public comments on the DEIR. Updates and corrections include the following:

- Inclusion of criteria pollutant emissions from onsite truck traffic associated with the project.
- Inclusion of PM emissions from increased coke handling at Wilmington Operations.
- Sulfuric Acid Regeneration Plant (SARP) reactor H_2SO_4 emissions have been included as condensable particulate emissions in the analysis.
- Stack temperatures for SRP Incinerators F704 and F754 and Heater H-101 were updated.

The updates and corrections listed above caused changes to the modeled criteria pollutant concentrations reported in the DEIR. A comparison of the modeling results in the DEIR and the FEIR are shown in the tables below:

Table A. Comparison of Modeled NO_2, SO_2, and CO Concentrations plus Background

Pollutant	Averaging Period	Max concentration (ug/m3)		AAQS
		DEIR (model result including background)	FEIR (model result including background)	
NO_2	1 Hour - State	301.4	304.0	339
	1 Hour - Federal	184.9	187.1	188
	Annual	49.7*	49.7	57
SO_2	1 Hour - State	71.4	71.4	655
	1 Hour - Federal	46.6	46.6	196
	24 Hour	65.5	65.5	105
CO	1 Hour	4,819.4	4,820.2	23,000
	8 Hour	2,980.6	2,982.1	10,000

* There was a copy/paste error in the March 2016 report, and the value listed for NO_2 annual (including background) was 49.7. The correct value is 49.4.

Table B. Comparison of Modeled PM_{10} and $PM_{2.5}$ Concentrations

Pollutant	Averaging Period	Max concentration (ug/m3) DEIR	Max concentration (ug/m3) FEIR[1]
PM_{10}	24 Hour	0.42	0.42
	Annual	0.16	0.52
$PM_{2.5}$	24 Hour	0.42	0.42
	Annual	0.16	0.52

The updates and corrections listed above, resulted in minor changes to the modeled ambient air quality concentrations. The updated modeling results continue to demonstrate compliance with all state and federal ambient air quality standards.

Health Risk Assessment (HRA)

In March 2016, Ashworth Leininger Group prepared a Health Risk Assessment (HRA) to evaluate the proposed Tesoro Los Angeles Refinery Integration and Compliance Project. The HRA considered toxic chemical emission increases associated with the proposed project. This HRA was used to support the March 2016 draft EIR (DEIR).

The HRA has been revised for the final EIR (FEIR) to include updates and technical corrections identified during review of the document to respond to public comments on the DEIR. Updates and corrections include the following:

- Inclusion of diesel particulate matter emissions from onsite truck traffic associated with the project.
- Inclusion of toxics resulting from increased coke handling at the Wilmington Operations.
- Sulfuric acid mist emissions from refinery fuel gas and natural gas process heaters have been updated to reflect methodologies published in the Oil & Gas Journal.
- Sulfuric Acid Regeneration Plant (SARP) emissions of H_2SO_4 have been reduced based on updated information from a SARP and emissions control equipment vendor.
- Hydrogen cyanide (HCN) emissions at the Carson Operations Fluid Catalytic Cracking Unit have been added.
- Four residential receptors not included in the original modeling were included in the FEIR.
- Stack temperatures for SRP Incinerators F704 and F754 and Heater H-101 were updated.
- Tables showing the health risk by source and also by chemical, at the maximally exposed receptors were added to the report.

The updates and corrections listed above caused changes to the health risk values reported in the DEIR. A comparison of the predicted health risks in the DEIR and the FEIR are shown in the table below:

[1] Not all sources experience daily or hourly increases but may experience annual increases. Therefore modeled annual concentrations may be greater than short term concentrations at some receptors.

Table C. Comparison of Predicted Health Risks (DEIR vs FEIR)

Maximally Exposed Individual	DEIR Result	DEIR UTM Coordinates (NAD83) Easting (m)	DEIR UTM Coordinates (NAD83) Northing (m)	FEIR Result	FEIR UTM Coordinates (NAD83) Easting (m)	FEIR UTM Coordinates (NAD83) Northing (m)
Residential						
Cancer Risk (Increase Cases in-one-million)	3.6	383700	3741400	3.7	383700	3741400
Chronic Risk (Hazard Index)	0.049	387500	3739600	0.030	385251	3739503
8-Hr Chronic Risk (Hazard Index)	0.006	383700	3741400	0.006	383700	3741400
Acute Risk (Hazard Index)	0.052	385305	3742454	0.052	385305	3742454
Offsite Workplace						
Cancer Risk (Increase Cases in-one-million)	9.2	386006	3742921	9.3	386006	3742921
Chronic Risk (Hazard Index)	0.127	386000	3739500	0.106	386153	3741128
8-Hr Chronic Risk (Hazard Index)	0.108	386153	3741128	0.108	386153	3741128
Acute Risk (Hazard Index)	0.052	385305	3742454	0.052	385305	3742454
Sensitive Receptor						
Cancer Risk (Increase Cases in-one-million)	2.1	386721	3739987	2.1	386721	3739987
Chronic Risk (Hazard Index)	0.054	387304	3739447	0.025	387304	3739447
8-Hr Chronic Risk (Hazard Index)	0.005	386721	3739987	0.005	386721	3739987
Acute Risk (Hazard Index)	0.010	386721	3739987	0.010	386721	3739987

The updates and corrections listed above, resulted in minor changes to the modeled health risk results. The updated modeling continues to demonstrate a project cancer risk increase below 10 in one million and chronic and acute hazard indices below 1.

1. INTRODUCTION

Ashworth Leininger Group (ALG) was contracted by the Tesoro Refining & Marketing Company LLC (Tesoro) Los Angeles Refinery (Refinery) to perform emissions calculations and perform an air quality analysis of the impacts of stationary sources associated with the Integration and Compliance Project. ALG's analysis has been prepared to support the California Environmental Quality Act (CEQA) analysis for the project. This report is prepared based on design and emissions information provided by Tesoro.

In June 2013, Tesoro purchased the BP West Coast Products LLC (BP) Carson Refinery (now named the Tesoro Los Angeles Refinery – Carson Operations) which is adjacent to the Tesoro Los Angeles Refinery – Wilmington Operations. The Los Angeles Refinery – Wilmington Operations is located at 2101 East Pacific Coast Highway, Wilmington, CA while the Los Angeles Refinery – Carson Operations is located at 2350 East 223rd Street, Carson, CA; both operations are located in the South Coast Air Basin. As these two facilities are adjacent to each other they are considered a single stationary source for air quality evaluation purposes.

Currently, the Wilmington and Carson Operations function as two separate and distinct facilities with limited operational integration. The proposed project is intended to further integrate the Los Angeles Refinery Wilmington and Carson Operations. As part of the project, the refinery will also be modified in order to comply with the federally mandated Tier 3 gasoline specifications, as well as with state and local regulations mandating emission reductions, including but not limited to, California AB32 Greenhouse Gas (GHG) Cap and Trade requirements and SCAQMD RECLAIM NOx and SOx allocation shaves. This project will include the shutdown of the Wilmington Operation's Fluid Catalytic Cracking Unit (FCCU) and reconfiguring the combined Refinery complex with flexibility to improve the gasoline to distillate production ratio in order to meet changing market demand. As part of the project, equipment efficiency and heat recovery will be optimized for new or modified units to minimize GHG and other pollutants. All new and modified sources will meet Best Available Control Technology (BACT) requirements (unless otherwise exempt). The proposed project will have a small impact on crude oil and feedstock throughput capacity. The crude oil and feedstock processing capability at the integrated Refinery will increase by approximately 2% or 6,000 BPD as a result of the proposed project. The type of crude oil and feedstocks will not change as part of the proposed project. The proposed modifications include new and modified equipment, shutdown of existing equipment, as well as piping modifications.

2. AIR QUALITY

This section discusses the methodologies used to conduct the evaluation of air quality impacts for the proposed project and technical methods employed in the evaluation. Emissions calculations are provided in **Attachment A** to this report; calculation strategies are summarized below. The baseline period for this analysis is 2012 and 2013; a summary of the proposed modifications to the Refinery is listed below:

- Shutdown of the Wilmington Operation's Fluid Catalytic Cracking Unit (FCCU) and associated heaters (CO Boiler, H2 Heater, H3 Heater, H4 Heater, H5 Heater and Startup Heater).
- Construction of new heaters to support the new Sulfuric Acid Regeneration Plant.

- Construction of a Propane Storage and Treatment Unit, Sulfuric Acid Regeneration Plant and Wet Jet Treater.
- Construction of new internal floating roof storage tanks and modifications to existing fixed and floating roof storage tanks.
- Modification of a railcar LPG Loading/Unloading Rack.
- Installation of interconnect piping between the two operations.
- Modifications to several existing process units and equipment resulting in the addition of pipeline equipment components and the potential for associated fugitive component VOC emissions (modified process units are listed in Section 2.1).
- Modifications to increase the maximum permitted equipment description firing rates of the Carson 51 Vacuum Unit Heater as well as Wilmington Heaters H-100, H-300 and H-301.
- Modifications to the Carson Naphtha Hydrotreater Heater to allow the installation of ultra-low NOx burners.

Additionally, although no physical modifications will be made, the following units will experience increased utilization as a result of this project:

- Carson Storage Tanks 14, 31, 62, 63, 64, 502 and 959.
- Wilmington Storage Tanks 80074, 80211, 80215 and 80217.
- Carson Heaters Hydrocracker R-1, Hydrocracker R-2 and the Light Hydrotreating Unit Heater.
- Carson FCCU Regenerator and FCCU Pre-Heater.
- Carson Cogeneration Units 1-4
- Wilmington Delayed Coker Unit Heater H-101.
- Wilmington Hydrotreater Unit #3 Heaters H-30 and H-21/22.
- Wilmington Catalytic Reforming Unit Heaters H-510, H-501A, H-501B, H-502, H-503/504.
- Wilmington Steam Generating Boilers 7, 8, 9 and 10.
- Wilmington coke handling operations.
- Sulfur Recovery Plant Boilers H-1601/1602.
- Sulfur Recovery Plant Incinerators F-704 and F-754.
- Onsite operation of trains and trucks.

2.1 Emissions Calculation Methodology

Shutdown of the Wilmington Operations FCCU and Associated Heaters
Emissions reductions resulting from the shutdown of the Wilmington Operations FCCU and associated heaters (H-2, H-3, H-4, H-5, CO Boiler and Startup Heater) are based on emissions occurring during the baseline period (2012/2013). Punitive substitutions for missing emissions data (as applied by the SCAQMD RECLAIM program) and concentration/mass emissions limit exceedances are excluded from this analysis.

Fugitive component VOC emissions are based on actual emissions, as monitored during 2012/2013, and using the Correlation Equation Method described in the SCAQMD Guidelines for Fugitive Emissions Calculations, June 2003 [reference to CAPCOA publication California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities (February 1999)].

Notably, emissions reductions resulting from the shutdown of the Wilmington Operation's FCCU have been conservatively excluded from the Criteria Pollutant Modeling and Health Risk Analysis.

New Sulfuric Acid Regeneration Unit

The proposed Sulfuric Acid Regeneration Unit will include processing equipment as well as three natural gas fired process heaters (5, 20 and 42 MMBtu/hr). This process unit is assumed to operate 24 hours per day. Process vent emissions (SO_2 and PM10) are calculated based on engineering design estimates. These heaters will be designed to meet Best Available Control Technology (BACT) requirements for NOx for heaters of their respective sizes (5 MMBtu/hr and 20 MMBtu/hr: ultra-low NOx burners meeting 12 ppmv NOx @ 3% O_2; 42 MMBtu/hr: ultra-low NOx burners and SCR meeting 2 ppmv NOx @ 3% O_2). Other criteria pollutant emission factors based on SCAQMD Annual Emissions Report (AER) default factors for natural gas fired heaters. Combustion source startup, shutdown and commissioning emissions were included in the analysis. Toxic pollutant emission factors are derived from industry data or refinery-specific test data for similar units. Greenhouse gas emission factors are taken from 40 CFR Part 89 Tables C-1 and C-2 for natural gas. This unit is not expected to process streams containing VOC; as such, VOC emissions resulting from fugitive component leaks are not anticipated.

New Propane Storage and Transfer Unit

The proposed Propane Storage and Transfer Unit is a closed system with no vents to atmosphere. Fugitive component emissions are evaluated as described in the Fugitive Component Equipment Leaks section, below.

New Wet Jet Treater

The proposed Wet Jet Treater is a closed system with no vents to atmosphere. Fugitive component emissions are evaluated as described in the Fugitive Component Equipment Leaks section, below.

New/Modified Storage Tanks

Emissions from new and modified storage tanks are estimated using the EPA TANKS 4.0.9d model and in accordance with the User's Guide to the TANKS program. Site-specific TANKS parameters and fittings were used for new floating roof tanks; controls required by District Rules 463 and 1178 were also considered in the analysis. Baseline emissions are calculated as the average of the 2012 and 2013 reported emissions for each tank; project emissions are calculated based on anticipated post-project throughputs and products to be stored. Detailed storage tank emissions calculations are included in **Attachment B** to this report.

Tanks that are new or modified are identified in Table 1, below.

Table 1. Storage Tanks with Changes to Potential Emission

Tank ID	New/Modification	Baseline Service	Proposed Service
CCT #1 (C)	New Tank	NA	Crude Oil
CCT #2 (C)	New Tank	NA	Crude Oil
CCT #3 (C)	New Tank	NA	Crude Oil
CCT #4 (C)	New Tank	NA	Crude Oil
CCT #5 (C)	New Tank	NA	Crude Oil
CCT #6 (C)	New Tank	NA	Crude Oil
80035 (W)	Removed from Service	Crude Oil	NA
80036 (W)	Removed from Service	Crude Oil	NA

Tank ID	New/Modification	Baseline Service	Proposed Service
80038 (W)	Modification (Increase Throughput and Connect to VRS)	Petroleum Distillates	Petroleum Distillates and Light Gas Oils
80060 (W)	Modification (Increase Throughput and Convert to IFR)	Crude Oil	Crude Oil
80067 (W)	Modification (Increase Throughput and Convert to IFR)	Crude Oil	Crude Oil
80079 (W)	Modification (Increase Throughput)	Crude Oil	Crude Oil
300035 (W)	New Tank	NA	Crude Oil
300036 (W)	New Tank	NA	Crude Oil

Fugitive component emissions associated with new tanks are evaluated as described in the Fugitive Component Equipment Leaks section, below.

Storage Tanks – Increased Utilization
Several storage tanks will experience increased utilization as a result of this project. These tanks will not be physically modified. Emissions from these tanks are estimated using the EPA TANKS 4.0.9d model and in accordance with the User's Guide for the TANKS program. Baseline emissions are calculated as the average of the 2012 and 2013 reported emissions for each tank; project emissions are calculated based on anticipated post-project throughputs and products to be stored. Detailed storage tank emissions calculations are included in **Attachment B** to this report.

Tanks that will experience an increase in utilization are identified in Table 2, below.

Table 2. Storage Tanks with Increased Utilization

Tank ID	Baseline Service	Proposed Service
14 (C)	Gas Oil	Gas Oil
31 (C)	Naphtha	Naphtha
62 (C)	Naphtha	Naphtha
63 (C)	Naphtha	Naphtha
64 (C)	Alkylate	Alkylate
502 (C)	Gas Oil	Gas Oil
959 (C)	Gas Oil	Gas Oil
80044 (W)	Gasoline	Gasoline
80074 (W)	Out of Service	Diesel
80211 (W)	Naphtha	Naphtha
80215 (W)	Naphtha	Naphtha
80217 (W)	Naphtha	Naphtha

Modification of the LPG Railcar Load/Unload Rack

The existing LPG Railcar Load/Unload Rack will be modified to allow additional unloading capabilities. No new loading/unloading positions or arms will be installed as part of this project. This system currently vents to the vapor recovery system (VRS) and no additional process vent emissions are expected to occur as a result of this modification. Fugitive component emissions are evaluated as described in the Fugitive Component Equipment Leaks section, below.

Interconnect Piping

The proposed interconnect piping consists of piping modifications/additions to facilitate petroleum material transfers between locations. Fugitive component emissions associated with interconnect piping are evaluated as described in the Fugitive Component Equipment Leaks section, below.

Modifications to Existing Process Units

The proposed modifications to existing process units will result in changes to fugitive component emissions to atmosphere. Fugitive component emissions are evaluated as described in the Fugitive Component Equipment Leaks section, below. A list of the existing process units that will be modified as part of this project is included below:

1. 51 Vacuum Unit (Carson)
2. Alkylation Unit (Carson)
3. Hydrocracker Unit (Carson)
4. Light Hydrotreating Unit (Carson)
5. Mid-Barrel Distillate Hydrotreater (Carson)
6. Naphtha Isomerization Unit (Carson)
7. Naphtha Hydrodesulfurization Unit (Carson)
8. Catalytic Reforming Unit #3 (Wilmington)
9. Hydrocracker Unit (Wilmington)
10. Hydrotreater Unit #1 (Wilmington)
11. Hydrotreater Unit #2 (Wilmington)
12. Hydrotreater Unit #4 (Wilmington)

Modified Heaters

Several heaters will be modified as part of this project. These heaters are assumed to operate 24 hours per day. Combustion source startup, shutdown and commissioning emissions were included in the analysis. These heaters will be modified as described in Table 3 below:

Table 3. Heaters with Modified Firing Duty

Heater ID	Proposed Equipment Description Maximum Firing Rate (MMBtu/hr)	Proposed BACT
H-100 (W)	302.4	Not applicable, see discussion below
H-300 (W)	65.1	5 ppmv NOx; fire on natural gas
H-301 (W)	31	5 ppmv NOx; fire on natural gas
51-Vac (C)	360	Not applicable, see discussion below
NHDS (C)	12.5 (No Change)	Not applicable, see discussion below

H-100: Although Tesoro has requested an increase in equipment description maximum firing rate for this heater, Tesoro believes that it can maintain post-project heater emissions at or below the current maximum levels. As the modification will not result in an emissions increase, BACT is not triggered by this modification. 1-hour modeling inputs are based on anticipated post-project maximum 1-hour emissions rates. Confirmation that post-project criteria pollutant emissions from this heater will remain below current maximum levels will be achieved by way of source test, if requested by the SCAQMD. Toxic pollutant emission factors are derived from industry data or refinery-specific test data for similar units. Greenhouse gas emission factors are estimated based on data reported for the 2012/2013 baseline period.

51 Vac: Although Tesoro has requested an increase in equipment description maximum firing rate for this heater, Tesoro believes that it can maintain post-project heater emissions below the current maximum permitted levels. As the modification will not result in an emissions increase, BACT is not triggered by this modification; however, Tesoro voluntarily accepts a 9 ppmv NOx limit as an emissions reduction measure. Confirmation that post-project criteria pollutant emissions from this heater will remain below current permitted levels will be achieved by way of source test, if requested by the SCAQMD. Toxic pollutant emission factors are derived from industry data or refinery-specific test data for similar units. Greenhouse gas emission factors are estimated based on data reported for the 2012/2013 baseline period.

NHDS: This heater will be modified to allow the installation of ultra-low NOx burners. This heater will not see any increase to the maximum permitted firing rate. Criteria pollutant emission factors (other than NOx) are based on current permitted potentials to emit. The CO emissions factor is requested to be based on the SCAQMD Annual Emissions Report (AER) default factor for natural gas fired heaters. Toxic pollutant emission factors are derived from industry data or refinery-specific test data for similar units. Greenhouse gas emission factors are based on monitored fuel gas data (NHDS heater) or taken from 40 CFR Part 89 Tables C-1 and C-2 for natural gas. NOx emissions are calculated based on an estimated 12 ppmv NOx concentration as described in Table 3, above.

H-300 and H-301: Criteria pollutant emission factors (other than NOx) are based on SCAQMD Annual Emissions Report (AER) default factors for natural gas fired heaters. Toxic pollutant emission factors are derived from industry data or refinery-specific test data for similar units. Greenhouse gas emission factors are taken from 40 CFR Part 89 Tables C-1 and C-2 for natural gas. NOx emissions are calculated based on current BACT as described in Table 3, above.

Emissions Baseline (Daily Basis): Baseline emissions for each combustion unit are calculated as the emissions at the operating day where the emissions were at the 98th percentile of the sum of all modified combustion sources.

Emissions Baseline (Annual Basis): Baseline emissions for each combustion unit are calculated as the average of the 2012 and 2013 emissions for each unit.

<u>Non-Modified Combustion Sources – Increased Utilization</u>
The following combustion sources will not be modified but will experience increases in utilization as described in Table 4, below:

Table 4. Heaters with Ultra-Low NOx Burners (Increased Utilization)

Source Description	Increase in Utilization
Carson HC Heater R-1	15 MMBtu/hr
Carson HC Heater R-2	20 MMBtu/hr
Carson LHU Heater	5 MMBtu/hr
Wilmington DCU Heater H-101	7 MMBtu/hr
Wilmington HTU #3 Heater H-30	4.1 MMBtu/hr
Wilmington HTU #3 Heater H-21/22	4.1 MMBtu/hr
Wilmington CRU Heater H-510	0.4 MMBtu/hr
Wilmington CRU Heater H-501A, B, 502, 503/504	1.6 MMBtu/hr
Wilmington Boilers 7 and 8	5 MMBtu/hr
Wilmington Boilers 9 and 10	5 MMBtu/hr
SRP Boilers H-1601/1602	0.125 MMBtu/hr
SRP Incinerators F-704 and F-754	6 long tons per day increased sulfur production

Emissions increases are calculated by multiplying the estimated increased in utility (fired duty) by the appropriate emissions factor. Criteria pollutant emission factors are derived from either permitted emissions levels, specific test data or levels reported in the SCAQMD Annual Emissions Report. Toxic pollutant emission factors are derived from industry data or refinery-specific test data for similar units. Greenhouse gas emission factors are based on monitored fuel gas data or taken from 40 CFR Part 89 Tables C-1 and C-2 for natural gas.

Coke Handling Emissions

Particulate matter emissions increases are calculated based on the increased coke handling throughput and the resulting increase in the number of truck trips. Calculations are performed in accordance with the calculation methodologies found in US EPA AP-42 Chapter 13.2. Peak hourly and daily operational rates will not change as a result of this project; however, the annual average operational utilization may increase.

Carson FCCU Regenerator and Pre-Heater – Increased Utilization

The Carson FCCU Regenerator and Pre-Heater will not be modified but will experience increases in utilization as described in Table 5 below:

Table 5. Carson FCCU (Increased Utilization)

Heater ID	Increase in Utilization
FCCU Regenerator	12.7 MBPD
FCCU Pre-Heater	10.6 MMBtu/Hr

Peak daily operations rates will not change as a result of this project; however, the annual average operational utilization is expected to increase as shown in Table 5, above. Emissions increases are calculated by multiplying the estimated increase in utility by the appropriate emissions factor. Criteria pollutant emission factors are based on permit limits and/or emissions represented in the evaluation for permits to construct. Toxic pollutant emission factors are derived from industry data or refinery-specific test data. Greenhouse gas emission factors are based on 2012/2013 reported values.

Carson Cogeneration Units 1-4 – Increased Utilization

Carson Cogeneration Units 1-4 will not be modified but will experience increases in utilization. The annual average operational utilization is expected to increase by approximately 42 MMBtu/hr. Emissions increases are calculated by multiplying the estimated increase in utility by the appropriate emissions factor. Criteria pollutant emission factors are based on permit limits and/or emissions represented in the evaluation for permits to construct. Toxic pollutant emission factors are derived from industry data or refinery-specific test data. Greenhouse gas emission factors are based on 2012/2013 reported values.

Fugitive Component Leaks

Fugitive component leaks are estimated based on the number of components in specific categories (e.g., valves, flanges, connections, etc.), and emission factors based on the component type and service (i.e., heavy liquid, light liquid, or vapor). Net increases in component counts for the modified process units and new equipment are based on preliminary design estimates, with contingency factors applied in order to provide conservative estimates of new fugitive components. Emission factors for fugitive component leaks are prescribed by the SCAQMD [see Guidelines for Fugitive Emissions Calculations, June 2003, with reference to the Correlation Equation Method described in the CAPCOA publication California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities (February 1999)], using a 500 ppmv leak rate.

To calculate hazardous air pollutant (HAP) emissions, representative streams were chosen to approximate the light liquid, heavy liquid, and vapor compositions within each affected unit. The HAP contents of these representative streams are estimated based on industry data or refinery-specific laboratory data. HAP emissions are calculated as follows:

$$HAP_i(lb/hr) = [VOC(lb/hr)] \times wt\%_i$$

Locomotive Emissions

Tesoro operates two locomotive engines for the movement of railcars onsite at the rail unloading area, EMD GP9 and EMD SW1200. The movement of rail cars on site is commonly known as “switching”. The locomotives will be switching 4 hours per day during LPG transportation with approximately one-third of the time dedicated to the EMD GP9 and two-thirds of the time to the EMD SW1200. Criteria pollutant and GHG emissions from these locomotive engines are calculated using the U.S. EPA Locomotive Standards Regulatory Support Document (U.S. EPA, 1998), the U.S. EPA Emission Factors for Locomotives (U.S. EPA, 2009), and the Port of Long Beach 2012 Air Emissions Inventory (POLB, 2013). Emission calculations assume that on a day when LPG will be transported, the EMD GP9 will switch for 1.3 hours per day and EMD SW1200 will switch 2.7 hours per day (4 hours combined) to move the estimated 10 railcars per day of LPG. Annual emission estimates assume 365 days of operation.

Onsite Truck Emissions

Onsite delivery truck emissions were based on T7 category trucks emission factors from the Emfac2014 model (CARB, 2014). All transit emissions were based on the 5 mile per hour speed bin. All idling emissions were based on three 5-minute stops per trip, for a total of 15 minutes of idling per trip. The Carson Operations were based on 1.75 miles of onsite transit with 15 truck trips per day, or 5,475 truck trips per year. The Wilmington Operations were based on 0.75 miles of onsite transit with two truck trips per day, or 730 truck trips per year. The Wilmington Operations Coke Handling truck trips were based on one mile of onsite transit with no increase in hourly or daily; however, with a potential annual increase of 1460 truck trips per year. Annual emission estimates assume 365 days of operation.

2.2 Summary of Emissions Changes

2.2.1 Stationary Source Emissions

As described previously, operation of the proposed project will result in increased emissions from fugitive equipment leaks, storage tanks, coke handling and combustion units. Tables 6 and 7 present the estimated stationary source emissions associated with the proposed project. Detailed emissions calculations are included in **Attachment A** to this report.

Table 6. Summary of Emissions Changes (Pounds per Day)

	Emissions (lbs/day)				
NEW AND MODIFIED SOURCES	**NOx**	**SOx**	**CO**	**PM_{10}***	**VOC**
51 Vac Unit Heater	32.72	1.80	233.85	45.49	32.85
Naphtha HDS ULNB Conversion	1.87	0.64	10.23	5.56	1.73
DCU H-100 Heater Duty Bump	(171.03)	86.69	(5.14)	(0.98)	(0.43)
HC H-300 Heater Duty Bump	4.67	(14.98)	49.75	10.79	10.10
HC H-301 Heater Duty Bump (incl with H-300)	(incl with H-300)	(incl with H-300)	(incl with H-300)	(incl with H-300)	(incl with H-300)
Sulfuric Acid Regen Plant Process Air Heater	6.99	0.28	16.37	3.51	3.27
Sulfuric Acid Regen Plant Decomp. Furnace	2.45	0.59	34.39	7.37	6.88
Sulfuric Acid Regen Plant Converter Heater	1.75	0.07	4.09	0.88	0.82
Sulfuric Acid Regen Plant Process Vent	-	31.12	-	~~0.00~~ 6.00	-
Carson Crude Tank Emissions	-	-	-	-	112.51
Wilmington Tank Project Emissions	-	-	-	-	141.64
CARSON AND WILMINGTON FUGITIVE COMPONENT EMISSIONS					
51 Vac (Carson)	-	-	-	-	11.74
Alkylation (Carson)	-	-	-	-	18.88
Crude Tanks (Fug Ems) (Carson)	-	-	-	-	43.05
HCU Mods (Carson)	-	-	-	-	6.77
Interconnect Piping (Carson)	-	-	-	-	27.22
LHU Mods (Carson)	-	-	-	-	14.34
LPG Railcar Load/Unload (Carson)	-	-	-	-	26.85
Mid Barrel Distillate Treater (Carson)	-	-	-	-	2.15
Naphtha Isom (Carson)	-	-	-	-	9.46
NHDS Mods (Carson)	-	-	-	-	15.21
PSTU (Carson)	-	-	-	-	15.44
Wet Jet Treater (Carson)	-	-	-	-	50.45
CRU 3 (Wilmington)	-	-	-	-	10.24

Crude Tanks (Fug Ems) (Wilmington)	-	-	-	-	3.61
HCU (Wilmington)	-	-	-	-	20.69
HTU 1 (Wilmington)	-	-	-	-	3.50
HTU 2 (Wilmington)	-	-	-	-	3.80
HTU 4 (Wilmington)	-	-	-	-	6.32
Interconnect Piping (Wilmington)	-	-	-	-	37.20
Sulfuric Acid Plant (Fug Ems) (Wilmington)	-	-	-	-	-

CARSON AND WILMINGTON INCREASED UTILIZATION EMISSIONS

Carson FCCU Regenerator*	-	-	-	-	-
Carson FCCU Pre-Heater*	-	-	-	-	-
Carson Cogeneration Units 1-4	20.60	2.50	4.50	9.85	4.15
Carson HC Heater R-1	18.00	4.61	1.04	5.38	1.77
Carson HC Heater R-2	14.40	9.81	1.38	7.18	2.36
Carson LHU Heater	6.00	1.50	0.36	1.87	0.62
Wilmington DCU Heater H-101	19.00	7.58	4.36	0.83	0.83
Wilmington HTU #3 Heater H-30	7.87	2.53	0.38	1.97	1.59
Wilmington HTU #3 Heater H-21/22	12.69	1.33	2.76	0.59	0.61
Wilmington CRU Heater H-510	0.48	0.24	0.60	0.15	0.05
Wilmington CRU Heater H-501A, B, 502, 503/504	1.27	0.41	0.95	0.59	0.18
Wilmington Boilers 7 and 8	12.00	3.07	0.37	1.89	0.63
Wilmington Boilers 9 and 10	12.00	3.07	0.37	1.89	0.63
Wilmington Coke Handling**	--	--	--	--	--
SRP Boilers H-1601/1602	0.11	0.04	0.01	0.05	0.02
SRP Incinerators F-704	0.24	12.66	0.05	0.01	0.01
SRP Incinerators F-754	0.52	12.66	0.03	0.03	0.01
Carson Tank 14	-	-	-	-	0.54
Carson Tank 31	-	-	-	-	0.35
Carson Tank 62	-	-	-	-	17.58
Carson Tank 63	-	-	-	-	18.72
Carson Tank 64	-	-	-	-	0.32
Carson Tank 502	-	-	-	-	26.59
Carson Tank 959	-	-	-	-	0.26
Wilmington Tank 80044	-	-	-	-	3.02
Wilmington Tank 80074	-	-	-	-	0.15
Wilmington Tank 80211	-	-	-	-	0.32
Wilmington Tank 80215	-	-	-	-	0.31
Wilmington Tank 80217	-	-	-	-	0.31

* Daily operating rates of the FCCU regenerator and Pre-Heater will not increase above previous maximum daily rates; as such, daily emissions increases are listed as zero.
** Daily operating rates of the Wilmington Coke Handling will not increase above previous maximum daily rates; as such, daily emissions increases are listed as zero.

WILMINGTON FCCU SHUTDOWN (HISTORIC ACTUAL EMISSIONS)

FCCU	(343.31)	(387.50)	(incl w/CO Boiler)	(98.59)	(274.03)
CO Boiler	(incl w/FCCU)	(incl w/FCCU)	(909.62)	(22.71)	(16.43)
H2 Heater	(16.53)	(1.28)	(4.06)	(0.87)	(0.81)
H3/H4 Heater	(209.75)	(27.59)	(45.30)	(49.01)	(9.93)
H5 Heater	-	-	-	-	-
Startup Heater	(3.00)	(0.01)	(0.81)	(0.17)	(0.16)
Fugitive Components					(17.60)
Total Combined Emissions	**(567.98)**	**(248.15)**	**(599.06)**	**~~(66.43)~~ (60.43)**	**399.26**

*All PM emissions were conservatively assumed to be equal to PM_{10}, and those emissions were also conservatively assumed to be $PM_{2.5}$.

Table 7. Summary of Emissions Changes (Tons per Year)

	Emissions (tons/year)					
NEW AND MODIFIED SOURCES	**NOx**	**SOx**	**CO**	**PM_{10}***	**VOC**	**CO2e (MT/Yr)**
51 Vac Unit Heater	~~13.16~~ 18.04	0.25	42.75	8.55	6.12	59,707
Naphtha HDS ULNB Conversion	~~0.02~~ 0.18	0.11	1.86	1.07	0.32	3,910
DCU H-100 Heater Duty Bump	~~(4.38)~~ 6.12	35.38	3.63	0.75	0.80	33,282
HC H-300 Heater Duty Bump	~~(1.57)~~ (0.10)	(1.24)	10.02	2.15	2.00	28,074
HC H-301 Heater Duty Bump (incl with H-300)	(incl with H-300)	(incl with H-300)	(incl with H-300)	(incl with H-300)	(incl with H-300)	(incl with H-300)
Sulfuric Acid Regen Plant Process Air Heater	1.28	0.05	2.99	0.64	0.60	9,306
Sulfuric Acid Regen Plant Decomp. Furnace	0.45	0.11	6.28	1.34	1.26	19,542
Sulfuric Acid Regen Plant Converter Heater	0.32	0.01	0.75	0.16	0.15	2,326
Sulfuric Acid Regen Plant Process Vent	-	5.68	-	~~0.00~~ 1.10	-	-
Carson Crude Tank Emissions	-	-	-	-	20.53	-
Wilmington Tank Project Emissions	-	-	-	-	25.85	-
CARSON AND WILMINGTON FUGITIVE COMPONENT EMISSIONS						
51 Vac (Carson)	-	-	-	-	2.14	-
Alkylation (Carson)	-	-	-	-	3.45	-
Crude Tanks (Fug Ems) (Carson)	-	-	-	-	7.86	-
HCU Mods (Carson)	-	-	-	-	1.24	-
Interconnect Piping (Carson)	-	-	-	-	4.97	-
LHU Mods (Carson)	-	-	-	-	2.62	-
LPG Railcar Load/Unload (Carson)	-	-	-	-	4.90	-
Mid Barrel Distillate Treater (Carson)	-	-	-	-	0.39	-
Naphtha Isom (Carson)	-	-	-	-	1.73	-
NHDS Mods (Carson)	-	-	-	-	2.78	-
PSTU (Carson)	-	-	-	-	2.82	-
Wet Jet Treater (Carson)	-	-	-	-	9.21	-
CRU 3 (Wilmington)	-	-	-	-	1.87	-
Crude Tanks (Fug Ems) (Wilmington)	-	-	-	-	0.66	-
HCU (Wilmington)	-	-	-	-	3.78	-
HTU 1 (Wilmington)	-	-	-	-	0.64	-
HTU 2 (Wilmington)	-	-	-	-	0.69	-
HTU 4 (Wilmington)	-	-	-	-	1.15	-
Interconnect Piping (Wilmington)	-	-	-	-	6.79	-

Sulfuric Acid Plant (Fug Ems) (Wilmington)	-	-	-	-	0.00	-

CARSON AND WILMINGTON INCREASED UTILIZATION EMISSIONS

Carson FCCU Regenerator	14.58	20.99	18.24	7.44	0.68	99,938
Carson FCCU Pre-Heater	1.39	0.34	0.13	0.69	0.23	5,048
Carson Cogeneration Units 1-4	3.76	0.46	0.82	1.80	0.76	20,147
Carson HC Heater R-1	3.29	0.84	0.19	0.98	0.32	7,146
Carson HC Heater R-2	2.63	1.79	0.25	1.31	0.43	9,528
Carson LHU Heater	1.10	0.27	0.07	0.34	0.11	2,377
Wilmington DCU Heater H-101	3.47	1.38	0.80	0.15	0.15	3,414
Wilmington HTU #3 Heater H-30	1.44	0.46	0.07	0.36	0.29	2,001
Wilmington HTU #3 Heater H-21/22	2.32	0.24	0.50	0.11	0.11	1,998
Wilmington CRU Heater H-510	0.09	0.04	0.11	0.03	0.01	195
Wilmington CRU Heater H-501A, B, 502, 503/504	0.23	0.08	0.17	0.11	0.03	780
Wilmington Boilers 7 and 8	2.19	0.56	0.07	0.35	0.12	2,443
Wilmington Boilers 9 and 10	2.19	0.56	0.07	0.35	0.12	2,443
Wilmington Coke Handling	--	--	--	0.07	--	--
SRP Boilers H-1601/1602	0.02	0.01	0.00	0.01	0.00	53
SRP Incinerators F-704	0.04	2.31	0.01	0.00	0.00	33
SRP Incinerators F-754	0.10	2.31	0.01	0.01	0.00	33
Carson Tank 14	-	-	-	-	0.10	-
Carson Tank 31	-	-	-	-	0.06	-
Carson Tank 62	-	-	-	-	3.21	-
Carson Tank 63	-	-	-	-	3.42	-
Carson Tank 64	-	-	-	-	0.06	-
Carson Tank 502	-	-	-	-	4.85	-
Carson Tank 959	-	-	-	-	0.05	-
Wilmington Tank 80044	-	-	-	-	0.55	-
Wilmington Tank 80074	-	-	-	-	0.03	-
Wilmington Tank 80211	-	-	-	-	0.06	-
Wilmington Tank 80215	-	-	-	-	0.06	-
Wilmington Tank 80217	-	-	-	-	0.06	-

WILMINGTON FCCU SHUTDOWN (HISTORIC ACTUAL EMISSIONS)

FCCU	(62.65)	(70.72)	(incl w/CO Boiler)	(17.99)	(50.01)	(247,466)
CO Boiler	(incl w/FCCU)	(incl w/FCCU)	(166.01)	(4.14)	(3.00)	(72,569)
H2 Heater	(3.02)	(0.23)	(0.74)	(0.16)	(0.15)	(2,838)
H3/H4 Heater	(38.28)	(5.03)	(8.27)	(8.94)	(1.81)	(60,739)
H5 Heater	-	-	-	-	-	-
Startup Heater	(0.55)	(0.00)	(0.15)	(0.03)	(0.03)	(433)
Fugitive Components	-	-	-	-	(3.21)	-

Total Combined Emissions	**~~(56.40)~~ (39.40)**	**(2.99)**	**(85.37)**	**~~(2.59)~~ (1.42)**	**74.94**	**(70,321.32)**

*All PM emissions were conservatively assumed to be equal to PM_{10}, and those emissions were also conservatively assumed to be $PM_{2.5}$.

2.2.2 Locomotive Emissions

As described previously, operation of the proposed project will result in increased utilization of locomotive engines. Table 8 presents the estimated increase in locomotive emissions associated with the proposed project. Detailed emissions calculations are included in **Attachment A** to this report.

Table 8. Summary of Locomotive Emissions

	Emissions (lbs/day)				
	NOx	**SOx**	**CO**	**PM_{10}**	**VOC**
EMD GP9	4.83	0.003	0.83	0.10	0.27
EMD SW1200	6.82	0.004	1.18	0.15	0.39

2.2.3 Truck Emissions

As described previously, operation of the proposed project will result in increased utilization of onsite trucks. Table 9 presents the estimated increase in truck emissions associated with the proposed project. Detailed emissions calculations are included in **Attachment A** to this report.

Table 9. Summary of Onsite Truck Emissions

	Emissions				
	NOx	**SOx**	**CO**	**PM10**	**VOC**
Onsite Trucks (lbs/day)	2.25	0.0015	0.585	0.011	0.173
Onsite Trucks (tons/year)	0.48	0.00	0.12	0.00	0.04

3. CRITERIA POLLUTANT MODELING

3.1 Methodology

A complete description of the criteria pollutant modeling approach is provided in **Attachment C**. A summary is provided below.

Emissions Assessment. Project emission sources relative to criteria pollutants evaluated for the Project included:

- New Sulfuric Acid Regeneration Plant (SARP)
- New heaters to support the new Sulfuric Acid Regeneration Plant.
- Process vent emissions from the new Sulfuric Acid Regeneration Plant.
- Modifications to increase the permitted equipment description firing rate of the Carson 51 Vacuum Unit Heater as well as Wilmington Heaters H-100, H-300 and H-301.
- Modifications to the Carson Naphtha Hydrotreater Heater to allow the installation of ultra-low NOx burners.

- Increased utilization of the following heaters at the Carson Operations: Hydrocracker R-1, Hydrocracker R-2 and the Light Hydrotreating Unit Heater.
- Increased utilization of the Carson FCCU Regenerator and Pre-Heater.
- Increased utilization of the Carson Cogeneration Units 1-4.
- Increased utilization of the following heaters at the Wilmington Operations: Delayed Coking Unit H-101, Hydrotreating Unit #3 H-30, Hydrotreating Unit #3 H-21/22, CRU H-510, CRU H-501A, H-501B, H-502 and H-503/504.
- Increased utilization of the following boilers at the Wilmington Operations: Boilers 7, 8, 9 and 10.
- Increased handing of coke products at Wilmington Operations.
- Increased utilization of the following boilers at the Sulfur Recovery Plant Operations: Boilers H-1601/1602.
- Increased utilization of the following incinerators at the Sulfur Recovery Plant Operations: Incinerators F-704 and H-754.
- Locomotives associated with increased railcar movement of LPG, in-transit and idling on site and just outside facility fenceline.
- Increase truck traffic associated with the project, including, idling and transit emissions.

The emission sources listed above represent the components of this project that result in emission *increases* of criteria pollutants with ambient air quality standards (AAQSs). There will also be a substantial reduction in criteria pollutant emissions from the shutdown of the Wilmington Operation's Fluid Catalytic Cracking Unit (FCCU) and associated heaters (CO Boiler, H2 Heater, H3 Heater, H4 Heater, H5 Heater and Startup Heater). To simplify the modeling, only the emission increases were considered (e.g., emission decreases associated with the FCCU shutdown were not considered). There are also volatile organic chemical (VOC) emission increases (and decreases) associated with process unit and piping fugitive components and storage tanks, but there are no AAQSs for VOCs and no criteria pollutant modeling is required.

Emissions for the project-related sources were estimated using SCAQMD-approved methodologies. Stationary source and locomotive emissions are documented in **Attachment A**.

Air Dispersion Model and Inputs. The AMS/EPA Regulatory Model (AERMOD~~, v15181~~)[2], the air dispersion model currently preferred by U.S. EPA and approved by the SCAQMD, was used for this analysis. AERMOD simulates the atmospheric transport and dilution of emissions from project sources. This mathematical model estimates dilution of emissions by diffusion and turbulent mixing with ambient air as the emissions travel downwind from a source. AERMOD can predict the resulting concentrations at specified locations of interest (commonly referred to as receptors). The model is capable of predicting impacts from any combination of point, area, and volume sources in terrain ranging from flat to complex.

[2] Short term modeling (1-hr, 8-hr, and 24-hr) was performed in November 2016 with AERMOD v15181. Annual modeling was performed in February 2017 with AERMOD v16216r. Based on a review of the model change bulletin, no differences in results between the two versions of the model are expected for the types of emission sources and model options in this project.

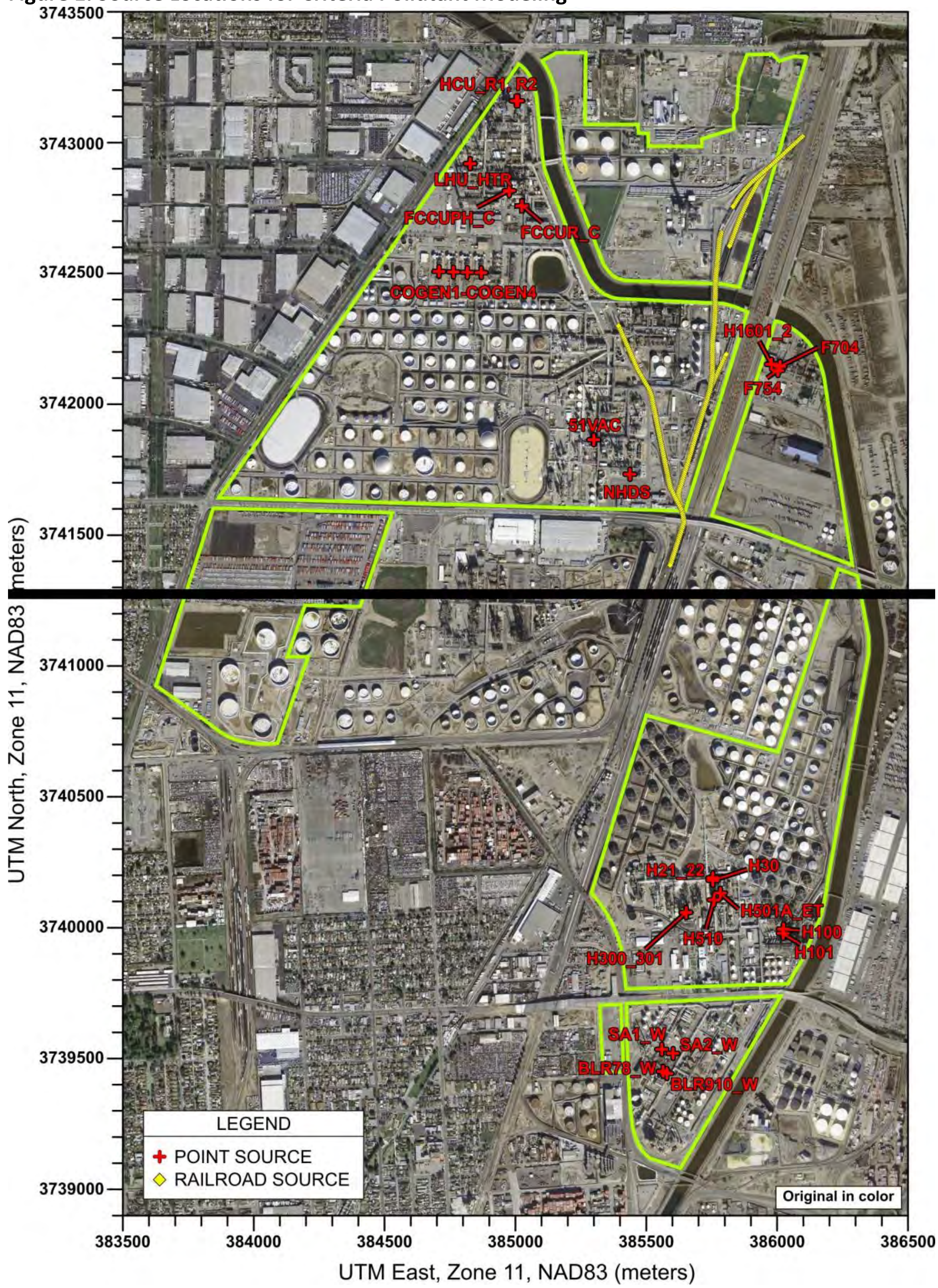
Emissions from project stationary combustion sources were assumed to be at maximum capacity 24 hours per day and 365 days per year. For new and modified combustion sources, startup, shutdown and commissioning emissions were included in the analysis. The modeled emission rates and source parameters ~~and emission rates~~ are provided in **Tables 2 and 4** of **Attachment C**.

Locomotive operations currently occur between the hours of 6:00 AM and 2:00 PM, and locomotives only operate (in transit or idling) for an estimated four of those eight hours. For criteria pollutants with a 1-hour standard (NO_2, SO_2, and CO), the maximum 1-hour emission rate was modeled for the entire 8-hour period during which locomotive operations could occur. While this essentially doubles the total amount of emissions on a daily or annual basis and may be considered conservative, it ensures that the maximum impact during potential locomotive operating hours is captured. The 8-hr CO modeling was also performed using the maximum 1-hour emission rate. For 24-hour and annual averaging periods, the daily emissions were spread evenly over the 6:00 AM to 2:00 PM period. Modeled emission rates and source parameters ~~and emission rates~~ for the locomotives are provided in **Tables 3 and ~~5~~6** of **Attachment C**.

Onsite truck operations currently occur routinely during the operations of the refinery. Emissions were spread evenly over the entire 24-hour operating period. Modeled emission rates and source parameters for the trucks are provided in **Tables 3 and 6** of **Attachment C**.

Emission summaries for all modeled sources are provided in **Attachment A**. Source locations are shown in Figure 1.

~~Figure 1. Source Locations for Criteria Pollutant Modeling~~



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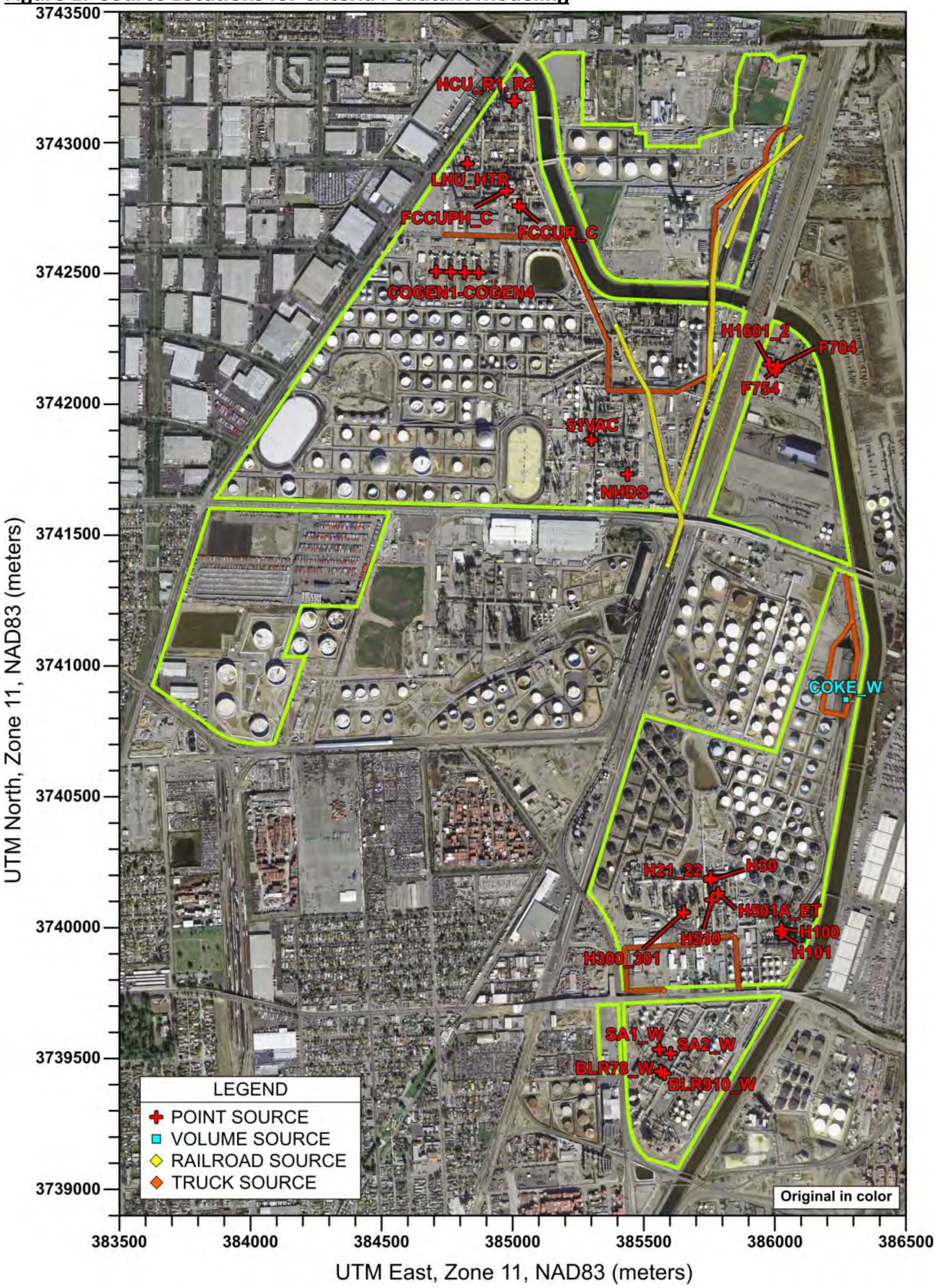


Two locomotive engines are used to move railcars carrying LPG. These locomotives were modeled as a string of evenly-spaced volume sources along the segments of track where engines are expected to travel. The engines travel a short distance outside the facility boundaries at times; this was reflected in the modeling.

Onsite trucks were modeled as a string of evenly-spaced volume sources along the segments of road where trucks are expected to travel.

The AERMOD-ready meteorological data sets for years 2006, 2007, 2008, 2009, and 2011 for the Long Beach, CA monitoring station were used for the analysis. These data sets were developed by SCAQMD using AERMET version 14134, the AERMOD meteorological data preprocessor, and provided for use in this analysis. The Long Beach meteorological station is located less than 3 miles east of the refinery.

The receptors used to analyze project impacts include:

- 25-m spaced receptors along the outer facility boundary
- 100-m spaced receptors within the facility boundary and out to 1,000+ meters from the facility boundary
- 250-m spaced receptors beyond 1,000 m out to 3,500 m or more from the facility boundary

Receptor spacing was based on SCAQMD modeling guidance[3], which requires a fenceline spacing of 100 meters or less for facility areas greater than or equal to 100 acres. Figure 2 shows a plot of the receptors. A total of 5,738 receptors were included in the analysis.

[3] http://www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/modeling-guidance

~~Figure 2. Location of Maximum Modeled Criteria Pollutant Impacts~~

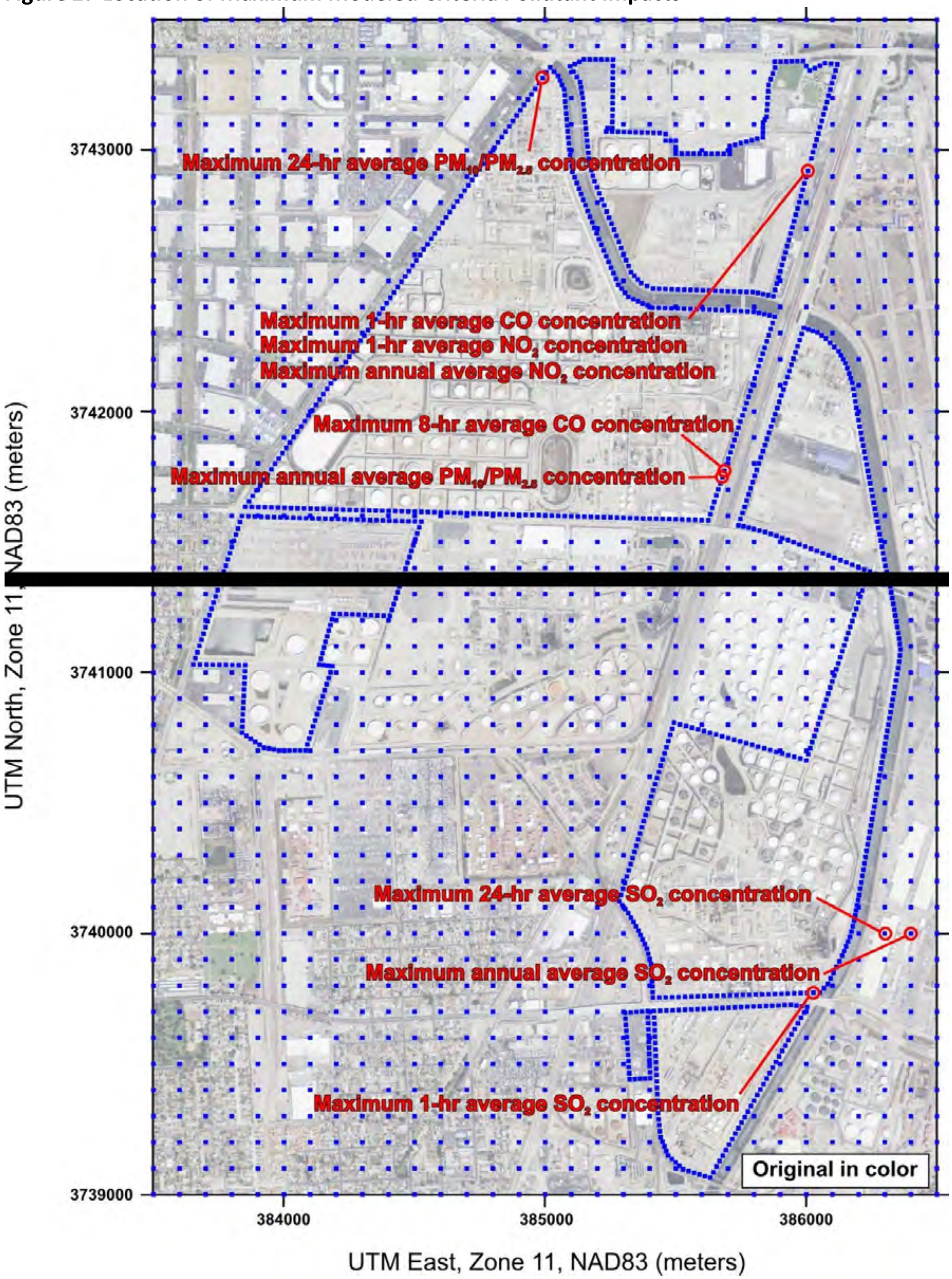
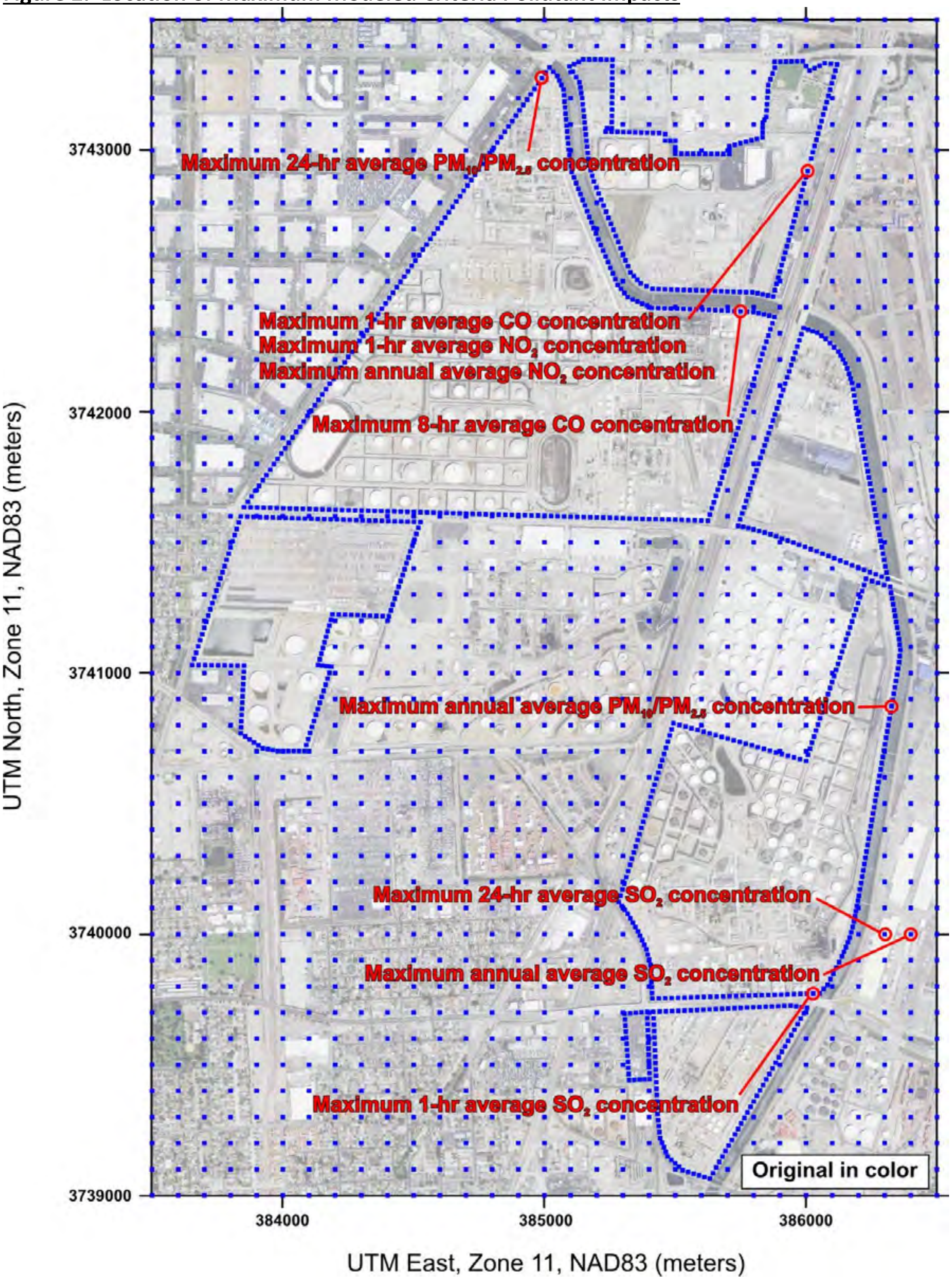


Figure 2. Location of Maximum Modeled Criteria Pollutant Impacts



3.2 Thresholds

The criteria pollutants of concern associated with this project are:

- Nitrogen Dioxide (NO_2)
- Sulfur Dioxide (SO_2)
- Carbon Monoxide (CO)
- Respirable Particulate Matter (PM_{10})
- Fine Particulate Matter ($PM_{2.5}$)

Table ~~9~~10 shows the basis upon which the significance of modeled criteria pollutant impacts is judged. If the pollutant is in attainment of AAQSs (i.e., NO_2 and CO), then the maximum impact is added to a representative maximum background concentration derived from ambient monitoring, and the total concentration is compared to the most stringent AAQS. A total concentration greater than the AAQS is a significant impact. If the pollutant is not in attainment (i.e., PM_{10} and $PM_{2.5}$), then the impact is significant if the modeled impact is greater than the SCAQMD Significant Change in Concentration value.

~~**Table 9. Criteria Pollutant Ambient Concentration Significance Thresholds.**~~
Table 10. Criteria Pollutant Ambient Concentration Significance Thresholds.

Pollutant	Averaging Period	SCAQMD Significant Change (µg/m³)	Most Stringent Ambient Air Quality Standard (µg/m³)
NO_2	1-hour	--[a]	339 (California) 188 (Federal)
	Annual	--[a]	57
CO	1-hour	--[a]	23,000
	8-hour	--[a]	10,000
SO_2	1-hour	--[a]	655 (California) 196 (Federal)
	3-hour	--[a]	1300 (Federal)
	24-hour	--[a]	105
PM_{10}	24-hour	2.5	50[b]
	Annual	1.0	20[b]
$PM_{2.5}$	24-hour	2.5	35[b]

[a] SCAQMD is in attainment for these pollutants and averaging periods.
[b] SCAQMD is not in attainment of these standards.

3.3 Summary of Results

Criteria Pollutant Modeling

Ambient air quality modeling results for NO_2, SO_2, and CO are summarized in Table ~~10~~11 along with the applicable ambient air quality standard (AAQS). Modeling results for PM_{10} and $PM_{2.5}$ are shown in Table ~~11~~12, along with the SCAQMD's applicable Significant Impact Levels.

~~Table 10. Modeled NO2, SO2, and CO Impacts~~

Table 11. Modeled NO_2, SO_2, and CO Impacts

Pollutant	Averaging Period	Concentrations (μg/m³) Modeled Impact[a]	Background[b]	Total[e]	AAQS
NO_2	1 Hour - State	~~45.9~~ 48.5	255.5	~~301.4~~ 304.0	339
	1 Hour - Federal[c]	~~38.6~~ 40.8	146.3	~~184.9~~ 187.1	188
	Annual	2.1	47.6	49.7	57
SO_2	1 Hour - State	6.5	64.9	71.4	655
	1 Hour – Federal[d]	6.5	40.0	46.6	196
	24 Hour	0.6	64.9	65.5	105
CO	1 Hour	~~10.4~~ 11.2	4,809.0	~~4,819.4~~ 4,820.2	23,000
	8 Hour	~~3.6~~ 5.1	2,977.0	~~2,980.6~~ 2,982.1	10,000

[a] Maximum concentration at any fenceline or offsite receptor, except for 1-hr federal NO_2 value. Modeled federal NO_2 1-hr value is the average of the 8th highest daily maximum 1-hr average for each of the five years modeled. NO_2 converted from NOx by using default factor of 0.8 for hourly and 0.75 for annual, per 9/30/2014 Memorandum from R. Chris Owen and Roger Brode, EPA Air Quality Modeling Group, to Regional Air Division Directors re: *Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO2 National Ambient Air Quality Standard*. See http://www.epa.gov/ttn/scram/guidance/clarification/NO2_Clarification_Memo-20140930.pdf.

[b] Background values taken from SCAQMD Air Quality Data Tables for 2012-2014 (downloaded 10/1/2015) for Station #033 (West Long Beach). Maximum value of the three years was used, except concentrations used to compare with federal standards were averages. See: http://www.aqmd.gov/home/library/air-quality-data-studies/historical-data-by-year.

Note: AQMD tables did not contain maximum 1-hr CO or maximum 24-hr SO_2 values for all three years. Those values were obtained from Jillian Wong of SCAQMD - see 10/8/2015 email from Jillian Wong to Michael Choi of Environmental Audit.

[c] Federal standard is the 98th percentile concentration, averaged over three years.

[d] Federal standard is the 99th percentile concentration, averaged over three years.

[e] Some values may vary slightly from those listed in the Appendix due to rounding.

~~Table 11. Modeled Particulate Matter Impacts.~~

Table 12. Modeled Particulate Matter Impacts.

Pollutant	Averaging Period	Modeled Impact [a, b] (μg/m³)	Significance Thresholds ~~[b]~~[c] (μg/m³)
PM_{10}	24 Hour	0.42	2.5
	Annual	~~0.16~~ 0.52	1
$PM_{2.5}$	24 Hour	0.42	2.5

[a] All PM emissions were conservatively assumed to be equal to PM_{10}, and those emissions were also conservatively assumed to be $PM_{2.5}$.

[b] Not all sources experience daily or hourly increases but may have annual increases. Therefore modeled annual concentrations may be greater than short term concentrations at some receptors.

[b] Not all sources experience daily or hourly increases but may have annual increases. Therefore modeled annual concentrations may be greater than short term concentrations at some receptors.
[~~b~~c] SCAQMD Significant Increase in Concentration per Rule 1303 Table A-2 and SCAQMD Air Quality Significance Thresholds (see http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf).

As shown in Table ~~10~~11, the maximum total concentrations (modeled impacts plus background) are less than the most stringent AAQS for NO_2, SO_2, and CO. Therefore, the modeled increases are not expected to create exceedances of AAQS. Notably, compliance with the state 1-hour SO_2 standard ensures compliance with the federal 3-hour SO_2 standard listed in Table ~~9~~10. Impacts associated with ambient NO_2, SO_2, and CO concentrations therefore are expected to be less than significant.

In the case of particulate matter impacts, the comparisons made in Table ~~11~~12 demonstrate that modeled PM_{10} and $PM_{2.5}$ impacts are less than the Significant Impact Levels. The PM_{10} and $PM_{2.5}$ impacts therefore are also expected to be less than significant. As a conservative assumption, all calculated PM emissions represent PM, PM_{10} and $PM_{2.5}$.

The receptors with maximum concentrations as calculated by the model for all pollutants and averaging periods are shown in Figure 2. These receptors are located as follows:

- For 1-hr CO and 1-hr and annual NO_2, the maximum impacted receptors are those nearest to where the railroad tracks cross the facility boundary at the northeast portion of the refinery.
- For 8-hr CO, the receptor is located at the Carson operations fenceline where the locomotives and onsite trucks cross over the Dominguez Channel.
- For annual PM_{10} and $PM_{2.5}$ ~~and 8-hr CO, the receptors are located at the fenceline east of the onsite railroad tracks and Carson 51 Vacuum Unit and Naphtha HDS heaters, stacks~~ the receptors are located at the fenceline east of the Wilmington coke barn loading area, immediately west of the Dominguez Channel.
- For 24-hr PM_{10} and $PM_{2.5}$ the receptors are located at the fenceline near the Carson Hydrocracker R1 and R2 heater stacks.
- For SO_2, the receptors are located at or near the fenceline around the southern portion of the refinery in the vicinity of the H100 heater stack and Sulfuric Acid Regeneration Plant combustion sources.

As can be seen, all maximum concentrations occurred at or near fenceline receptors, where people are not typically found. Regarding the disparate locations of the maximally impacted receptors, the NO_2 is impacted more by locomotive emissions and proximity of fenceline receptors to the locomotive sources, the CO and PM are impacted by both stationary ~~combustion~~ sources and locomotive sources, and SO_2 was impacted primarily by the Sulfuric Acid Plant and H-100 heater stack emissions.

4. HEALTH RISK ASSESSMENT

4.1 Methodology

A complete description of the health risk assessment approach is provided in the Health Risk Assessment provided under separate cover. A summary is provided below.

This health risk assessment (HRA) was performed following the Office of Environmental Health Hazard Assessment (OEHHA), Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA, 2015) and SCAQMD risk assessment guidelines (SCAQMD, 2015). ~~The latest versions of the air dispersion model (AERMOD v. 15181) and risk assessment model (HARP2 v. 16057) were used in this analysis.~~ AMS/EPA Regulatory Model (AERMOD) was used as the air dispersion model for this analysis. Acute modeling was performed in November 2016 with AERMOD v15181. Chronic modeling was performed in February 2017 with AERMOD v16216r. Based on a review of the model change bulletin, no differences in results between the two versions of the model are expected for the types of emission sources and model options in this project. HARP2 (Hotspots Analysis and Reporting Program) Air Dispersion Modeling & Risk Tool, dated 16217 was used for acute risk analysis performed in November 2016. HARP2 (Hotspots Analysis and Reporting Program) Air Dispersion Modeling & Risk Tool, dated 17023 was used for cancer and chronic risk analysis performed in February 2017. Based on a review of the version history, no differences between the two versions of the model are expected for the toxics and model options for this project. AERMOD was run outside of the HARP2 program, and modeling results were imported into HARP2 to complete the risk analysis.

The purpose of the Health Risk Assessment was to evaluate the risk associated with changes in emissions resulting from the integration of the Wilmington and Carson operations. Therefore, calculations were made for the pre-project actual emissions (defined as the average of the 2012 and 2013 calendar year emissions) and post-project emissions.

Hazard Identification/Emissions Assessment. Project emission sources relative to toxic air contaminants (TACs) evaluated for the proposed project included:

- New Sulfuric Acid Regeneration Plant (SARP)
- New heaters to support the new Sulfuric Acid Regeneration Plant.
- New Propane Storage and Treatment Unit and Wet Jet Treater.
- New internal floating roof storage tanks and modifications to existing fixed and floating roof storage tanks.
- Increased utilization of several fixed and floating roof storage tanks at both Carson and Wilmington Operations.
- Modification of a Railcar LPG Loading/Unloading Rack.
- Installation of interconnect piping between the two operations.
- Modifications to existing process units and equipment resulting in the addition of equipment components and associated fugitive VOC leaks.

- Modifications to increase the permitted equipment description firing rate of the Carson 51 Vacuum Unit Heater as well as Wilmington Heaters H-100, H-300 and H-301.
- Modifications to the Carson Naphtha Hydrotreater Heater to allow the installation of ultra-low NOx burners.
- Increased utilization of the following heaters at the Carson Operations: Hydrocracker R-1, Hydrocracker R-2 and the Light Hydrotreating Unit Heater.
- Increased utilization of the Carson FCCU Regenerator and Pre-Heater.
- Increased utilization of the Carson Cogeneration Units 1-4.
- Increased utilization of the following heaters at the Wilmington Operations: Delayed Coking Unit H-101, Hydrotreating Unit #3 H-30, Hydrotreating Unit #3 H-21/22, CRU H-510, CRU H-501A, H-501B, H-502 and H-503/504.
- Increased utilization of the following boilers at the Wilmington Operations: Boilers 7, 8, 9 and 10.
- Increased handing of coke products at Wilmington Operations.
- Increased utilization of the following boilers at the Sulfur Recovery Plant Operations: Boilers H-1601/1602.
- Increased utilization of the following incinerators at the Sulfur Recovery Plant Operations: Incinerators F-704 and H-754.
- Locomotives associated with increased railcar movement of LPG, in-transit and idling on site and just outside facility fenceline.
- Increased onsite truck traffic at the refinery resulting from the proposed project.

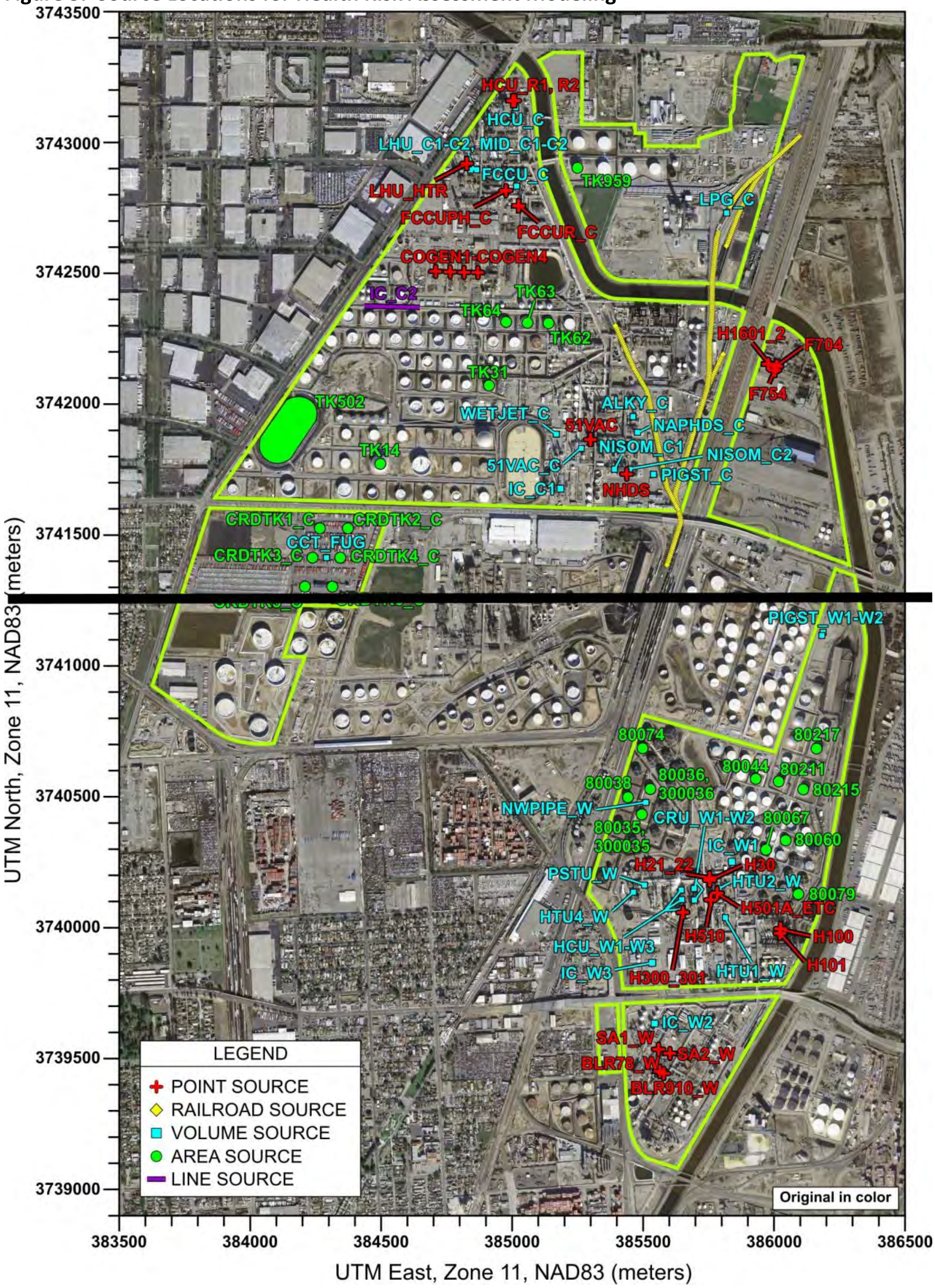
Specific TACs emitted as part of this project are listed in **Section 4.0** of the Health Risk Assessment provided under separate cover. Emissions for the project-related sources were estimated using SCAQMD-approved methodologies. Stationary source and locomotive emissions are summarized in **Attachment A**.

Exposure Assessment. Exposure assessment includes air dispersion modeling, identification of exposure routes, and estimation of exposure levels. In a typical exposure assessment, air dispersion modeling is used to estimate ground level concentrations for each substance. Potential pathways of exposure to potential offsite receptors for each substance are identified (e.g., inhalation, dermal) and the appropriate algorithms are then used together to estimate concentrations in air, soil, water, vegetation, and animals. The potential exposure levels to receptors are then estimated for each substance.

Stationary combustion sources (heaters and process vents) were modeled using representative release parameters. Process unit pipeline component fugitive emissions and coke handling fugitive emissions were modeled as volume sources. The interconnect piping fugitive emission sources were also modeled as volume sources, except for one long, narrow, straight stretch of piping that was modeled as a line source. Storage tanks were modeled as area sources. Locomotives were modeled as a string of evenly-spaced volume sources along the segments of track where engines are expected to travel. The engines travel a short distance outside the facility boundaries at times; this was reflected in the modeling. Onsite trucks were modeled as a string of evenly-spaced volume sources along the segments of road where trucks are expected to travel. Figure 3 shows the modeled point, volume, and area source locations for proposed project stationary sources. Stationary source TAC emissions used as input to the HARP2 model are documented in **Attachment A**.

Notably, there will also be a substantial reduction in toxic pollutant emissions from the shutdown of the Wilmington Operation's Fluid Catalytic Cracking Unit (FCCU) and associated heaters (CO Boiler, H2 Heater, H3 Heater, H4 Heater, H5 Heater and Startup Heater). These emissions were conservatively excluded from the Health Risk Assessment.

~~Figure 3. Source Locations for Health Risk Assessment Modeling~~



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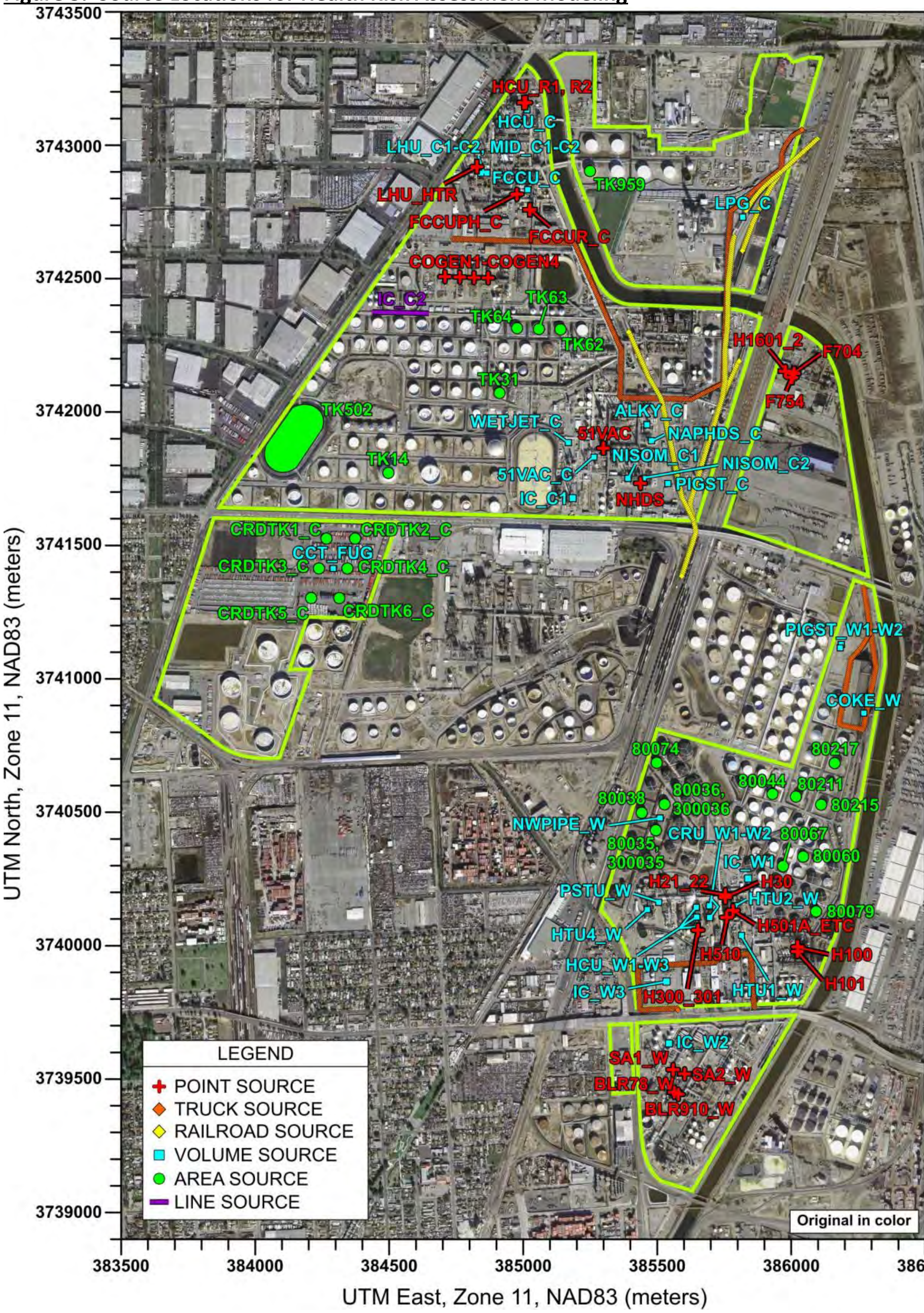


Source parameters used in the modeling are detailed in the Health Risk Assessment provided under separate cover.

The AERMOD-ready meteorological data sets for years 2006, 2007, 2008, 2009, and 2011 for the Long Beach, CA monitoring station were used for the analysis. These data sets were developed by SCAQMD using AERMET version 14134, the AERMOD meteorological data preprocessor, and provided for use in this analysis. The Long Beach meteorological station is located less than 3 miles east of the refinery.

Health effect indices such as cancer risk, chronic hazard index, and acute hazard index were calculated for a variety of receptor locations. Receptors of primary interest are those at residential locations, at sensitive population locations, and at offsite worker locations. However, in order to get a more complete picture of the patterns of exposure, concentrations and risk are also calculated at regularly spaced grid points throughout the modeling domain.

The receptors used to analyze project impacts include:

- 25-m spaced receptors along the outer facility boundary
- 100-m spaced receptors within the facility boundary and out to 1,000+ meters from the facility boundary
- 250-m spaced receptors beyond 1,000 m out to 3,500 m or more from the facility boundary
- Sensitive receptors within a radius of approximately 6 kilometers of a central refinery location
- Four (4) additional receptors located at residences in an otherwise commercial/industrial area immediately west of the southern portion of the facility

Receptor spacing was based on SCAQMD modeling guidance[4], which requires a fenceline spacing of 100 meters or less for facility areas greater than or equal to 100 acres. Sensitive receptor locations (schools, day care facilities, hospitals, and convalescent homes) were obtained via an internet search and the Google Maps database

Figure 4 shows the model representation of grid and fenceline receptors, and Figure 5 plots the sensitive receptor locations. A total of ~~5,738~~ 5,742 fenceline and grid receptors were included in the analysis, plus an additional 76 sensitive receptors.

[4] South Coast Air Quality Management District, Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act, June 5, 2015, Table 9.

Figure 4. Fenceline and Grid Receptor Locations

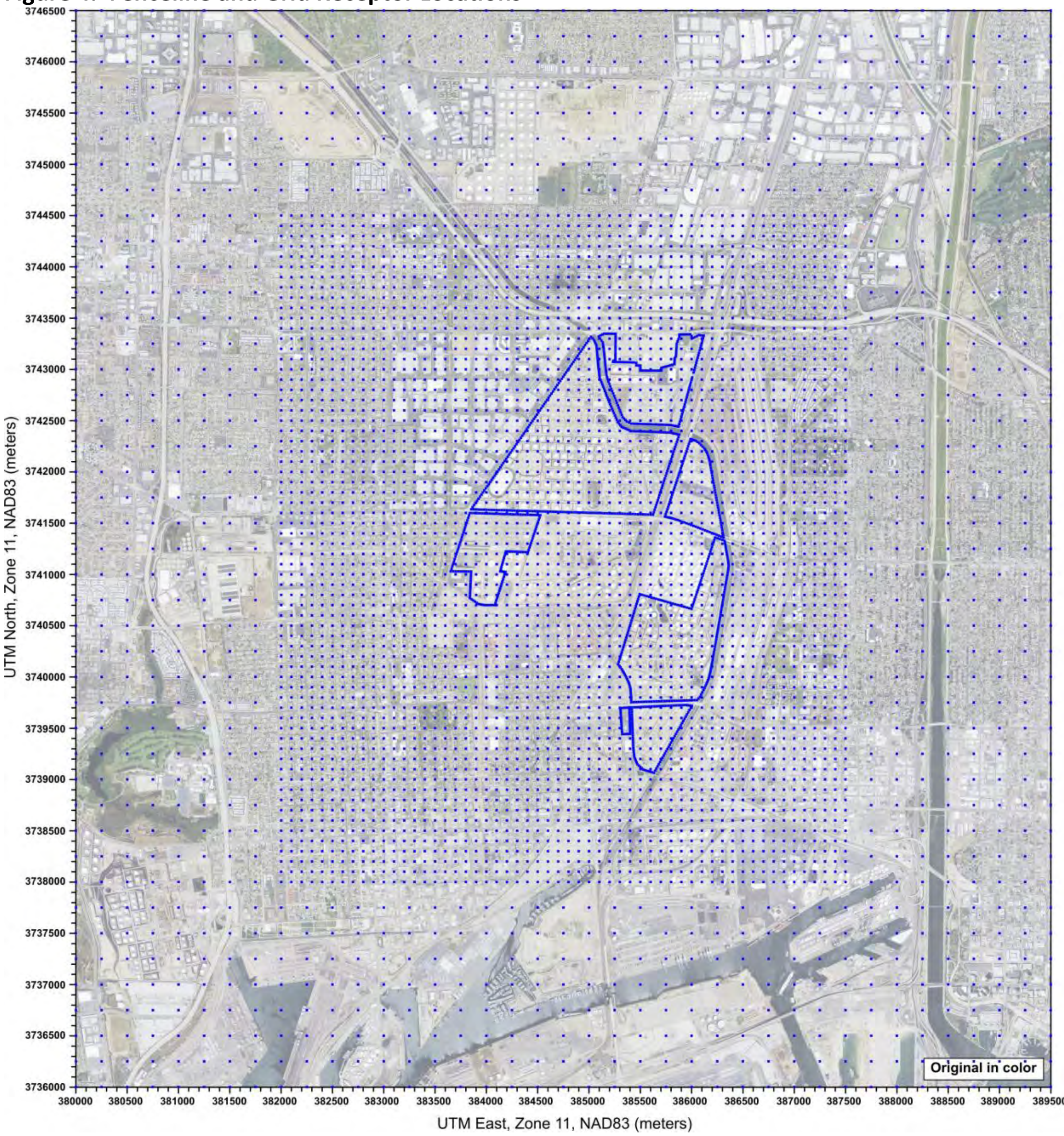
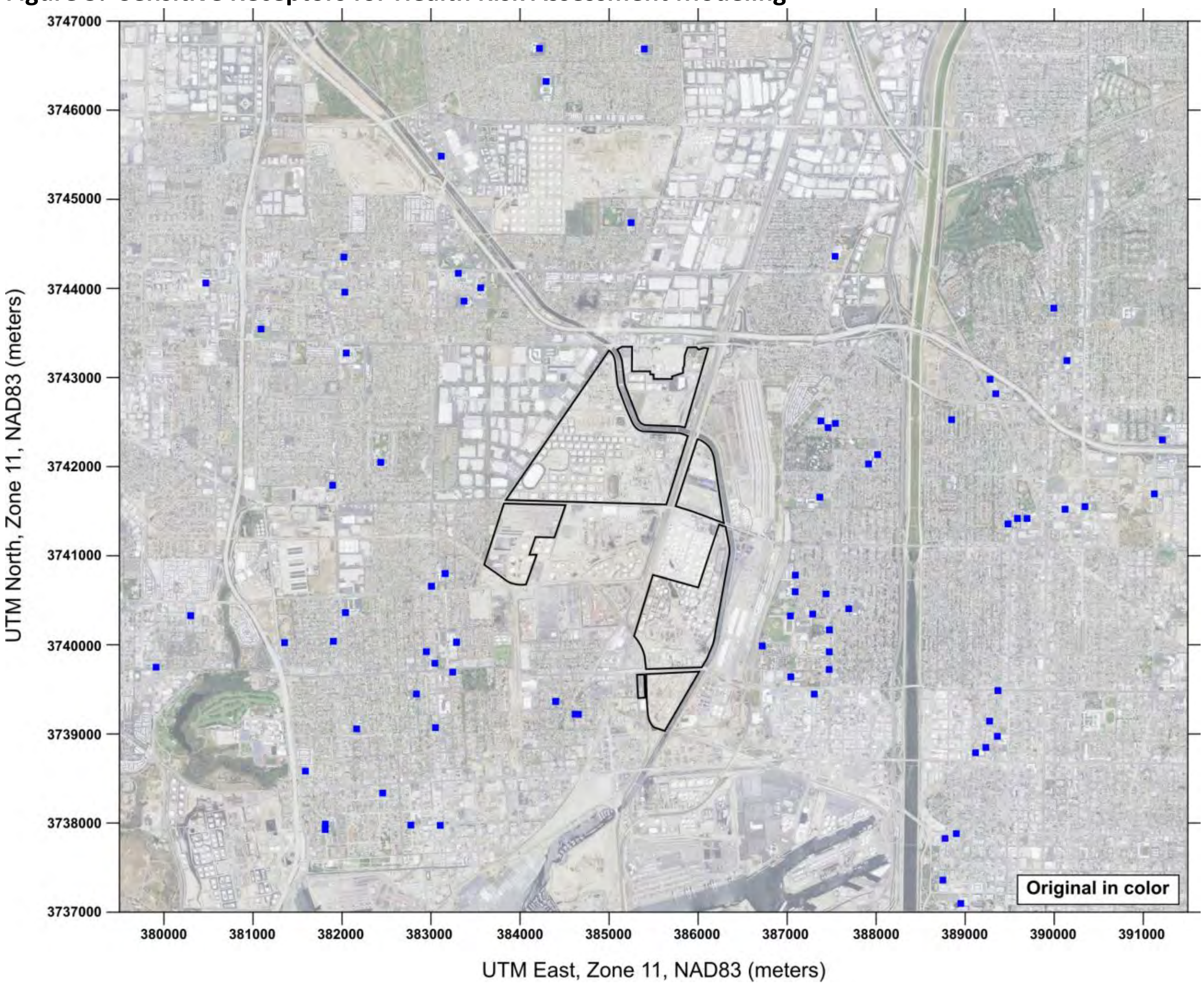


Figure 5. Sensitive Receptors for Health Risk Assessment Modeling



4.2 Thresholds

The SCAQMD's thresholds of significance for health risks associated with toxic air contaminants are as follows:

- Carcinogens: Increased cancer risk of 10 per one million or greater for the maximally exposed individual; cancer burden greater than 0.5
- Non-Carcinogens: Hazard index of 1 or greater for the maximally exposed individual. Note that the hazard index is expressed as a ratio of exposure levels to acceptable levels

4.3 Summary of Results

Project emissions are summarized in **Attachment A** to this report. As described above, modeling was performed with HARP2 following current SCAQMD HRA guidance. The results of the health risk assessment conducted for the proposed project are summarized below.

The results of the HRA are summarized in Table ~~12~~ 13 below. The highest cancer risk at a residential receptor is a cancer risk value of ~~3.6~~ 3.7 in one million. The receptor is located just west of the western boundary of the refinery nearest to the proposed new crude tanks – see Figure 6. Contours showing the areal distribution of calculated cancer risks for worst-case residential exposure are shown on Figure 7. The highest calculated cancer risk at a sensitive receptor was 2.1 in one million, at Bethune Mary School located about 500 meters east of the eastern boundary of the Wilmington Operations area.

The receptor with the highest calculated worker exposure cancer risk was located near the railroad tracks at the northeastern boundary of the refinery – see Figure 6. The receptor is in the immediate vicinity of the location where a locomotive engine enters and exits the facility boundary when moving LPG railcars. The worst case worker cancer risk at this receptor is ~~9.2~~ 9.3 in one million. This receptor is located along the fenceline[5] where long-term (multi-decade) 40 hour/week exposure is highly unlikely to occur. Contours showing the areal distribution of calculated cancer risks for worst-case worker exposure are shown on Figure 8.

~~The maximum chronic hazard index (worker or residential) of 0.127 was predicted at a receptor just east of the southern portion of the facility. The maximum 8-hr chronic hazard index (worker or residential) of 0.108 was predicted at a receptor just west of the Wilmington operations refinery interconnect system.~~ The maximum chronic hazard index (worker or residential) of 0.106 was predicted at a receptor just west of the Wilmington operations refinery interconnect system. The maximum 8-hr chronic hazard index (worker or residential) of 0.108 was predicted at the same receptor. The maximum increase in the acute hazard index value was predicted to be 0.052 at a fenceline receptor[6] along the Dominguez Channel. The maximum chronic HI and acute HI receptors are shown in Figure 6.

HARP2 contains an option to calculate the 8-hr chronic HI based on hour-by-hour model results for a specific 8-hr period (e.g., 8:00 AM to 4:00 PM to represent typical worker schedule). As this option requires long model times and can generate extremely large computer files, ARB guidance[7] suggests a screening calculation prior to performing this refined analysis. An extremely conservative screening calculation was made by multiplying the maximum chronic HI values by three. Multiplying by three provides the absolute worst-case value, as this assumes that all exposure occurs in the same 8-hr period each day. This approach also assumes that the 8-hr chronic REL is equal to the chronic REL, which is not

[5] Per discussions with AQMD staff, fenceline receptors in the vicinity of the rail-line could be included as worker receptors as a conservative measure.

[6] As a conservative assumption, all fenceline receptors were considered when determining the maximum acute HI.

[7] California Office of Environmental Health Hazard Assessment (OEHHA) 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. February 2015, p. 4-46.

California Air Resources Board, User Manual for the Hotspots Analysis and Reporting Program Air Dispersion Modeling and Risk Assessment Tool Version 2. March 17, 2015, p. 46.

the case for most chemicals[8]. Using this conservative screening approach, neither the maximum residential, worker, nor sensitive receptor chronic HI multiplied by three exceeded one.

~~**Table 12. Summary of Health Risk Assessment Results**~~
Table 13. Summary of Health Risk Assessment Results

Maximally Exposed Individual[a]	Increased Cancer Risk (per million)	Increased Non-Cancer Risk		
		Chronic (Hazard Index)	8-Hr Chronic (Hazard Index)	Acute[c] (Hazard Index)
Residential Receptor	3.7 ~~3.6~~	0.030 ~~0.049~~	0.006	0.052
Off-site Workplace Receptor	9.3 ~~9.2~~	0.106 ~~0.127~~	0.108	0.052
Sensitive Receptor[b]	2.1	0.025 ~~0.054~~	0.005	0.010

Notes:
a. Excludes on-site receptors.
b. Maximum sensitive receptors:
Cancer risk: Bethune Mary School
Chronic risk: Long Beach Japanese School
8-Hr Chronic Risk: Bethune Mary School
Acute risk: Bethune Mary School
c. Fenceline receptors were conservatively included as potential residential and worker receptors for determination of maximum acute risk.

Additionally, cancer burden was calculated to estimate the increase in cancer cases in the population. Using the same conservative approach as described above for the HARP modeling, the cancer burden was calculated to be ~~0.46~~ 0.47, less than the AQMD Rule 1401 threshold of 0.5.

[8] 8-hr chronic RELs are either equal to or greater than the chronic REL for the respective chemical. Notably, there are many chemicals for which an 8-hr chronic REL does not exist, including DPM.

~~**Figure 6. Location of Maximum Calculated Health Risks (HARP2 Modeling)**~~

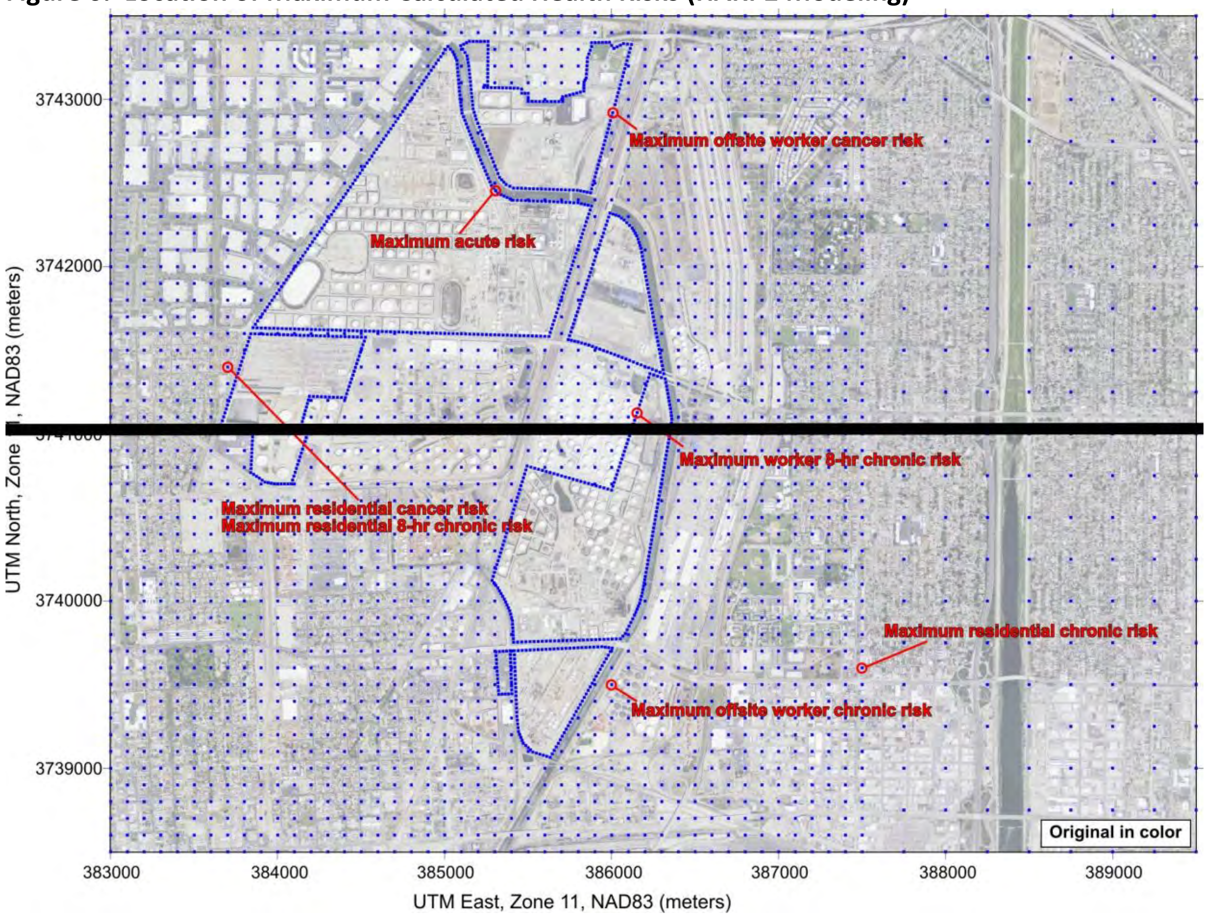
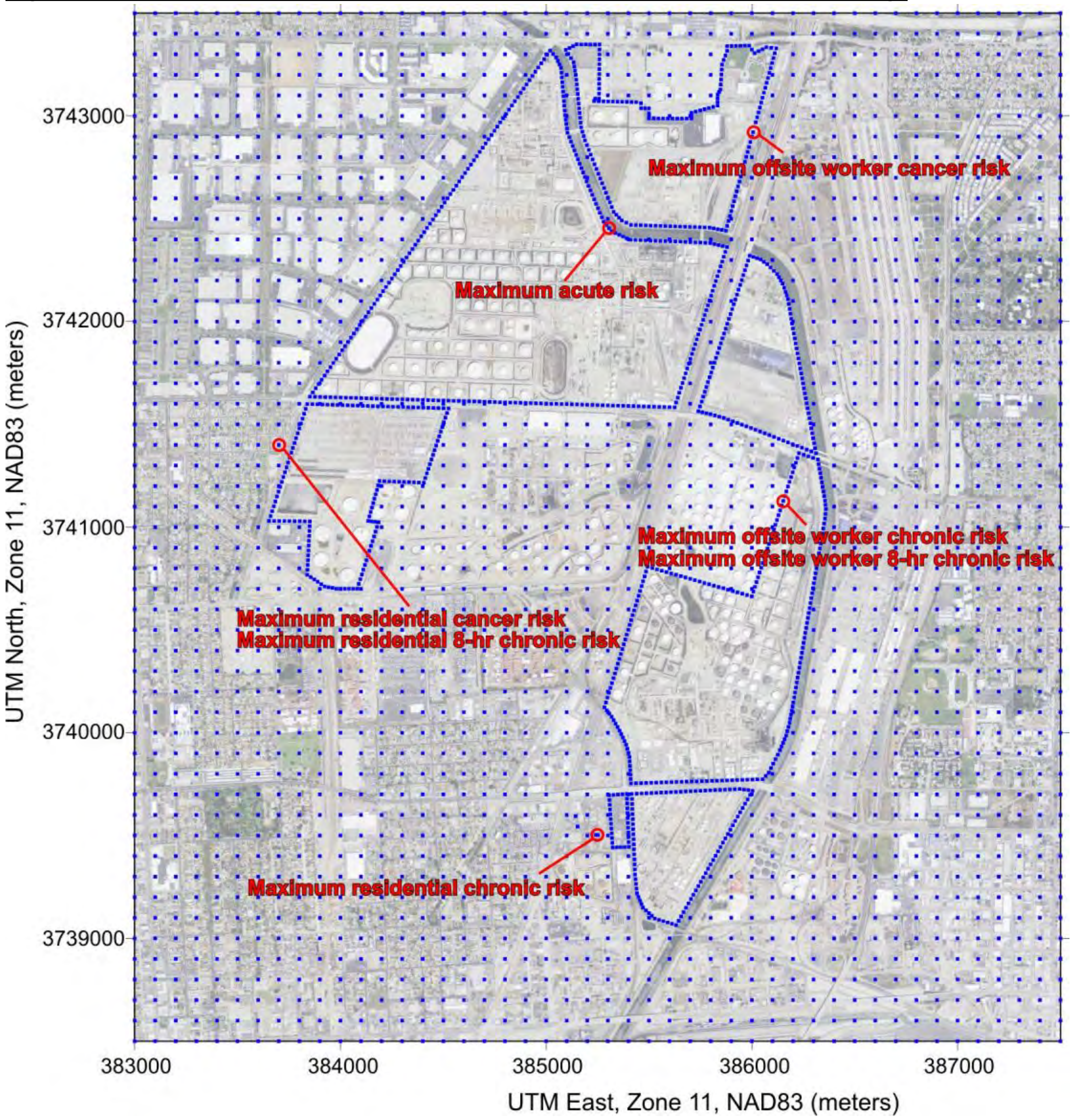


Figure 6. Location of Maximum Calculated Health Risks (HARP2 Modeling)



~~**Figure 7. Calculated Increased Residential Cancer Risk Contours, per million exposed (HARP2 Modeling)**~~

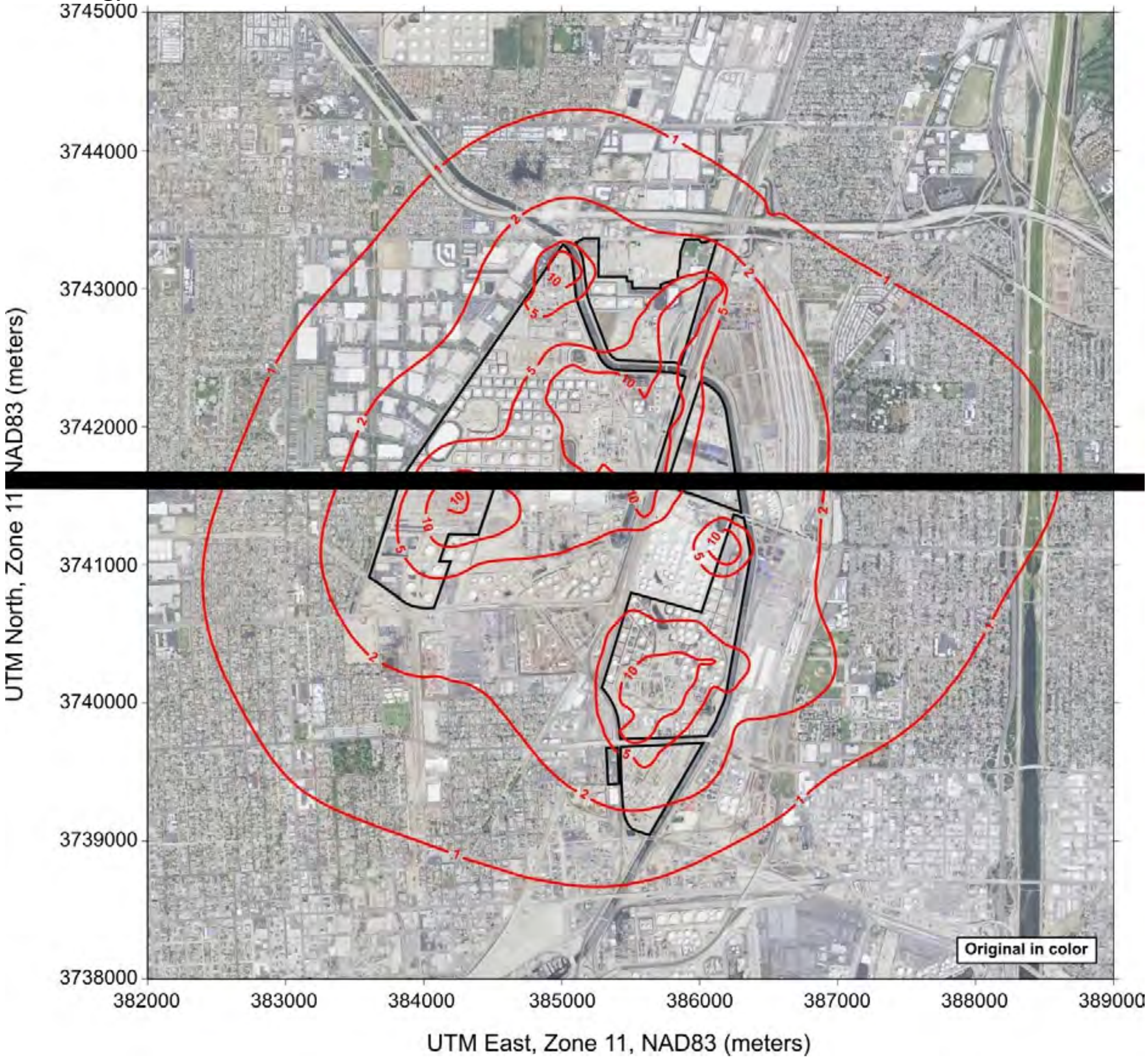
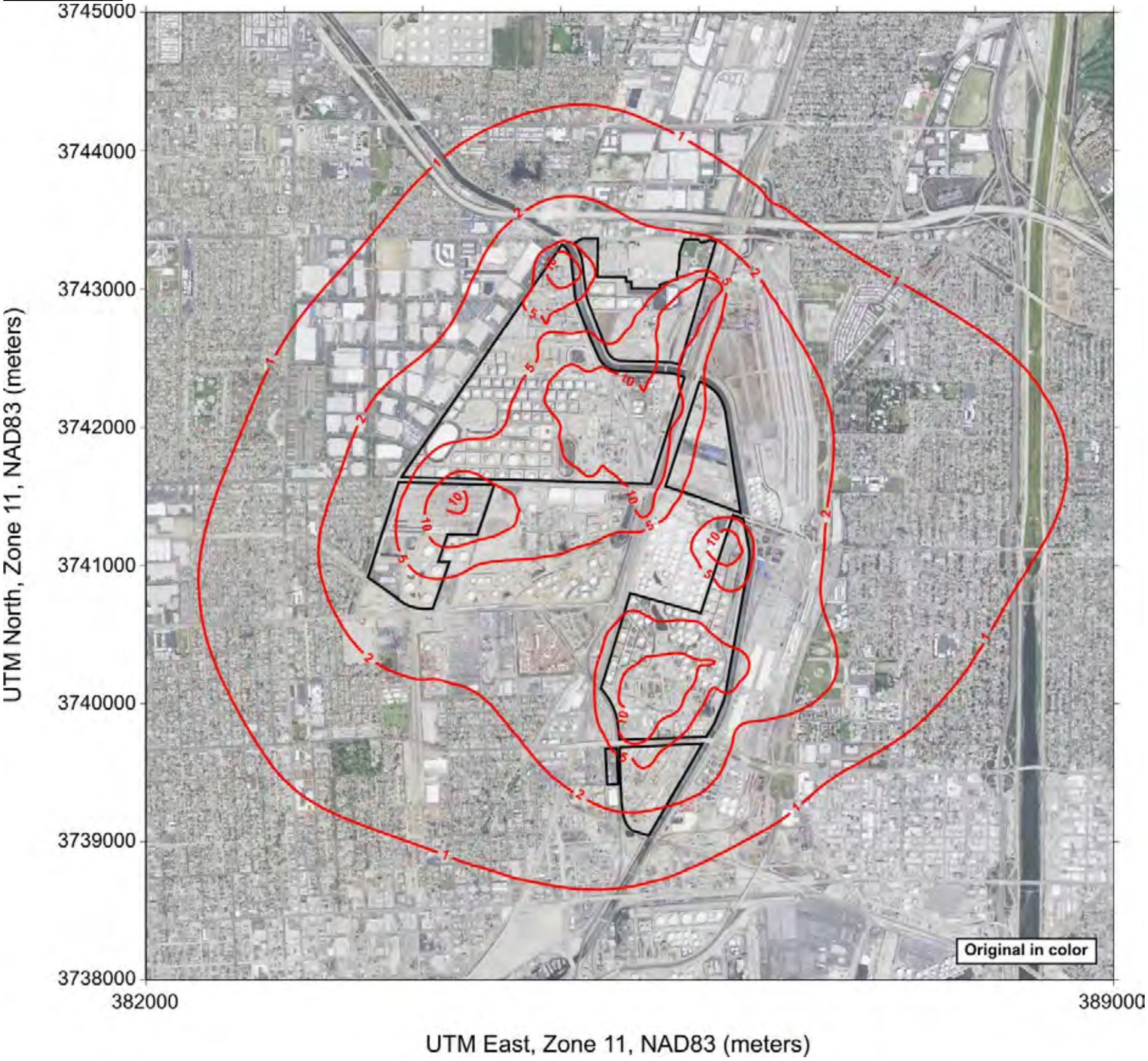


Figure 7. Calculated Increased Residential Cancer Risk Contours, per million exposed (HARP2 Modeling)



~~**Figure 8. Calculated Increased Worker Cancer Risk Contours, per million exposed (HARP2 Modeling)**~~

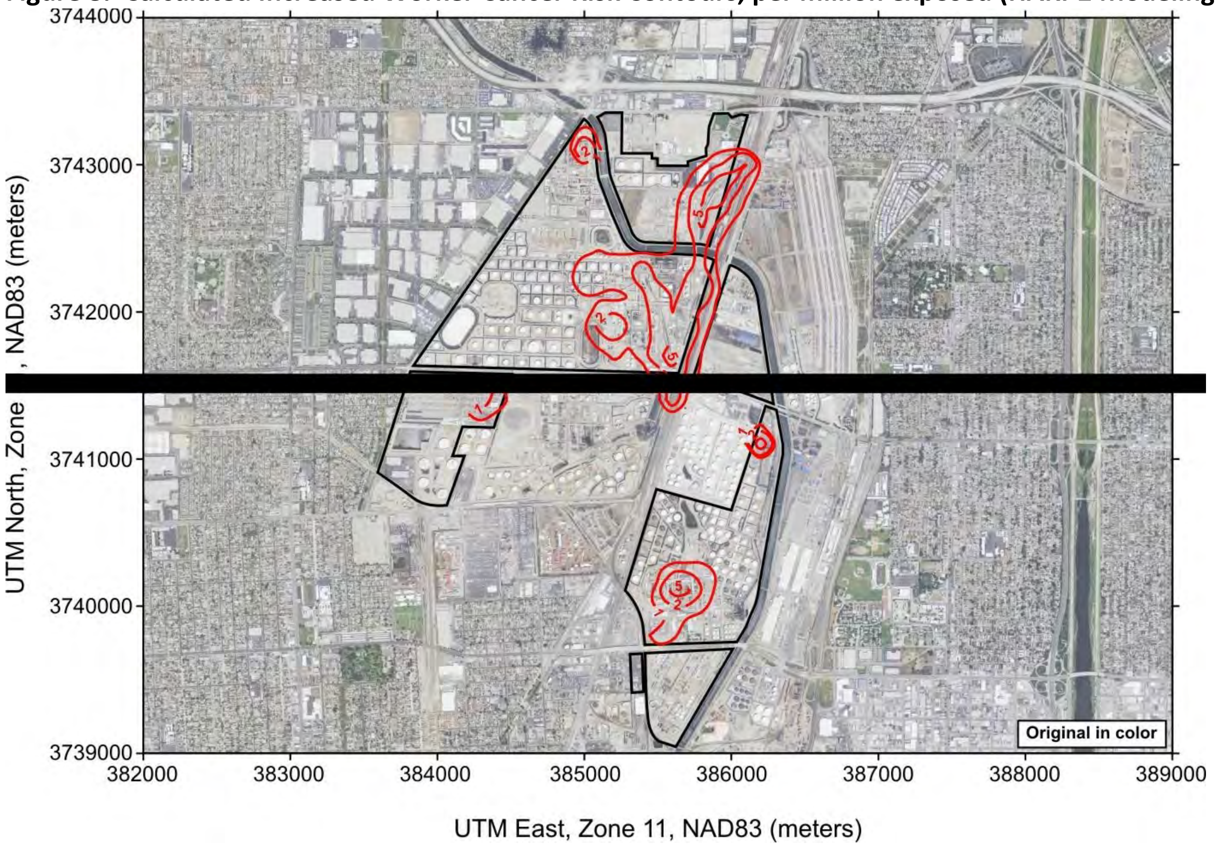
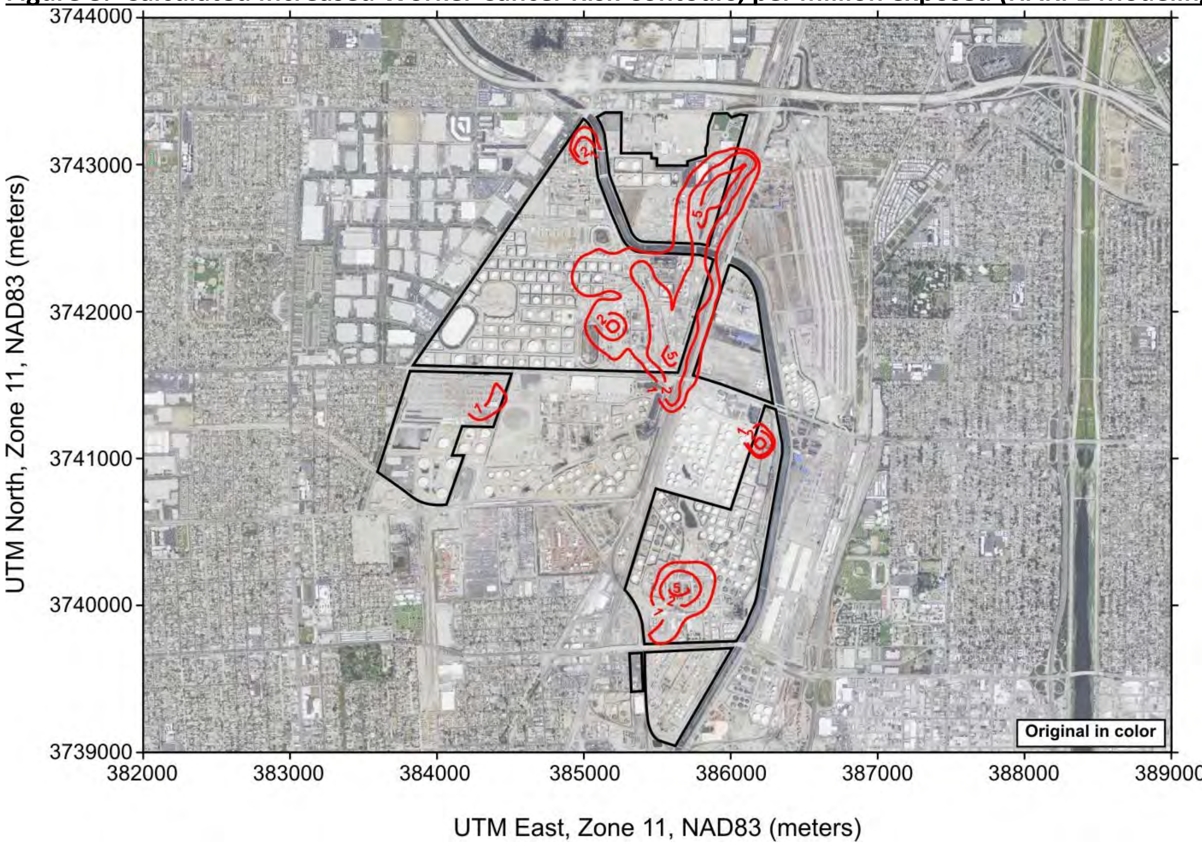


Figure 8. Calculated Increased Worker Cancer Risk Contours, per million exposed (HARP2 Modeling)



5. GREENHOUSE GASES (GLOBAL CLIMATE CHANGE)

5.1.1 Stationary Source Emissions

Calculation methodologies for GHG emissions are described in Section 2 above. Project emissions are summarized in **Attachment A** to this report. Table ~~13~~ 14 presents the estimated stationary source emissions associated with the proposed project.

~~Table 13. Summary of Emissions Changes (GHG)~~
Table 14. Summary of Stationary Source Emissions Changes (GHG)

	Emissions Change (short tons/year)				(metric tons/yr)
NEW AND MODIFIED SOURCES	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**CO_2e**
51 Vac Heater	65,747.97	1.24	0.12	65,815.84	59,706.82
Naphtha HDS ULNB Conversion	4,304.45	0.08	0.01	4,310.10	3,910.04
DCU H-100 Heater Duty Bump	36,500.80	2.14	0.43	36,686.95	33,281.67
HC H-300 Heater Duty Bump	30,978.46	(0.06)	(0.11)	30,946.20	28,073.77
HC H-301 Heater Duty Bump (incl with H-300)	(incl with H-300)	(incl with H-300)	(incl with H-300)	(incl with H-300)	(incl with H-300)
Sulfuric Acid Regen Plant Process Air Heater	10,247.20	0.19	0.02	10,257.78	9,305.65
Sulfuric Acid Regen Plant Decomp. Furnace	21,519.11	0.41	0.04	21,541.34	19,541.87
Sulfuric Acid Regen Plant Converter Heater	2,561.80	0.05	0.00	2,564.45	2,326.41
Sulfuric Acid Regen Plant Process Vent	-	-	-	-	-
Carson Crude Tank Emissions	-	-	-	-	-
Wilmington Tank Emissions	-	-	-	-	-
Fugitive Component Emissions (All Projects)	-	-	-	-	-
CARSON AND WILMINGTON INCREASED UTILIZATION EMISSIONS					
Carson FCCU Regenerator	109,893.81	3.22	0.64	110,163.35	99,937.99
Carson FCCU Pre-Heater	5,538.59	0.31	0.06	5,564.56	5,048.06
Carson Cogeneration Units 1-4	22,105.25	1.22	0.24	22,208.18	20,146.82
Carson HC Heater R-1	7,840.91	0.43	0.09	7,877.67	7,146.47
Carson HC Heater R-2	10,453.67	0.58	0.12	10,502.69	9,527.83
Carson LHU Heater	2,607.62	0.14	0.03	2,619.87	2,376.70
Wilmington DCU Heater H-101	3,746.10	0.20	0.04	3,763.20	3,413.90
Wilmington HTU #3 Heater H-30	2,195.52	0.12	0.02	2,205.50	2,000.79
Wilmington HTU #3 Heater H-21/22	2,192.92	0.12	0.02	2,202.93	1,998.45
Wilmington CRU Heater H-510	213.78	0.01	0.00	214.76	194.82
Wilmington CRU Heater H-501A, B, 502, 503/504	856.40	0.05	0.01	860.31	780.46
Wilmington Boilers 7 and 8	2,680.51	0.15	0.03	2,692.75	2,442.81

Wilmington Boilers 9 and 10	2,860.59	0.14	0.03	2,692.83	2,442.88
Wilmington Coke Handling	-	-	-	-	-
SRP Boilers H-1601/1602	58.42	0.00	0.00	58.56	53.12
SRP Incinerators F-704	36.13	0.00	0.00	36.30	32.93
SRP Incinerators F-754	36.70	0.00	0.00	36.87	33.45
Carson Tank 14	-	-	-	-	-
Carson Tank 31	-	-	-	-	-
Carson Tank 62	-	-	-	-	-
Carson Tank 63	-	-	-	-	-
Carson Tank 64	-	-	-	-	-
Carson Tank 502	-	-	-	-	-
Carson Tank 959	-	-	-	-	-
Wilmington Tank 80044	-	-	-	-	-
Wilmington Tank 80074	-	-	-	-	-
Wilmington Tank 80211	-	-	-	-	-
Wilmington Tank 80215	-	-	-	-	-
Wilmington Tank 80217	-	-	-	-	-
FCCU SHUTDOWN (HISTORIC ACTUAL EMISSIONS)					
FCCU	(272,118.51)	(7.97)	(1.59)	(272,785.90)	(247,465.91)
CO Boiler	(79,631.48)	(4.33)	(0.87)	(79,994.09)	(72,569.03)
H2 Heater	(3,114.47)	(0.17)	(0.03)	(3,128.91)	(2,838.48)
H3/H4 Heater	(66,649.74)	(3.62)	(0.72)	(66,953.21)	(60,738.61)
H5 Heater	-	-	-	-	-
Startup Heater	(477.13)	(0.01)	(0.00)	(477.30)	(433.00)
Fugitive Components	-	-	-	-	-
Total Combined Emissions	**(76,994.62)**	**(5.36)**	**(1.36)**	**(77,516.39)**	**(70,321.32)**

5.1.2 Locomotive Emissions

As described previously, operation of the proposed project will result in increased utilization of locomotive engines. Table ~~14~~ 15 presents the estimated increase in locomotive emissions associated with the proposed project. Detailed emissions calculations are included in **Attachment A** to this report.

~~Table 14. Summary of Emissions Changes (GHG)~~
Table 15. Summary of Locomotive Source Emissions Changes (GHG)

	Emissions Change (metric tons/year)			
	CO_2	CH_4	N_2O	CO_2e
EMD GP9	50.68	0.01	0.00	51.79
EMD SW1200	71.59	0.01	0.00	73.16
Total Combined Emissions	122.27	0.02	0.01	124.94

5.1.3 Onsite Truck Emissions

As described previously, operation of the proposed project will result in increased utilization of onsite trucks. Table 16 presents the estimated increase in truck emissions associated with the proposed project. Detailed emissions calculations are included in **Attachment A** to this report.

Table 16. Summary of Onsite Truck Emissions Changes (GHG)

	Emissions Change (metric tons/year)			
	CO_2	CH_4	N_2O	CO_2e
Onsite Truck Emissions	80.58	-	-	80.58

Note: Emission factors for CH_4 and N_2O are not reported by EMFAC.

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ATTACHMENT A: EMISSIONS SUMMARIES

Table	Title
A-1	Summary of Emissions Changes
A-2	Carson and Wilmington New and Modified Heater Emissions (Potential to Emit)
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A-5	Carson FCCU Regenerator and Pre-Heater Emissions Calculations (Increased Utility) – Increase in Annual Emissions
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A-7	Wilmington Combustion Unit Emissions Calculations (Increased Utilization)
A-8	Carson and Wilmington Heater Toxic Emissions Calculations (Modified Sources) – Increase in Daily Emissions
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A-22	Carson Cogeneration Units 1-4 Emissions Calculations (Increased Utilization) – Annual Average
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A-25	Summary of Onroad Truck Emissions
A-26	H2SO4 Emissions From Refinery Heaters
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Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-1: Summary of Emissions Changes

	Emissions (lbs/day)						Source
CARSON	**NOx**	**SOx**	**CO**	**PM10**	**VOC**	**CO2e****	**Table**
51 Vac Heater	32.72	1.80	233.85	45.49	32.85	360,634.76	A-6
Naphtha HDS ULNB Conversion	1.87	0.64	10.23	5.56	1.73	23,616.98	A-3
FCCU Regenerator (Increased Utilization)*	-	-	-	-	-	-	--
FCCU Pre-Heater (Increased Utilization)*	-	-	-	-	-	-	--
Cogeneration Units 1-4 (Increased Utilization)*	20.60	2.50	4.50	9.85	4.15	121,688.67	A-22
HC R-1 Heater (Increased Utilization)	18.00	4.61	1.04	5.38	1.77	43,165.34	A-6
HC R-2 Heater (Increased Utilization)	14.40	9.81	1.38	7.18	2.36	57,548.98	A-6
LHU Heater (Increased Utilization)	6.00	1.50	0.36	1.87	0.62	14,355.47	A-6
Subtotals:	**93.59**	**20.86**	**251.37**	**75.34**	**43.48**	**621,010.19**	**--**

* Daily operations rates of the FCCU Regenerator and Pre-heater will not increase above previous maximum daily rates; as such, daily emissions increases are listed as zero.
** CO2e emissions calculated based on annual averages.

WILMINGTON	NOx	SOx	CO	PM10	VOC	CO2e**	Source Table
HC H-300 Heater Duty Bump	4.67	(14.98)	49.75	10.79	10.10	169,568.20	A-3
HC H-301 Heater Duty Bump (incl with H-300)	(see H-300)	(see H-300)	(see H-300)	(see H-300)	(see H-300)	(see H-300)	--
H-100 Heater Duty Bump	(171.03)	86.69	(5.14)	(0.98)	(0.43)	201,024.40	A-3
Sulfuric Acid Regen Plant Process Air Heater	6.99	0.28	16.37	3.51	3.27	56,207.02	A-2
Sulfuric Acid Regen Plant Decomp. Furnace	2.45	0.59	34.39	7.37	6.88	118,034.73	A-2
Sulfuric Acid Regen Plant Converter Heater	1.75	0.07	4.09	0.88	0.82	14,051.75	A-2
Sulfuric Acid Regen Plant Process Vent	-	31.12	-	~~0.00~~ 6.00	-	-	A-2
Subtotals:	**(155.17)**	**103.76**	**99.46**	~~**21.56**~~ **27.56**	**20.64**	**558,886.10**	**--**

WILMINGTON - CRUDE INCREASE EFFECTS	NOx	SOx	CO	PM10	VOC	CO2e**	Source Table
H-101 Heater (Increased Utilization)	19.00	7.58	4.36	0.83	0.83	20,620.29	A-7
H-30 Heater (Increased Utilization)	7.87	2.53	0.38	1.97	1.59	12,084.95	A-7
H-21/22 (Increased Utilization)	12.69	1.33	2.76	0.59	0.61	12,070.83	A-7
H-510 (Increased Utilization)	0.48	0.24	0.60	0.15	0.05	1,176.76	A-7
H-501A, B, 502, 503/504 (Increased Utilization)	1.27	0.41	0.95	0.59	0.18	4,714.05	A-7
Boilers 7 & 8 (Increased Utilization)	12.00	3.07	0.37	1.89	0.63	14,754.81	A-7
Boilers 9 & 10 (Increased Utilization)	12.00	3.07	0.37	1.89	0.63	14,755.24	A-7
Coke Handling (Increased Utilization)*	--	--	--	--	--	--	A-27
SRP Boilers H-1601/1602 (Increased Utilization)	0.11	0.04	0.01	0.05	0.02	320.87	A-7
SRP Incinerator F-704 (Increased Sulfur Load)	0.24	12.66	0.05	0.01	0.01	198.89	A-7
SRP Incinerator F-754 (Increased Sulfur Load)	0.52	12.66	0.03	0.03	0.01	202.02	A-7
Subtotals:	**66.19**	**43.60**	**9.89**	**8.02**	**4.57**	**80,898.70**	--

* Daily operations rates of the Wilmington Operations Coke Handling Operations will not increase above previous maximum daily rates; as such, daily emissions increases are listed as zero.

WILMINGTON FCCU SHUTDOWN (HISTORIC ACTUAL EMISSIONS)	NOx	SOx	CO	PM10	VOC	CO2e**	Source Table
FCCU (CO emissions included with CO Boiler)	(343.31)	(387.50)	-	(98.59)	(274.03)	(1,494,717.26)	A-12
CO Boiler (NOx and SOx emissions included with FCCU)	-	-	(909.62)	(22.71)	(16.43)	(438,323.76)	A-12
H2 Heater	(16.53)	(1.28)	(4.06)	(0.87)	(0.81)	(17,144.70)	A-12
H3/H4 Heater	(209.75)	(27.59)	(45.30)	(49.01)	(9.93)	(366,866.89)	A-12
H5 Heater	-	-	-	-	-	-	A-12
Startup Heater	(3.00)	(0.01)	(0.81)	(0.17)	(0.16)	(2,615.34)	A-12
Fugitive Components	-	-	-	-	(17.60)	-	A-12
Subtotals:	**(572.59)**	**(416.38)**	**(959.78)**	**(171.35)**	**(318.96)**	**(2,319,667.94)**	--

FUGITIVE COMPONENT EMISSIONS	NOx	SOx	CO	PM10	VOC	CO2e**	Source Table
51 Vac (Carson)	-	-	-	-	11.74	-	A-15
Alkylation (Carson)	-	-	-	-	18.88	-	A-15
Crude Tanks (Fug Ems) (Carson)	-	-	-	-	43.05	-	A-15
HCU Mods (Carson)	-	-	-	-	6.77	-	A-15
Interconnect Piping (Carson)	-	-	-	-	27.22	-	A-15
LHU Mods (Carson)	-	-	-	-	14.34	-	A-15
LPG Railcar Load/Unload (Carson)	-	-	-	-	26.85	-	A-15
Mid Barrel Distillate Treater (Carson)	-	-	-	-	2.15	-	A-15
Naphtha Isom (Carson)	-	-	-	-	9.46	-	A-15
NHDS Mods (Carson)	-	-	-	-	15.21	-	A-15
Wet Jet Treater (Carson)	-	-	-	-	50.45	-	A-15
PSTU (Wilmington)	-	-	-	-	15.44	-	A-15
CRU 3 (Wilmington)	-	-	-	-	10.24	-	A-15
Crude Tanks (Fug Ems) (Wilmington)	-	-	-	-	3.61	-	A-15
HCU (Wilmington)	-	-	-	-	20.69	-	A-15
HTU 1 (Wilmington)	-	-	-	-	3.50	-	A-15
HTU 2 (Wilmington)	-	-	-	-	3.80	-	A-15
HTU 4 (Wilmington)	-	-	-	-	6.32	-	A-15
Interconnect Piping (Wilmington)	-	-	-	-	37.20	-	A-15
Sulfuric Acid Plant (Fug Ems) (Wilmington)	-	-	-	-	-	-	A-15
Subtotals:	**-**	**-**	**-**	**-**	**326.92**	**-**	--

STORAGE TANK EMISSIONS	NOx	SOx	CO	PM10	VOC	CO2e**	Source Table
Carson Tank Emissions - New	-	-	-	-	112.51	-	A-17
Carson Tank Emissions - Increased Utilization	-	-	-	-	64.35	-	A-17
Wilimington Tank Emissions - New/Modified	-	-	-	-	141.64	-	A-17
Wilmington Tank Emissions - Increased Utilization	-	-	-	-	4.12	-	A-17
Subtotals:	**-**	**-**	**-**	**-**	**322.62**	**-**	--

	NOx	SOx	CO	PM10	VOC	CO2e**
Onsite Mobil Source Train Emissions:	**11.65**	**0.01**	**2.01**	**0.25**	**0.66**	**754.66**
Onsite Mobil Truck Emissions:	**2.25E+00**	**1.53E-03**	**5.85E-01**	**1.09E-02**	**1.73E-01**	**4.21E+02**
Total Emissions (Excl. Mobil Source Truck and Train Emissions):	**(567.98)**	**(248.15)**	**(599.06)**	~~**(66.43)**~~ **(60.43)**	**399.26**	**(1,058,872.94)**

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-1: Summary of Emissions Changes

	Emissions (tons/year)						tonnes/yr	Source
CARSON	**NOx**	**SOx**	**CO**	**PM10**	**VOC**	**CO2e**	**CO2e**	**Table**
51 Vac Heater	~~13.16~~ 18.04	0.25	42.75	8.55	6.12	65,815.84	59,706.82	A-4
Naphtha HDS ULNB Conversion	~~0.02~~ 0.18	0.11	1.86	1.07	0.32	4,310.10	3,910.04	A-4
FCCU Regenerator (Increased Utilization)*	14.58	20.99	18.24	7.44	0.68	110,163.35	99,937.99	A-5
FCCU Pre-Heater (Increased Utilization)*	1.39	0.34	0.13	0.69	0.23	5,564.56	5,048.06	A-5
Cogeneration Units 1-4*	3.76	0.46	0.82	1.80	0.76	22,208.18	20,146.82	A-22
HC R-1 Heater (Increased Utilization)	3.29	0.84	0.19	0.98	0.32	7,877.67	7,146.47	A-6
HC R-2 Heater (Increased Utilization)	2.63	1.79	0.25	1.31	0.43	10,502.69	9,527.83	A-6
LHU Heater (Increased Utilization)	1.10	0.27	0.07	0.34	0.11	2,619.87	2,376.70	A-6
Subtotals:	**~~39.92~~ 44.96**	**25.06**	**64.32**	**22.17**	**8.97**	**229,062.28**	**207,800.72**	**--**
WILMINGTON								
HC H-300 Heater Duty Bump	~~(1.57)~~ (0.10)	(1.24)	10.02	2.15	2.00	30,946.20	28,073.77	A-4
HC H-301 Heater Duty Bump (incl with H-300)	(see H-300)	(see H-300)	(see H-300)	(see H-300)	(see H-300)	(see H-300)	(see H-300)	--
H-100 Heater Duty Bump	~~(4.38)~~ 6.12	35.38	3.63	0.75	0.80	36,686.95	33,281.67	A-4
Sulfuric Acid Regen Plant Process Air Heater	1.28	0.05	2.99	0.64	0.60	10,257.78	9,305.65	A-2
Sulfuric Acid Regen Plant Decomp. Furnace	0.45	0.11	6.28	1.34	1.26	21,541.34	19,541.87	A-2
Sulfuric Acid Regen Plant Converter Heater	0.32	0.01	0.75	0.16	0.15	2,564.45	2,326.41	A-2
Sulfuric Acid Regen Plant Process Vent	-	5.68	-	~~0.00~~ 1.10	-	-	-	A-2
Subtotals:	**~~(3.91)~~ 8.06**	**39.98**	**23.66**	**~~5.04~~ 6.14**	**4.81**	**101,996.71**	**92,529.38**	--
WILMINGTON - CRUDE INCREASE EFFECTS								
H-101 Heater (Increased Utilization)	3.47	1.38	0.80	0.15	0.15	3,763.20	3,413.90	A-7
H-30 Heater (Increased Utilization)	1.44	0.46	0.07	0.36	0.29	2,205.50	2,000.79	A-7
H-21/22 (Increased Utilization)	2.32	0.24	0.50	0.11	0.11	2,202.93	1,998.45	A-7
H-510 (Increased Utilization)	0.09	0.04	0.11	0.03	0.01	214.76	194.82	A-7
H-501A, B, 502, 503/504 (Increased Utilization)	0.23	0.08	0.17	0.11	0.03	860.31	780.46	A-7
Boilers 7 & 8 (Increased Utilization)	2.19	0.56	0.07	0.35	0.12	2,692.75	2,442.81	A-7
Boilers 9 & 10 (Increased Utilization)	2.19	0.56	0.07	0.35	0.12	2,692.83	2,442.88	A-7
Coke Handling (Increased Utilization)	--	--	--	0.07	--	--	--	A-27
SRP Boilers H-1601/1602 (Increased Utilization)	0.02	0.01	0.00	0.01	0.00	58.56	53.12	A-7
SRP Incinerator F-704 (Increased Sulfur Load)	0.04	2.31	0.01	0.00	0.00	36.30	32.93	A-7
SRP Incinerator F-754 (Increased Sulfur Load)	0.10	2.31	0.01	0.01	0.00	36.87	33.45	A-7
Subtotals:	**12.08**	**7.96**	**1.81**	**~~1.46~~ 1.54**	**0.83**	**14,764.01**	**13,393.62**	--
WILMINGTON FCCU SHUTDOWN (HISTORIC ACTUAL EMISSIONS)								
FCCU (CO emissions included with CO Boiler)	(62.65)	(70.72)	-	(17.99)	(50.01)	(272,785.90)	(247,465.91)	A-12
CO Boiler (NOx and SOx emissions included with FCCU)	-	-	(166.01)	(4.14)	(3.00)	(79,994.09)	(72,569.03)	A-12
H2 Heater	(3.02)	(0.23)	(0.74)	(0.16)	(0.15)	(3,128.91)	(2,838.48)	A-12
H3/H4 Heater	(38.28)	(5.03)	(8.27)	(8.94)	(1.81)	(66,953.21)	(60,738.61)	A-12
H5 Heater	-	-	-	-	-	-	-	A-12
Startup Heater	(0.55)	(0.00)	(0.15)	(0.03)	(0.03)	(477.30)	(433.00)	A-12
Fugitive Components	-	-	-	-	(3.21)	-	-	A-12
Subtotals:	**(104.50)**	**(75.99)**	**(175.16)**	**(31.27)**	**(58.21)**	**(423,339.40)**	**(384,045.04)**	--
FUGITIVE COMPONENT EMISSIONS								
51 Vac (Carson)	-	-	-	-	2.14	-	-	A-15
Alkylation (Carson)	-	-	-	-	3.45	-	-	A-15
Crude Tanks (Fug Ems) (Carson)	-	-	-	-	7.86	-	-	A-15
HCU Mods (Carson)	-	-	-	-	1.24	-	-	A-15
Interconnect Piping (Carson)	-	-	-	-	4.97	-	-	A-15
LHU Mods (Carson)	-	-	-	-	2.62	-	-	A-15
LPG Railcar Load/Unload (Carson)	-	-	-	-	4.90	-	-	A-15
Mid Barrel Distillate Treater (Carson)	-	-	-	-	0.39	-	-	A-15
Naphtha Isom (Carson)	-	-	-	-	1.73	-	-	A-15
NHDS Mods (Carson)	-	-	-	-	2.78	-	-	A-15
PSTU (Wilmington)	-	-	-	-	2.82	-	-	A-15
Wet Jet Treater (Carson)	-	-	-	-	9.21	-	-	A-15
CRU 3 (Wilmington)	-	-	-	-	1.87	-	-	A-15
Crude Tanks (Fug Ems) (Wilmington)	-	-	-	-	0.66	-	-	A-15
HCU (Wilmington)	-	-	-	-	3.78	-	-	A-15
HTU 1 (Wilmington)	-	-	-	-	0.64	-	-	A-15
HTU 2 (Wilmington)	-	-	-	-	0.69	-	-	A-15
HTU 4 (Wilmington)	-	-	-	-	1.15	-	-	A-15
Interconnect Piping (Wilmington)	-	-	-	-	6.79	-	-	A-15
Sulfuric Acid Plant (Fug Ems) (Wilmington)	-	-	-	-	-	-	-	A-15
Subtotals:	**-**	**-**	**-**	**-**	**59.66**	**-**	**-**	--
STORAGE TANK EMISSIONS								
Carson Tank Emissions - New	-	-	-	-	20.53	-	-	A-17
Carson Tank Emissions - Increased Utilization	-	-	-	-	11.74	-	-	A-17
Wilimington Tank Emissions - New/Modified	-	-	-	-	25.85	-		A-17
Wilmington Tank Emissions - Increased Utilization	-	-	-	-	0.75	-	-	A-17
	-	**-**	**-**	**-**	**58.88**	**-**	-	--
Onsite Mobil Source Train Emissions:	**2.13**	**0.00**	**0.37**	**0.05**	**0.12**	**137.72**	**124.94**	
Onsite Mobil Source Truck Emissions:	**0.48**	**0.00**	**0.12**	**0.00**	**0.04**	**88.83**	**80.58**	
Total Emissions (Excl. Mobil Source Truck and Train Emissions):	**~~(56.40)~~ (39.40)**	**(2.99)**	**(85.37)**	**~~(2.59)~~ (1.42)**	**74.94**	**(77,516.39)**	**(70,321.32)**	

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-2: Carson and Wilmington New and Modified Heater Emissions (Potential to Emit)

Constants

O2 Concentration (Heaters)	3	percent (dry)
O2 Concentration (Cogen)	15	percent (dry)
F-factor	8710	dscf/mmbtu (40 CFR 60 App A Meth. 19)
NOx Conc Conversion Factor	1.19E-07	ppm to lbs/scf (40 CFR 60 App A Meth. 19)
Fuel HHV	1026	btu/scf (natural gas; 40 CFR 98 default)
Operating Hours	24	hrs/day
Operating Hours	365	days/year
Ideal Gas Constant	385.24	scf/lbmol @ 68 F
GWP CH4	25	GWP
GWP N2O	298	GWP

Emission Factors

SOx EF	0.6	lbs/mmscf (AER Default Factor)
CO EF	35	lbs/mmscf (AER Default Factor' ~0.033 lbs/mmbtu)
PM EF	7.5	lbs/mmscf (AER Default Factor)
VOC EF	7	lbs/mmscf (AER Default Factor)
CO2 EF	53.06	kg/mmbtu (natural gas; 40 CFR 98 default)
CH4 EF	1.00E-03	kg/mmbtu (natural gas; 40 CFR 98 default)
N2O EF	1.00E-04	kg/mmbtu (natural gas; 40 CFR 98 default)
NOx EF		Conservative assumptions of NOx BACT concentrations are listed for each heater. NOx concentrations may be adjusted at the time of permitting.

Sulfuric Acid Plant Process Air Heater (LARW)

Max Firing Rate	20	mmbtu/hr
HHV NG	1026	mmbtu/mmscf

Assumptions: NG

	Daily Controlled lbs/day	Annual lbs/yr	
NOx (SSC)	23.31	3,042.48	
NOx (Routine)	6.99	2,552.88	12 ppmv NOx
SOx	0.28	102.46	AER default for NG.
CO	16.37	5,976.61	AER default for NG.
PM	3.51	1,280.70	AER default for NG.
VOC	3.27	1,195.32	AER default for NG.
CO2	56,149.03	20,494,394.44	NG Default Factor
CH4	1.06	386.25	NG Default Factor
N2O	0.11	38.62	NG Default Factor
CO2e	**56,207.02**	**20,515,560.91**	

- Startup, Shutdown and Comissioning (SSC) includes "routine" operations as well as maximum startup, shutdown and commssioning/refractory dryout emissions.
- NOx (Routine) is representative of "normal" operations.

SSC Hours:	720	hours/year
NOx SSC EF:	40	ppmv
NOx SSC EF (calculated):	0.0486	lb/mmbtu
NOx SSC Emissions:	0.97	lbs/hr (max)

Sulfuric Acid Plant Decomposition Furnace (LARW)

Max Firing Rate	42	mmbtu/hr
HHV NG	1026	mmbtu/mmscf

Assumptions: NG w/SCR

	Daily Controlled lbs/day	Annual lbs/yr	
NOx (SSC)	48.96	2,288.85	
NOx (Routine)	2.45	893.51	2 ppmv NOx
SOx	0.59	215.16	AER default for NG.
CO	34.39	12,550.88	AER default for NG.
PM	7.37	2,689.47	AER default for NG.
VOC	6.88	2,510.18	AER default for NG.
CO2	117,912.95	43,038,228.32	NG Default Factor
CH4	2.22	811.12	NG Default Factor
N2O	0.22	81.11	NG Default Factor
CO2e	**118,034.73**	**43,082,677.90**	

- Startup, Shutdown and Comissioning (SSC) includes "routine" operations as well as maximum startup, shutdown and commssioning/refractory dryout emissions.
- NOx (Routine) is representative of "normal" operations.

SSC Hours:	720	hours/year
NOx SSC EF:	40	ppmv
NOx SSC EF (calculated):	0.0486	lb/mmbtu
NOx SSC Emissions:	2.04	lbs/hr (max)

Sulfuric Acid Plant Converter Heater (LARW)

Max Firing Rate	5	mmbtu/hr
HHV NG	1026	mmbtu/mmscf

Assumptions: NG

	Daily Controlled lbs/day	Annual lbs/yr	
NOx (SSC)	5.83	760.62	
NOx (Routine)	1.75	638.22	12 ppmv NOx
SOx	0.07	25.61	AER default for NG.
CO	4.09	1,494.15	AER default for NG.
PM	0.88	320.18	AER default for NG.
VOC	0.82	298.83	AER default for NG.
CO2	14,037.26	5,123,598.61	NG Default Factor
CH4	0.26	96.56	NG Default Factor
N2O	0.03	9.66	NG Default Factor
CO2e	**14,051.75**	**5,128,890.23**	

- Startup, Shutdown and Comissioning (SSC) includes "routine" operations as well as maximum startup, shutdown and commssioning/refractory dryout emissions.
- NOx (Routine) is representative of "normal" operations.

SSC Hours:	720	hours/year
NOx SSC EF:	40	ppmv
NOx SSC EF (calculat	0.0486	lb/mmbtu
NOx SSC Emissions:	0.24	lbs/hr (max)

Sulfuric Acid Plant Process Vent Emissions (LARW)

Assumptions: Associated with Decomp Furnace Stack

	Daily Controlled lbs/day	Annual lbs/yr
NOx (SSC)		-
NOx (Routine)		
SOx	31.12	11,356.99
CO		-
PM	~~0.00~~ 6.00	~~0.00~~ 2,190.00
VOC		-
CO2		-
CH4		-
N2O		-
CO2e	**-**	**-**

Sulfuric Acid Plant Total Emissions (LARW)

	Daily Controlled lbs/day	Annual lbs/yr	Annual tpy
NOx (SSC)	78.10	6,091.95	3.05
NOx (Routine)	11.19	4,084.61	2.04
SOx	32.06	11,700.22	5.85
CO	54.85	20,021.64	10.01
PM	17.75	6,480.35	3.24
VOC	10.97	4,004.33	2.00
CO2	188,099.24	68,656,221.37	34,328.11
CH4	3.55	1,293.94	0.65
N2O	0.35	129.39	0.06
CO2e	188,293.50	68,727,129.03	**34,363.56**

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-2: Carson and Wilmington New and Modified Heater Emissions (Potential to Emit)

NHDS Heater (D1433) Post-Mod PTE

Max Firing Rate	12.5	mmbtu/hr
HHV NG	1026	mmbtu/mmscf

Assumptions: NG w/ULNB

	Daily Controlled lbs/day	Annual lbs/yr	
NOx (SSC)	14.57	1,901.55	
NOx (Routine)	4.37	1,595.55	ULNB (12 ppmv)
SOx	0.66	240.90	2002 Application
CO	10.23	3,735.38	AER default for NG.
PM	6.00	2,190.00	permit condition
VOC	1.92	700.80	permit condition
CO2	35,093.14	12,808,996.52	NG Default Factor
CH4	0.66	241.41	NG Default Factor
N2O	0.07	24.14	NG Default Factor
CO2e	**35,129.39**	**12,822,225.57**	

- Startup, Shutdown and Comissioning (SSC) includes "routine" operations as well as maximum startup, shutdown and commssioning/refractory dryout emissions.
- NOx (Routine) is representative of "normal" operations.

SSC Hours:	720	hours/year
NOx SSC EF:	40	ppmv
NOx SSC EF (calculated):	0.0486	lb/mmbtu
NOx SSC Emissions:	0.61	lbs/hr (max)

HCU H-300 Post-Mod PTE

Max Firing Rate	65.1	mmbtu/hr
HHV NG	1026	mmbtu/mmscf

Assumptions: NG w/SCR

	Daily Controlled lbs/day	Annual lbs/yr	
NOx (SSC)	75.89	5,454.39	
NOx (Routine)	9.49	3,462.35	5 ppmv NOx
SOx	0.91	333.49	AER default for NG.
CO	53.30	19,453.86	AER default for NG.
PM	11.42	4,168.68	AER default for NG.
VOC	10.66	3,890.77	AER default for NG.
CO2	182,765.08	66,709,253.89	NG Default Factor
CH4	3.44	1,257.24	NG Default Factor
N2O	0.34	125.72	NG Default Factor
CO2e	**182,953.84**	**66,778,150.75**	

- Startup, Shutdown and Comissioning (SSC) includes "routine" operations as well as maximum startup, shutdown and commssioning/refractory dryout emissions.
- NOx (Routine) is representative of "normal" operations.

SSC Hours:	720	hours/year
NOx SSC EF:	40	ppmv
NOx SSC EF (calculated):	0.0486	lb/mmbtu
NOx SSC Emissions:	3.16	lbs/hr (max)

HCU H-301 Post-Mod PTE

Max Firing Rate	31	mmbtu/hr
HHV NG	1026	mmbtu/mmscf

Assumptions: NG w/SCR

	Daily Controlled lbs/day	Annual lbs/yr	
NOx (SSC)	36.14	2,597.33	
NOx (Routine)	4.52	1,648.74	5 ppmv NOx
SOx	0.44	158.81	AER default for NG.
CO	25.38	9,263.74	AER default for NG.
PM	5.44	1,985.09	AER default for NG.
VOC	5.08	1,852.75	AER default for NG.
CO2	87,030.99	31,766,311.38	NG Default Factor
CH4	1.64	598.69	NG Default Factor
N2O	0.16	59.87	NG Default Factor
CO2e	**87,120.88**	**31,799,119.40**	NG Default Factor

- Startup, Shutdown and Comissioning (SSC) includes "routine" operations as well as maximum startup, shutdown and commssioning/refractory dryout emissions.
- NOx (Routine) is representative of "normal" operations.

SSC Hours:	720	hours/year
NOx SSC EF:	40	ppmv
NOx SSC EF (calculat	0.0486	lb/mmbtu
NOx SSC Emissions:	1.51	lbs/hr (max)

51 Vac Heater (D63) Post-Mod PTE

Max Firing Rate	360	mmbtu/hr
HHV NG	1050	mmbtu/mmscf

Assumptions: NG w/SCR

	Daily Controlled lbs/day	Annual lbs/yr	
NOx (SSC)	419.65	44,220.85	
NOx (Routine)	94.42	34,463.93	9 ppmv NOx
SOx	4.94	1,802.06	AER default for NG.
CO	247	90,155.00	
PM	53	19,345.00	
VOC	50	18,250.00	
CO2	1,010,682.47	368,899,099.87	NG Default Factor
CH4	19.05	6,952.49	NG Default Factor
N2O	1.90	695.25	NG Default Factor
CO2e	**1,011,726.29**	**369,280,096.31**	
	62.88		

Notes (51 Vac Heater)

CO EF:	29.6	lbs/mmscf (applied by AQMD)
PM EF:	6.3	lbs/mmscf (applied by AQMD)
VOC EF:	5.9	lbs/mmscf (applied by AQMD)

- CO, PM and VOC emission factors provided by SCAQMD.
- CO, PM and VOC emissions rounded "up" to the nearest whole number.

- Startup, Shutdown and Comissioning (SSC) includes "routine" operations as well as maximum startup, shutdown and commssioning/refractory dryout emissions.
- NOx (Routine) is representative of "normal" operations.

SSC Hours:	720	hours/year
NOx SSC EF:	40	ppmv
NOx SSC EF (calculated):	0.0486	lb/mmbtu
NOx SSC Emissions:	17.49	lbs/hr (max)

DCU H-100 Post-Mod PTE

Max Firing Rate	302.4	mmbtu/hr
HHV RFG	1230	mmbtu/mmscf

Assumptions: RFG w/SCR

	Daily Controlled lbs/day	Annual lbs/yr
NOx (SSC)	881.27	87,220.49
NOx (Routine)	181.44	66,225.60
SOx	250.00	91,250.00
CO	178	64,970.00
PM	38	13,870.00
VOC	36	13,140.00
CO2	868,497.13	317,001,452.39
CH4	48.00	17,520.27
N2O	9.60	3,504.05
CO2e	**872,557.99**	**318,483,667.56**

GHG Factors		
CC (kg C/kg):	0.7236	2012/2013 GHG report
MW (kg C/kg)	21.05206	2012/2013 GHG report
HHV (mmbtu/scf)	0.00123	Estimated
CH4 EF (kg/mmbtu)	0.003	2012/2013 GHG report
N2O EF (kg/mmbtu)	0.0006	2012/2013 GHG report

Notes (H-100 Heater)

CO EF:	29.6	lbs/mmscf (applied by AQMD)
PM EF:	6.3	lbs/mmscf (applied by AQMD)
VOC EF:	5.9	lbs/mmscf (applied by AQMD)

- CO, PM and VOC emission factors provided by SCAQMD.
- CO, PM and VOC emissions rounded "up" to the nearest whole number.

- Startup, Shutdown and Comissioning (SSC) includes "routine" operations as well as maximum startup, shutdown and commssioning/refractory dryout emissions.
- NOx (Routine) is representative of "normal" operations.

SSC Hours:	720	hours/year
NOx SSC EF:	100	ppmv
NOx SSC EF (calculated):	0.1214	lb/mmbtu
NOx SSC Emissions:	36.72	lbs/hr (max)

NOx (Routine) ~~(Daily)~~: Emissions based on R1109 EF of 0.03 lb/mmbtu and 252 mmbtu/hr (previous described firing rate).
SOx (Daily): Max daily emissions assumed to be 250 lbs/day (based on historical operating data).
SOx (Hourly): Max hourly emissions assumed to be 22 lbs/hr (based on historical operating data).

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-3: Carson and Wilmington Heater Emissions Calculations (Modified Heaters) Increase in Daily Emissions

Carson 51 Vacuum Unit Heater (D63) - Duty Bump to 360 MMBtu/Hr

	Pre Mod Actual Emissions (Lbs/Day)	Post Mod Potential Emissions (Lbs/Day)	Increase (Lbs/Day)	Pre-Mod Basis	Post-Mod Basis
NOx (SSC)	61.70	419.65	357.95	RECLAIM Emissions (2012/2013)	~~9 ppmv Nox (calculated)~~ Appendix A, Table A-2
NOx (Routine)	61.70	94.42	32.72	RECLAIM Emissions (2012/2013)	9 ppmv Nox (calculated)
SOx	3.14	4.94	1.80	2012/2013 Daily Operating Data	AER Default for NG
CO	13.15	247.00	233.85	2012/2013 Daily Operating Data	Permit Limit
PM	7.51	53.00	45.49	2012/2013 Daily Operating Data	AER Default for NG
VOC	17.15	50.00	32.85	2012/2013 Daily Operating Data	Permit Limit

Carson NHDS Ultra-Low NOx Burner Installation (RW0053; D1433)

	Pre Mod Actual Emissions (Lbs/Day)	Post Mod Potential Emissions (Lbs/Day)	Increase (Lbs/Day)	Pre-Mod Basis	Post-Mod Basis
NOx (SSC)	2.50	14.57	12.07	RECLAIM Emissions (2012/2013)	~~Vendor guarantee~~ Appendix A, Table A-2
NOx (Routine)	2.50	4.37	1.87	RECLAIM Emissions (2012/2013)	Vendor guarantee
SOx	0.02	0.66	0.64	2012/2013 Daily Operating Data	2002 permit application
CO	-	10.23	10.23	2012/2013 Daily Operating Data	AER Default for NG
PM	0.44	6.00	5.56	2012/2013 Daily Operating Data	Permit condition A63.19
VOC	0.19	1.92	1.73	2012/2013 Daily Operating Data	Permit condition A63.19

Wilmington H-100 Heater - Duty Bump to 302.4 MMBtu/Hr

	Pre Mod Actual Emissions (Lbs/Day)	Post Mod Potential Emissions (Lbs/Day)	Increase (Lbs/Day)	Pre-Mod Basis	Post-Mod Basis
NOx (SSC)	352.47	881.27	528.80	RECLAIM Emissions (2012/2013)	~~2014 Permit Application~~) Appendix A, Table A-2
NOx (Routine)	352.47	181.44	(171.03)	RECLAIM Emissions (2012/2013)	~~2014 Permit Application~~ Rule 1109 EF
SOx	163.31	250.00	86.69	RECLAIM Emissions (2012/2013)	NSPS J RFG Limit
CO	183.14	178.00	(5.14)	2012/2013 Daily Operating Data	1976 Permit Application
PM	38.98	38.00	(0.98)	2012/2013 Daily Operating Data	1976 Permit Application
VOC	36.43	36.00	(0.43)	2012/2013 Daily Operating Data	1976 Permit Application

* Max hourly post project SOx emissions conservatively modeled at higher post project emissions rate of 22 lbs/hour - based on historic operating data.
** NOx emissions will decrease from baseline levels as a result of restrictions that will be applied in the revised permit to construct/operate.

Wilmington HCU Heaters H-300 and H-301 Duty Bump (Also install ULNB and SCR and Convert to NG)

	Pre Mod Actual Emissions (Lbs/Day)	Post Mod Potential Emissions (Lbs/Day)	Increase (Lbs/Day)	Pre-Mod Basis	Post-Mod Basis
NOx (SSC)	9.33	112.02	102.69	RECLAIM Emissions (2012/2013)	~~5 ppmv Nox (calculated)~~ Appendix A, Table A-2
NOx (Routine)	9.33	14.00	4.67	RECLAIM Emissions (2012/2013)	5 ppmv Nox (calculated)
SOx	16.33	1.35	(14.98)	RECLAIM Emissions (2012/2013)	AER Default for NG
CO	28.93	78.68	49.75	2012/2013 Daily Operating Data	AER Default for NG
PM	6.07	16.86	10.79	2012/2013 Daily Operating Data	AER Default for NG
VOC	5.64	15.74	10.10	2012/2013 Daily Operating Data	AER Default for NG

* SOx emissions will decrease as a result of switching from refinery fuel gas to natural gas.

Notes

* Pre-mod actual daily emissions are based on the emissions for each heater on days where combined actual emissions from the modified heaters were at the 98th percentile.
** NOx emissions increases are modeled at the start-up, shutdown, commissioning (SCC) post-project emissions rate.
*** Table A-1 emissions increases represent the emissions increase based on a routine/normal operating day. SSC emissions are not used for Table A-1 as pre-project emissions vs. post-project emissions are not expected to change.

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-4: Carson and Wilmington Heater Emissions Calculations (Modified Heaters) Increase in Annual Emissions

Carson 51 Vacuum Unit Heater (D63) - Duty Bump to 360 MMBtu/Hr

	Pre Mod Actual Emissions (Lbs/Year)	Post Mod Emissions (Lbs/Year)	Increase (TPY)	Pre-Mod Basis	Post-Mod Basis
NOx ~~(SSC)~~	8,148.50	44,220.85	18.04	RECLAIM Emissions (2012/2013)	Appendix A, Table A-2
~~NOx (Routine)~~	~~8,148.50~~	~~34,463.93~~	~~13.16~~	~~RECLAIM Emissions (2012/2013)~~	~~1991 Permit Application~~
SOx	1,298.50	1,802.06	0.25	2012/2013 AER	1991 Permit Application
CO	4,653.50	90,155.00	42.75	2012/2013 AER	Permit Limit
PM	2,252.00	19,345.00	8.55	2012/2013 AER	Permit Limit
VOC	6,015.50	18,250.00	6.12	2012/2013 AER	Permit Limit
CO2	237,403,159.88	368,899,099.87	65,747.97	2012/2013 GHG Data	Default Factors
CH4	4,475.38	6,952.49	1.24	2012/2013 GHG Data	Default Factors
N2O	447.54	695.25	0.12	2012/2013 GHG Data	Default Factors
CO2e	237,648,410.63	369,280,096.31	65,815.84	2012/2013 GHG Data	Default Factors

Wilmington H-100 Heater - Duty Bump to 302.4 MMBtu/Hr

	Pre Mod Actual Emissions (Lbs/Year)	Post Mod Emissions (Lbs/Year)	Increase (TPY)	Pre-Mod Basis	Post-Mod Basis
NOx ~~(SSC)~~	74,980.50	87,220.49	6.12	RECLAIM Data	Appendix A, Table A-2
~~NOx (Routine)~~	~~74,980.50~~	~~66,225.60~~	~~(4.38)~~	~~RECLAIM Data~~	~~2014 Permit Application~~
SOx	20,497.50	91,250.00	35.38	2012/2013 AER	NSPS J RFG Limit
CO	57,716.40	64,970.00	3.63	2012/2013 AER	1976 Permit Application
PM	12,367.81	13,870.00	0.75	2012/2013 AER	1976 Permit Application
VOC	11,543.28	13,140.00	0.80	2012/2013 AER	1976 Permit Application
CO2	243,999,845.89	317,001,452.39	36,500.80	2012/2013 GHG Data	2012/2013 RFG CC and HHV values
CH4	13,238.74	17,520.27	2.14	2012/2013 GHG Data	2012/2013 RFG CC and HHV values
N2O	2,646.65	3,504.05	0.43	2012/2013 GHG Data	2012/2013 RFG CC and HHV values
CO2e	245,109,761.83	318,483,667.56	36,686.95	2012/2013 GHG Data	2012/2013 RFG CC and HHV values

** NOx emissions will decrease from baseline levels as a result of restrictions that will be applied in the revised permit to construct/operate.

Carson NHDS Ultra-Low NOx Burner Installation (RW0053; D1433)

	Pre Mod Actual Emissions (Lbs/Year)	Post Mod Emissions (Lbs/Year)	Increase (TPY)	Pre-Mod Basis	Post-Mod Basis
NOx ~~(SSC)~~	1,547.00	1,901.55	0.18	2012/2013 RECLAIM Emissions	Appendix A, Table A-2
~~NOx (Routine)~~	~~1,547.00~~	~~1,595.55~~	~~0.02~~	~~2012/2013 RECLAIM Emissions~~	~~Vendor guarantee~~
SOx	21.50	240.90	0.11	2012/2013 AER	2002 permit application
CO	9.50	3,735.38	1.86	2012/2013 AER	AER Default for NG
PM	50.50	2,190.00	1.07	2012/2013 AER	Permit condition A63.19
VOC	63.00	700.80	0.32	2012/2013 AER	Permit condition A63.19
CO2	4,200,098.72	12,808,996.52	4,304.45	2012/2013 GHG Data	TPY (Default Factors)
CH4	77.16	241.41	0.08	2012/2013 GHG Data	TPY (Default Factors)
N2O	-	24.14	0.01	2012/2013 GHG Data	TPY (Default Factors)
CO2e	4,202,027.77	12,822,225.57	4,310.10	2012/2013 GHG Data	TPY (Default Factors)

Wilmington HCU Heaters H-300 and H-301 Duty Bump (Also install ULNB and SCR and Convert to NG)

	Pre Mod Actual Emissions (Lbs/Year)	Post Mod Emissions (Lbs/Year)	Increase (TPY)	Pre-Mod Basis	Post-Mod Basis
NOx ~~(SSC)~~	8,258.00	8,051.71	(0.10)	2012/2013 RECLAIM Emissions	Appendix A, Table A-2
~~NOx (Routine)~~	~~8,258.00~~	~~5,111.09~~	~~(1.57)~~	~~2012/2013 RECLAIM Emissions~~	~~5 ppmv Nox (calculated)~~
SOx	2,981.50	492.30	(1.24)	2012/2013 RECLAIM Emissions	AER Default for NG
CO	8,670.03	28,717.60	10.02	2012/2013 AER	AER Default for NG
PM	1,857.87	6,153.77	2.15	2012/2013 AER	AER Default for NG
VOC	1,734.01	5,743.52	2.00	2012/2013 AER	AER Default for NG
CO2	36,518,648.45	98,475,565.27	30,978.46	2012/2013 GHG Data	(Default Factors for NG)
CH4	1,984.16	1,855.93	(0.06)	2012/2013 GHG Data	(Default Factors for NG)
N2O	396.83	185.59	(0.11)	2012/2013 GHG Data	(Default Factors for NG)
CO2e	36,684,876.80	98,577,270.15	30,946.20	2012/2013 GHG Data	(Default Factors for NG)

* NOx emissions will decrease from baseline levels as a result of upgrades to the SCR system.
** SOx emissions will decrease as a result of switching from refinery fuel gas to natural gas.

Notes
* Pre-mod actual emissions based on the arithmetic average emissions during the baseline period.
** NOx emissions increases are modeled at the start-up, shutdown, commissioning (SCC) post-project emissions rate.
*** Table A-1 emissions increases represent the emissions increase based on a routine/normal operating day. SSC emissions are not used for Table A-1 as pre-project emissions vs. post-project emissions are not expected to change.

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Appendix A: Summary of Emissions

Table A-5: Carson FCCU Regenerator and Pre-Heater Emissions Calculations (Increased Utility) Increase in Annual Emissions

Carson FCCU (Process 3, System 1)

Anticipated Incremental Increase:

12.7	**MBPD (Annual Average)**

	Incremental Increase Emissions (Lbs/Day)	Post-Mod Basis
NOx	79.90	Incremental Increase in Throughput * EF
SOx	115.02	Incremental Increase in Throughput * EF
NH3	14.55	Incremental Increase in Throughput * EF
CO	99.96	Incremental Increase in Throughput * EF
PM	40.77	Incremental Increase in Throughput * EF
VOC	3.72	Incremental Increase in Throughput * EF
CO2	602,157.86	Incremental Increase in Throughput * EF
CH4	17.64	Incremental Increase in Throughput * EF
N2O	3.53	Incremental Increase in Throughput * EF
CO2e	603,634.81	Incremental Increase in Throughput * EF

Carson FCCU Pre-Heater (D250)

Anticipated Incremental Increase:

10.6	**mmbtu/hr**

	Incremental Increase Emissions (Lbs/Day)	Post-Mod Basis
NOx	7.63	Incremental Increase in Firing Rate * EF
SOx	1.89	Incremental Increase in Firing Rate * EF
NH3	1.14	Incremental Increase in Firing Rate * EF
CO	0.73	Incremental Increase in Firing Rate * EF
PM	3.75	Incremental Increase in Firing Rate * EF
VOC	1.25	Incremental Increase in Firing Rate * EF
CO2	30,348.43	Incremental Increase in Firing Rate * EF
CH4	1.68	Incremental Increase in Firing Rate * EF
N2O	0.34	Incremental Increase in Firing Rate * EF
CO2e	30,490.76	Incremental Increase in Firing Rate * EF

Note 1: Criteria pollutant EFs are based on EFs used during permitting (and permit conditions). GHG EFs are calculated based on emissions reported in the 2012/2013 AER.

Note 2: FCCU maximum daily emissions will not increase; however, annual average emissions will increase. Calculations here are for estimation of the annual average emissions increase.

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-6: Carson Heater Emissions Calculations (Increased Utilization)

Carson HC R-1 Heater (D625)

Anticipated Incremental Increase in Firing Rate: 15 mmbtu/hr

	Incremental Increase Emissions (Lbs/Day)	Increase (TPY)	Calculation Basis
NOx	18.00	3.29	Incremental Increase in Firing Rate * EF
SOx	4.61	0.84	Incremental Increase in Firing Rate * EF
CO	1.04	0.19	Incremental Increase in Firing Rate * EF
PM	5.38	0.98	Incremental Increase in Firing Rate * EF
VOC	1.77	0.32	Incremental Increase in Firing Rate * EF
CO2	42,963.91	7,840.91	Incremental Increase in Firing Rate * EF
CH4	2.38	0.43	Incremental Increase in Firing Rate * EF
N2O	0.48	0.09	Incremental Increase in Firing Rate * EF
CO2e	43,165.34	7,877.67	Incremental Increase in Firing Rate * EF

* Criteria pollutant EFs are based on EFs used during permitting. GHG EFs are calculated based on emissions reported in the 2013 AER.

Carson HC R-2 Heater (D627)

Anticipated Incremental Increase in Firing Rate: 20 mmbtu/hr

	Incremental Increase Emissions (Lbs/Day)	Increase (TPY)	Calculation Basis
NOx	14.40	2.63	Incremental Increase in Firing Rate * EF
SOx	9.81	1.79	Incremental Increase in Firing Rate * EF
CO	1.38	0.25	Incremental Increase in Firing Rate * EF
PM	7.18	1.31	Incremental Increase in Firing Rate * EF
VOC	2.36	0.43	Incremental Increase in Firing Rate * EF
CO2	57,280.41	10,453.67	Incremental Increase in Firing Rate * EF
CH4	3.17	0.58	Incremental Increase in Firing Rate * EF
N2O	0.63	0.12	Incremental Increase in Firing Rate * EF
CO2e	57,548.98	10,502.69	Incremental Increase in Firing Rate * EF

* Criteria pollutant EFs are based on EFs used during permitting. GHG EFs are calculated based on emissions reported in the 2013 AER.

Carson LHU Heater (D425)

Anticipated Incremental Increase in Firing Rate: 5 mmbtu/hr

	Incremental Increase Emissions (Lbs/Day)	Increase (TPY)	Calculation Basis
NOx	6.00	1.10	Incremental Increase in Firing Rate * EF
SOx	1.50	0.27	Incremental Increase in Firing Rate * EF
CO	0.36	0.07	Incremental Increase in Firing Rate * EF
PM	1.87	0.34	Incremental Increase in Firing Rate * EF
VOC	0.62	0.11	Incremental Increase in Firing Rate * EF
CO2	14,288.33	2,607.62	Incremental Increase in Firing Rate * EF
CH4	0.79	0.14	Incremental Increase in Firing Rate * EF
N2O	0.16	0.03	Incremental Increase in Firing Rate * EF
CO2e	14,355.47	2,619.87	Incremental Increase in Firing Rate * EF

* Criteria pollutant EFs are based on EFs used during permitting. GHG EFs are calculated based on emissions reported in the 2013 AER.

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Appendix A: Summary of Emissions

Table A-7: Wilmington Combustion Unit Emissions Calculations (Increased Utilization)

Wilmington H-101 Heater (D32)

Anticipated Incremental Increase in Firing Rate: **7 mmbtu/hr**

	Incremental Increase Emissions (Lbs/Day)	Incremental Increase (TPY)	Calculation Basis
NOx	19.00	3.47	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
SOx	7.58	1.38	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO	4.36	0.80	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
PM	0.83	0.15	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
VOC	0.83	0.15	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2	20,526.55	3,746.10	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CH4	1.11	0.20	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
N2O	0.22	0.04	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2e	20,620.29	3,763.20	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF

* Criteria pollutant EFs are based on EFs used during permitting. GHG EFs are calculated based on emissions reported in the 2013 AER.

Wilmington H-30 Heater (D157)

Anticipated Incremental Increase in Firing Rate: **4.1 mmbtu/hr**

	Incremental Increase Emissions (Lbs/Day)	Incremental Increase (TPY)	Calculation Basis
NOx	7.87	1.44	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
SOx	2.53	0.46	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO	0.38	0.07	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
PM	1.97	0.36	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
VOC	1.59	0.29	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2	12,030.22	2,195.52	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CH4	0.65	0.12	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
N2O	0.13	0.02	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2e	12,084.95	2,205.50	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF

* Criteria pollutant EFs are based on EFs used during permitting. GHG EFs are calculated based on emissions reported in the 2013 AER.

Wilmington H-21/H-22 Heater (D158)

Anticipated Incremental Increase in Firing Rate: **4.1 mmbtu/hr**

	Incremental Increase Emissions (Lbs/Day)	Incremental Increase (TPY)	Calculation Basis
NOx	12.69	2.32	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
SOx	1.33	0.24	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO	2.76	0.50	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
PM	0.59	0.11	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
VOC	0.61	0.11	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2	12,015.98	2,192.92	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CH4	0.65	0.12	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
N2O	0.13	0.02	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2e	12,070.83	2,202.93	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF

* Criteria pollutant EFs are based on EFs used during permitting. GHG EFs are calculated based on emissions reported in the 2013 AER.

Wilmington H-510 Heater (D218)

Anticipated Incremental Increase in Firing Rate: **0.4 mmbtu/hr**

	Incremental Increase Emissions (Lbs/Day)	Incremental Increase (TPY)	Calculation Basis
NOx	0.48	0.09	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
SOx	0.24	0.04	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO	0.60	0.11	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
PM	0.15	0.03	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
VOC	0.05	0.01	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2	1,171.42	213.78	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CH4	0.06	0.01	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
N2O	0.01	0.00	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2e	1,176.76	214.76	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF

* Criteria pollutant EFs are based on EFs used during permitting. GHG EFs are calculated based on emissions reported in the 2013 AER.

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Appendix A: Summary of Emissions

Table A-7: Wilmington Combustion Unit Emissions Calculations (Increased Utilization)

Wilmington H-501A, H-501B, H-502, H-503/504 Heater (D216, D217, D214 and D215)

Anticipated Incremental Increase in Firing Rate: 1.6 mmbtu/hr

	Incremental Increase Emissions (Lbs/Day)	Incremental Increase (TPY)	Calculation Basis
NOx	1.27	0.23	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
SOx	0.41	0.08	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO	0.95	0.17	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
PM	0.59	0.11	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
VOC	0.18	0.03	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2	4,692.59	856.40	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CH4	0.25	0.05	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
N2O	0.05	0.01	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2e	4,714.05	860.31	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF

* EFs are calculated based on emissions reported in the 2013 AER.

Wilmington SRP H-1601/H-1602 Boilers (D76 and D77)

Anticipated Incremental Increase in Firing Rate: 0.125 mmbtu/hr

	Incremental Increase Emissions (Lbs/Day)	Incremental Increase (TPY)	Calculation Basis
NOx	0.11	0.02	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
SOx	0.04	0.01	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO	0.01	0.00	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
PM	0.05	0.01	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
VOC	0.02	0.00	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2	320.12	58.42	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CH4	0.01	0.00	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
N2O	0.00	0.00	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2e	320.87	58.56	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF

* Criteria pollutant EFs are based on EFs used during permitting. GHG EFs are calculated based on emissions reported in the 2013 AER.

Wilmington Boilers 7 and 8 (D722 and D723)

Anticipated Incremental Increase in Firing Rate: 5 mmbtu/hr

	Incremental Increase Emissions (Lbs/Day)	Incremental Increase (TPY)	Calculation Basis
NOx	12.00	2.19	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
SOx	3.07	0.56	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO	0.37	0.07	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
PM	1.89	0.35	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
VOC	0.63	0.12	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2	14,687.74	2,680.51	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CH4	0.79	0.15	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
N2O	0.16	0.03	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2e	14,754.81	2,692.75	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF

* Criteria pollutant EFs are based on EFs used during permitting. GHG EFs are calculated based on emissions reported in the 2013 AER.

Wilmington Boilers 9 and 10 (D724 and D725)

Anticipated Incremental Increase in Firing Rate: 5 mmbtu/hr

	Incremental Increase Emissions (Lbs/Day)	Incremental Increase (TPY)	Calculation Basis
NOx	12.00	2.19	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
SOx	3.07	0.56	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO	0.37	0.07	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
PM	1.89	0.35	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
VOC	0.63	0.12	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2	14,688.15	2,680.59	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CH4	0.79	0.14	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
N2O	0.16	0.03	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF
CO2e	14,755.24	2,692.83	~~Baseline Emissions +~~ Incremental Increase in Firing Rate * EF

* Criteria pollutant EFs are based on EFs used during permitting. GHG EFs are calculated based on emissions reported in the 2013 AER.

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Appendix A: Summary of Emissions

Table A-7: Wilmington Combustion Unit Emissions Calculations (Increased Utilization)

Wilmington SRP Incinerators F-704 (C56)

Estimated Incremental Increase in Sulfur Production:	**3**	**Long Tons Per Day**
Estimated % Increase in Sulfur Production:	**1.4%**	**percent**

	Incremental Increase Emissions (Lbs/Day)	**Incremental Increase (TPY)**	**Calculation Basis**
NOx	0.24	0.04	See note below
SOx	12.66	2.31	See note below
CO	0.05	0.01	See note below
PM	0.01	0.00	See note below
VOC	0.01	0.00	See note below
CO2	197.98	36.13	See note below
CH4	0.01	0.00	See note below
N2O	0.00	0.00	See note below
CO2e	198.89	36.30	See note below

* SOx emissions increases estimated based on SRP conversion efficiency. Other criteria pollutant emissions increases estimated based on historic emissions data multiplied by the estimated % sulfur loading increase.

** EF estimated based on an ultra conservative 99.9% conversion efficiency from sulfur compounds to elemental sulfur.

Wilmington SRP Incinerators F-754 (C54)

Anticipated Incremental Increase in Sulfur Production:	**3**	**Long Tons Per Day**
Estimated % Increase in Sulfur Production:	**1.4%**	**percent**

	Incremental Increase Emissions (Lbs/Day)	**Incremental Increase (TPY)**	**Calculation Basis**
NOx	0.52	0.10	See note below
SOx	12.66	2.31	See note below
CO	0.03	0.01	See note below
PM	0.03	0.01	See note below
VOC	0.01	0.00	See note below
CO2	201.09	36.70	See note below
CH4	0.01	0.00	See note below
N2O	0.00	0.00	See note below
CO2e	202.02	36.87	See note below

* SOx emissions increases estimated based on SRP conversion efficiency. Other criteria pollutant emissions increases estimated based on historic emissions data multiplied by the estimated % sulfur loading increase.

** EF estimated based on an ultra conservative 99.9% conversion efficiency from sulfur compounds to elemental sulfur.

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Table A-8: **Carson and Wilmington Heater Toxic Emissions Calculations (Modified Units) Increase in Daily Emissions**

Carson 51 Vacuum Unit Heater (D63)

Max Firing Rate (98th Percentile):	276.98	mmbtuhr
Fuel:	Natural Gas	

Post-Mod Characteristics

Max Firing Rate:	360	mmbtuhr
Fuel:	Natural Gas	

2012/2013 Reported Emissions | **Emissions Increase**

		FLUENATGAS			FLUENATGAS			
Chemical Name	**CAS No.**	**Lbs/mmbtu**	**EF Basis**	**Emissions (lbs/day)**	**Lbs/mmbtu**	**EF Basis**	**Emissions (lbs/day)**	**Emissions (lbs/day)**
1,2,4-Trimethylbenzene	95-63-6			0.00E+00			0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	1.49E-08	Sierra Source Testing, 1993-94	9.90E-05	1.49E-08	Sierra Source Testing, 1993-94	1.29E-04	2.97E-05
Acenaphthene	83-32-9	5.73E-10	Sierra Source Testing, 1993-94	3.81E-06	5.73E-10	Sierra Source Testing, 1993-94	4.95E-06	1.14E-06
Acenaphthylene	208-96-8	6.39E-10	Sierra Source Testing, 1993-94	4.25E-06	6.39E-10	Sierra Source Testing, 1993-94	5.52E-06	1.27E-06
Anthracene	120-12-7	8.73E-10	Sierra Source Testing, 1993-94	5.80E-06	8.73E-10	Sierra Source Testing, 1993-94	7.54E-06	1.74E-06
Antimony	7440-36-0			0.00E+00			0.00E+00	0.00E+00
Barium	7440-39-3			0.00E+00			0.00E+00	0.00E+00
Benzo(g,h,i)perylene	191-24-2	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Carbonyl sulfide	463-58-1			0.00E+00			0.00E+00	0.00E+00
Cobalt	7440-48-4	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Cyclohexane	110-82-7			0.00E+00			0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086			0.00E+00			0.00E+00	0.00E+00
Ethylene	74-85-1			0.00E+00			0.00E+00	0.00E+00
Fluoranthene	206-44-0	2.47E-09	Sierra Source Testing, 1993-94	1.64E-05	2.47E-09	Sierra Source Testing, 1993-94	2.13E-05	4.92E-06
Fluorene	86-73-7	3.97E-09	Sierra Source Testing, 1993-94	2.64E-05	3.97E-09	Sierra Source Testing, 1993-94	3.43E-05	7.91E-06
Molybdenum	7439-98-7	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5			0.00E+00			0.00E+00	0.00E+00
Phenanthrene	85-01-8	9.93E-09	Sierra Source Testing, 1993-94	6.60E-05	9.93E-09	Sierra Source Testing, 1993-94	8.58E-05	1.98E-05
Phosphorus	7723-14-0			0.00E+00			0.00E+00	0.00E+00
Pyrene	129-00-0	2.48E-09	Sierra Source Testing, 1993-94	1.65E-05	2.48E-09	Sierra Source Testing, 1993-94	2.14E-05	4.94E-06
Silver	7440-22-4			0.00E+00			0.00E+00	0.00E+00
Thallium	7440-28-0			0.00E+00			0.00E+00	0.00E+00
Zinc	7440-66-6	1.19E-06	WSPA Pooled Source Testing, 1992	7.91E-03	1.19E-06	WSPA Pooled Source Testing, 1992	1.03E-02	2.37E-03
Chromium	7440-47-3	2.24E-07	WSPA Pooled Source Testing, 1992	1.49E-03	2.24E-07	WSPA Pooled Source Testing, 1992	1.94E-03	4.46E-04
Acetaldehyde	75-07-0	4.62E-05	Sierra Source Testing, 1993-94	3.07E-01	4.62E-05	Sierra Source Testing, 1993-94	3.99E-01	9.21E-02
Arsenic	7440-38-2	1.42E-07	WSPA Pooled Source Testing, 1992	9.44E-04	1.42E-07	WSPA Pooled Source Testing, 1992	1.23E-03	2.83E-04
Acrolein	107-02-8	4.40E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	2.92E-02	4.40E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	3.80E-02	8.77E-03
Ammonia	7664-41-7	2.34E-04	Estimated based on source test data	1.55E+00	20 ppmv	Currnet permitted BACT limit	7.77E+01	7.61E+01
Benzene	71-43-2	4.19E-07	Sierra Source Testing, 1993-94	2.79E-03	4.19E-07	Sierra Source Testing, 1993-94	3.62E-03	8.35E-04
Beryllium	7440-41-7	2.84E-08	WSPA Pooled Source Testing, 1992	1.89E-04	2.84E-08	WSPA Pooled Source Testing, 1992	2.45E-04	5.66E-05
1,3-Butadiene	106-99-0			0.00E+00			0.00E+00	0.00E+00
Cadmium	7440-43-9	5.67E-08	WSPA Pooled Source Testing, 1992	3.77E-04	5.67E-08	WSPA Pooled Source Testing, 1992	4.90E-04	1.13E-04
Carbon Disulfide	75-15-0			0.00E+00			0.00E+00	0.00E+00
Chromium (hexavalent)	18540-29-9	4.29E-08	WSPA Pooled Source Testing, 1992	2.85E-04	4.29E-08	WSPA Pooled Source Testing, 1992	3.71E-04	8.55E-05
Copper	7440-50-8	1.60E-07	WSPA Pooled Source Testing, 1992	1.06E-03	1.60E-07	WSPA Pooled Source Testing, 1992	1.38E-03	3.19E-04
Carbon Tetrachloride	56-23-5			0.00E+00			0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8			0.00E+00			0.00E+00	0.00E+00
Ethylbenzene	100-41-4	5.90E-07	Sierra Source Testing, 1993-94	3.92E-03	5.90E-07	Sierra Source Testing, 1993-94	5.10E-03	1.18E-03
Formaldehyde	50-00-0	1.24E-05	Sierra Source Testing, 1993-94	8.24E-02	1.24E-05	Sierra Source Testing, 1993-94	1.07E-01	2.47E-02

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-8: **Carson and Wilmington Heater Toxic Emissions Calculations (Modified Units)**
Increase in Daily Emissions

Hydrochloric acid	7647-01-0			0.00E+00			0.00E+00	0.00E+00
Hydrogen sulfide	7783-06-4	1.99E-04	WSPA Pooled Source Testing, 1992	1.32E+00	1.99E-04	WSPA Pooled Source Testing, 1992	1.72E+00	3.97E-01
Hexane	110-54-3	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Lead	7439-92-1	5.67E-07	WSPA Pooled Source Testing, 1992	3.77E-03	5.67E-07	WSPA Pooled Source Testing, 1992	4.90E-03	1.13E-03
Manganese	7439-96-5	1.01E-06	WSPA Pooled Source Testing, 1992	6.71E-03	1.01E-06	WSPA Pooled Source Testing, 1992	8.73E-03	2.01E-03
Mercury	7439-97-6	1.58E-07	WSPA Pooled Source Testing, 1992	1.05E-03	1.58E-07	WSPA Pooled Source Testing, 1992	1.37E-03	3.15E-04
Nickel	7440-02-0	2.70E-07	WSPA Pooled Source Testing, 1992	1.79E-03	2.70E-07	WSPA Pooled Source Testing, 1992	2.33E-03	5.38E-04
Benzo(a)anthracene	56-55-3	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Benzo(a)pyrene	50-32-8	4.14E-10	Sierra Source Testing, 1993-94	2.75E-06	4.14E-10	Sierra Source Testing, 1993-94	3.58E-06	8.25E-07
Benzo(b)fluoranthene	205-99-2	6.17E-10	Sierra Source Testing, 1993-94	4.10E-06	6.17E-10	Sierra Source Testing, 1993-94	5.33E-06	1.23E-06
Benzo(k)fluoranthene	207-08-9	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Chrysene	218-01-9	8.08E-10	Sierra Source Testing, 1993-94	5.37E-06	8.08E-10	Sierra Source Testing, 1993-94	6.98E-06	1.61E-06
Dibenz(a,h)anthracene	53-70-3	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Tetrachloroethylene	127-18-4			0.00E+00			0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
3-Methylchloranthrene	56-49-5	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Phenol	108-95-2	7.92E-06	WSPA Pooled Source Testing, 1992	5.26E-02	7.92E-06	WSPA Pooled Source Testing, 1992	6.84E-02	1.58E-02
Naphthalene	91-20-3	5.79E-08	Sierra Source Testing, 1993-94	3.85E-04	5.79E-08	Sierra Source Testing, 1993-94	5.00E-04	1.15E-04
Propylene	115-07-1	4.53E-04	API/WSPA, August 14, 1998 {preferred over AP-42}	3.01E+00	4.53E-04	API/WSPA, August 14, 1998 {preferred over AP-42}	3.91E+00	9.03E-01
Selenium	7782-49-2	1.18E-07	WSPA Pooled Source Testing, 1992	7.84E-04	1.18E-07	WSPA Pooled Source Testing, 1992	1.02E-03	2.35E-04
Sulfuric Acid	7664-93-9			0.00E+00		Appendix A, Table A-26	~~0.00E+00~~ 2.09E-01	~~0.00E+00~~ 2.09E-01
Toluene	108-88-3	3.75E-06	Sierra Source Testing, 1993-94	2.49E-02	3.75E-06	Sierra Source Testing, 1993-94	3.24E-02	7.47E-03
Vanadium	7440-62-2			0.00E+00			0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	1.47E-06	Sierra Source Testing, 1993-94	9.77E-03	1.47E-06	Sierra Source Testing, 1993-94	1.27E-02	2.93E-03

Carson NHDS Heater (D1433)

Max Firing Rate (98th Percentile):	3.77	mmbtuhr
Fuel:	Natural Gas	

Post-Mod Characteristics

Max Firing Rate:	12.5	mmbtuhr
Fuel:	Natural Gas	

2012/2013 Reported Emissions

Emissions Increase

		FLUENATGAS			FLUENATGAS			
Chemical Name	**CAS No.**	**Lbs/mmbtu**	**EF Basis**	**Emissions (lbs/day)**	**Lbs/mmbtu**	**EF Basis**	**Emissions (lbs/day)**	**Emissions (lbs/day)**
1,2,4-Trimethylbenzene	95-63-6			0.00E+00			0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	1.49E-08	Sierra Source Testing, 1993-94	1.35E-06	1.49E-08	Sierra Source Testing, 1993-94	4.47E-06	3.12E-06
Acenaphthene	83-32-9	5.73E-10	Sierra Source Testing, 1993-94	5.18E-08	5.73E-10	Sierra Source Testing, 1993-94	1.72E-07	1.20E-07
Acenaphthylene	208-96-8	6.39E-10	Sierra Source Testing, 1993-94	5.78E-08	6.39E-10	Sierra Source Testing, 1993-94	1.92E-07	1.34E-07
Anthracene	120-12-7	8.73E-10	Sierra Source Testing, 1993-94	7.90E-08	8.73E-10	Sierra Source Testing, 1993-94	2.62E-07	1.83E-07
Antimony	7440-36-0			0.00E+00			0.00E+00	0.00E+00
Barium	7440-39-3			0.00E+00			0.00E+00	0.00E+00
Benzo(g,h,i)perylene	191-24-2	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Carbonyl sulfide	463-58-1			0.00E+00			0.00E+00	0.00E+00
Cobalt	7440-48-4	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Cyclohexane	110-82-7			0.00E+00			0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086			0.00E+00			0.00E+00	0.00E+00
Ethylene	74-85-1			0.00E+00			0.00E+00	0.00E+00

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-8: **Carson and Wilmington Heater Toxic Emissions Calculations (Modified Units)**
Increase in Daily Emissions

Fluoranthene	206-44-0	2.47E-09	Sierra Source Testing, 1993-94	2.23E-07	2.47E-09	Sierra Source Testing, 1993-94	7.41E-07	5.18E-07
Fluorene	86-73-7	3.97E-09	Sierra Source Testing, 1993-94	3.59E-07	3.97E-09	Sierra Source Testing, 1993-94	1.19E-06	8.32E-07
Molybdenum	7439-98-7	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5			0.00E+00			0.00E+00	0.00E+00
Phenanthrene	85-01-8	9.93E-09	Sierra Source Testing, 1993-94	8.98E-07	9.93E-09	Sierra Source Testing, 1993-94	2.98E-06	2.08E-06
Phosphorus	7723-14-0			0.00E+00			0.00E+00	0.00E+00
Pyrene	129-00-0	2.48E-09	Sierra Source Testing, 1993-94	2.24E-07	2.48E-09	Sierra Source Testing, 1993-94	7.44E-07	5.20E-07
Silver	7440-22-4			0.00E+00			0.00E+00	0.00E+00
Thallium	7440-28-0			0.00E+00			0.00E+00	0.00E+00
Zinc	7440-66-6	1.19E-06	WSPA Pooled Source Testing, 1992	1.08E-04	1.19E-06	WSPA Pooled Source Testing, 1992	3.57E-04	2.49E-04
Chromium	7440-47-3	2.24E-07	WSPA Pooled Source Testing, 1992	2.03E-05	2.24E-07	WSPA Pooled Source Testing, 1992	6.72E-05	4.69E-05
Acetaldehyde	75-07-0	4.62E-05	Sierra Source Testing, 1993-94	4.18E-03	4.62E-05	Sierra Source Testing, 1993-94	1.39E-02	9.68E-03
Arsenic	7440-38-2	1.42E-07	WSPA Pooled Source Testing, 1992	1.28E-05	1.42E-07	WSPA Pooled Source Testing, 1992	4.26E-05	2.98E-05
Acrolein	107-02-8	4.40E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	3.98E-04	4.40E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	1.32E-03	9.22E-04
Ammonia	7664-41-7			0.00E+00			0.00E+00	0.00E+00
Benzene	71-43-2	4.19E-07	Sierra Source Testing, 1993-94	3.79E-05	4.19E-07	Sierra Source Testing, 1993-94	1.26E-04	8.78E-05
Beryllium	7440-41-7	2.84E-08	WSPA Pooled Source Testing, 1992	2.57E-06	2.84E-08	WSPA Pooled Source Testing, 1992	8.52E-06	5.95E-06
1,3-Butadiene	106-99-0			0.00E+00			0.00E+00	0.00E+00
Cadmium	7440-43-9	5.67E-08	WSPA Pooled Source Testing, 1992	5.13E-06	5.67E-08	WSPA Pooled Source Testing, 1992	1.70E-05	1.19E-05
Carbon Disulfide	75-15-0			0.00E+00			0.00E+00	0.00E+00
Chromium (hexavalent)	18540-29-9	4.29E-08	WSPA Pooled Source Testing, 1992	3.88E-06	4.29E-08	WSPA Pooled Source Testing, 1992	1.29E-05	8.99E-06
Copper	7440-50-8	1.60E-07	WSPA Pooled Source Testing, 1992	1.45E-05	1.60E-07	WSPA Pooled Source Testing, 1992	4.80E-05	3.35E-05
Carbon Tetrachloride	56-23-5			0.00E+00			0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8			0.00E+00			0.00E+00	0.00E+00
Ethylbenzene	100-41-4	5.90E-07	Sierra Source Testing, 1993-94	5.34E-05	5.90E-07	Sierra Source Testing, 1993-94	1.77E-04	1.24E-04
Formaldehyde	50-00-0	1.24E-05	Sierra Source Testing, 1993-94	1.12E-03	1.24E-05	Sierra Source Testing, 1993-94	3.72E-03	2.60E-03
Hydrochloric acid	7647-01-0			0.00E+00			0.00E+00	0.00E+00
Hydrogen sulfide	7783-06-4	1.99E-04	WSPA Pooled Source Testing, 1992	1.80E-02	1.99E-04	WSPA Pooled Source Testing, 1992	5.97E-02	4.17E-02
Hexane	110-54-3	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Lead	7439-92-1	5.67E-07	WSPA Pooled Source Testing, 1992	5.13E-05	5.67E-07	WSPA Pooled Source Testing, 1992	1.70E-04	1.19E-04
Manganese	7439-96-5	1.01E-06	WSPA Pooled Source Testing, 1992	9.14E-05	1.01E-06	WSPA Pooled Source Testing, 1992	3.03E-04	2.12E-04
Mercury	7439-97-6	1.58E-07	WSPA Pooled Source Testing, 1992	1.43E-05	1.58E-07	WSPA Pooled Source Testing, 1992	4.74E-05	3.31E-05
Nickel	7440-02-0	2.70E-07	WSPA Pooled Source Testing, 1992	2.44E-05	2.70E-07	WSPA Pooled Source Testing, 1992	8.10E-05	5.66E-05
Benzo(a)anthracene	56-55-3	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Benzo(a)pyrene	50-32-8	4.14E-10	Sierra Source Testing, 1993-94	3.75E-08	4.14E-10	Sierra Source Testing, 1993-94	1.24E-07	8.67E-08
Benzo(b)fluoranthene	205-99-2	6.17E-10	Sierra Source Testing, 1993-94	5.58E-08	6.17E-10	Sierra Source Testing, 1993-94	1.85E-07	1.29E-07
Benzo(k)fluoranthene	207-08-9	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Chrysene	218-01-9	8.08E-10	Sierra Source Testing, 1993-94	7.31E-08	8.08E-10	Sierra Source Testing, 1993-94	2.42E-07	1.69E-07
Dibenz(a,h)anthracene	53-70-3	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Tetrachloroethylene	127-18-4			0.00E+00			0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
3-Methylchloranthrene	56-49-5	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Phenol	108-95-2	7.92E-06	WSPA Pooled Source Testing, 1992	7.17E-04	7.92E-06	WSPA Pooled Source Testing, 1992	2.38E-03	1.66E-03
Naphthalene	91-20-3	5.79E-08	Sierra Source Testing, 1993-94	5.24E-06	5.79E-08	Sierra Source Testing, 1993-94	1.74E-05	1.21E-05
Propylene	115-07-1	4.53E-04	API/WSPA, August 14, 1998 {preferred over AP-42}	4.10E-02	4.53E-04	API/WSPA, August 14, 1998 {preferred over AP-42}	1.36E-01	9.49E-02
Selenium	7782-49-2	1.18E-07	WSPA Pooled Source Testing, 1992	1.07E-05	1.18E-07	WSPA Pooled Source Testing, 1992	3.54E-05	2.47E-05
							~~0.00E+00~~	~~0.00E+00~~

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-8: **Carson and Wilmington Heater Toxic Emissions Calculations (Modified Units)**
Increase in Daily Emissions

Sulfuric Acid	7664-93-9			0.00E+00		Appendix A, Table A-26	2.00E-02	2.00E-02
Toluene	108-88-3	3.75E-06	Sierra Source Testing, 1993-94	3.39E-04	3.75E-06	Sierra Source Testing, 1993-94	1.13E-03	7.86E-04
Vanadium	7440-62-2			0.00E+00			0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	1.47E-06	Sierra Source Testing, 1993-94	1.33E-04	1.47E-06	Sierra Source Testing, 1993-94	4.41E-04	3.08E-04

Wilmington H-100 Heater (D33)

Max Firing Rate (98th Percentile):	251.45	mmbtuhr
Fuel:	Refinery Fuel Gas	

Post-Mod Characteristics

Max Firing Rate:	302.4	mmbtuhr
Fuel:	Refinery Fuel Gas	

2012/2013 Reported Emissions

Emissions Increase

		RFG			RFG			
Chemical Name	**CAS No.**	**Lbs/mmscf**	**EF Basis**	**Emissions (lbs/day)**	**Lbs/mmscf**	**EF Basis**	**Emissions (lbs/day)**	**Emissions (lbs/day)**
1,2,4-Trimethylbenzene	95-63-6	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Acenaphthene	83-32-9	2.33E-06	2013 AER/TRI	1.14E-05	2.33E-06	2013 AER/TRI	1.37E-05	2.32E-06
Acenaphthylene	208-96-8	1.52E-06	2013 AER/TRI	7.46E-06	1.52E-06	2013 AER/TRI	8.97E-06	1.51E-06
Anthracene	120-12-7	2.81E-06	2013 AER/TRI	1.38E-05	2.81E-06	2013 AER/TRI	1.66E-05	2.79E-06
Antimony	7440-36-0	5.81E-04	2013 AER/TRI	2.85E-03	5.81E-04	2013 AER/TRI	3.43E-03	5.78E-04
Barium	7440-39-3	6.49E-03	2013 AER/TRI	3.18E-02	6.49E-03	2013 AER/TRI	3.83E-02	6.45E-03
Benzo(g,h,i)perylene	191-24-2	1.17E-06	2013 AER/TRI	5.74E-06	1.17E-06	2013 AER/TRI	6.90E-06	1.16E-06
Carbonyl sulfide	463-58-1	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Cobalt	7440-48-4	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Cyclohexane	110-82-7	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Ethylene	74-85-1	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Fluoranthene	206-44-0	2.37E-06	2013 AER/TRI	1.16E-05	2.37E-06	2013 AER/TRI	1.40E-05	2.36E-06
Fluorene	86-73-7	3.95E-06	2013 AER/TRI	1.94E-05	3.95E-06	2013 AER/TRI	2.33E-05	3.92E-06
Molybdenum	7439-98-7	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Phenanthrene	85-01-8	1.01E-05	2013 AER/TRI	4.97E-05	1.01E-05	2013 AER/TRI	5.97E-05	1.01E-05
Phosphorus	7723-14-0	7.21E-04	2013 AER/TRI	3.54E-03	7.21E-04	2013 AER/TRI	4.25E-03	7.17E-04
Pyrene	129-00-0	2.05E-06	2013 AER/TRI	1.01E-05	2.05E-06	2013 AER/TRI	1.21E-05	2.04E-06
Silver	7440-22-4	1.81E-03	2013 AER/TRI	8.88E-03	1.81E-03	2013 AER/TRI	1.07E-02	1.80E-03
Thallium	7440-28-0	6.49E-03	2013 AER/TRI	3.18E-02	6.49E-03	2013 AER/TRI	3.83E-02	6.45E-03
Zinc	7440-66-6	2.41E-03	2013 AER/TRI	1.18E-02	2.41E-03	2013 AER/TRI	1.42E-02	2.40E-03
Chromium	7440-47-3	8.09E-04	2013 AER/TRI	3.97E-03	8.09E-04	2013 AER/TRI	4.77E-03	8.04E-04
Acetaldehyde	75-07-0	5.71E-03	2013 AER/TRI	2.80E-02	5.71E-03	2013 AER/TRI	3.37E-02	5.67E-03
Arsenic	7440-38-2	1.33E-04	2013 AER/TRI	6.52E-04	1.33E-04	2013 AER/TRI	7.84E-04	1.32E-04
Acrolein	107-02-8	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Ammonia	7664-41-7	4.23E+00	2013 AER/TRI	2.08E+01	20 ppmv	Current permitted BACT limit.	65.26	4.45E+01
Benzene	71-43-2	9.60E-02	2013 AER/TRI	4.71E-01	9.60E-02	2013 AER/TRI	5.67E-01	9.55E-02
Beryllium	7440-41-7	2.88E-04	2013 AER/TRI	1.41E-03	2.88E-04	2013 AER/TRI	1.70E-03	2.86E-04
1,3-Butadiene	106-99-0	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Cadmium	7440-43-9	1.40E-04	2013 AER/TRI	6.88E-04	1.40E-04	2013 AER/TRI	8.27E-04	1.39E-04
Carbon Disulfide	75-15-0	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Chromium (hexavalent)	18540-29-9	1.67E-05	2013 AER/TRI	8.21E-05	1.67E-05	2013 AER/TRI	9.87E-05	1.66E-05
Copper	7440-50-8	2.73E-04	2013 AER/TRI	1.34E-03	2.73E-04	2013 AER/TRI	1.61E-03	2.71E-04
Carbon Tetrachloride	56-23-5	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Ethylbenzene	100-41-4	1.76E-03	2013 AER/TRI	8.63E-03	1.76E-03	2013 AER/TRI	1.04E-02	1.75E-03
Formaldehyde	50-00-0	2.40E-03	2013 AER/TRI	1.18E-02	2.40E-03	2013 AER/TRI	1.41E-02	2.38E-03

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-8: **Carson and Wilmington Heater Toxic Emissions Calculations (Modified Units)**
Increase in Daily Emissions

Hydrochloric acid	7647-01-0	9.60E-02	2013 AER/TRI	4.71E-01	9.60E-02	2013 AER/TRI	5.67E-01	9.55E-02
Hydrogen sulfide	7783-06-4	4.05E-01	2013 AER/TRI	1.99E+00	4.05E-01	2013 AER/TRI	2.39E+00	4.03E-01
Hexane	110-54-3	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Lead	7439-92-1	1.94E-04	2013 AER/TRI	9.53E-04	1.94E-04	2013 AER/TRI	1.15E-03	1.93E-04
Manganese	7439-96-5	1.40E-05	2013 AER/TRI	6.88E-05	1.40E-05	2013 AER/TRI	8.27E-05	1.39E-05
Mercury	7439-97-6	7.42E-05	2013 AER/TRI	3.64E-04	7.42E-05	2013 AER/TRI	4.38E-04	7.37E-05
Nickel	7440-02-0	2.18E-04	2013 AER/TRI	1.07E-03	2.18E-04	2013 AER/TRI	1.28E-03	2.16E-04
Benzo(a)anthracene	56-55-3	3.70E-05	2013 AER/TRI	1.82E-04	3.70E-05	2013 AER/TRI	2.18E-04	3.68E-05
Benzo(a)pyrene	50-32-8	9.89E-05	2013 AER/TRI	4.85E-04	9.89E-05	2013 AER/TRI	5.84E-04	9.83E-05
Benzo(b)fluoranthene	205-99-2	4.61E-05	2013 AER/TRI	2.26E-04	4.61E-05	2013 AER/TRI	2.72E-04	4.58E-05
Benzo(k)fluoranthene	207-08-9	2.72E-05	2013 AER/TRI	1.33E-04	2.72E-05	2013 AER/TRI	1.60E-04	2.70E-05
Chrysene	218-01-9	1.66E-06	2013 AER/TRI	8.14E-06	1.66E-06	2013 AER/TRI	9.79E-06	1.65E-06
Dibenz(a,h)anthracene	53-70-3	1.06E-05	2013 AER/TRI	5.20E-05	1.06E-05	2013 AER/TRI	6.25E-05	1.05E-05
Tetrachloroethylene	127-18-4	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	1.15E-04	2013 AER/TRI	5.64E-04	1.15E-04	2013 AER/TRI	6.79E-04	1.14E-04
3-Methylchloranthrene	56-49-5	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Phenol	108-95-2	6.96E-03	2013 AER/TRI	3.41E-02	6.96E-03	2013 AER/TRI	4.11E-02	6.92E-03
Naphthalene	91-20-3	1.59E-04	2013 AER/TRI	7.78E-04	1.59E-04	2013 AER/TRI	9.36E-04	1.58E-04
Propylene	115-07-1	2.05E-03	2013 AER/TRI	1.01E-02	2.05E-03	2013 AER/TRI	1.21E-02	2.04E-03
Selenium	7782-49-2	4.38E-04	2013 AER/TRI	2.15E-03	4.38E-04	2013 AER/TRI	2.59E-03	4.36E-04
Sulfuric Acid	7664-93-9	2.75E-02	2013 AER/TRI	1.35E-01		Appendix A, Table A-26	~~1.62E-01~~ 5.33E+00	~~2.73E-02~~ 5.20E+00
Toluene	108-88-3	9.42E-02	2013 AER/TRI	4.62E-01	9.42E-02	2013 AER/TRI	5.56E-01	9.36E-02
Vanadium	7440-62-2	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	1.32E-02	2013 AER/TRI	6.50E-02	1.32E-02	2013 AER/TRI	7.81E-02	1.32E-02
Cyanide compounds	57-12-5	2.39E-03	2013 AER/TRI	1.17E-02	2.39E-03	2013 AER/TRI	1.41E-02	2.37E-03
Benzo(e)pyrene	192-97-2	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Dimethyl disulfide	624-92-0	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Methyl mercaptan	74-93-1	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Perylene	198-55-0	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
PAHs, total, with individ. components also reported	1150	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-8: **Carson and Wilmington Heater Toxic Emissions Calculations (Modified Units)**
Increase in Daily Emissions

Wilmington H-300 Heater (D384)

Max Firing Rate (98th Percentile):	29.27	mmbtuhr
Fuel:	Refinery Fuel Gas	

Post-Mod Characteristics

Max Firing Rate:	65.1	mmbtuhr
Fuel:	Natural Gas	

2012/2013 Reported Emissions

Emissions Increase

Chemical Name	CAS No.	RFG Lbs/mmscf	EF Basis	Emissions (lbs/day)	FLUENATGAS Lbs/mmbtu	EF Basis	Emissions (lbs/day)	Emissions Increase Emissions (lbs/day)
1,2,4-Trimethylbenzene	95-63-6	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	0.00E+00	2013 AER/TRI	0.00E+00	1.49E-08	Sierra Source Testing, 1993-94	2.33E-05	2.33E-05
Acenaphthene	83-32-9	5.77E-06	2013 AER/TRI	3.95E-06	5.73E-10	Sierra Source Testing, 1993-94	8.95E-07	-3.05E-06
Acenaphthylene	208-96-8	6.73E-07	2013 AER/TRI	4.61E-07	6.39E-10	Sierra Source Testing, 1993-94	9.98E-07	5.38E-07
Anthracene	120-12-7	6.94E-06	2013 AER/TRI	4.75E-06	8.73E-10	Sierra Source Testing, 1993-94	1.36E-06	-3.38E-06
Antimony	7440-36-0	5.81E-04	2013 AER/TRI	3.98E-04			0.00E+00	-3.98E-04
Barium	7440-39-3	6.49E-03	2013 AER/TRI	4.44E-03			0.00E+00	-4.44E-03
Benzo(g,h,i)perylene	191-24-2	1.17E-06	2013 AER/TRI	8.01E-07	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-8.01E-07
Carbonyl sulfide	463-58-1	1.41E+00	2013 AER/TRI	9.68E-01			0.00E+00	-9.68E-01
Cobalt	7440-48-4		2013 AER/TRI	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Cyclohexane	110-82-7		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Dichlorobenzene	95-50-1		2013 AER/TRI	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Ethylene	74-85-1	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Fluoranthene	206-44-0	4.45E-06	2013 AER/TRI	3.05E-06	2.47E-09	Sierra Source Testing, 1993-94	3.86E-06	8.11E-07
Fluorene	86-73-7	1.75E-05	2013 AER/TRI	1.20E-05	3.97E-09	Sierra Source Testing, 1993-94	6.20E-06	-5.75E-06
Molybdenum	7439-98-7		2013 AER/TRI	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Phenanthrene	85-01-8	1.61E-05	2013 AER/TRI	1.10E-05	9.93E-09	Sierra Source Testing, 1993-94	1.55E-05	4.48E-06
Phosphorus	7723-14-0	7.21E-04	2013 AER/TRI	4.94E-04			0.00E+00	-4.94E-04
Pyrene	129-00-0	8.01E-06	2013 AER/TRI	5.48E-06	2.48E-09	Sierra Source Testing, 1993-94	3.87E-06	-1.61E-06
Silver	7440-22-4	1.81E-03	2013 AER/TRI	1.24E-03			0.00E+00	-1.24E-03
Thallium	7440-28-0	6.49E-03	2013 AER/TRI	4.44E-03			0.00E+00	-4.44E-03
Zinc	7440-66-6	5.95E-03	2013 AER/TRI	4.08E-03	1.19E-06	WSPA Pooled Source Testing, 1992	1.86E-03	-2.22E-03
Chromium	7440-47-3	6.70E-04	2013 AER/TRI	4.59E-04	2.24E-07	WSPA Pooled Source Testing, 1992	3.50E-04	-1.09E-04
Acetaldehyde	75-07-0	1.55E-02	2013 AER/TRI	1.06E-02	4.62E-05	Sierra Source Testing, 1993-94	7.22E-02	6.16E-02
Arsenic	7440-38-2	2.83E-04	2013 AER/TRI	1.94E-04	1.42E-07	WSPA Pooled Source Testing, 1992	2.22E-04	2.82E-05
Acrolein	107-02-8	0.00E+00	2013 AER/TRI	0.00E+00	4.40E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	6.87E-03	6.87E-03
Ammonia	7664-41-7	1.12E+00	2013 AER/TRI	7.67E-01	20 ppmv	Current permitted BACT limit.	14.05	1.33E+01
Benzene	71-43-2	1.28E-02	2013 AER/TRI	8.76E-03	4.19E-07	Sierra Source Testing, 1993-94	6.55E-04	-8.10E-03
Beryllium	7440-41-7	2.88E-04	2013 AER/TRI	1.97E-04	2.84E-08	WSPA Pooled Source Testing, 1992	4.44E-05	-1.53E-04
1,3-Butadiene	106-99-0	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Cadmium	7440-43-9	2.07E-04	2013 AER/TRI	1.41E-04	5.67E-08	WSPA Pooled Source Testing, 1992	8.86E-05	-5.29E-05
Carbon Disulfide	75-15-0	3.06E-01	2013 AER/TRI	2.10E-01			0.00E+00	-2.10E-01
Chromium (hexavalent)	18540-29-9	4.00E-05	2013 AER/TRI	2.74E-05	4.29E-08	WSPA Pooled Source Testing, 1992	6.70E-05	3.97E-05
Copper	7440-50-8	5.51E-04	2013 AER/TRI	3.77E-04	1.60E-07	WSPA Pooled Source Testing, 1992	2.50E-04	-1.27E-04
Carbon Tetrachloride	56-23-5		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Ethylbenzene	100-41-4	3.04E-02	2013 AER/TRI	2.08E-02	5.90E-07	Sierra Source Testing, 1993-94	9.22E-04	-1.99E-02
Formaldehyde	50-00-0	1.21E-02	2013 AER/TRI	8.28E-03	1.24E-05	Sierra Source Testing, 1993-94	1.94E-02	1.11E-02

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-8: **Carson and Wilmington Heater Toxic Emissions Calculations (Modified Units)**
Increase in Daily Emissions

Hydrochloric acid	7647-01-0	4.14E-01	2013 AER/TRI	2.84E-01			0.00E+00	-2.84E-01
Hydrogen sulfide	7783-06-4	3.12E-01	2013 AER/TRI	2.14E-01	1.99E-04	WSPA Pooled Source Testing, 1992	3.11E-01	9.71E-02
Hexane	110-54-3		2013 AER/TRI	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Lead	7439-92-1	2.29E-04	2013 AER/TRI	1.57E-04	5.67E-07	WSPA Pooled Source Testing, 1992	8.86E-04	7.29E-04
Manganese	7439-96-5	1.07E-02	2013 AER/TRI	7.33E-03	1.01E-06	WSPA Pooled Source Testing, 1992	1.58E-03	-5.76E-03
Mercury	7439-97-6	3.82E-05	2013 AER/TRI	2.62E-05	1.58E-07	WSPA Pooled Source Testing, 1992	2.47E-04	2.21E-04
Nickel	7440-02-0	5.20E-04	2013 AER/TRI	3.56E-04	2.70E-07	WSPA Pooled Source Testing, 1992	4.22E-04	6.57E-05
Benzo(a)anthracene	56-55-3	1.04E-06	2013 AER/TRI	7.10E-07	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-7.10E-07
Benzo(a)pyrene	50-32-8	9.89E-05	2013 AER/TRI	6.77E-05	4.14E-10	Sierra Source Testing, 1993-94	6.47E-07	-6.71E-05
Benzo(b)fluoranthene	205-99-2	1.24E-06	2013 AER/TRI	8.50E-07	6.17E-10	Sierra Source Testing, 1993-94	9.64E-07	1.14E-07
Benzo(k)fluoranthene	207-08-9	2.72E-05	2013 AER/TRI	1.86E-05	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-1.86E-05
Chrysene	218-01-9	1.66E-06	2013 AER/TRI	1.14E-06	8.08E-10	Sierra Source Testing, 1993-94	1.26E-06	1.26E-07
Dibenz(a,h)anthracene	53-70-3	1.06E-05	2013 AER/TRI	7.26E-06	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-7.26E-06
Tetrachloroethylene	127-18-4		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6		2013 AER/TRI	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	1.15E-04	2013 AER/TRI	7.87E-05	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-7.87E-05
3-Methylchloranthrene	56-49-5		2013 AER/TRI	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Phenol	108-95-2	1.16E-03	2013 AER/TRI	7.94E-04	7.92E-06	WSPA Pooled Source Testing, 1992	1.24E-02	1.16E-02
Naphthalene	91-20-3	3.47E-04	2013 AER/TRI	2.37E-04	5.79E-08	Sierra Source Testing, 1993-94	9.05E-05	-1.47E-04
Propylene	115-07-1	2.05E-03	2013 AER/TRI	1.40E-03	4.53E-04	API/WSPA, August 14, 1998 {preferred over AP-42}	7.08E-01	7.06E-01
Selenium	7782-49-2	2.20E-05	2013 AER/TRI	1.51E-05	1.18E-07	WSPA Pooled Source Testing, 1992	1.84E-04	1.69E-04
Sulfuric Acid	7664-93-9	1.27E-01	2013 AER/TRI	8.69E-02		Appendix A, Table A-26	~~0.00E+00~~ 3.62E-02	~~-8.69E-02~~ -5.06E-02
Toluene	108-88-3	1.28E-01	2013 AER/TRI	8.76E-02	3.75E-06	Sierra Source Testing, 1993-94	5.86E-03	-8.17E-02
Vanadium	7440-62-2		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	1.31E-02	2013 AER/TRI	8.99E-03	1.47E-06	Sierra Source Testing, 1993-94	2.30E-03	-6.70E-03
Cyanide compounds	57-12-5	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Benzo(e)pyrene	192-97-2	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Dimethyl disulfide	624-92-0	1.27E+00	2013 AER/TRI	8.67E-01			0.00E+00	-8.67E-01
Methyl mercaptan	74-93-1	5.82E-02	2013 AER/TRI	3.98E-02			0.00E+00	-3.98E-02
Perylene	198-55-0	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
PAHs, total, with individ. components also reported	1150	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00

Wilmington H-301 Heater (D385)

Max Firing Rate (98th Percentile):		13.94	mmbtuhr
Fuel:	Refinery Fuel Gas		

Post-Mod Characteristics

Max Firing Rate:	31	mmbtuhr
Fuel:	Natural Gas	

2012/2013 Reported Emissions

Emissions Increase

		RFG			FLUENATGAS			
Chemical Name	**CAS No.**	**Lbs/mmscf**	**EF Basis**	**Emissions (lbs/day)**	**Lbs/mmbtu**	**EF Basis**	**Emissions (lbs/day)**	**Emissions (lbs/day)**
1,2,4-Trimethylbenzene	95-63-6	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	0.00E+00	2013 AER/TRI	0.00E+00	1.49E-08	Sierra Source Testing, 1993-94	1.11E-05	1.11E-05
Acenaphthene	83-32-9	5.77E-06	2013 AER/TRI	1.88E-06	5.73E-10	Sierra Source Testing, 1993-94	4.26E-07	-1.45E-06
Acenaphthylene	208-96-8	6.73E-07	2013 AER/TRI	2.19E-07	6.39E-10	Sierra Source Testing, 1993-94	4.75E-07	2.56E-07
Anthracene	120-12-7	6.94E-06	2013 AER/TRI	2.26E-06	8.73E-10	Sierra Source Testing, 1993-94	6.50E-07	-1.61E-06
Antimony	7440-36-0	5.81E-04	2013 AER/TRI	1.89E-04			0.00E+00	-1.89E-04
Barium	7440-39-3	6.49E-03	2013 AER/TRI	2.12E-03			0.00E+00	-2.12E-03
Benzo(g,h,i)perylene	191-24-2	1.17E-06	2013 AER/TRI	3.81E-07	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-3.81E-07
Carbonyl sulfide	463-58-1	1.41E+00	2013 AER/TRI	4.61E-01			0.00E+00	-4.61E-01

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-8: **Carson and Wilmington Heater Toxic Emissions Calculations (Modified Units) Increase in Daily Emissions**

Cobalt	7440-48-4		2013 AER/TRI	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Cyclohexane	110-82-7		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Dichlorobenzene	95-50-1		2013 AER/TRI	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Ethylene	74-85-1	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Fluoranthene	206-44-0	4.45E-06	2013 AER/TRI	1.45E-06	2.47E-09	Sierra Source Testing, 1993-94	1.84E-06	3.86E-07
Fluorene	86-73-7	1.75E-05	2013 AER/TRI	5.69E-06	3.97E-09	Sierra Source Testing, 1993-94	2.95E-06	-2.74E-06
Molybdenum	7439-98-7		2013 AER/TRI	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Phenanthrene	85-01-8	1.61E-05	2013 AER/TRI	5.25E-06	9.93E-09	Sierra Source Testing, 1993-94	7.39E-06	2.14E-06
Phosphorus	7723-14-0	7.21E-04	2013 AER/TRI	2.35E-04			0.00E+00	-2.35E-04
Pyrene	129-00-0	8.01E-06	2013 AER/TRI	2.61E-06	2.48E-09	Sierra Source Testing, 1993-94	1.85E-06	-7.65E-07
Silver	7440-22-4	1.81E-03	2013 AER/TRI	5.90E-04			0.00E+00	-5.90E-04
Thallium	7440-28-0	6.49E-03	2013 AER/TRI	2.12E-03			0.00E+00	-2.12E-03
Zinc	7440-66-6	5.95E-03	2013 AER/TRI	1.94E-03	1.19E-06	WSPA Pooled Source Testing, 1992	8.85E-04	-1.06E-03
Chromium	7440-47-3	6.70E-04	2013 AER/TRI	2.19E-04	2.24E-07	WSPA Pooled Source Testing, 1992	1.67E-04	-5.19E-05
Acetaldehyde	75-07-0	1.55E-02	2013 AER/TRI	5.05E-03	4.62E-05	Sierra Source Testing, 1993-94	3.44E-02	2.93E-02
Arsenic	7440-38-2	2.83E-04	2013 AER/TRI	9.22E-05	1.42E-07	WSPA Pooled Source Testing, 1992	1.06E-04	1.34E-05
Acrolein	107-02-8	0.00E+00	2013 AER/TRI	0.00E+00	4.40E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	3.27E-03	3.27E-03
Ammonia	7664-41-7	1.12E+00	2013 AER/TRI	3.65E-01	20 ppmv	Current permitted BACT limit.	6.69	6.32E+00
Benzene	71-43-2	1.28E-02	2013 AER/TRI	4.17E-03	4.19E-07	Sierra Source Testing, 1993-94	3.12E-04	-3.86E-03
Beryllium	7440-41-7	2.88E-04	2013 AER/TRI	9.39E-05	2.84E-08	WSPA Pooled Source Testing, 1992	2.11E-05	-7.28E-05
1,3-Butadiene	106-99-0	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Cadmium	7440-43-9	2.07E-04	2013 AER/TRI	6.74E-05	5.67E-08	WSPA Pooled Source Testing, 1992	4.22E-05	-2.52E-05
Carbon Disulfide	75-15-0	3.06E-01	2013 AER/TRI	9.98E-02			0.00E+00	-9.98E-02
Chromium (hexavalent)	18540-29-9	4.00E-05	2013 AER/TRI	1.30E-05	4.29E-08	WSPA Pooled Source Testing, 1992	3.19E-05	1.89E-05
Copper	7440-50-8	5.51E-04	2013 AER/TRI	1.80E-04	1.60E-07	WSPA Pooled Source Testing, 1992	1.19E-04	-6.06E-05
Carbon Tetrachloride	56-23-5		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Ethylbenzene	100-41-4	3.04E-02	2013 AER/TRI	9.91E-03	5.90E-07	Sierra Source Testing, 1993-94	4.39E-04	-9.47E-03
Formaldehyde	50-00-0	1.21E-02	2013 AER/TRI	3.94E-03	1.24E-05	Sierra Source Testing, 1993-94	9.23E-03	5.28E-03
Hydrochloric acid	7647-01-0	4.14E-01	2013 AER/TRI	1.35E-01			0.00E+00	-1.35E-01
Hydrogen sulfide	7783-06-4	3.12E-01	2013 AER/TRI	1.02E-01	1.99E-04	WSPA Pooled Source Testing, 1992	1.48E-01	4.62E-02
Hexane	110-54-3		2013 AER/TRI	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Lead	7439-92-1	2.29E-04	2013 AER/TRI	7.46E-05	5.67E-07	WSPA Pooled Source Testing, 1992	4.22E-04	3.47E-04
Manganese	7439-96-5	1.07E-02	2013 AER/TRI	3.49E-03	1.01E-06	WSPA Pooled Source Testing, 1992	7.51E-04	-2.74E-03
Mercury	7439-97-6	3.82E-05	2013 AER/TRI	1.25E-05	1.58E-07	WSPA Pooled Source Testing, 1992	1.18E-04	1.05E-04
Nickel	7440-02-0	5.20E-04	2013 AER/TRI	1.70E-04	2.70E-07	WSPA Pooled Source Testing, 1992	2.01E-04	3.13E-05
Benzo(a)anthracene	56-55-3	1.04E-06	2013 AER/TRI	3.38E-07	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-3.38E-07
Benzo(a)pyrene	50-32-8	9.89E-05	2013 AER/TRI	3.22E-05	4.14E-10	Sierra Source Testing, 1993-94	3.08E-07	-3.19E-05
Benzo(b)fluoranthene	205-99-2	1.24E-06	2013 AER/TRI	4.05E-07	6.17E-10	Sierra Source Testing, 1993-94	4.59E-07	5.41E-08
Benzo(k)fluoranthene	207-08-9	2.72E-05	2013 AER/TRI	8.87E-06	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-8.87E-06
Chrysene	218-01-9	1.66E-06	2013 AER/TRI	5.41E-07	8.08E-10	Sierra Source Testing, 1993-94	6.01E-07	5.99E-08
Dibenz(a,h)anthracene	53-70-3	1.06E-05	2013 AER/TRI	3.46E-06	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-3.46E-06
Tetrachloroethylene	127-18-4		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6		2013 AER/TRI	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	1.15E-04	2013 AER/TRI	3.75E-05	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-3.75E-05

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-8: **Carson and Wilmington Heater Toxic Emissions Calculations (Modified Units)**
Increase in Daily Emissions

3-Methylchloranthrene	56-49-5		2013 AER/TRI	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Phenol	108-95-2	1.16E-03	2013 AER/TRI	3.78E-04	7.92E-06	WSPA Pooled Source Testing, 1992	5.89E-03	5.51E-03
Naphthalene	91-20-3	3.47E-04	2013 AER/TRI	1.13E-04	5.79E-08	Sierra Source Testing, 1993-94	4.31E-05	-7.00E-05
Propylene	115-07-1	2.05E-03	2013 AER/TRI	6.68E-04	4.53E-04	API/WSPA, August 14, 1998 {preferred over AP-42}	3.37E-01	3.36E-01
Selenium	7782-49-2	2.20E-05	2013 AER/TRI	7.17E-06	1.18E-07	WSPA Pooled Source Testing, 1992	8.78E-05	8.06E-05
Sulfuric Acid	7664-93-9	1.27E-01	2013 AER/TRI	4.14E-02		Appendix A, Table A-26	~~0.00E+00~~ 1.73E-02	~~-4.14E-02~~ -2.41E-02
Toluene	108-88-3	1.28E-01	2013 AER/TRI	4.17E-02	3.75E-06	Sierra Source Testing, 1993-94	2.79E-03	-3.89E-02
Vanadium	7440-62-2		2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	1.31E-02	2013 AER/TRI	4.28E-03	1.47E-06	Sierra Source Testing, 1993-94	1.09E-03	-3.19E-03
Cyanide compounds	57-12-5	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Benzo(e)pyrene	192-97-2	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
Dimethyl disulfide	624-92-0	1.27E+00	2013 AER/TRI	4.13E-01			0.00E+00	-4.13E-01
Methyl mercaptan	74-93-1	5.82E-02	2013 AER/TRI	1.90E-02			0.00E+00	-1.90E-02
Perylene	198-55-0	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00
PAHs, total, with individ. components also reported	1150	0.00E+00	2013 AER/TRI	0.00E+00			0.00E+00	0.00E+00

* The 98th percentuile firing rate is based on the average firing rate on days where combined emissions from the modified combustion sources were >= 98th percentile of actual emissions during the baseline period.

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units) Increase in Annual Emissions**

Carson 51 Vacuum Unit Heater (D63)

Post-Mod Characteristics

Max Firing Rate:	360	mmbtuhr
Fuel:	Natural Gas	

2012/2013 Reported Emissions / **Post-Mod Toxic Emissions** (FLUENATGAS) / **Emissions Increase**

Chemical Name	CAS No.	2012 (lbs)	2013 (lbs)	Avg Emissions (lbs/year)	Lbs/mmbtu	EF Basis	Emissions (lbs/year)	Emissions Increase Emissions (lbs/year)
1,2,4-Trimethylbenzene	95-63-6	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	3.33E-02	3.66E-02	3.49E-02	1.49E-08	Sierra Source Testing, 1993-94	4.70E-02	1.21E-02
Acenaphthene	83-32-9	1.28E-03	1.41E-03	1.34E-03	5.73E-10	Sierra Source Testing, 1993-94	1.81E-03	4.64E-04
Acenaphthylene	208-96-8	1.43E-03	1.57E-03	1.50E-03	6.39E-10	Sierra Source Testing, 1993-94	2.02E-03	5.18E-04
Anthracene	120-12-7	1.95E-03	2.14E-03	2.05E-03	8.73E-10	Sierra Source Testing, 1993-94	2.75E-03	7.07E-04
Antimony	7440-36-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Barium	7440-39-3	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Benzo(g,h,i)perylene	191-24-2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Carbonyl sulfide	463-58-1	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Cobalt	7440-48-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Cyclohexane	110-82-7	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Ethylene	74-85-1	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Fluoranthene	206-44-0	5.51E-03	6.06E-03	5.79E-03	2.47E-09	Sierra Source Testing, 1993-94	7.79E-03	2.00E-03
Fluorene	86-73-7	8.86E-03	9.75E-03	9.30E-03	3.97E-09	Sierra Source Testing, 1993-94	1.25E-02	3.22E-03
Molybdenum	7439-98-7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Phenanthrene	85-01-8	2.22E-02	2.44E-02	2.33E-02	9.93E-09	Sierra Source Testing, 1993-94	3.13E-02	8.05E-03
Phosphorus	7723-14-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Pyrene	129-00-0	5.53E-03	6.09E-03	5.81E-03	2.48E-09	Sierra Source Testing, 1993-94	7.82E-03	2.01E-03
Silver	7440-22-4	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Thallium	7440-28-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Zinc	7440-66-6	2.66E+00	2.92E+00	2.79E+00	1.19E-06	WSPA Pooled Source Testing, 1992	3.75E+00	9.64E-01
Chromium	7440-47-3	5.00E-01	5.50E-01	5.25E-01	2.24E-07	WSPA Pooled Source Testing, 1992	7.06E-01	1.82E-01
Acetaldehyde	75-07-0	1.03E+02	1.13E+02	1.08E+02	4.62E-05	Sierra Source Testing, 1993-94	1.46E+02	3.74E+01
Arsenic	7440-38-2	3.17E-01	3.49E-01	3.33E-01	1.42E-07	WSPA Pooled Source Testing, 1992	4.48E-01	1.15E-01
Acrolein	107-02-8	9.82E+00	1.08E+01	1.03E+01	4.40E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	1.39E+01	3.57E+00
Ammonia	7664-41-7	7.39E+03	4.59E+03	5.99E+03	20 ppmv	Currnet permitted BACT limit	28,355.97	2.24E+04
Benzene	71-43-2	9.35E-01	1.03E+00	9.82E-01	4.19E-07	Sierra Source Testing, 1993-94	1.32E+00	3.40E-01
Beryllium	7440-41-7	6.34E-02	6.97E-02	6.65E-02	2.84E-08	WSPA Pooled Source Testing, 1992	8.96E-02	2.30E-02
1,3-Butadiene	106-99-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Cadmium	7440-43-9	1.27E-01	1.39E-01	1.33E-01	5.67E-08	WSPA Pooled Source Testing, 1992	1.79E-01	4.59E-02
Carbon Disulfide	75-15-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Chromium (hexavalent)	18540-29-9	9.57E-02	1.05E-01	1.01E-01	4.29E-08	WSPA Pooled Source Testing, 1992	1.35E-01	3.48E-02
Copper	7440-50-8	3.57E-01	3.93E-01	3.75E-01	1.60E-07	WSPA Pooled Source Testing, 1992	5.05E-01	1.30E-01
Carbon Tetrachloride	56-23-5	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Ethylbenzene	100-41-4	1.32E+00	1.45E+00	1.38E+00	5.90E-07	Sierra Source Testing, 1993-94	1.86E+00	4.78E-01
Formaldehyde	50-00-0	2.77E+01	3.04E+01	2.91E+01	1.24E-05	Sierra Source Testing, 1993-94	3.91E+01	1.00E+01
Hydrochloric acid	7647-01-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units)**
Increase in Annual Emissions

Hydrogen sulfide	7783-06-4	4.44E+02	4.89E+02	4.66E+02	1.99E-04	WSPA Pooled Source Testing, 1992	6.28E+02	1.61E+02
Hexane	110-54-3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Lead	7439-92-1	1.27E+00	1.39E+00	1.33E+00	5.67E-07	WSPA Pooled Source Testing, 1992	1.79E+00	4.59E-01
Manganese	7439-96-5	2.25E+00	2.48E+00	2.37E+00	1.01E-06	WSPA Pooled Source Testing, 1992	3.19E+00	8.18E-01
Mercury	7439-97-6	3.53E-01	3.88E-01	3.70E-01	1.58E-07	WSPA Pooled Source Testing, 1992	4.98E-01	1.28E-01
Nickel	7440-02-0	6.03E-01	6.63E-01	6.33E-01	2.70E-07	WSPA Pooled Source Testing, 1992	8.51E-01	2.19E-01
Benzo(a)anthracene	56-55-3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Benzo(a)pyrene	50-32-8	9.24E-04	1.02E-03	9.70E-04	4.14E-10	Sierra Source Testing, 1993-94	1.31E-03	3.35E-04
Benzo(b)fluoranthene	205-99-2	1.38E-03	1.51E-03	1.45E-03	6.17E-10	Sierra Source Testing, 1993-94	1.95E-03	5.00E-04
Benzo(k)fluoranthene	207-08-9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Chrysene	218-01-9	1.80E-03	1.98E-03	1.89E-03	8.08E-10	Sierra Source Testing, 1993-94	2.55E-03	6.55E-04
Dibenz(a,h)anthracene	53-70-3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Tetrachloroethylene	127-18-4	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
3-Methylchloranthrene	56-49-5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Phenol	108-95-2	1.77E+01	1.94E+01	1.86E+01	7.92E-06	WSPA Pooled Source Testing, 1992	2.50E+01	6.42E+00
Naphthalene	91-20-3	1.29E-01	1.42E-01	1.36E-01	5.79E-08	Sierra Source Testing, 1993-94	1.83E-01	4.69E-02
Propylene	115-07-1	1.01E+03	1.11E+03	1.06E+03	4.53E-04	API/WSPA, August 14, 1998 {preferred over AP-42}	1.43E+03	3.67E+02
Selenium	7782-49-2	2.63E-01	2.90E-01	2.77E-01	1.18E-07	WSPA Pooled Source Testing, 1992	3.72E-01	9.56E-02
Sulfuric Acid	7664-93-9	0.00E+00	0.00E+00	0.00E+00		Appendix A, Table A-26	~~0.00E+00~~ 7.63E+01	~~0.00E+00~~ 7.63E+01
Toluene	108-88-3	8.37E+00	9.21E+00	8.79E+00	3.75E-06	Sierra Source Testing, 1993-94	1.18E+01	3.04E+00
Vanadium	7440-62-2	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	3.28E+00	3.61E+00	3.44E+00	1.47E-06	Sierra Source Testing, 1993-94	4.64E+00	1.19E+00

Carson NHDS Heater (D1433)

Post-Mod Characteristics

Max Firing Rate:	12.5	mmbtuhr
Fuel:	Natural Gas	

2012/2013 Reported Emissions

Post-Mod Toxic Emissions — **Emissions Increase**

Chemical Name	CAS No.	2012 (lbs)	2013 (lbs)	Avg Emissions (lbs/year)	FLUENATGAS Lbs/mmbtu	EF Basis	Emissions (lbs/year)	Emissions (lbs/year)
1,2,4-Trimethylbenzene	95-63-6	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	6.29E-04	4.58E-04	5.44E-04	1.49E-08	Sierra Source Testing, 1993-94	1.63E-03	1.09E-03
Acenaphthene	83-32-9	2.42E-05	1.76E-05	2.09E-05	5.73E-10	Sierra Source Testing, 1993-94	6.27E-05	4.18E-05
Acenaphthylene	208-96-8	2.70E-05	1.97E-05	2.33E-05	6.39E-10	Sierra Source Testing, 1993-94	7.00E-05	4.66E-05
Anthracene	120-12-7	3.69E-05	2.69E-05	3.19E-05	8.73E-10	Sierra Source Testing, 1993-94	9.56E-05	6.37E-05
Antimony	7440-36-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Barium	7440-39-3	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Benzo(g,h,i)perylene	191-24-2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Carbonyl sulfide	463-58-1	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Cobalt	7440-48-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Cyclohexane	110-82-7	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Ethylene	74-85-1	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Fluoranthene	206-44-0	1.04E-04	7.60E-05	9.02E-05	2.47E-09	Sierra Source Testing, 1993-94	2.70E-04	1.80E-04
Fluorene	86-73-7	1.68E-04	1.22E-04	1.45E-04	3.97E-09	Sierra Source Testing, 1993-94	4.35E-04	2.90E-04

Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units) Increase in Annual Emissions**

Molybdenum	7439-98-7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Phenanthrene	85-01-8	4.19E-04	3.05E-04	3.62E-04	9.93E-09	Sierra Source Testing, 1993-94	1.09E-03	7.25E-04
Phosphorus	7723-14-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Pyrene	129-00-0	1.05E-04	7.63E-05	9.05E-05	2.48E-09	Sierra Source Testing, 1993-94	2.72E-04	1.81E-04
Silver	7440-22-4	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Thallium	7440-28-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Zinc	7440-66-6	5.03E-02	3.66E-02	4.34E-02	1.19E-06	WSPA Pooled Source Testing, 1992	1.30E-01	8.69E-02
Chromium	7440-47-3	9.46E-03	6.89E-03	8.18E-03	2.24E-07	WSPA Pooled Source Testing, 1992	2.45E-02	1.64E-02
Acetaldehyde	75-07-0	1.95E+00	1.42E+00	1.69E+00	4.62E-05	Sierra Source Testing, 1993-94	5.06E+00	3.37E+00
Arsenic	7440-38-2	6.00E-03	4.37E-03	5.18E-03	1.42E-07	WSPA Pooled Source Testing, 1992	1.55E-02	1.04E-02
Acrolein	107-02-8	1.86E-01	1.35E-01	1.61E-01	4.40E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	4.82E-01	3.21E-01
Ammonia	7664-41-7	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Benzene	71-43-2	1.77E-02	1.29E-02	1.53E-02	4.19E-07	Sierra Source Testing, 1993-94	4.59E-02	3.06E-02
Beryllium	7440-41-7	1.20E-03	8.74E-04	1.04E-03	2.84E-08	WSPA Pooled Source Testing, 1992	3.11E-03	2.07E-03
1,3-Butadiene	106-99-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Cadmium	7440-43-9	2.39E-03	1.74E-03	2.07E-03	5.67E-08	WSPA Pooled Source Testing, 1992	6.21E-03	4.14E-03
Carbon Disulfide	75-15-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Chromium (hexavalent)	18540-29-9	1.81E-03	1.32E-03	1.57E-03	4.29E-08	WSPA Pooled Source Testing, 1992	4.70E-03	3.13E-03
Copper	7440-50-8	6.76E-03	4.92E-03	5.84E-03	1.60E-07	WSPA Pooled Source Testing, 1992	1.75E-02	1.17E-02
Carbon Tetrachloride	56-23-5	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Ethylbenzene	100-41-4	2.49E-02	1.81E-02	2.15E-02	5.90E-07	Sierra Source Testing, 1993-94	6.46E-02	4.31E-02
Formaldehyde	50-00-0	5.24E-01	3.81E-01	4.53E-01	1.24E-05	Sierra Source Testing, 1993-94	1.36E+00	9.05E-01
Hydrochloric acid	7647-01-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Hydrogen sulfide	7783-06-4	8.41E+00	6.12E+00	7.26E+00	1.99E-04	WSPA Pooled Source Testing, 1992	2.18E+01	1.45E+01
Hexane	110-54-3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Lead	7439-92-1	2.39E-02	1.74E-02	2.07E-02	5.67E-07	WSPA Pooled Source Testing, 1992	6.21E-02	4.14E-02
Manganese	7439-96-5	4.27E-02	3.11E-02	3.69E-02	1.01E-06	WSPA Pooled Source Testing, 1992	1.11E-01	7.37E-02
Mercury	7439-97-6	6.67E-03	4.86E-03	5.77E-03	1.58E-07	WSPA Pooled Source Testing, 1992	1.73E-02	1.15E-02
Nickel	7440-02-0	1.14E-02	8.31E-03	9.85E-03	2.70E-07	WSPA Pooled Source Testing, 1992	2.96E-02	1.97E-02
Benzo(a)anthracene	56-55-3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Benzo(a)pyrene	50-32-8	1.75E-05	1.27E-05	1.51E-05	4.14E-10	Sierra Source Testing, 1993-94	4.53E-05	3.02E-05
Benzo(b)fluoranthene	205-99-2	2.61E-05	1.90E-05	2.25E-05	6.17E-10	Sierra Source Testing, 1993-94	6.76E-05	4.50E-05
Benzo(k)fluoranthene	207-08-9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Chrysene	218-01-9	3.41E-05	2.49E-05	2.95E-05	8.08E-10	Sierra Source Testing, 1993-94	8.85E-05	5.90E-05
Dibenz(a,h)anthracene	53-70-3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Tetrachloroethylene	127-18-4	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
3-Methylchloranthrene	56-49-5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Phenol	108-95-2	3.35E-01	2.44E-01	2.89E-01	7.92E-06	WSPA Pooled Source Testing, 1992	8.67E-01	5.78E-01
Naphthalene	91-20-3	2.45E-03	1.78E-03	2.11E-03	5.79E-08	Sierra Source Testing, 1993-94	6.34E-03	4.23E-03
Propylene	115-07-1	1.91E+01	1.39E+01	1.65E+01	4.53E-04	API/WSPA, August 14, 1998 {preferred over AP-42}	4.96E+01	3.31E+01
Selenium	7782-49-2	4.98E-03	3.63E-03	4.31E-03	1.18E-07	WSPA Pooled Source Testing, 1992	1.29E-02	8.61E-03
Sulfuric Acid	7664-93-9	0.00E+00	0.00E+00	0.00E+00		Appendix A, Table A-26	~~0.00E+00~~ 7.31E+00	~~0.00E+00~~ 7.31E+00
Toluene	108-88-3	1.58E-01	1.15E-01	1.37E-01	3.75E-06	Sierra Source Testing, 1993-94	4.11E-01	2.74E-01
Vanadium	7440-62-2	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units) Increase in Annual Emissions**

Xylenes (mixed)	1330-20-7	6.21E-02	4.52E-02	5.37E-02	1.47E-06	Sierra Source Testing, 1993-94	1.61E-01	1.07E-01

Wilmington H-100 Heater (D33)

Post-Mod Characteristics

Max Firing Rate:	302.4	mmbtuhr
Fuel:	Refinery Fuel Gas	

2012/2013 Reported Emissions

Post-Mod Toxic Emissions (RFG)

Emissions Increase

Chemical Name	CAS No.	2012 (lbs)	2013 (lbs)	Avg Emissions (lbs/year)	Lbs/mmscf	EF Basis	Emissions (lbs/year)	Emissions Increase Emissions (lbs/year)
1,2,4-Trimethylbenzene	95-63-6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Acenaphthene	83-32-9	3.59E-03	4.09E-03	3.84E-03	2.33E-06	2013 AER/TRI	5.02E-03	1.18E-03
Acenaphthylene	208-96-8	2.34E-03	2.67E-03	2.51E-03	1.52E-06	2013 AER/TRI	3.27E-03	7.67E-04
Anthracene	120-12-7	4.33E-03	4.93E-03	4.63E-03	2.81E-06	2013 AER/TRI	6.05E-03	1.42E-03
Antimony	7440-36-0	8.96E-01	1.02E+00	9.58E-01	5.81E-04	2013 AER/TRI	1.25E+00	2.93E-01
Barium	7440-39-3	1.00E+01	1.14E+01	1.07E+01	6.49E-03	2013 AER/TRI	1.40E+01	3.28E+00
Benzo(g,h,i)perylene	191-24-2	1.80E-03	2.05E-03	1.93E-03	1.17E-06	2013 AER/TRI	2.52E-03	5.90E-04
Carbonyl sulfide	463-58-1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Cobalt	7440-48-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Cyclohexane	110-82-7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Ethylene	74-85-1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Fluoranthene	206-44-0	3.53E-03	4.17E-03	3.85E-03	2.37E-06	2013 AER/TRI	5.11E-03	1.26E-03
Fluorene	86-73-7	5.86E-03	6.93E-03	6.40E-03	3.95E-06	2013 AER/TRI	8.50E-03	2.10E-03
Molybdenum	7439-98-7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Phenanthrene	85-01-8	1.50E-02	1.78E-02	1.64E-02	1.01E-05	2013 AER/TRI	2.18E-02	5.39E-03
Phosphorus	7723-14-0	1.11E+00	1.27E+00	1.19E+00	7.21E-04	2013 AER/TRI	1.55E+00	3.64E-01
Pyrene	129-00-0	3.05E-03	3.61E-03	3.33E-03	2.05E-06	2013 AER/TRI	4.42E-03	1.09E-03
Silver	7440-22-4	2.79E+00	3.18E+00	2.98E+00	1.81E-03	2013 AER/TRI	3.90E+00	9.13E-01
Thallium	7440-28-0	1.00E+01	1.14E+01	1.07E+01	6.49E-03	2013 AER/TRI	1.40E+01	3.28E+00
Zinc	7440-66-6	3.58E+00	4.23E+00	3.91E+00	2.41E-03	2013 AER/TRI	5.19E+00	1.28E+00
Chromium	7440-47-3	1.20E+00	1.42E+00	1.31E+00	8.09E-04	2013 AER/TRI	1.74E+00	4.31E-01
Acetaldehyde	75-07-0	8.48E+00	1.00E+01	9.25E+00	5.71E-03	2013 AER/TRI	1.23E+01	3.04E+00
Arsenic	7440-38-2	1.97E-01	2.33E-01	2.15E-01	1.33E-04	2013 AER/TRI	2.86E-01	7.08E-02
Acrolein	107-02-8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Ammonia	7664-41-7	1.93E+03	7.43E+03	4.68E+03	20 ppmv	Current permitted BACT limit.	2.38E+04	1.91E+04
Benzene	71-43-2	1.43E+02	1.69E+02	1.56E+02	9.60E-02	2013 AER/TRI	2.07E+02	5.12E+01
Beryllium	7440-41-7	4.44E-01	5.06E-01	4.75E-01	2.88E-04	2013 AER/TRI	6.20E-01	1.45E-01
1,3-Butadiene	106-99-0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Cadmium	7440-43-9	2.08E-01	2.46E-01	2.27E-01	1.40E-04	2013 AER/TRI	3.02E-01	7.47E-02
Carbon Disulfide	75-15-0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Chromium (hexavalent)	18540-29-9	2.48E-02	2.94E-02	2.71E-02	1.67E-05	2013 AER/TRI	3.60E-02	8.91E-03
Copper	7440-50-8	4.06E-01	4.79E-01	4.42E-01	2.73E-04	2013 AER/TRI	5.88E-01	1.45E-01
Carbon Tetrachloride	56-23-5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Ethylbenzene	100-41-4	2.61E+00	3.09E+00	2.85E+00	1.76E-03	2013 AER/TRI	3.79E+00	9.37E-01
Formaldehyde	50-00-0	3.56E+00	4.21E+00	3.89E+00	2.40E-03	2013 AER/TRI	5.16E+00	1.28E+00
Hydrochloric acid	7647-01-0	1.43E+02	1.69E+02	1.56E+02	9.60E-02	2013 AER/TRI	2.07E+02	5.12E+01
Hydrogen sulfide	7783-06-4	6.25E+02	7.11E+02	6.68E+02	4.05E-01	2013 AER/TRI	8.72E+02	2.04E+02
Hexane	110-54-3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Lead	7439-92-1	2.89E-01	3.41E-01	3.15E-01	1.94E-04	2013 AER/TRI	4.18E-01	1.04E-01

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units)**
Increase in Annual Emissions

Manganese	7439-96-5	2.08E-02	2.46E-02	2.27E-02	1.40E-05	2013 AER/TRI	3.02E-02	7.47E-03
Mercury	7439-97-6	1.10E-01	1.30E-01	1.20E-01	7.42E-05	2013 AER/TRI	1.60E-01	3.95E-02
Nickel	7440-02-0	3.23E-01	3.82E-01	3.53E-01	2.18E-04	2013 AER/TRI	4.69E-01	1.16E-01
Benzo(a)anthracene	56-55-3	5.71E-02	6.50E-02	6.10E-02	3.70E-05	2013 AER/TRI	7.97E-02	1.87E-02
Benzo(a)pyrene	50-32-8	1.53E-01	1.74E-01	1.63E-01	9.89E-05	2013 AER/TRI	2.13E-01	4.99E-02
Benzo(b)fluoranthene	205-99-2	7.11E-02	8.09E-02	7.60E-02	4.61E-05	2013 AER/TRI	9.93E-02	2.33E-02
Benzo(k)fluoranthene	207-08-9	4.19E-02	4.78E-02	4.49E-02	2.72E-05	2013 AER/TRI	5.86E-02	1.37E-02
Chrysene	218-01-9	2.56E-03	2.91E-03	2.74E-03	1.66E-06	2013 AER/TRI	3.58E-03	8.38E-04
Dibenz(a,h)anthracene	53-70-3	1.63E-02	1.86E-02	1.75E-02	1.06E-05	2013 AER/TRI	2.28E-02	5.35E-03
Tetrachloroethylene	127-18-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	1.77E-01	2.02E-01	1.90E-01	1.15E-04	2013 AER/TRI	2.48E-01	5.80E-02
3-Methylchloranthrene	56-49-5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Phenol	108-95-2	1.07E+01	1.22E+01	1.15E+01	6.96E-03	2013 AER/TRI	1.50E+01	3.51E+00
Naphthalene	91-20-3	2.36E-01	2.79E-01	2.57E-01	1.59E-04	2013 AER/TRI	3.42E-01	8.45E-02
Propylene	115-07-1	3.16E+00	3.60E+00	3.38E+00	2.05E-03	2013 AER/TRI	4.42E+00	1.03E+00
Selenium	7782-49-2	6.51E-01	7.70E-01	7.11E-01	4.38E-04	2013 AER/TRI	9.44E-01	2.34E-01
Sulfuric Acid	7664-93-9	3.53E+01	4.83E+01	4.18E+01	~~2.75E-02~~	~~2013 AER/TRI~~ Appendix A, Table A-26	~~5.92E+01~~ 1.95E+03	~~1.74E+01~~ 1.90E+03
Toluene	108-88-3	1.40E+02	1.65E+02	1.53E+02	9.42E-02	2013 AER/TRI	2.03E+02	5.02E+01
Vanadium	7440-62-2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	1.97E+01	2.33E+01	2.15E+01	1.32E-02	2013 AER/TRI	2.85E+01	7.06E+00
Cyanide compounds	57-12-5	3.54E+00	4.19E+00	3.87E+00	2.39E-03	2013 AER/TRI	5.14E+00	1.27E+00
Benzo(e)pyrene	192-97-2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Dimethyl disulfide	624-92-0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Methyl mercaptan	74-93-1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Perylene	198-55-0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
PAHs, total, with individ. components also reported	1150	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00

Wilmington H-300 Heater (D384)

Post-Mod Characteristics

Max Firing Rate:	65.1	mmbtuhr
Fuel:	Natural Gas	

2012/2013 Reported Emissions

Post-Mod Toxic Emissions — FLUENATGAS

Emissions Increase

Chemical Name	CAS No.	2012 (lbs)	2013 (lbs)	Avg Emissions (lbs/year)	Lbs/mmbtu	EF Basis	Emissions (lbs/year)	Emissions (lbs/year)
1,2,4-Trimethylbenzene	95-63-6	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	0.00E+00	1.11E-03	5.56E-04	1.49E-08	Sierra Source Testing, 1993-94	8.50E-03	7.94E-03
Acenaphthene	83-32-9	9.29E-04	1.30E-04	5.29E-04	5.73E-10	Sierra Source Testing, 1993-94	3.27E-04	-2.03E-04
Acenaphthylene	208-96-8	1.08E-04	1.34E-03	7.23E-04	6.39E-10	Sierra Source Testing, 1993-94	3.64E-04	-3.59E-04
Anthracene	120-12-7	1.12E-03	1.12E-01	5.66E-02	8.73E-10	Sierra Source Testing, 1993-94	4.98E-04	-5.61E-02
Antimony	7440-36-0	9.71E-02	1.25E+00	6.74E-01			0.00E+00	-6.74E-01
Barium	7440-39-3	1.09E+00	2.26E-04	5.43E-01			0.00E+00	-5.43E-01
Benzo(g,h,i)perylene	191-24-2	1.96E-04	2.73E+02	1.36E+02	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-1.36E+02
Carbonyl sulfide	463-58-1	2.28E+02	0.00E+00	1.14E+02			0.00E+00	-1.14E+02
Cobalt	7440-48-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Cyclohexane	110-82-7	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Ethylene	74-85-1	0.00E+00	8.59E-04	4.29E-04			0.00E+00	-4.29E-04
Fluoranthene	206-44-0	7.17E-04	3.37E-03	2.04E-03	2.47E-09	Sierra Source Testing, 1993-94	1.41E-03	-6.34E-04
Fluorene	86-73-7	2.81E-03	0.00E+00	1.41E-03	3.97E-09	Sierra Source Testing, 1993-94	2.26E-03	8.58E-04

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units) Increase in Annual Emissions**

Molybdenum	7439-98-7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5	0.00E+00	3.11E-03	1.55E-03			0.00E+00	-1.55E-03
Phenanthrene	85-01-8	2.59E-03	1.39E-01	7.08E-02	9.93E-09	Sierra Source Testing, 1993-94	5.66E-03	-6.52E-02
Phosphorus	7723-14-0	1.21E-01	1.54E-03	6.10E-02			0.00E+00	-6.10E-02
Pyrene	129-00-0	1.29E-03	3.49E-01	1.75E-01	2.48E-09	Sierra Source Testing, 1993-94	1.41E-03	-1.74E-01
Silver	7440-22-4	3.03E-01	1.25E+00	7.77E-01			0.00E+00	-7.77E-01
Thallium	7440-28-0	1.09E+00	1.15E+00	1.12E+00			0.00E+00	-1.12E+00
Zinc	7440-66-6	9.59E-01	1.29E-01	5.44E-01	1.19E-06	WSPA Pooled Source Testing, 1992	6.79E-01	1.35E-01
Chromium	7440-47-3	1.08E-01	2.99E+00	1.55E+00	2.24E-07	WSPA Pooled Source Testing, 1992	1.28E-01	-1.42E+00
Acetaldehyde	75-07-0	2.50E+00	5.45E-02	1.27E+00	4.62E-05	Sierra Source Testing, 1993-94	2.63E+01	2.51E+01
Arsenic	7440-38-2	4.55E-02	0.00E+00	2.28E-02	1.42E-07	WSPA Pooled Source Testing, 1992	8.10E-02	5.82E-02
Acrolein	107-02-8	0.00E+00	2.16E+02	1.08E+02	4.40E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	2.51E+00	-1.06E+02
Ammonia	7664-41-7	4.74E+02	2.47E+00	2.38E+02	20 ppmv	Current permitted BACT limit.	5,127.71	4.89E+03
Benzene	71-43-2	2.06E+00	5.55E-02	1.06E+00	4.19E-07	Sierra Source Testing, 1993-94	2.39E-01	-8.19E-01
Beryllium	7440-41-7	4.81E-02	0.00E+00	2.41E-02	2.84E-08	WSPA Pooled Source Testing, 1992	1.62E-02	-7.88E-03
1,3-Butadiene	106-99-0	0.00E+00	3.98E-02	1.99E-02			0.00E+00	-1.99E-02
Cadmium	7440-43-9	3.33E-02	5.91E+01	2.95E+01	5.67E-08	WSPA Pooled Source Testing, 1992	3.23E-02	-2.95E+01
Carbon Disulfide	75-15-0	4.93E+01	7.71E-03	2.47E+01			0.00E+00	-2.47E+01
Chromium (hexavalent)	18540-29-9	6.44E-03	1.06E-01	5.63E-02	4.29E-08	WSPA Pooled Source Testing, 1992	2.45E-02	-3.19E-02
Copper	7440-50-8	8.87E-02	0.00E+00	4.44E-02	1.60E-07	WSPA Pooled Source Testing, 1992	9.12E-02	4.69E-02
Carbon Tetrachloride	56-23-5	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8	0.00E+00	5.86E+00	2.93E+00			0.00E+00	-2.93E+00
Ethylbenzene	100-41-4	5.08E+00	2.33E+00	3.71E+00	5.90E-07	Sierra Source Testing, 1993-94	3.36E-01	-3.37E+00
Formaldehyde	50-00-0	1.95E+00	7.99E+01	4.09E+01	1.24E-05	Sierra Source Testing, 1993-94	7.07E+00	-3.39E+01
Hydrochloric acid	7647-01-0	6.67E+01	1.58E+00	3.42E+01			0.00E+00	-3.42E+01
Hydrogen sulfide	7783-06-4	2.62E+00	0.00E+00	1.31E+00	1.99E-04	WSPA Pooled Source Testing, 1992	1.13E+02	1.12E+02
Hexane	110-54-3	0.00E+00	4.41E-02	2.21E-02	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	-2.21E-02
Lead	7439-92-1	3.68E-02	2.07E+00	1.05E+00	5.67E-07	WSPA Pooled Source Testing, 1992	3.23E-01	-7.28E-01
Manganese	7439-96-5	1.72E+00	7.38E-03	8.66E-01	1.01E-06	WSPA Pooled Source Testing, 1992	5.76E-01	-2.90E-01
Mercury	7439-97-6	6.16E-03	1.00E-01	5.32E-02	1.58E-07	WSPA Pooled Source Testing, 1992	9.01E-02	3.69E-02
Nickel	7440-02-0	8.38E-02	2.00E-04	4.20E-02	2.70E-07	WSPA Pooled Source Testing, 1992	1.54E-01	1.12E-01
Benzo(a)anthracene	56-55-3	1.67E-04	1.91E-02	9.62E-03	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-9.62E-03
Benzo(a)pyrene	50-32-8	1.65E-02	2.40E-04	8.39E-03	4.14E-10	Sierra Source Testing, 1993-94	2.36E-04	-8.15E-03
Benzo(b)fluoranthene	205-99-2	2.00E-04	5.25E-03	2.72E-03	6.17E-10	Sierra Source Testing, 1993-94	3.52E-04	-2.37E-03
Benzo(k)fluoranthene	207-08-9	4.55E-03	3.20E-04	2.43E-03	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-2.43E-03
Chrysene	218-01-9	2.78E-04	2.04E-03	1.16E-03	8.08E-10	Sierra Source Testing, 1993-94	4.61E-04	-7.00E-04
Dibenz(a,h)anthracene	53-70-3	1.77E-03	0.00E+00	8.86E-04	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-8.86E-04
Tetrachloroethylene	127-18-4	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
3-Methylchloranthrene	56-49-5	0.00E+00	2.24E-01	1.12E-01	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	-1.12E-01
Phenol	108-95-2	1.87E-01	6.69E-02	1.27E-01	7.92E-06	WSPA Pooled Source Testing, 1992	4.52E+00	4.39E+00
Naphthalene	91-20-3	5.58E-02	3.95E-01	2.26E-01	5.79E-08	Sierra Source Testing, 1993-94	3.30E-02	-1.93E-01
Propylene	115-07-1	3.43E-01	4.24E-03	1.73E-01	4.53E-04	API/WSPA, August 14, 1998 {preferred over AP-42}	2.58E+02	2.58E+02
Selenium	7782-49-2	3.68E-03	2.64E+01	1.32E+01	1.18E-07	WSPA Pooled Source Testing, 1992	6.73E-02	-1.31E+01
Sulfuric Acid	7664-93-9	1.60E+01	2.47E+01	2.04E+01		Appendix A, Table A-26	~~0.00E+00~~ 1.32E+01	~~-2.04E+01~~ -7.12E+00
Toluene	108-88-3	2.06E+01	0.00E+00	1.03E+01	3.75E-06	Sierra Source Testing, 1993-94	2.14E+00	-8.16E+00
Vanadium	7440-62-2	0.00E+00	2.53E+00	1.27E+00			0.00E+00	-1.27E+00

Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units)**
Increase in Annual Emissions

Xylenes (mixed)	1330-20-7	2.12E+00	0.00E+00	1.06E+00	1.47E-06	Sierra Source Testing, 1993-94	8.38E-01	-2.19E-01
Cyanide compounds	57-12-5	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Benzo(e)pyrene	192-97-2	0.00E+00	2.44E+02	1.22E+02			0.00E+00	-1.22E+02
Dimethyl disulfide	624-92-0	2.04E+02	1.12E+01	1.08E+02			0.00E+00	-1.08E+02
Methyl mercaptan	74-93-1	9.37E+00	0.00E+00	4.68E+00			0.00E+00	-4.68E+00
Perylene	198-55-0	0.00E+00	8.54E-01	4.27E-01			0.00E+00	-4.27E-01
PAHs, total, with individ. components also reported	1150	7.17E-04	0.00E+00	3.58E-04			0.00E+00	-3.58E-04

Wilmington H-301 Heater (D385)

Post-Mod Characteristics

Max Firing Rate:	31	mmbtuhr
Fuel:	Natural Gas	

2012/2013 Reported Emissions

Post-Mod Toxic Emissions

Emissions Increase

Chemical Name	CAS No.	2012 (lbs)	2013 (lbs)	Avg Emissions (lbs/year)	FLUENATGAS Lbs/mmbtu	EF Basis	Emissions (lbs/year)	Emissions (lbs/year)
1,2,4-Trimethylbenzene	95-63-6	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	0.00E+00	0.00E+00	0.00E+00	1.49E-08	Sierra Source Testing, 1993-94	4.05E-03	4.05E-03
Acenaphthene	83-32-9	3.49E-04	4.18E-04	3.84E-04	5.73E-10	Sierra Source Testing, 1993-94	1.56E-04	-2.28E-04
Acenaphthylene	208-96-8	4.07E-05	4.88E-05	4.48E-05	6.39E-10	Sierra Source Testing, 1993-94	1.74E-04	1.29E-04
Anthracene	120-12-7	4.20E-04	5.03E-04	4.62E-04	8.73E-10	Sierra Source Testing, 1993-94	2.37E-04	-2.24E-04
Antimony	7440-36-0	3.65E-02	4.21E-02	3.93E-02			0.00E+00	-3.93E-02
Barium	7440-39-3	4.08E-01	4.71E-01	4.39E-01			0.00E+00	-4.39E-01
Benzo(g,h,i)perylene	191-24-2	7.36E-05	8.49E-05	7.92E-05	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-7.92E-05
Carbonyl sulfide	463-58-1	8.56E+01	1.03E+02	9.41E+01			0.00E+00	-9.41E+01
Cobalt	7440-48-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Cyclohexane	110-82-7	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Ethylene	74-85-1	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Fluoranthene	206-44-0	2.70E-04	3.23E-04	2.96E-04	2.47E-09	Sierra Source Testing, 1993-94	6.71E-04	3.75E-04
Fluorene	86-73-7	1.06E-03	1.27E-03	1.16E-03	3.97E-09	Sierra Source Testing, 1993-94	1.08E-03	-8.39E-05
Molybdenum	7439-98-7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Phenanthrene	85-01-8	9.76E-04	1.17E-03	1.07E-03	9.93E-09	Sierra Source Testing, 1993-94	2.70E-03	1.62E-03
Phosphorus	7723-14-0	4.53E-02	5.23E-02	4.88E-02			0.00E+00	-4.88E-02
Pyrene	129-00-0	4.85E-04	5.81E-04	5.33E-04	2.48E-09	Sierra Source Testing, 1993-94	6.73E-04	1.41E-04
Silver	7440-22-4	1.14E-01	1.31E-01	1.23E-01			0.00E+00	-1.23E-01
Thallium	7440-28-0	4.08E-01	4.71E-01	4.39E-01			0.00E+00	-4.39E-01
Zinc	7440-66-6	3.60E-01	4.32E-01	3.96E-01	1.19E-06	WSPA Pooled Source Testing, 1992	3.23E-01	-7.29E-02
Chromium	7440-47-3	4.06E-02	4.86E-02	4.46E-02	2.24E-07	WSPA Pooled Source Testing, 1992	6.08E-02	1.62E-02
Acetaldehyde	75-07-0	9.38E-01	1.12E+00	1.03E+00	4.62E-05	Sierra Source Testing, 1993-94	1.25E+01	1.15E+01
Arsenic	7440-38-2	1.71E-02	2.05E-02	1.88E-02	1.42E-07	WSPA Pooled Source Testing, 1992	3.86E-02	1.97E-02
Acrolein	107-02-8	0.00E+00	0.00E+00	0.00E+00	4.40E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	1.19E+00	1.19E+00
Ammonia	7664-41-7	1.78E+02	8.13E+01	1.30E+02	20 ppmv	Current permitted BACT limit.	2,441.76	2.31E+03
Benzene	71-43-2	7.75E-01	9.28E-01	8.51E-01	4.19E-07	Sierra Source Testing, 1993-94	1.14E-01	-7.37E-01
Beryllium	7440-41-7	1.81E-02	2.09E-02	1.95E-02	2.84E-08	WSPA Pooled Source Testing, 1992	7.71E-03	-1.18E-02
1,3-Butadiene	106-99-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Cadmium	7440-43-9	1.25E-02	1.50E-02	1.37E-02	5.67E-08	WSPA Pooled Source Testing, 1992	1.54E-02	1.65E-03

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units)**
Increase in Annual Emissions

Carbon Disulfide	75-15-0	1.85E+01	2.22E+01	2.04E+01			0.00E+00	-2.04E+01
Chromium (hexavalent)	18540-29-9	2.42E-03	2.90E-03	2.66E-03	4.29E-08	WSPA Pooled Source Testing, 1992	1.16E-02	8.99E-03
Copper	7440-50-8	3.34E-02	4.00E-02	3.67E-02	1.60E-07	WSPA Pooled Source Testing, 1992	4.34E-02	6.79E-03
Carbon Tetrachloride	56-23-5	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Ethylbenzene	100-41-4	1.91E+00	2.20E+00	2.06E+00	5.90E-07	Sierra Source Testing, 1993-94	1.60E-01	-1.90E+00
Formaldehyde	50-00-0	7.32E-01	8.77E-01	8.04E-01	1.24E-05	Sierra Source Testing, 1993-94	3.37E+00	2.56E+00
Hydrochloric acid	7647-01-0	2.51E+01	3.01E+01	2.76E+01			0.00E+00	-2.76E+01
Hydrogen sulfide	7783-06-4	1.30E+00	7.80E-01	1.04E+00	1.99E-04	WSPA Pooled Source Testing, 1992	5.40E+01	5.30E+01
Hexane	110-54-3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Lead	7439-92-1	1.39E-02	1.66E-02	1.52E-02	5.67E-07	WSPA Pooled Source Testing, 1992	1.54E-01	1.39E-01
Manganese	7439-96-5	6.49E-01	7.77E-01	7.13E-01	1.01E-06	WSPA Pooled Source Testing, 1992	2.74E-01	-4.38E-01
Mercury	7439-97-6	2.32E-03	2.77E-03	2.54E-03	1.58E-07	WSPA Pooled Source Testing, 1992	4.29E-02	4.04E-02
Nickel	7440-02-0	3.15E-02	3.77E-02	3.46E-02	2.70E-07	WSPA Pooled Source Testing, 1992	7.33E-02	3.87E-02
Benzo(a)anthracene	56-55-3	6.28E-05	7.52E-05	6.90E-05	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-6.90E-05
Benzo(a)pyrene	50-32-8	6.22E-03	7.17E-03	6.70E-03	4.14E-10	Sierra Source Testing, 1993-94	1.12E-04	-6.58E-03
Benzo(b)fluoranthene	205-99-2	7.52E-05	9.01E-05	8.26E-05	6.17E-10	Sierra Source Testing, 1993-94	1.68E-04	8.49E-05
Benzo(k)fluoranthene	207-08-9	1.71E-03	1.97E-03	1.84E-03	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-1.84E-03
Chrysene	218-01-9	1.04E-04	1.20E-04	1.12E-04	8.08E-10	Sierra Source Testing, 1993-94	2.19E-04	1.07E-04
Dibenz(a,h)anthracene	53-70-3	6.66E-04	7.69E-04	7.18E-04	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	-7.18E-04
Tetrachloroethylene	127-18-4	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
3-Methylchloranthrene	56-49-5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Phenol	108-95-2	7.02E-02	8.41E-02	7.72E-02	7.92E-06	WSPA Pooled Source Testing, 1992	2.15E+00	2.07E+00
Naphthalene	91-20-3	2.10E-02	2.51E-02	2.31E-02	5.79E-08	Sierra Source Testing, 1993-94	1.57E-02	-7.35E-03
Propylene	115-07-1	1.29E-01	1.49E-01	1.39E-01	4.53E-04	API/WSPA, August 14, 1998 {preferred over AP-42}	1.23E+02	1.23E+02
Selenium	7782-49-2	1.38E-03	1.60E-03	1.49E-03	1.18E-07	WSPA Pooled Source Testing, 1992	3.20E-02	3.06E-02
Sulfuric Acid	7664-93-9	6.88E+00	7.31E+00	7.09E+00		Appendix A, Table A-26	~~0.00E+00~~ 6.30E+00	~~-7.09E+00~~ -7.94E-01
Toluene	108-88-3	7.75E+00	9.28E+00	8.51E+00	3.75E-06	Sierra Source Testing, 1993-94	1.02E+00	-7.49E+00
Vanadium	7440-62-2	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	7.95E-01	9.52E-01	8.74E-01	1.47E-06	Sierra Source Testing, 1993-94	3.99E-01	-4.75E-01
Cyanide compounds	57-12-5	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Benzo(e)pyrene	192-97-2	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
Dimethyl disulfide	624-92-0	7.67E+01	9.19E+01	8.43E+01			0.00E+00	-8.43E+01
Methyl mercaptan	74-93-1	3.52E+00	4.22E+00	3.87E+00			0.00E+00	-3.87E+00
Perylene	198-55-0	0.00E+00	0.00E+00	0.00E+00			0.00E+00	0.00E+00
PAHs, total, with individ. components also reported	1150	2.70E-04	3.23E-04	2.96E-04			0.00E+00	-2.96E-04

Sulfuric Acid Plant Air Heater (New)

Post-Mod Characteristics

Max Firing Rate:	20	mmbtuhr
Fuel:	Natural Gas	

Post-Mod Toxic Emissions

Chemical Name	CAS No.	FLUENATGAS Lbs/mmbtu	EF Basis	Emissions (lbs/year)
1,2,4-Trimethylbenzene	95-63-6			0.00E+00
2-Methylnaphthalene	91-57-6	1.49E-08	Sierra Source Testing, 1993-94	2.61E-03
Acenaphthene	83-32-9	5.73E-10	Sierra Source Testing, 1993-94	1.00E-04

Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units) Increase in Annual Emissions**

Acenaphthylene	208-96-8	6.39E-10	Sierra Source Testing, 1993-94	1.12E-04
Anthracene	120-12-7	8.73E-10	Sierra Source Testing, 1993-94	1.53E-04
Antimony	7440-36-0			0.00E+00
Barium	7440-39-3			0.00E+00
Benzo(g,h,i)perylene	191-24-2	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
Carbonyl sulfide	463-58-1			0.00E+00
Cobalt	7440-48-4	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Cyclohexane	110-82-7			0.00E+00
Dichlorobenzene	95-50-1	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Dioxin and dioxin-like compounds	1086			0.00E+00
Ethylene	74-85-1			0.00E+00
Fluoranthene	206-44-0	2.47E-09	Sierra Source Testing, 1993-94	4.33E-04
Fluorene	86-73-7	3.97E-09	Sierra Source Testing, 1993-94	6.96E-04
Molybdenum	7439-98-7	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Molybdenum Trioxide	1313-27-5			0.00E+00
Phenanthrene	85-01-8	9.93E-09	Sierra Source Testing, 1993-94	1.74E-03
Phosphorus	7723-14-0			0.00E+00
Pyrene	129-00-0	2.48E-09	Sierra Source Testing, 1993-94	4.34E-04
Silver	7440-22-4			0.00E+00
Thallium	7440-28-0			0.00E+00
Zinc	7440-66-6	1.19E-06	WSPA Pooled Source Testing, 1992	2.08E-01
Chromium	7440-47-3	2.24E-07	WSPA Pooled Source Testing, 1992	3.92E-02
Acetaldehyde	75-07-0	4.62E-05	Sierra Source Testing, 1993-94	8.09E+00
Arsenic	7440-38-2	1.42E-07	WSPA Pooled Source Testing, 1992	2.49E-02
Acrolein	107-02-8	4.40E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	7.71E-01
Ammonia	7664-41-7	5 ppmv	Current BACT	393.83
Benzene	71-43-2	4.19E-07	Sierra Source Testing, 1993-94	7.34E-02
Beryllium	7440-41-7	2.84E-08	WSPA Pooled Source Testing, 1992	4.98E-03
1,3-Butadiene	106-99-0			0.00E+00
Cadmium	7440-43-9	5.67E-08	WSPA Pooled Source Testing, 1992	9.93E-03
Carbon Disulfide	75-15-0			0.00E+00
Chromium (hexavalent)	18540-29-9	4.29E-08	WSPA Pooled Source Testing, 1992	7.52E-03

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Appendix A: Summary of Emissions

Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units) Increase in Annual Emissions**

Copper	7440-50-8	1.60E-07	WSPA Pooled Source Testing, 1992	2.80E-02
Carbon Tetrachloride	56-23-5			0.00E+00
Hydrogen cyanide	74-90-8			0.00E+00
Ethylbenzene	100-41-4	5.90E-07	Sierra Source Testing, 1993-94	1.03E-01
Formaldehyde	50-00-0	1.24E-05	Sierra Source Testing, 1993-94	2.17E+00
Hydrochloric acid	7647-01-0			0.00E+00
Hydrogen sulfide	7783-06-4	1.99E-04	WSPA Pooled Source Testing, 1992	3.49E+01
Hexane	110-54-3	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Lead	7439-92-1	5.67E-07	WSPA Pooled Source Testing, 1992	9.93E-02
Manganese	7439-96-5	1.01E-06	WSPA Pooled Source Testing, 1992	1.77E-01
Mercury	7439-97-6	1.58E-07	WSPA Pooled Source Testing, 1992	2.77E-02
Nickel	7440-02-0	2.70E-07	WSPA Pooled Source Testing, 1992	4.73E-02
Benzo(a)anthracene	56-55-3	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
Benzo(a)pyrene	50-32-8	4.14E-10	Sierra Source Testing, 1993-94	7.25E-05
Benzo(b)fluoranthene	205-99-2	6.17E-10	Sierra Source Testing, 1993-94	1.08E-04
Benzo(k)fluoranthene	207-08-9	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
Chrysene	218-01-9	8.08E-10	Sierra Source Testing, 1993-94	1.42E-04
Dibenz(a,h)anthracene	53-70-3	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
Tetrachloroethylene	127-18-4			0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
3-Methylchloranthrene	56-49-5	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Phenol	108-95-2	7.92E-06	WSPA Pooled Source Testing, 1992	1.39E+00
Naphthalene	91-20-3	5.79E-08	Sierra Source Testing, 1993-94	1.01E-02
Propylene	115-07-1	4.53E-04	API/WSPA, August 14, 1998 {preferred over AP-42}	7.94E+01
Selenium	7782-49-2	1.18E-07	WSPA Pooled Source Testing, 1992	2.07E-02
Sulfuric Acid	7664-93-9		Appendix A, Table A-26	~~0.00E+00~~ 3.87E+00
Toluene	108-88-3	3.75E-06	Sierra Source Testing, 1993-94	6.57E-01
Vanadium	7440-62-2			0.00E+00

Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units) Increase in Annual Emissions**

Xylenes (mixed)	1330-20-7	1.47E-06	Sierra Source Testing, 1993-94	2.58E-01

Sulfuric Acid Plant Decomposition Furnace (New) **Post-Mod Characteristics**

Max Firing Rate:	42	mmbtuhr
Fuel:	Natural Gas	

Post-Mod Toxic Emissions

		FLUENATGAS		
Chemical Name	**CAS No.**	**Lbs/mmbtu**	**EF Basis**	**Emissions (lbs/year)**
1,2,4-Trimethylbenzene	95-63-6			0.00E+00
2-Methylnaphthalene	91-57-6	1.49E-08	Sierra Source Testing, 1993-94	5.48E-03
Acenaphthene	83-32-9	5.73E-10	Sierra Source Testing, 1993-94	2.11E-04
Acenaphthylene	208-96-8	6.39E-10	Sierra Source Testing, 1993-94	2.35E-04
Anthracene	120-12-7	8.73E-10	Sierra Source Testing, 1993-94	3.21E-04
Antimony	7440-36-0			0.00E+00
Barium	7440-39-3			0.00E+00
Benzo(g,h,i)perylene	191-24-2	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
Carbonyl sulfide	463-58-1			0.00E+00
Cobalt	7440-48-4	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Cyclohexane	110-82-7			0.00E+00
Dichlorobenzene	95-50-1	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Dioxin and dioxin-like compounds	1086			0.00E+00
Ethylene	74-85-1			0.00E+00
Fluoranthene	206-44-0	2.47E-09	Sierra Source Testing, 1993-94	9.09E-04
Fluorene	86-73-7	3.97E-09	Sierra Source Testing, 1993-94	1.46E-03
Molybdenum	7439-98-7	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Molybdenum Trioxide	1313-27-5			0.00E+00
Phenanthrene	85-01-8	9.93E-09	Sierra Source Testing, 1993-94	3.65E-03
Phosphorus	7723-14-0			0.00E+00
Pyrene	129-00-0	2.48E-09	Sierra Source Testing, 1993-94	9.12E-04
Silver	7440-22-4			0.00E+00
Thallium	7440-28-0			0.00E+00
Zinc	7440-66-6	1.19E-06	WSPA Pooled Source Testing, 1992	4.38E-01
Chromium	7440-47-3	2.24E-07	WSPA Pooled Source Testing, 1992	8.24E-02
Acetaldehyde	75-07-0	4.62E-05	Sierra Source Testing, 1993-94	1.70E+01

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Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units) Increase in Annual Emissions**

Arsenic	7440-38-2	1.42E-07	WSPA Pooled Source Testing, 1992	5.22E-02
Acrolein	107-02-8	4.40E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	1.62E+00
Ammonia	7664-41-7	5 ppmv	Current BACT	827.05
Benzene	71-43-2	4.19E-07	Sierra Source Testing, 1993-94	1.54E-01
Beryllium	7440-41-7	2.84E-08	WSPA Pooled Source Testing, 1992	1.04E-02
1,3-Butadiene	106-99-0			0.00E+00
Cadmium	7440-43-9	5.67E-08	WSPA Pooled Source Testing, 1992	2.09E-02
Carbon Disulfide	75-15-0			0.00E+00
Chromium (hexavalent)	18540-29-9	4.29E-08	WSPA Pooled Source Testing, 1992	1.58E-02
Copper	7440-50-8	1.60E-07	WSPA Pooled Source Testing, 1992	5.89E-02
Carbon Tetrachloride	56-23-5			0.00E+00
Hydrogen cyanide	74-90-8			0.00E+00
Ethylbenzene	100-41-4	5.90E-07	Sierra Source Testing, 1993-94	2.17E-01
Formaldehyde	50-00-0	1.24E-05	Sierra Source Testing, 1993-94	4.56E+00
Hydrochloric acid	7647-01-0			0.00E+00
Hydrogen sulfide	7783-06-4	1.99E-04	WSPA Pooled Source Testing, 1992	7.32E+01
Hexane	110-54-3	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Lead	7439-92-1	5.67E-07	WSPA Pooled Source Testing, 1992	2.09E-01
Manganese	7439-96-5	1.01E-06	WSPA Pooled Source Testing, 1992	3.72E-01
Mercury	7439-97-6	1.58E-07	WSPA Pooled Source Testing, 1992	5.81E-02
Nickel	7440-02-0	2.70E-07	WSPA Pooled Source Testing, 1992	9.93E-02
Benzo(a)anthracene	56-55-3	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
Benzo(a)pyrene	50-32-8	4.14E-10	Sierra Source Testing, 1993-94	1.52E-04
Benzo(b)fluoranthene	205-99-2	6.17E-10	Sierra Source Testing, 1993-94	2.27E-04
Benzo(k)fluoranthene	207-08-9	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
Chrysene	218-01-9	8.08E-10	Sierra Source Testing, 1993-94	2.97E-04
Dibenz(a,h)anthracene	53-70-3	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
Tetrachloroethylene	127-18-4			0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00

Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units) Increase in Annual Emissions**

3-Methylchloranthrene	56-49-5	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Phenol	108-95-2	7.92E-06	WSPA Pooled Source Testing, 1992	2.91E+00
Naphthalene	91-20-3	5.79E-08	Sierra Source Testing, 1993-94	2.13E-02
Propylene	115-07-1	4.53E-04	API/WSPA, August 14, 1998 {preferred over AP-42}	1.67E+02
Selenium	7782-49-2	1.18E-07	WSPA Pooled Source Testing, 1992	4.34E-02
Sulfuric Acid	7664-93-9		Appendix A, Table A-26	9.18E+00
Toluene	108-88-3	3.75E-06	Sierra Source Testing, 1993-94	1.38E+00
Vanadium	7440-62-2			0.00E+00
Xylenes (mixed)	1330-20-7	1.47E-06	Sierra Source Testing, 1993-94	5.41E-01

Sulfuric Acid Plant Converter Heater (New)

Post-Mod Characteristics

Max Firing Rate:	5	mmbtuhr
Fuel:	Natural Gas	

Post-Mod Toxic Emissions

Chemical Name	CAS No.	FLUENATGAS Lbs/mmbtu	EF Basis	Emissions (lbs/year)
1,2,4-Trimethylbenzene	95-63-6			0.00E+00
2-Methylnaphthalene	91-57-6	1.49E-08	Sierra Source Testing, 1993-94	6.53E-04
Acenaphthene	83-32-9	5.73E-10	Sierra Source Testing, 1993-94	2.51E-05
Acenaphthylene	208-96-8	6.39E-10	Sierra Source Testing, 1993-94	2.80E-05
Anthracene	120-12-7	8.73E-10	Sierra Source Testing, 1993-94	3.82E-05
Antimony	7440-36-0			0.00E+00
Barium	7440-39-3			0.00E+00
Benzo(g,h,i)perylene	191-24-2	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
Carbonyl sulfide	463-58-1			0.00E+00
Cobalt	7440-48-4	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Cyclohexane	110-82-7			0.00E+00
Dichlorobenzene	95-50-1	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Dioxin and dioxin-like compounds	1086			0.00E+00
Ethylene	74-85-1			0.00E+00
Fluoranthene	206-44-0	2.47E-09	Sierra Source Testing, 1993-94	1.08E-04
Fluorene	86-73-7	3.97E-09	Sierra Source Testing, 1993-94	1.74E-04
Molybdenum	7439-98-7	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-9: Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units) Increase in Annual Emissions

Molybdenum Trioxide	1313-27-5			0.00E+00
Phenanthrene	85-01-8	9.93E-09	Sierra Source Testing, 1993-94	4.35E-04
Phosphorus	7723-14-0			0.00E+00
Pyrene	129-00-0	2.48E-09	Sierra Source Testing, 1993-94	1.09E-04
Silver	7440-22-4			0.00E+00
Thallium	7440-28-0			0.00E+00
Zinc	7440-66-6	1.19E-06	WSPA Pooled Source Testing, 1992	5.21E-02
Chromium	7440-47-3	2.24E-07	WSPA Pooled Source Testing, 1992	9.81E-03
Acetaldehyde	75-07-0	4.62E-05	Sierra Source Testing, 1993-94	2.02E+00
Arsenic	7440-38-2	1.42E-07	WSPA Pooled Source Testing, 1992	6.22E-03
Acrolein	107-02-8	4.40E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	1.93E-01
Ammonia	7664-41-7			0.00E+00
Benzene	71-43-2	4.19E-07	Sierra Source Testing, 1993-94	1.84E-02
Beryllium	7440-41-7	2.84E-08	WSPA Pooled Source Testing, 1992	1.24E-03
1,3-Butadiene	106-99-0			0.00E+00
Cadmium	7440-43-9	5.67E-08	WSPA Pooled Source Testing, 1992	2.48E-03
Carbon Disulfide	75-15-0			0.00E+00
Chromium (hexavalent)	18540-29-9	4.29E-08	WSPA Pooled Source Testing, 1992	1.88E-03
Copper	7440-50-8	1.60E-07	WSPA Pooled Source Testing, 1992	7.01E-03
Carbon Tetrachloride	56-23-5			0.00E+00
Hydrogen cyanide	74-90-8			0.00E+00
Ethylbenzene	100-41-4	5.90E-07	Sierra Source Testing, 1993-94	2.58E-02
Formaldehyde	50-00-0	1.24E-05	Sierra Source Testing, 1993-94	5.43E-01
Hydrochloric acid	7647-01-0			0.00E+00
Hydrogen sulfide	7783-06-4	1.99E-04	WSPA Pooled Source Testing, 1992	8.72E+00
Hexane	110-54-3	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Lead	7439-92-1	5.67E-07	WSPA Pooled Source Testing, 1992	2.48E-02
Manganese	7439-96-5	1.01E-06	WSPA Pooled Source Testing, 1992	4.42E-02
Mercury	7439-97-6	1.58E-07	WSPA Pooled Source Testing, 1992	6.92E-03
Nickel	7440-02-0	2.70E-07	WSPA Pooled Source Testing, 1992	1.18E-02
Benzo(a)anthracene	56-55-3	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
Benzo(a)pyrene	50-32-8	4.14E-10	Sierra Source Testing, 1993-94	1.81E-05

Table A-9: **Carson and Wilmington Heater Toxic Emissions Calculations (New and Modified Units) Increase in Annual Emissions**

Benzo(b)fluoranthene	205-99-2	6.17E-10	Sierra Source Testing, 1993-94	2.70E-05
Benzo(k)fluoranthene	207-08-9	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
Chrysene	218-01-9	8.08E-10	Sierra Source Testing, 1993-94	3.54E-05
Dibenz(a,h)anthracene	53-70-3	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
Tetrachloroethylene	127-18-4			0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.00E+00	Sierra Source Testing, 1993-94	0.00E+00
3-Methylchloranthrene	56-49-5	0.00E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00
Phenol	108-95-2	7.92E-06	WSPA Pooled Source Testing, 1992	3.47E-01
Naphthalene	91-20-3	5.79E-08	Sierra Source Testing, 1993-94	2.54E-03
Propylene	115-07-1	4.53E-04	API/WSPA, August 14, 1998 {preferred over AP-42}	1.98E+01
Selenium	7782-49-2	1.18E-07	WSPA Pooled Source Testing, 1992	5.17E-03
Sulfuric Acid	7664-93-9		Appendix A, Table A-26	9.66E-01
Toluene	108-88-3	3.75E-06	Sierra Source Testing, 1993-94	1.64E-01
Vanadium	7440-62-2			0.00E+00
Xylenes (mixed)	1330-20-7	1.47E-06	Sierra Source Testing, 1993-94	6.44E-02

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Appendix A: Summary of Emissions

Table A-10: Carson Heater Toxic Emissions Calculations (Increased Utilization)

Carson HC R1 Heater (D625)

Post-Mod Characteristics

Est. Incr. in Firing Rate:	15	mmbtu/hr
HHV	1321	mmbtu/mmscf
Fuel:	RFG	

Post-Mod Toxic Emissions — **Emissions Increase**

Chemical Name	CAS No.	FLUELONOXH_E Lbs/MMBtu	EF Basis	Emissions (lbs/hr)	Emissions (lbs/year)
1,2,4-Trimethylbenzene	95-63-6			0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	1.100000E-07	Sierra Source Testing, 1993-94	1.65E-06	1.45E-02
Acenaphthene	83-32-9	5.160000E-09	Sierra Source Testing, 1993-94	7.74E-08	6.78E-04
Acenaphthylene	208-96-8	8.240000E-09	Sierra Source Testing, 1993-94	1.24E-07	1.08E-03
Anthracene	120-12-7	1.320000E-08	Sierra Source Testing, 1993-94	1.98E-07	1.73E-03
Antimony	7440-36-0	5.170000E-07	API/WSPA, August 14, 1998	7.76E-06	6.79E-02
Barium	7440-39-3	5.780000E-06	API/WSPA, August 14, 1998	8.67E-05	7.59E-01
Benzo(g,h,i)perylene	191-24-2	0.000000E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Carbonyl sulfide	463-58-1			0.00E+00	0.00E+00
Cobalt	7440-48-4	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Cyclohexane	110-82-7			0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086			0.00E+00	0.00E+00
Ethylene	74-85-1			0.00E+00	0.00E+00
Fluoranthene	206-44-0	7.140000E-09	Sierra Source Testing, 1993-94	1.07E-07	9.38E-04
Fluorene	86-73-7	2.420000E-08	Sierra Source Testing, 1993-94	3.63E-07	3.18E-03
Molybdenum	7439-98-7	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5			0.00E+00	0.00E+00
Phenanthrene	85-01-8	8.790000E-08	Sierra Source Testing, 1993-94	1.32E-06	1.16E-02
Phosphorus	7723-14-0	6.420000E-07	API/WSPA, August 14, 1998	9.63E-06	8.44E-02
Pyrene	129-00-0	7.690000E-09	Sierra Source Testing, 1993-94	1.15E-07	1.01E-03
Silver	7440-22-4	1.610000E-06	API/WSPA, August 14, 1998	2.42E-05	2.12E-01
Thallium	7440-28-0	5.780000E-06	API/WSPA, August 14, 1998	8.67E-05	7.59E-01
Zinc	7440-66-6	1.190000E-06	WSPA Pooled Source Testing, 1992	1.79E-05	1.56E-01
Chromium	7440-47-3	2.240000E-07	WSPA Pooled Source Testing, 1992	3.36E-06	2.94E-02
Acetaldehyde	75-07-0	2.610000E-05	Sierra Source Testing, 1993-94	3.92E-04	3.43E+00
Arsenic	7440-38-2	1.420000E-07	WSPA Pooled Source Testing, 1992	2.13E-06	1.87E-02
Acrolein	107-02-8			0.00E+00	0.00E+00
Ammonia	7664-41-7			0.00E+00	0.00E+00
Benzene	71-43-2	5.940000E-07	Sierra Source Testing, 1993-94	8.91E-06	7.81E-02
Beryllium	7440-41-7	2.840000E-08	WSPA Pooled Source Testing, 1992	4.26E-07	3.73E-03
1,3-Butadiene	106-99-0			0.00E+00	0.00E+00
Cadmium	7440-43-9	5.670000E-08	WSPA Pooled Source Testing, 1992	8.51E-07	7.45E-03
Carbon Disulfide	75-15-0			0.00E+00	0.00E+00
Chromium (hexavalent)	18540-29-9	4.290000E-08	WSPA Pooled Source Testing, 1992	6.44E-07	5.64E-03
Copper	7440-50-8	1.600000E-07	WSPA Pooled Source Testing, 1992	2.40E-06	2.10E-02
Carbon Tetrachloride	56-23-5		WSPA Pooled Source Testing, 1992	0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8			0.00E+00	0.00E+00
Ethylbenzene	100-41-4	8.350000E-07	Sierra Source Testing, 1993-94	1.25E-05	1.10E-01
Formaldehyde	50-00-0	3.150000E-05	Sierra Source Testing, 1993-94	4.73E-04	4.14E+00
Hydrochloric acid	7647-01-0			0.00E+00	0.00E+00
Hydrogen sulfide	7783-06-4	1.990000E-04	WSPA Pooled Source Testing, 1992	2.99E-03	2.61E+01
Hexane	110-54-3	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Lead	7439-92-1	5.670000E-07	WSPA Pooled Source Testing, 1992	8.51E-06	7.45E-02
Manganese	7439-96-5	1.010000E-06	WSPA Pooled Source Testing, 1992	1.52E-05	1.33E-01
Mercury	7439-97-6	1.580000E-07	WSPA Pooled Source Testing, 1992	2.37E-06	2.08E-02
Nickel	7440-02-0	2.700000E-07	WSPA Pooled Source Testing, 1992	4.05E-06	3.55E-02
Benzo(a)anthracene	56-55-3	0.000000E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Benzo(a)pyrene	50-32-8	5.490000E-10	Sierra Source Testing, 1993-94	8.24E-09	7.21E-05
Benzo(b)fluoranthene	205-99-2	5.490000E-10	Sierra Source Testing, 1993-94	8.24E-09	7.21E-05
Benzo(k)fluoranthene	207-08-9	0.000000E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Chrysene	218-01-9	5.490000E-10	Sierra Source Testing, 1993-94	8.24E-09	7.21E-05
Dibenz(a,h)anthracene	53-70-3	0.000000E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Tetrachloroethylene	127-18-4			0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.000000E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
3-Methylchloranthrene	56-49-5	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Phenol	108-95-2	7.920000E-06	WSPA Pooled Source Testing, 1992	1.19E-04	1.04E+00
Naphthalene	91-20-3	4.510000E-07	Sierra Source Testing, 1993-94	6.77E-06	5.93E-02
Propylene	115-07-1	2.170000E-06	API/WSPA, August 14, 1998	3.26E-05	2.85E-01

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Appendix A: Summary of Emissions

Table A-10: Carson Heater Toxic Emissions Calculations (Increased Utilization)

Selenium	7782-49-2	1.180000E-07	WSPA Pooled Source Testing, 1992	1.77E-06	1.55E-02
Sulfuric Acid	7664-93-9	~~1.051186E-03~~	~~2013 TRI Report~~ Appendix A, Table A-26	~~1.58E-02~~ 5.58E-03	~~1.38E+02~~ 4.89E+01
Toluene	108-88-3	5.310000E-06	Sierra Source Testing, 1993-94	7.97E-05	6.98E-01
Vanadium	7440-62-2			0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	2.080000E-06	Sierra Source Testing, 1993-94	3.12E-05	2.73E-01

Carson HC R2 Heater (D627)

Post-Mod Characteristics

Est. Incr. in Firing Rate:	20	mmbtu/hr
HHV	1320	mmbtu/mmscf
Fuel:	RFG	

Post-Mod Toxic Emissions — **Emissions Increase**

Chemical Name	CAS No.	FLUELONOXH_E Lbs/MMBtu	EF Basis	Emissions (lbs/hr)	Emissions (lbs/year)
1,2,4-Trimethylbenzene	95-63-6			0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	1.100000E-07	Sierra Source Testing, 1993-94	2.20E-06	1.93E-02
Acenaphthene	83-32-9	5.160000E-09	Sierra Source Testing, 1993-94	1.03E-07	9.04E-04
Acenaphthylene	208-96-8	8.240000E-09	Sierra Source Testing, 1993-94	1.65E-07	1.44E-03
Anthracene	120-12-7	1.320000E-08	Sierra Source Testing, 1993-94	2.64E-07	2.31E-03
Antimony	7440-36-0	5.170000E-07	API/WSPA, August 14, 1998	1.03E-05	9.06E-02
Barium	7440-39-3	5.780000E-06	API/WSPA, August 14, 1998	1.16E-04	1.01E+00
Benzo(g,h,i)perylene	191-24-2	0.000000E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Carbonyl sulfide	463-58-1			0.00E+00	0.00E+00
Cobalt	7440-48-4	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Cyclohexane	110-82-7			0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086			0.00E+00	0.00E+00
Ethylene	74-85-1			0.00E+00	0.00E+00
Fluoranthene	206-44-0	7.140000E-09	Sierra Source Testing, 1993-94	1.43E-07	1.25E-03
Fluorene	86-73-7	2.420000E-08	Sierra Source Testing, 1993-94	4.84E-07	4.24E-03
Molybdenum	7439-98-7	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5			0.00E+00	0.00E+00
Phenanthrene	85-01-8	8.790000E-08	Sierra Source Testing, 1993-94	1.76E-06	1.54E-02
Phosphorus	7723-14-0	6.420000E-07	API/WSPA, August 14, 1998	1.28E-05	1.12E-01
Pyrene	129-00-0	7.690000E-09	Sierra Source Testing, 1993-94	1.54E-07	1.35E-03
Silver	7440-22-4	1.610000E-06	API/WSPA, August 14, 1998	3.22E-05	2.82E-01
Thallium	7440-28-0	5.780000E-06	API/WSPA, August 14, 1998	1.16E-04	1.01E+00
Zinc	7440-66-6	1.190000E-06	WSPA Pooled Source Testing, 1992	2.38E-05	2.08E-01
Chromium	7440-47-3	2.240000E-07	WSPA Pooled Source Testing, 1992	4.48E-06	3.92E-02
Acetaldehyde	75-07-0	2.610000E-05	Sierra Source Testing, 1993-94	5.22E-04	4.57E+00
Arsenic	7440-38-2	1.420000E-07	WSPA Pooled Source Testing, 1992	2.84E-06	2.49E-02
Acrolein	107-02-8			0.00E+00	0.00E+00
Ammonia	7664-41-7			0.00E+00	0.00E+00
Benzene	71-43-2	5.940000E-07	Sierra Source Testing, 1993-94	1.19E-05	1.04E-01
Beryllium	7440-41-7	2.840000E-08	WSPA Pooled Source Testing, 1992	5.68E-07	4.98E-03
1,3-Butadiene	106-99-0			0.00E+00	0.00E+00
Cadmium	7440-43-9	5.670000E-08	WSPA Pooled Source Testing, 1992	1.13E-06	9.93E-03
Carbon Disulfide	75-15-0			0.00E+00	0.00E+00
Chromium (hexavalent)	18540-29-9	4.290000E-08	WSPA Pooled Source Testing, 1992	8.58E-07	7.52E-03
Copper	7440-50-8	1.600000E-07	WSPA Pooled Source Testing, 1992	3.20E-06	2.80E-02
Carbon Tetrachloride	56-23-5		WSPA Pooled Source Testing, 1992	0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8			0.00E+00	0.00E+00
Ethylbenzene	100-41-4	8.350000E-07	Sierra Source Testing, 1993-94	1.67E-05	1.46E-01
Formaldehyde	50-00-0	3.150000E-05	Sierra Source Testing, 1993-94	6.30E-04	5.52E+00
Hydrochloric acid	7647-01-0			0.00E+00	0.00E+00
Hydrogen sulfide	7783-06-4	1.990000E-04	WSPA Pooled Source Testing, 1992	3.98E-03	3.49E+01
Hexane	110-54-3	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Lead	7439-92-1	5.670000E-07	WSPA Pooled Source Testing, 1992	1.13E-05	9.93E-02
Manganese	7439-96-5	1.010000E-06	WSPA Pooled Source Testing, 1992	2.02E-05	1.77E-01
Mercury	7439-97-6	1.580000E-07	WSPA Pooled Source Testing, 1992	3.16E-06	2.77E-02
Nickel	7440-02-0	2.700000E-07	WSPA Pooled Source Testing, 1992	5.40E-06	4.73E-02
Benzo(a)anthracene	56-55-3	0.000000E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Benzo(a)pyrene	50-32-8	5.490000E-10	Sierra Source Testing, 1993-94	1.10E-08	9.62E-05
Benzo(b)fluoranthene	205-99-2	5.490000E-10	Sierra Source Testing, 1993-94	1.10E-08	9.62E-05
Benzo(k)fluoranthene	207-08-9	0.000000E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Chrysene	218-01-9	5.490000E-10	Sierra Source Testing, 1993-94	1.10E-08	9.62E-05
Dibenz(a,h)anthracene	53-70-3	0.000000E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
Tetrachloroethylene	127-18-4			0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-10: Carson Heater Toxic Emissions Calculations (Increased Utilization)

Indeno(1,2,3-cd)pyrene	193-39-5	0.000000E+00	Sierra Source Testing, 1993-94	0.00E+00	0.00E+00
3-Methylchloranthrene	56-49-5	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Phenol	108-95-2	7.920000E-06	WSPA Pooled Source Testing, 1992	1.58E-04	1.39E+00
Naphthalene	91-20-3	4.510000E-07	Sierra Source Testing, 1993-94	9.02E-06	7.90E-02
Propylene	115-07-1	2.170000E-06	API/WSPA, August 14, 1998	4.34E-05	3.80E-01
Selenium	7782-49-2	1.180000E-07	WSPA Pooled Source Testing, 1992	2.36E-06	2.07E-02
Sulfuric Acid	7664-93-9	~~8.647768E-04~~	~~2013 TRI Report~~ Appendix A, Table A-26	~~1.73E-02~~ 1.35E-02	~~1.52E+02~~ 1.18E+02
Toluene	108-88-3	5.310000E-06	Sierra Source Testing, 1993-94	1.06E-04	9.30E-01
Vanadium	7440-62-2			0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	2.080000E-06	Sierra Source Testing, 1993-94	4.16E-05	3.64E-01

Carson LHU Heater (D425)

Post-Mod Characteristics

Est. Incr. in Firing Rate:	5	mmbtu/hr
HHV	1350	mmbtu/mmscf
Fuel:	RFG	

Post-Mod Toxic Emissions — **Emissions Increase**

Chemical Name	CAS No.	NewFLUELONOXH_E Lbs/MMBtu	EF Basis	Emissions (lbs/hr)	Emissions (lbs/year)
1,2,4-Trimethylbenzene	95-63-6	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	7.510000E-09	Delta AQS, HC Frac Reboiler Source Testing, May 2008	3.76E-08	3.29E-04
Acenaphthene	83-32-9	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Acenaphthylene	208-96-8	8.470000E-10	Delta AQS, HC Frac Reboiler Source Testing, May 2008	4.24E-09	3.71E-05
Anthracene	120-12-7	4.070000E-10	Delta AQS, HC Frac Reboiler Source Testing, May 2008	2.04E-09	1.78E-05
Antimony	7440-36-0	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Barium	7440-39-3	2.080000E-07	Delta AQS, HC Frac Reboiler Source Testing, May 2008	1.04E-06	9.11E-03
Benzo(g,h,i)perylene	191-24-2	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Carbonyl sulfide	463-58-1			0.00E+00	0.00E+00
Cobalt	7440-48-4	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Cyclohexane	110-82-7	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086			0.00E+00	0.00E+00
Ethylene	74-85-1			0.00E+00	0.00E+00
Fluoranthene	206-44-0	2.710000E-09	Delta AQS, HC Frac Reboiler Source Testing, May 2008	1.36E-08	1.19E-04
Fluorene	86-73-7	1.090000E-09	Delta AQS, HC Frac Reboiler Source Testing, May 2008	5.45E-09	4.77E-05
Molybdenum	7439-98-7	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5			0.00E+00	0.00E+00
Phenanthrene	85-01-8	1.590000E-08	Delta AQS, HC Frac Reboiler Source Testing, May 2008	7.95E-08	6.96E-04
Phosphorus	7723-14-0	6.420000E-07	API/WSPA, August 14, 1998	3.21E-06	2.81E-02
Pyrene	129-00-0	1.420000E-10	Delta AQS, HC Frac Reboiler Source Testing, May 2008	7.10E-10	6.22E-06
Silver	7440-22-4	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Thallium	7440-28-0	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Zinc	7440-66-6	4.070000E-06	Delta AQS, HC Frac Reboiler Source Testing, May 2008	2.04E-05	1.78E-01
Chromium	7440-47-3	2.050000E-08	Delta AQS, HC Frac Reboiler Source Testing, May 2008	1.03E-07	8.98E-04
Acetaldehyde	75-07-0	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Arsenic	7440-38-2	1.000000E-08	Delta AQS, HC Frac Reboiler Source Testing, May 2008	5.00E-08	4.38E-04
Acrolein	107-02-8	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Ammonia	7664-41-7			0.00E+00	0.00E+00
Benzene	71-43-2	5.940000E-07	Sierra Source Testing, 1993-94	2.97E-06	2.60E-02
Beryllium	7440-41-7	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
1,3-Butadiene	106-99-0	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Cadmium	7440-43-9	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Carbon Disulfide	75-15-0			0.00E+00	0.00E+00
Chromium (hexavalent)	18540-29-9	1.540000E-09	Delta AQS, HC Frac Reboiler Source Testing, May 2008	7.70E-09	6.75E-05
Copper	7440-50-8	2.600000E-07	Delta AQS, HC Frac Reboiler Source Testing, May 2008	1.30E-06	1.14E-02
Carbon Tetrachloride	56-23-5			0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8			0.00E+00	0.00E+00
Ethylbenzene	100-41-4	8.350000E-07	Sierra Source Testing, 1993-94	4.18E-06	3.66E-02
Formaldehyde	50-00-0	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Hydrochloric acid	7647-01-0	3.200000E-05	Delta AQS, HC Frac Reboiler Source Testing, May 2008	1.60E-04	1.40E+00
Hydrogen sulfide	7783-06-4	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Hexane	110-54-3	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Lead	7439-92-1	1.670000E-07	Delta AQS, HC Frac Reboiler Source Testing, May 2008	8.35E-07	7.31E-03
Manganese	7439-96-5	2.440000E-07	Delta AQS, HC Frac Reboiler Source Testing, May 2008	1.22E-06	1.07E-02
Mercury	7439-97-6	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Nickel	7440-02-0	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Benzo(a)anthracene	56-55-3	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Benzo(a)pyrene	50-32-8	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Benzo(b)fluoranthene	205-99-2	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Benzo(k)fluoranthene	207-08-9	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Chrysene	218-01-9	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	53-70-3	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-10: Carson Heater Toxic Emissions Calculations (Increased Utilization)

Tetrachloroethylene	127-18-4			0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
3-Methylchloranthrene	56-49-5	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Phenol	108-95-2	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Naphthalene	91-20-3	5.210000E-08	Delta AQS, HC Frac Reboiler Source Testing, May 2008	2.61E-07	2.28E-03
Propylene	115-07-1	2.170000E-06	API/WSPA, August 14, 1998	1.09E-05	9.50E-02
Selenium	7782-49-2	1.420000E-07	Delta AQS, HC Frac Reboiler Source Testing, May 2008	7.10E-07	6.22E-03
Sulfuric Acid	7664-93-9	~~2.757377E-04~~	~~2013 TRI Report~~ Appendix A, Table A-26	~~1.38E-03~~ 1.95E-03	~~1.21E+01~~ 1.71E+01
Toluene	108-88-3	5.310000E-06	Sierra Source Testing, 1993-94	2.66E-05	2.33E-01
Vanadium	7440-62-2	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	2.080000E-06	Sierra Source Testing, 1993-94	1.04E-05	9.11E-02

Carson FCCU Regenerator (P3, S1)

Post-Mod Characteristics

Est. Incr. in Throughput:	12.7	MBBL/Day (Annual Average)

Post-Mod Toxic Emissions | **Emissions Increase**

Chemical Name	CAS No.	FLUEFCCESP Lbs/MBBL	EF Basis	Emissions (lbs/hr)	Emissions (lbs/year)
1,2,4-Trimethylbenzene	95-63-6	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Acenaphthene	83-32-9	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Acenaphthylene	208-96-8	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Anthracene	120-12-7	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Antimony	7440-36-0	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Barium	7440-39-3	6.150000E-05	Delta AQS, FCCU Source Testing, August 2009	3.25E-05	2.84E-01
Benzo(g,h,i)perylene	191-24-2	1.460000E-07	Delta AQS, FCCU Source Testing, August 2009	7.70E-08	6.75E-04
Carbonyl sulfide	463-58-1		Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Cobalt	7440-48-4	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Cyclohexane	110-82-7	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086	6.939963E-08	Delta AQS, FCCU Source Testing, August 2009	3.66E-08	3.21E-04
Ethylene	74-85-1	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Fluoranthene	206-44-0	5.910000E-07	Delta AQS, FCCU Source Testing, August 2009	3.12E-07	2.73E-03
Fluorene	86-73-7	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Molybdenum	7439-98-7	1.220000E-04	Delta AQS, FCCU Source Testing, August 2009	6.44E-05	5.64E-01
Molybdenum Trioxide	1313-27-5	1.830000E-04	Delta AQS, FCCU Source Testing, August 2009	9.66E-05	8.46E-01
Phenanthrene	85-01-8	3.230000E-06	Delta AQS, FCCU Source Testing, August 2009	1.70E-06	1.49E-02
Phosphorus	7723-14-0		Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Pyrene	129-00-0	2.100000E-07	Delta AQS, FCCU Source Testing, August 2009	1.11E-07	9.71E-04
Silver	7440-22-4	3.940000E-06	Delta AQS, FCCU Source Testing, August 2009	2.08E-06	1.82E-02
Thallium	7440-28-0	2.130000E-05	Delta AQS, FCCU Source Testing, August 2009	1.12E-05	9.85E-02
Zinc	7440-66-6	1.250000E-04	Delta AQS, FCCU Source Testing, August 2009	6.60E-05	5.78E-01
Chromium	7440-47-3	6.990000E-05	Delta AQS, FCCU Source Testing, August 2009	3.69E-05	3.23E-01
Acetaldehyde	75-07-0	4.930000E-05	Delta AQS, FCCU Source Testing, August 2009	2.60E-05	2.28E-01
Arsenic	7440-38-2	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Acrolein	107-02-8	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Ammonia	7664-41-7		Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Benzene	71-43-2	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Beryllium	7440-41-7	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
1,3-Butadiene	106-99-0	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Cadmium	7440-43-9	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Carbon Disulfide	75-15-0	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Chromium (hexavalent)	18540-29-9	2.350000E-06	Delta AQS, FCCU Source Testing, August 2009	1.24E-06	1.09E-02
Copper	7440-50-8	1.730000E-05	Delta AQS, FCCU Source Testing, August 2009	9.13E-06	8.00E-02
Carbon Tetrachloride	56-23-5	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8	~~0.000000E+00~~ 2.580774E+00	~~Delta AQS, FCCU Source Testing, August 2009~~ Tesoro Martinez Source Test, September 2014	~~0.00E+00~~ 1.36E+00	~~0.00E+00~~ 1.19E+04
Ethylbenzene	100-41-4	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Formaldehyde	50-00-0	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Hydrochloric acid	7647-01-0	6.610000E-01	Delta AQS, FCCU Source Testing, August 2009	3.49E-01	3.06E+03
Hydrogen sulfide	7783-06-4	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Hexane	110-54-3	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Lead	7439-92-1	1.080000E-05	Delta AQS, FCCU Source Testing, August 2009	5.70E-06	4.99E-02
Manganese	7439-96-5	1.450000E-04	Delta AQS, FCCU Source Testing, August 2009	7.65E-05	6.70E-01
Mercury	7439-97-6	1.280000E-05	Delta AQS, FCCU Source Testing, August 2009	6.75E-06	5.92E-02
Nickel	7440-02-0	1.500000E-05	Delta AQS, FCCU Source Testing, August 2009	7.92E-06	6.93E-02
Benzo(a)anthracene	56-55-3	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Benzo(a)pyrene	50-32-8	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00

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Table A-10: Carson Heater Toxic Emissions Calculations (Increased Utilization)

Benzo(b)fluoranthene	205-99-2	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Benzo(k)fluoranthene	207-08-9	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Chrysene	218-01-9	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	53-70-3	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Tetrachloroethylene	127-18-4	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6		Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
3-Methylchloranthrene	56-49-5		Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Phenol	108-95-2	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Naphthalene	91-20-3	7.440000E-06	Delta AQS, FCCU Source Testing, August 2009	3.93E-06	3.44E-02
Propylene	115-07-1	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Selenium	7782-49-2	6.590000E-05	Delta AQS, FCCU Source Testing, August 2009	3.48E-05	3.05E-01
Sulfuric Acid	7664-93-9	1.629674E-01	2013 TRI	8.60E-02	7.53E+02
Toluene	108-88-3	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Vanadium	7440-62-2	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	0.000000E+00	Delta AQS, FCCU Source Testing, August 2009	0.00E+00	0.00E+00

Carson FCCU Pre-Heater (D250)

Post-Mod Characteristics

Est. Incr. in Firing Rate:	11	mmbtuhr
Fuel:	RFG	

Post-Mod Toxic Emissions — **Emissions Increase**

Chemical Name	CAS No.	NewFLUE1STAGH_E Lbs/mmbtu	EF Basis	Emissions (lbs/hr)	Emissions (lbs/year)
1,2,4-Trimethylbenzene	95-63-6	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	7.510000E-09	Delta AQS, HC Frac Reboiler Source Testing, May 2008	7.96E-08	6.97E-04
Acenaphthene	83-32-9	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Acenaphthylene	208-96-8	8.470000E-10	Delta AQS, HC Frac Reboiler Source Testing, May 2008	8.98E-09	7.86E-05
Anthracene	120-12-7	4.070000E-10	Delta AQS, HC Frac Reboiler Source Testing, May 2008	4.31E-09	3.78E-05
Antimony	7440-36-0	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Barium	7440-39-3	2.080000E-07	Delta AQS, HC Frac Reboiler Source Testing, May 2008	2.20E-06	1.93E-02
Benzo(g,h,i)perylene	191-24-2	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Carbonyl sulfide	463-58-1		Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Cobalt	7440-48-4	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Cyclohexane	110-82-7	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086		Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Ethylene	74-85-1		Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Fluoranthene	206-44-0	2.710000E-09	Delta AQS, HC Frac Reboiler Source Testing, May 2008	2.87E-08	2.52E-04
Fluorene	86-73-7	1.090000E-09	Delta AQS, HC Frac Reboiler Source Testing, May 2008	1.16E-08	1.01E-04
Molybdenum	7439-98-7	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Molybdenum Trioxide	1313-27-5		Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Phenanthrene	85-01-8	1.590000E-08	Delta AQS, HC Frac Reboiler Source Testing, May 2008	1.69E-07	1.48E-03
Phosphorus	7723-14-0	6.420000E-07	API/WSPA, August 14, 1998 {preferred over AP-42}	6.80E-06	5.96E-02
Pyrene	129-00-0	1.420000E-10	Delta AQS, HC Frac Reboiler Source Testing, May 2008	1.51E-09	1.32E-05
Silver	7440-22-4	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Thallium	7440-28-0	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Zinc	7440-66-6	4.070000E-06	Delta AQS, HC Frac Reboiler Source Testing, May 2008	4.31E-05	3.78E-01
Chromium	7440-47-3	2.050000E-08	Delta AQS, HC Frac Reboiler Source Testing, May 2008	2.17E-07	1.90E-03
Acetaldehyde	75-07-0	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Arsenic	7440-38-2	1.000000E-08	Delta AQS, HC Frac Reboiler Source Testing, May 2008	1.06E-07	9.28E-04
Acrolein	107-02-8	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Ammonia	7664-41-7		Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Benzene	71-43-2	5.940000E-07	Sierra Source Testing, 1993-94	6.30E-06	5.52E-02
Beryllium	7440-41-7	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
1,3-Butadiene	106-99-0	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Cadmium	7440-43-9	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Carbon Disulfide	75-15-0		Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Chromium (hexavalent)	18540-29-9	1.540000E-09	Delta AQS, HC Frac Reboiler Source Testing, May 2008	1.63E-08	1.43E-04
Copper	7440-50-8	2.600000E-07	Delta AQS, HC Frac Reboiler Source Testing, May 2008	2.76E-06	2.41E-02
Carbon Tetrachloride	56-23-5		Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8		Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Ethylbenzene	100-41-4	8.350000E-07	Sierra Source Testing, 1993-94	8.85E-06	7.75E-02
Formaldehyde	50-00-0	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Hydrochloric acid	7647-01-0	3.200000E-05	Delta AQS, HC Frac Reboiler Source Testing, May 2008	3.39E-04	2.97E+00
Hydrogen sulfide	7783-06-4	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Hexane	110-54-3	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Lead	7439-92-1	1.670000E-07	Delta AQS, HC Frac Reboiler Source Testing, May 2008	1.77E-06	1.55E-02
Manganese	7439-96-5	2.440000E-07	Delta AQS, HC Frac Reboiler Source Testing, May 2008	2.59E-06	2.27E-02
Mercury	7439-97-6	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Nickel	7440-02-0	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-10: Carson Heater Toxic Emissions Calculations (Increased Utilization)

Benzo(a)anthracene	56-55-3	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Benzo(a)pyrene	50-32-8	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Benzo(b)fluoranthene	205-99-2	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Benzo(k)fluoranthene	207-08-9	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Chrysene	218-01-9	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	53-70-3	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Tetrachloroethylene	127-18-4		Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
3-Methylchloranthrene	56-49-5	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Phenol	108-95-2	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Naphthalene	91-20-3	5.210000E-08	Delta AQS, HC Frac Reboiler Source Testing, May 2008	5.52E-07	4.84E-03
Propylene	115-07-1	2.170000E-06	API/WSPA, August 14, 1998 {preferred over AP-42}	2.30E-05	2.01E-01
Selenium	7782-49-2	1.420000E-07	Delta AQS, HC Frac Reboiler Source Testing, May 2008	1.51E-06	1.32E-02
Sulfuric Acid	7664-93-9	~~4.844964E-04~~	~~2013 TRI Report~~ Appendix A, Table A-26	~~5.14E-03~~ 2.44E-02	~~4.50E+01~~ 2.14E+02
Toluene	108-88-3	5.310000E-06	Sierra Source Testing, 1993-94	5.63E-05	4.93E-01
Vanadium	7440-62-2	0.000000E+00	Delta AQS, HC Frac Reboiler Source Testing, May 2008	0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	2.080000E-06	Sierra Source Testing, 1993-94	2.20E-05	1.93E-01

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Appendix A: Summary of Emissions

Table A-11: Wilmington Combustion Unit Toxic Emissions Calculations (Increased Utilization)

Wilmington H-101 Heater (D32)

Projected Emisions Characteristics

Est. Incr. in Firing Rate:	7	mmbtu/hr
HHV	1230	mmbtu/mmscf
Fuel:	RFG	

		Projected Emissions		Emissions Increase	
Chemical Name	**CAS No.**	**Lbs/mmscf**	**EF Basis**	**Emissions (lbs/hr)**	**Emissions (lbs/year)**
2-Methylnaphthalene	91-57-6	1.76E-05	2013 AER/TRI	0.00	0.00
Acenaphthene	83-32-9	1.60E-06	2013 AER/TRI	0.00	0.00
Acenaphthylene	208-96-8	1.73E-06	2013 AER/TRI	0.00	0.00
Acetaldehyde	75-07-0	1.95E-02	2013 AER/TRI	0.00	0.97
Acrolein	107-02-8	0.00E+00	2013 AER/TRI	-	-
Ammonia	7664-41-7	3.20E+00	2013 AER/TRI	0.02	159.53
Anthracene	120-12-7	3.97E-06	2013 AER/TRI	0.00	0.00
Antimony	7440-36-0	5.81E-04	2013 AER/TRI	0.00	0.03
Arsenic	7440-38-2	9.54E-04	2013 AER/TRI	0.00	0.05
Barium	7440-39-3	6.49E-03	2013 AER/TRI	0.00	0.32
Benzene	71-43-2	8.42E-02	2013 AER/TRI	0.00	4.20
Benzo(a)anthracene	56-55-3	1.82E-06	2013 AER/TRI	0.00	0.00
Benzo(a)pyrene	50-32-8	9.89E-05	2013 AER/TRI	0.00	0.00
Benzo(b)fluoranthene	205-99-2	7.54E-06	2013 AER/TRI	0.00	0.00
Benzo(e)pyrene	192-97-2	1.87E-06	2013 AER/TRI	0.00	0.00
Benzo(g,h,i)perylene	191-24-2	1.17E-06	2013 AER/TRI	0.00	0.00
Benzo(k)fluoranthene	207-08-9	1.51E-06	2013 AER/TRI	0.00	0.00
Beryllium	7440-41-7	2.88E-04	2013 AER/TRI	0.00	0.01
Cadmium	7440-43-9	1.11E-03	2013 AER/TRI	0.00	0.06
Carbon Disulfide	75-15-0	0.00E+00	2013 AER/TRI	-	-
Carbonyl Sulfide	463-58-1	0.00E+00	2013 AER/TRI	-	-
Chromium	7440-47-3	3.37E-04	2013 AER/TRI	0.00	0.02
Chromium (Hexavalent)	18540-29-9	1.16E-04	2013 AER/TRI	0.00	0.01
Chrysene	218-01-9	5.90E-06	2013 AER/TRI	0.00	0.00
Copper	7440-50-8	4.73E-03	2013 AER/TRI	0.00	0.24
Cyanide compounds	57-12-5	0.00E+00	2013 AER/TRI	-	-
Dibenz(a,h)anthracene	53-70-3	1.06E-05	2013 AER/TRI	0.00	0.00
Dimethyl disulfide	624-92-0	0.00E+00	2013 AER/TRI	-	-
Ethylbenzene	100-41-4	3.04E-02	2013 AER/TRI	0.00	1.52
Fluoranthene	206-44-0	1.70E-05	2013 AER/TRI	0.00	0.00
Fluorene	86-73-7	2.82E-06	2013 AER/TRI	0.00	0.00
Formaldehyde	50-00-0	1.51E-01	2013 AER/TRI	0.00	7.53
Hydrochloric acid	7647-01-0	0.00E+00	2013 AER/TRI	-	-
Hydrogen sulfide	7783-06-4	4.05E-01	2013 AER/TRI	0.00	20.19
Indeno(1,2,3-cd)pyrene	193-39-5	1.15E-04	2013 AER/TRI	0.00	0.01
Lead	7439-92-1	5.49E-03	2013 AER/TRI	0.00	0.27
Manganese	7439-96-5	1.65E-02	2013 AER/TRI	0.00	0.82
Mercury	7439-97-6	1.71E-05	2013 AER/TRI	0.00	0.00
Methyl mercaptan	74-93-1	0.00E+00	2013 AER/TRI	-	-
Naphthalene	91-20-3	3.02E-04	2013 AER/TRI	0.00	0.02
Nickel	7440-02-0	1.06E-02	2013 AER/TRI	0.00	0.53
Perylene	198-55-0	0.00E+00	2013 AER/TRI	-	-
Phenanthrene	85-01-8	2.72E-05	2013 AER/TRI	0.00	0.00
Phenol	108-95-2	6.96E-03	2013 AER/TRI	0.00	0.35
Phosphorus	7723-14-0	7.21E-04	2013 AER/TRI	0.00	0.04
PAHs, total, with individ. components also reported	1150	1.70E-05	2013 AER/TRI	0.00	0.00
Propylene	115-07-1	2.05E-03	2013 AER/TRI	0.00	0.10
Pyrene	129-00-0	5.62E-06	2013 AER/TRI	0.00	0.00
Selenium	7782-49-2	1.34E-02	2013 AER/TRI	0.00	0.67
Silver	7440-22-4	1.81E-03	2013 AER/TRI	0.00	0.09
Sulfuric Acid	7664-93-9	~~2.00E-01~~	~~2013 AER/TRI~~ Appendix A, Table A-26	~~-~~ 4.59E-02	~~9.96~~ 402.02
Thallium	7440-28-0	6.49E-03	2013 AER/TRI	0.00	0.32
Toluene	108-88-3	1.37E-01	2013 AER/TRI	0.00	6.83
Xylenes (mixed)	1330-20-7	3.74E-02	2013 AER/TRI	0.00	1.86

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Appendix A: Summary of Emissions

Table A-11: Wilmington Combustion Unit Toxic Emissions Calculations (Increased Utilization)

Zinc	7440-66-6	2.32E-03	2013 AER/TRI	0.00	0.12

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Appendix A: Summary of Emissions

Table A-11: Wilmington Combustion Unit Toxic Emissions Calculations (Increased Utilization)

Wilmington H-30 Heater (D157)

Projected Emisions Characteristics

Est. Incr. in Firing Rate:	4.1	mmbtu/hr
HHV	1230	mmbtu/mmscf
Fuel:	RFG	

Projected Emissions **Emissions Increase**

Chemical Name	CAS No.	Lbs/mmscf	EF Basis	Emissions (lbs/hr)	Emissions (lbs/year)
2-Methylnaphthalene	91-57-6	1.76E-05	2013 AER/TRI	0.00	0.00
Acenaphthene	83-32-9	1.60E-06	2013 AER/TRI	0.00	0.00
Acenaphthylene	208-96-8	1.73E-06	2013 AER/TRI	0.00	0.00
Acetaldehyde	75-07-0	1.95E-02	2013 AER/TRI	0.00	0.57
Acrolein	107-02-8	0.00E+00	2013 AER/TRI	-	-
Ammonia	7664-41-7	3.20E+00	2013 AER/TRI	0.01	93.44
Anthracene	120-12-7	3.97E-06	2013 AER/TRI	0.00	0.00
Antimony	7440-36-0	5.81E-04	2013 AER/TRI	0.00	0.02
Arsenic	7440-38-2	9.54E-04	2013 AER/TRI	0.00	0.03
Barium	7440-39-3	6.49E-03	2013 AER/TRI	0.00	0.19
Benzene	71-43-2	8.42E-02	2013 AER/TRI	0.00	2.46
Benzo(a)anthracene	56-55-3	1.82E-06	2013 AER/TRI	0.00	0.00
Benzo(a)pyrene	50-32-8	9.89E-05	2013 AER/TRI	0.00	0.00
Benzo(b)fluoranthene	205-99-2	7.54E-06	2013 AER/TRI	0.00	0.00
Benzo(e)pyrene	192-97-2	1.87E-06	2013 AER/TRI	0.00	0.00
Benzo(g,h,i)perylene	191-24-2	1.17E-06	2013 AER/TRI	0.00	0.00
Benzo(k)fluoranthene	207-08-9	1.51E-06	2013 AER/TRI	0.00	0.00
Beryllium	7440-41-7	2.88E-04	2013 AER/TRI	0.00	0.01
Cadmium	7440-43-9	1.11E-03	2013 AER/TRI	0.00	0.03
Carbon Disulfide	75-15-0	0.00E+00	2013 AER/TRI	-	-
Carbonyl Sulfide	463-58-1	0.00E+00	2013 AER/TRI	-	-
Chromium	7440-47-3	3.37E-04	2013 AER/TRI	0.00	0.01
Chromium (Hexavalent)	18540-29-9	1.16E-04	2013 AER/TRI	0.00	0.00
Chrysene	218-01-9	5.90E-06	2013 AER/TRI	0.00	0.00
Copper	7440-50-8	4.73E-03	2013 AER/TRI	0.00	0.14
Cyanide compounds	57-12-5	0.00E+00	2013 AER/TRI	-	-
Dibenz(a,h)anthracene	53-70-3	1.06E-05	2013 AER/TRI	0.00	0.00
Dimethyl disulfide	624-92-0	0.00E+00	2013 AER/TRI	-	-
Ethylbenzene	100-41-4	3.04E-02	2013 AER/TRI	0.00	0.89
Fluoranthene	206-44-0	1.70E-05	2013 AER/TRI	0.00	0.00
Fluorene	86-73-7	2.82E-06	2013 AER/TRI	0.00	0.00
Formaldehyde	50-00-0	1.51E-01	2013 AER/TRI	0.00	4.41
Hydrochloric acid	7647-01-0	0.00E+00	2013 AER/TRI	-	-
Hydrogen sulfide	7783-06-4	4.05E-01	2013 AER/TRI	0.00	11.83
Indeno(1,2,3-cd)pyrene	193-39-5	1.15E-04	2013 AER/TRI	0.00	0.00
Lead	7439-92-1	5.49E-03	2013 AER/TRI	0.00	0.16
Manganese	7439-96-5	1.65E-02	2013 AER/TRI	0.00	0.48
Mercury	7439-97-6	1.71E-05	2013 AER/TRI	0.00	0.00
Methyl mercaptan	74-93-1	0.00E+00	2013 AER/TRI	-	-
Naphthalene	91-20-3	3.02E-04	2013 AER/TRI	0.00	0.01
Nickel	7440-02-0	1.06E-02	2013 AER/TRI	0.00	0.31
Perylene	198-55-0	0.00E+00	2013 AER/TRI	-	-
Phenanthrene	85-01-8	2.72E-05	2013 AER/TRI	0.00	0.00
Phenol	108-95-2	6.96E-03	2013 AER/TRI	0.00	0.20
Phosphorus	7723-14-0	7.21E-04	2013 AER/TRI	0.00	0.02
PAHs, total, with individ. components also reported	1150	1.70E-05	2013 AER/TRI	0.00	0.00
Propylene	115-07-1	2.05E-03	2013 AER/TRI	0.00	0.06
Pyrene	129-00-0	5.62E-06	2013 AER/TRI	0.00	0.00
Selenium	7782-49-2	1.34E-02	2013 AER/TRI	0.00	0.39
Silver	7440-22-4	1.81E-03	2013 AER/TRI	0.00	0.05
Sulfuric Acid	7664-93-9	~~7.29E-03~~	~~2013 AER/TRI~~ Appendix A, Table A-26	~~0.00~~ 7.66E-03	~~0.21~~ 67.14
Thallium	7440-28-0	6.49E-03	2013 AER/TRI	0.00	0.19
Toluene	108-88-3	1.37E-01	2013 AER/TRI	0.00	4.00
Xylenes (mixed)	1330-20-7	3.74E-02	2013 AER/TRI	0.00	1.09
Zinc	7440-66-6	2.32E-03	2013 AER/TRI	0.00	0.07

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Table A-11: Wilmington Combustion Unit Toxic Emissions Calculations (Increased Utilization)

Wilmington H-21/22 Heater (D158)

Projected Emisions Characteristics

Est. Incr. in Firing Rate:	4.1	mmbtu/hr
HHV	1230	mmbtu/mmscf
Fuel:	RFG	

Projected Emissions **Emissions Increase**

Chemical Name	CAS No.	Lbs/mmscf	EF Basis	Emissions (lbs/hr)	Emissions (lbs/year)
2-Methylnaphthalene	91-57-6	1.15E-04	2013 AER/TRI	0.00	0.00
Acenaphthene	83-32-9	1.24E-05	2013 AER/TRI	0.00	0.00
Acenaphthylene	208-96-8	1.44E-04	2013 AER/TRI	0.00	0.00
Acetaldehyde	75-07-0	5.14E-01	2013 AER/TRI	0.00	15.01
Acrolein	107-02-8	0.00E+00	2013 AER/TRI	-	-
Ammonia	7664-41-7	3.20E+00	2013 AER/TRI	0.01	93.44
Anthracene	120-12-7	3.54E-05	2013 AER/TRI	0.00	0.00
Antimony	7440-36-0	5.81E-04	2013 AER/TRI	0.00	0.02
Arsenic	7440-38-2	2.53E-03	2013 AER/TRI	0.00	0.07
Barium	7440-39-3	6.49E-03	2013 AER/TRI	0.00	0.19
Benzene	71-43-2	8.42E-02	2013 AER/TRI	0.00	2.46
Benzo(a)anthracene	56-55-3	1.08E-05	2013 AER/TRI	0.00	0.00
Benzo(a)pyrene	50-32-8	9.89E-05	2013 AER/TRI	0.00	0.00
Benzo(b)fluoranthene	205-99-2	1.56E-04	2013 AER/TRI	0.00	0.00
Benzo(e)pyrene	192-97-2	2.15E-05	2013 AER/TRI	0.00	0.00
Benzo(g,h,i)perylene	191-24-2	1.17E-06	2013 AER/TRI	0.00	0.00
Benzo(k)fluoranthene	207-08-9	3.05E-05	2013 AER/TRI	0.00	0.00
Beryllium	7440-41-7	2.88E-04	2013 AER/TRI	0.00	0.01
Cadmium	7440-43-9	1.11E-03	2013 AER/TRI	0.00	0.03
Carbon Disulfide	75-15-0	0.00E+00	2013 AER/TRI	-	-
Carbonyl Sulfide	463-58-1	0.00E+00	2013 AER/TRI	-	-
Chromium	7440-47-3	1.39E-03	2013 AER/TRI	0.00	0.04
Chromium (Hexavalent)	18540-29-9	5.12E-05	2013 AER/TRI	0.00	0.00
Chrysene	218-01-9	9.87E-05	2013 AER/TRI	0.00	0.00
Copper	7440-50-8	3.66E-03	2013 AER/TRI	0.00	0.11
Cyanide compounds	57-12-5	0.00E+00	2013 AER/TRI	-	-
Dibenz(a,h)anthracene	53-70-3	1.61E-06	2013 AER/TRI	0.00	0.00
Dimethyl disulfide	624-92-0	0.00E+00	2013 AER/TRI	-	-
Ethylbenzene	100-41-4	3.04E-02	2013 AER/TRI	0.00	0.89
Fluoranthene	206-44-0	1.54E-04	2013 AER/TRI	0.00	0.00
Fluorene	86-73-7	8.40E-05	2013 AER/TRI	0.00	0.00
Formaldehyde	50-00-0	1.75E+00	2013 AER/TRI	0.01	50.99
Hydrochloric acid	7647-01-0	2.82E+00	2013 AER/TRI	0.01	82.23
Hydrogen sulfide	7783-06-4	4.05E-01	2013 AER/TRI	0.00	11.83
Indeno(1,2,3-cd)pyrene	193-39-5	4.54E-06	2013 AER/TRI	0.00	0.00
Lead	7439-92-1	2.85E-03	2013 AER/TRI	0.00	0.08
Manganese	7439-96-5	1.39E-01	2013 AER/TRI	0.00	4.06
Mercury	7439-97-6	2.60E-04	2013 AER/TRI	0.00	0.01
Methyl mercaptan	74-93-1	0.00E+00	2013 AER/TRI	-	-
Naphthalene	91-20-3	1.36E-03	2013 AER/TRI	0.00	0.04
Nickel	7440-02-0	1.62E-02	2013 AER/TRI	0.00	0.47
Perylene	198-55-0	0.00E+00	2013 AER/TRI	-	-
Phenanthrene	85-01-8	3.11E-04	2013 AER/TRI	0.00	0.01
Phenol	108-95-2	6.25E-02	2013 AER/TRI	0.00	1.82
Phosphorus	7723-14-0	7.21E-04	2013 AER/TRI	0.00	0.02
PAHs, total, with individ. components also reported	1150	1.54E-04	2013 AER/TRI	0.00	0.00
Propylene	115-07-1	2.05E-03	2013 AER/TRI	0.00	0.06
Pyrene	129-00-0	6.75E-05	2013 AER/TRI	0.00	0.00
Selenium	7782-49-2	3.27E-01	2013 AER/TRI	0.00	9.55
Silver	7440-22-4	1.81E-03	2013 AER/TRI	0.00	0.05
Sulfuric Acid	7664-93-9	~~2.62E-04~~	~~2013 AER/TRI~~ Appendix A, Table A-26	~~0.00~~ 3.99E-03	~~0.01~~ 34.92
Thallium	7440-28-0	6.49E-03	2013 AER/TRI	0.00	0.19
Toluene	108-88-3	1.37E-01	2013 AER/TRI	0.00	4.00
Xylenes (mixed)	1330-20-7	3.74E-02	2013 AER/TRI	0.00	1.09
Zinc	7440-66-6	9.69E-02	2013 AER/TRI	0.00	2.83

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-11: Wilmington Combustion Unit Toxic Emissions Calculations (Increased Utilization)

Wilmington H-510 Heater (D218)

Projected Emisions Characteristics

Est. Incr. in Firing Rate:	0.4	mmbtu/hr
HHV	1230	mmbtu/mmscf
Fuel:	RFG	

		Projected Emissions		Emissions Increase	
Chemical Name	**CAS No.**	**Lbs/mmscf**	**EF Basis**	**Emissions (lbs/hr)**	**Emissions (lbs/year)**
2-Methylnaphthalene	91-57-6	1.76E-05	2013 AER/TRI	0.00	0.00
Acenaphthene	83-32-9	1.60E-06	2013 AER/TRI	0.00	0.00
Acenaphthylene	208-96-8	1.73E-06	2013 AER/TRI	0.00	0.00
Acetaldehyde	75-07-0	1.95E-02	2013 AER/TRI	0.00	0.06
Acrolein	107-02-8	0.00E+00	2013 AER/TRI	-	-
Ammonia	7664-41-7	3.20E+00	2013 AER/TRI	0.00	9.12
Anthracene	120-12-7	3.97E-06	2013 AER/TRI	0.00	0.00
Antimony	7440-36-0	5.81E-04	2013 AER/TRI	0.00	0.00
Arsenic	7440-38-2	9.54E-04	2013 AER/TRI	0.00	0.00
Barium	7440-39-3	6.49E-03	2013 AER/TRI	0.00	0.02
Benzene	71-43-2	8.42E-02	2013 AER/TRI	0.00	0.24
Benzo(a)anthracene	56-55-3	1.82E-06	2013 AER/TRI	0.00	0.00
Benzo(a)pyrene	50-32-8	9.89E-05	2013 AER/TRI	0.00	0.00
Benzo(b)fluoranthene	205-99-2	7.54E-06	2013 AER/TRI	0.00	0.00
Benzo(e)pyrene	192-97-2	1.87E-06	2013 AER/TRI	0.00	0.00
Benzo(g,h,i)perylene	191-24-2	1.17E-06	2013 AER/TRI	0.00	0.00
Benzo(k)fluoranthene	207-08-9	1.51E-06	2013 AER/TRI	0.00	0.00
Beryllium	7440-41-7	2.88E-04	2013 AER/TRI	0.00	0.00
Cadmium	7440-43-9	1.11E-03	2013 AER/TRI	0.00	0.00
Carbon Disulfide	75-15-0	0.00E+00	2013 AER/TRI	-	-
Carbonyl Sulfide	463-58-1	0.00E+00	2013 AER/TRI	-	-
Chromium	7440-47-3	3.37E-04	2013 AER/TRI	0.00	0.00
Chromium (Hexavalent)	18540-29-9	1.16E-04	2013 AER/TRI	0.00	0.00
Chrysene	218-01-9	5.90E-06	2013 AER/TRI	0.00	0.00
Copper	7440-50-8	4.73E-03	2013 AER/TRI	0.00	0.01
Cyanide compounds	57-12-5	0.00E+00	2013 AER/TRI	-	-
Dibenz(a,h)anthracene	53-70-3	1.06E-05	2013 AER/TRI	0.00	0.00
Dimethyl disulfide	624-92-0	0.00E+00	2013 AER/TRI	-	-
Ethylbenzene	100-41-4	3.04E-02	2013 AER/TRI	0.00	0.09
Fluoranthene	206-44-0	1.70E-05	2013 AER/TRI	0.00	0.00
Fluorene	86-73-7	2.82E-06	2013 AER/TRI	0.00	0.00
Formaldehyde	50-00-0	1.51E-01	2013 AER/TRI	0.00	0.43
Hydrochloric acid	7647-01-0	0.00E+00	2013 AER/TRI	-	-
Hydrogen sulfide	7783-06-4	4.05E-01	2013 AER/TRI	0.00	1.15
Indeno(1,2,3-cd)pyrene	193-39-5	1.15E-04	2013 AER/TRI	0.00	0.00
Lead	7439-92-1	5.49E-03	2013 AER/TRI	0.00	0.02
Manganese	7439-96-5	1.65E-02	2013 AER/TRI	0.00	0.05
Mercury	7439-97-6	1.71E-05	2013 AER/TRI	0.00	0.00
Methyl mercaptan	74-93-1	0.00E+00	2013 AER/TRI	-	-
Naphthalene	91-20-3	3.02E-04	2013 AER/TRI	0.00	0.00
Nickel	7440-02-0	1.06E-02	2013 AER/TRI	0.00	0.03
Perylene	198-55-0	0.00E+00	2013 AER/TRI	-	-
Phenanthrene	85-01-8	2.72E-05	2013 AER/TRI	0.00	0.00
Phenol	108-95-2	6.96E-03	2013 AER/TRI	0.00	0.02
Phosphorus	7723-14-0	7.21E-04	2013 AER/TRI	0.00	0.00
PAHs, total, with individ. components also reported	1150	1.70E-05	2013 AER/TRI	0.00	0.00
Propylene	115-07-1	2.05E-03	2013 AER/TRI	0.00	0.01
Pyrene	129-00-0	5.62E-06	2013 AER/TRI	0.00	0.00
Selenium	7782-49-2	1.34E-02	2013 AER/TRI	0.00	0.04
Silver	7440-22-4	1.81E-03	2013 AER/TRI	0.00	0.01
Sulfuric Acid	7664-93-9	~~4.52E-03~~	~~2013 AER/TRI~~ Appendix A, Table A-26	~~0.00~~ 1.09E-02	~~0.01~~ 95.10
Thallium	7440-28-0	6.49E-03	2013 AER/TRI	0.00	0.02
Toluene	108-88-3	1.37E-01	2013 AER/TRI	0.00	0.39
Xylenes (mixed)	1330-20-7	3.74E-02	2013 AER/TRI	0.00	0.11
Zinc	7440-66-6	2.32E-03	2013 AER/TRI	0.00	0.01

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-11: Wilmington Combustion Unit Toxic Emissions Calculations (Increased Utilization)

Wilmington H-501A/B, 502, 503/504 Heaters (D216, D217, D214 and D215)

Projected Emisions Characteristics

Est. Incr. in Firing Rate:	1.6	mmbtu/hr
HHV	1230	mmbtu/mmscf
Fuel:	RFG	

Projected Emissions — **Emissions Increase**

Chemical Name	CAS No.	Lbs/mmscf	EF Basis	Emissions (lbs/hr)	Emissions (lbs/year)
2-Methylnaphthalene	91-57-6	0.00E+00	2013 AER/TRI	-	-
Acenaphthene	83-32-9	2.33E-06	2013 AER/TRI	0.00	0.00
Acenaphthylene	208-96-8	1.52E-06	2013 AER/TRI	0.00	0.00
Acetaldehyde	75-07-0	1.09E-02	2013 AER/TRI	0.00	0.12
Acrolein	107-02-8	0.00E+00	2013 AER/TRI	-	-
Ammonia	7664-41-7	2.60E+00	2013 AER/TRI	0.00	29.59
Anthracene	120-12-7	2.81E-06	2013 AER/TRI	0.00	0.00
Antimony	7440-36-0	5.81E-04	2013 AER/TRI	0.00	0.01
Arsenic	7440-38-2	3.09E-04	2013 AER/TRI	0.00	0.00
Barium	7440-39-3	6.49E-03	2013 AER/TRI	0.00	0.07
Benzene	71-43-2	4.09E-03	2013 AER/TRI	0.00	0.05
Benzo(a)anthracene	56-55-3	3.70E-05	2013 AER/TRI	0.00	0.00
Benzo(a)pyrene	50-32-8	9.89E-05	2013 AER/TRI	0.00	0.00
Benzo(b)fluoranthene	205-99-2	4.61E-05	2013 AER/TRI	0.00	0.00
Benzo(e)pyrene	192-97-2	0.00E+00	2013 AER/TRI	-	-
Benzo(g,h,i)perylene	191-24-2	1.17E-06	2013 AER/TRI	0.00	0.00
Benzo(k)fluoranthene	207-08-9	2.72E-05	2013 AER/TRI	0.00	0.00
Beryllium	7440-41-7	1.54E-05	2013 AER/TRI	0.00	0.00
Cadmium	7440-43-9	1.60E-04	2013 AER/TRI	0.00	0.00
Carbon Disulfide	75-15-0	0.00E+00	2013 AER/TRI	-	-
Carbonyl Sulfide	463-58-1	0.00E+00	2013 AER/TRI	-	-
Chromium	7440-47-3	1.97E-03	2013 AER/TRI	0.00	0.02
Chromium (Hexavalent)	18540-29-9	2.03E-05	2013 AER/TRI	0.00	0.00
Chrysene	218-01-9	1.66E-06	2013 AER/TRI	0.00	0.00
Copper	7440-50-8	3.80E-04	2013 AER/TRI	0.00	0.00
Cyanide compounds	57-12-5	0.00E+00	2013 AER/TRI	-	-
Dibenz(a,h)anthracene	53-70-3	1.06E-05	2013 AER/TRI	0.00	0.00
Dimethyl disulfide	624-92-0	0.00E+00	2013 AER/TRI	-	-
Ethylbenzene	100-41-4	4.60E-03	2013 AER/TRI	0.00	0.05
Fluoranthene	206-44-0	3.06E-06	2013 AER/TRI	0.00	0.00
Fluorene	86-73-7	2.82E-06	2013 AER/TRI	0.00	0.00
Formaldehyde	50-00-0	7.22E-03	2013 AER/TRI	0.00	0.08
Hydrochloric acid	7647-01-0	9.03E-02	2013 AER/TRI	0.00	1.03
Hydrogen sulfide	7783-06-4	4.05E-01	2013 AER/TRI	0.00	4.62
Indeno(1,2,3-cd)pyrene	193-39-5	1.15E-04	2013 AER/TRI	0.00	0.00
Lead	7439-92-1	1.77E-04	2013 AER/TRI	0.00	0.00
Manganese	7439-96-5	1.40E-03	2013 AER/TRI	0.00	0.02
Mercury	7439-97-6	4.56E-04	2013 AER/TRI	0.00	0.01
Methyl mercaptan	74-93-1	0.00E+00	2013 AER/TRI	-	-
Naphthalene	91-20-3	1.09E-04	2013 AER/TRI	0.00	0.00
Nickel	7440-02-0	1.21E-03	2013 AER/TRI	0.00	0.01
Perylene	198-55-0	0.00E+00	2013 AER/TRI	-	-
Phenanthrene	85-01-8	0.00E+00	2013 AER/TRI	-	-
Phenol	108-95-2	6.96E-03	2013 AER/TRI	0.00	0.08
Phosphorus	7723-14-0	7.21E-04	2013 AER/TRI	0.00	0.01
PAHs, total, with individ. components also reported	1150	0.00E+00	2013 AER/TRI	-	-
Propylene	115-07-1	2.05E-03	2013 AER/TRI	0.00	0.02
Pyrene	129-00-0	2.84E-06	2013 AER/TRI	0.00	0.00
Selenium	7782-49-2	2.20E-05	2013 AER/TRI	0.00	0.00
Silver	7440-22-4	1.81E-03	2013 AER/TRI	0.00	0.02
Sulfuric Acid	7664-93-9	~~2.05E-01~~	~~2013 AER/TRI~~ Appendix A, Table A-26	~~0.00~~ 2.76E-02	~~2.33~~ 241.78
Thallium	7440-28-0	6.49E-03	2013 AER/TRI	0.00	0.07
Toluene	108-88-3	1.27E-01	2013 AER/TRI	0.00	1.44
Xylenes (mixed)	1330-20-7	3.29E-02	2013 AER/TRI	0.00	0.37
Zinc	7440-66-6	2.34E-02	2013 AER/TRI	0.00	0.27

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-11: Wilmington Combustion Unit Toxic Emissions Calculations (Increased Utilization)

SRP H-1601/1602 Boilers (D76 and D77)

Projected Emisions Characteristics

Est. Incr. in Firing Rate:	0.125	mmbtu/hr
HHV	1230	mmbtu/mmscf
Fuel:	Nat Gas	

Projected Emissions — **Emissions Increase**

Chemical Name	CAS No.	Lbs/mmscf	EF Basis	Emissions (lbs/hr)	Emissions (lbs/year)
2-Methylnaphthalene	91-57-6	1.15E-04	2013 AER/TRI	1.16E-08	1.02E-04
Acenaphthene	83-32-9	1.24E-05	2013 AER/TRI	1.26E-09	1.11E-05
Acenaphthylene	208-96-8	1.44E-04	2013 AER/TRI	1.46E-08	1.28E-04
Acetaldehyde	75-07-0	5.14E-01	2013 AER/TRI	5.22E-05	4.58E-01
Acrolein	107-02-8	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Ammonia	7664-41-7	3.20E+00	2013 AER/TRI	3.25E-04	2.85E+00
Anthracene	120-12-7	3.54E-05	2013 AER/TRI	3.60E-09	3.15E-05
Antimony	7440-36-0	5.81E-04	2013 AER/TRI	5.90E-08	5.17E-04
Arsenic	7440-38-2	2.53E-03	2013 AER/TRI	2.57E-07	2.26E-03
Barium	7440-39-3	6.49E-03	2013 AER/TRI	6.60E-07	5.78E-03
Benzene	71-43-2	8.42E-02	2013 AER/TRI	8.56E-06	7.50E-02
Benzo(a)anthracene	56-55-3	1.08E-05	2013 AER/TRI	1.10E-09	9.62E-06
Benzo(a)pyrene	50-32-8	9.89E-05	2013 AER/TRI	1.01E-08	8.80E-05
Benzo(b)fluoranthene	205-99-2	1.56E-04	2013 AER/TRI	1.59E-08	1.39E-04
Benzo(e)pyrene	192-97-2	2.15E-05	2013 AER/TRI	2.19E-09	1.92E-05
Benzo(g,h,i)perylene	191-24-2	1.17E-06	2013 AER/TRI	1.19E-10	1.04E-06
Benzo(k)fluoranthene	207-08-9	3.05E-05	2013 AER/TRI	3.10E-09	2.71E-05
Beryllium	7440-41-7	2.88E-04	2013 AER/TRI	2.93E-08	2.56E-04
Cadmium	7440-43-9	1.11E-03	2013 AER/TRI	1.13E-07	9.88E-04
Carbon Disulfide	75-15-0	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Carbonyl Sulfide	463-58-1	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Chromium	7440-47-3	1.39E-03	2013 AER/TRI	1.41E-07	1.24E-03
Chromium (Hexavalent)	18540-29-9	5.12E-05	2013 AER/TRI	5.20E-09	4.55E-05
Chrysene	218-01-9	9.87E-05	2013 AER/TRI	1.00E-08	8.79E-05
Copper	7440-50-8	3.66E-03	2013 AER/TRI	3.72E-07	3.26E-03
Cyanide compounds	57-12-5	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	53-70-3	1.61E-06	2013 AER/TRI	1.64E-10	1.43E-06
Dimethyl disulfide	624-92-0	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Ethylbenzene	100-41-4	3.04E-02	2013 AER/TRI	3.09E-06	2.71E-02
Fluoranthene	206-44-0	1.54E-04	2013 AER/TRI	1.56E-08	1.37E-04
Fluorene	86-73-7	8.40E-05	2013 AER/TRI	8.54E-09	7.48E-05
Formaldehyde	50-00-0	1.75E+00	2013 AER/TRI	1.77E-04	1.55E+00
Hydrochloric acid	7647-01-0	2.82E+00	2013 AER/TRI	2.86E-04	2.51E+00
Hydrogen sulfide	7783-06-4	4.05E-01	2013 AER/TRI	4.12E-05	3.61E-01
Indeno(1,2,3-cd)pyrene	193-39-5	4.54E-06	2013 AER/TRI	4.61E-10	4.04E-06
Lead	7439-92-1	2.85E-03	2013 AER/TRI	2.90E-07	2.54E-03
Manganese	7439-96-5	1.39E-01	2013 AER/TRI	1.41E-05	1.24E-01
Mercury	7439-97-6	2.60E-04	2013 AER/TRI	2.64E-08	2.32E-04
Methyl mercaptan	74-93-1	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Naphthalene	91-20-3	1.36E-03	2013 AER/TRI	1.39E-07	1.22E-03
Nickel	7440-02-0	1.62E-02	2013 AER/TRI	1.64E-06	1.44E-02
Perylene	198-55-0	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Phenanthrene	85-01-8	3.11E-04	2013 AER/TRI	3.16E-08	2.77E-04
Phenol	108-95-2	6.25E-02	2013 AER/TRI	6.35E-06	5.56E-02
Phosphorus	7723-14-0	7.21E-04	2013 AER/TRI	7.33E-08	6.42E-04
PAHs, total, with individ. components also reported	1150	0.00E+00	2013 AER/TRI	0.00E+00	0.00E+00
Propylene	115-07-1	2.05E-03	2013 AER/TRI	2.08E-07	1.83E-03
Pyrene	129-00-0	6.75E-05	2013 AER/TRI	6.86E-09	6.01E-05
Selenium	7782-49-2	3.27E-01	2013 AER/TRI	3.32E-05	2.91E-01
Silver	7440-22-4	1.81E-03	2013 AER/TRI	1.84E-07	1.61E-03
Sulfuric Acid	7664-93-9	~~3.00E-01~~	~~2013 AER/TRI~~ Appendix A, Table A-26	~~3.05E-05~~ 1.30E-02	~~2.67E-01~~ 113.83
Thallium	7440-28-0	6.49E-03	2013 AER/TRI	6.60E-07	5.78E-03
Toluene	108-88-3	1.37E-01	2013 AER/TRI	1.39E-05	1.22E-01
Xylenes (mixed)	1330-20-7	3.74E-02	2013 AER/TRI	3.80E-06	3.33E-02
Zinc	7440-66-6	9.69E-02	2013 AER/TRI	9.85E-06	8.63E-02

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-11: Wilmington Combustion Unit Toxic Emissions Calculations (Increased Utilization)

SRP Incinerator F-704 (C56)

Projected Emisions Characteristics

2013 Fuel Use:	11.24	mmscf/year
Est. % Incr. in Sulfur Production:	1.4%	percent
Est. % Incr. in Fuel Use:	0.16	mmscf/year

Emissions Increase

Chemical Name	CAS No.	Lbs/mmscf	EF Basis	Emissions (lbs/hr)	Emissions (lbs/year)
2-Methylnaphthalene	91-57-6	-	2013 AER/TRI	0.00E+00	0.00E+00
Acenaphthene	83-32-9	0.000003542	2013 AER/TRI	6.55E-11	5.74E-07
Acenaphthylene	208-96-8	0.000004525	2013 AER/TRI	8.37E-11	7.34E-07
Acetaldehyde	75-07-0	0.087923845	2013 AER/TRI	1.63E-06	1.43E-02
Acrolein	107-02-8	-	2013 AER/TRI	0.00E+00	0.00E+00
Ammonia	7664-41-7	-	2013 AER/TRI	0.00E+00	0.00E+00
Anthracene	120-12-7	0.000006062	2013 AER/TRI	1.12E-10	9.83E-07
Antimony	7440-36-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Arsenic	7440-38-2	-	2013 AER/TRI	0.00E+00	0.00E+00
Barium	7440-39-3	-	2013 AER/TRI	0.00E+00	0.00E+00
Benzene	71-43-2	-	2013 AER/TRI	0.00E+00	0.00E+00
Benzo(a)anthracene	56-55-3	0.000002275	2013 AER/TRI	4.21E-11	3.69E-07
Benzo(a)pyrene	50-32-8	-	2013 AER/TRI	0.00E+00	0.00E+00
Benzo(b)fluoranthene	205-99-2	0.000002841	2013 AER/TRI	5.26E-11	4.61E-07
Benzo(e)pyrene	192-97-2	-	2013 AER/TRI	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	191-24-2	-	2013 AER/TRI	0.00E+00	0.00E+00
Benzo(k)fluoranthene	207-08-9	-	2013 AER/TRI	0.00E+00	0.00E+00
Beryllium	7440-41-7	-	2013 AER/TRI	0.00E+00	0.00E+00
Cadmium	7440-43-9	0.004402341	2013 AER/TRI	8.15E-08	7.14E-04
Carbon Disulfide	75-15-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Carbonyl Sulfide	463-58-1	-	2013 AER/TRI	0.00E+00	0.00E+00
Chromium	7440-47-3	-	2013 AER/TRI	0.00E+00	0.00E+00
Chromium (Hexavalent)	18540-29-9	0.000045130	2013 AER/TRI	8.35E-10	7.32E-06
Chrysene	218-01-9	-	2013 AER/TRI	0.00E+00	0.00E+00
Copper	7440-50-8	0.002176576	2013 AER/TRI	4.03E-08	3.53E-04
Cyanide compounds	57-12-5	-	2013 AER/TRI	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	53-70-3	-	2013 AER/TRI	0.00E+00	0.00E+00
Dimethyl disulfide	624-92-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Ethylbenzene	100-41-4	-	2013 AER/TRI	0.00E+00	0.00E+00
Fluoranthene	206-44-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Fluorene	86-73-7	0.000001894	2013 AER/TRI	3.50E-11	3.07E-07
Formaldehyde	50-00-0	0.046974697	2013 AER/TRI	8.69E-07	7.62E-03
Hydrochloric acid	7647-01-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Hydrogen sulfide	7783-06-4	-	2013 AER/TRI	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	-	2013 AER/TRI	0.00E+00	0.00E+00
Lead	7439-92-1	-	2013 AER/TRI	0.00E+00	0.00E+00
Manganese	7439-96-5	0.001733883	2013 AER/TRI	3.21E-08	2.81E-04
Mercury	7439-97-6	-	2013 AER/TRI	0.00E+00	0.00E+00
Methyl mercaptan	74-93-1	-	2013 AER/TRI	0.00E+00	0.00E+00
Naphthalene	91-20-3	0.000609933	2013 AER/TRI	1.13E-08	9.89E-05
Nickel	7440-02-0	0.000731674	2013 AER/TRI	1.35E-08	1.19E-04
Perylene	198-55-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Phenanthrene	85-01-8	-	2013 AER/TRI	0.00E+00	0.00E+00
Phenol	108-95-2	-	2013 AER/TRI	0.00E+00	0.00E+00
Phosphorus	7723-14-0	-	2013 AER/TRI	0.00E+00	0.00E+00
PAHs, total, with individ. components also reported	1150	0.000004820	2013 AER/TRI	8.92E-11	7.81E-07
Propylene	115-07-1	-	2013 AER/TRI	0.00E+00	0.00E+00
Pyrene	129-00-0	0.000004931	2013 AER/TRI	9.13E-11	7.99E-07
Selenium	7782-49-2	-	2013 AER/TRI	0.00E+00	0.00E+00
Silver	7440-22-4	-	2013 AER/TRI	0.00E+00	0.00E+00
Sulfuric Acid	7664-93-9	~~2.80E-01~~	~~2013 AER/TRI~~ Appendix A, Table A-26	~~5.18E-06~~ 3.53E-02	~~4.54E-02~~ 309.43
Thallium	7440-28-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Toluene	108-88-3	-	2013 AER/TRI	0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	-	2013 AER/TRI	0.00E+00	0.00E+00
Zinc	7440-66-6	0.010882881	2013 AER/TRI	2.01E-07	1.76E-03

* Toxic pollutant emissions increases estimated based on historic emissions data multiplied by the estimated % sulfur loading increase.

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-11: Wilmington Combustion Unit Toxic Emissions Calculations (Increased Utilization)

SRP Incinerator F-754 (C54)

Projected Emisions Characteristics

2013 Fuel Use:	12.56	mmscf/year
Est. % Incr. in Sulfur Production:	1.4%	percent
Est. % Incr. in Fuel Use:	0.18	mmscf/year

Emissions Increase

Chemical Name	CAS No.	Lbs/mmscf	EF Basis	Emissions (lbs/hr)	Emissions (lbs/year)
2-Methylnaphthalene	91-57-6	-	2013 AER/TRI	0.00E+00	0.00E+00
Acenaphthene	83-32-9	0.000003542	2013 AER/TRI	7.32E-11	6.42E-07
Acenaphthylene	208-96-8	0.000004525	2013 AER/TRI	9.36E-11	8.20E-07
Acetaldehyde	75-07-0	0.087923845	2013 AER/TRI	1.82E-06	1.59E-02
Acrolein	107-02-8	-	2013 AER/TRI	0.00E+00	0.00E+00
Ammonia	7664-41-7	-	2013 AER/TRI	0.00E+00	0.00E+00
Anthracene	120-12-7	0.000006062	2013 AER/TRI	1.25E-10	1.10E-06
Antimony	7440-36-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Arsenic	7440-38-2	-	2013 AER/TRI	0.00E+00	0.00E+00
Barium	7440-39-3	-	2013 AER/TRI	0.00E+00	0.00E+00
Benzene	71-43-2	-	2013 AER/TRI	0.00E+00	0.00E+00
Benzo(a)anthracene	56-55-3	0.000002275	2013 AER/TRI	4.70E-11	4.12E-07
Benzo(a)pyrene	50-32-8	-	2013 AER/TRI	0.00E+00	0.00E+00
Benzo(b)fluoranthene	205-99-2	0.000002841	2013 AER/TRI	5.87E-11	5.15E-07
Benzo(e)pyrene	192-97-2	-	2013 AER/TRI	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	191-24-2	-	2013 AER/TRI	0.00E+00	0.00E+00
Benzo(k)fluoranthene	207-08-9	-	2013 AER/TRI	0.00E+00	0.00E+00
Beryllium	7440-41-7	-	2013 AER/TRI	0.00E+00	0.00E+00
Cadmium	7440-43-9	0.004402341	2013 AER/TRI	9.10E-08	7.98E-04
Carbon Disulfide	75-15-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Carbonyl Sulfide	463-58-1	-	2013 AER/TRI	0.00E+00	0.00E+00
Chromium	7440-47-3	-	2013 AER/TRI	0.00E+00	0.00E+00
Chromium (Hexavalent)	18540-29-9	0.000045130	2013 AER/TRI	9.33E-10	8.18E-06
Chrysene	218-01-9	-	2013 AER/TRI	0.00E+00	0.00E+00
Copper	7440-50-8	0.002176576	2013 AER/TRI	4.50E-08	3.94E-04
Cyanide compounds	57-12-5	-	2013 AER/TRI	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	53-70-3	-	2013 AER/TRI	0.00E+00	0.00E+00
Dimethyl disulfide	624-92-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Ethylbenzene	100-41-4	-	2013 AER/TRI	0.00E+00	0.00E+00
Fluoranthene	206-44-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Fluorene	86-73-7	0.000001894	2013 AER/TRI	3.92E-11	3.43E-07
Formaldehyde	50-00-0	0.046974697	2013 AER/TRI	9.71E-07	8.51E-03
Hydrochloric acid	7647-01-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Hydrogen sulfide	7783-06-4	-	2013 AER/TRI	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	-	2013 AER/TRI	0.00E+00	0.00E+00
Lead	7439-92-1	-	2013 AER/TRI	0.00E+00	0.00E+00
Manganese	7439-96-5	0.001733883	2013 AER/TRI	3.59E-08	3.14E-04
Mercury	7439-97-6	-	2013 AER/TRI	0.00E+00	0.00E+00
Methyl mercaptan	74-93-1	-	2013 AER/TRI	0.00E+00	0.00E+00
Naphthalene	91-20-3	0.000609933	2013 AER/TRI	1.26E-08	1.10E-04
Nickel	7440-02-0	0.000731674	2013 AER/TRI	1.51E-08	1.33E-04
Perylene	198-55-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Phenanthrene	85-01-8	-	2013 AER/TRI	0.00E+00	0.00E+00
Phenol	108-95-2	-	2013 AER/TRI	0.00E+00	0.00E+00
Phosphorus	7723-14-0	-	2013 AER/TRI	0.00E+00	0.00E+00
PAHs, total, with individ. components also reported	1150	0.000004820	2013 AER/TRI	9.97E-11	8.73E-07
Propylene	115-07-1	-	2013 AER/TRI	0.00E+00	0.00E+00
Pyrene	129-00-0	0.000004931	2013 AER/TRI	1.02E-10	8.93E-07
Selenium	7782-49-2	-	2013 AER/TRI	0.00E+00	0.00E+00
Silver	7440-22-4	-	2013 AER/TRI	0.00E+00	0.00E+00
Sulfuric Acid	7664-93-9	~~7.00E-01~~	~~2013 AER/TRI~~ Appendix A, Table A-26	~~1.45E-05~~ 2.61E-02	~~1.27E-01~~ 229.02
Thallium	7440-28-0	-	2013 AER/TRI	0.00E+00	0.00E+00
Toluene	108-88-3	-	2013 AER/TRI	0.00E+00	0.00E+00
Xylenes (mixed)	1330-20-7	-	2013 AER/TRI	0.00E+00	0.00E+00
Zinc	7440-66-6	0.426655344	2013 AER/TRI	8.82E-06	7.73E-02
* Toxic pollutant emissions increases estimated based on historic emissions data multiplied by the estimated % sulfur loading increase.					

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-11: Wilmington Combustion Unit Toxic Emissions Calculations (Increased Utilization)

Wilmington Boilers 7 & 8 (D722 and D723)

Projected Emisions Characteristics

Est. Incr. in Firing Rate:	5	mmbtu/hr
HHV	1228	mmbtu/mmscf
Fuel:	RFG, NG	

Projected Emissions | **Emissions Increase**

Chemical Name	CAS No.	Lbs/mmscf	EF Basis	Emissions (lbs/hr)	Emissions (lbs/year)
2-Methylnaphthalene	91-57-6	1.15E-04	2013 AER/TRI	0.00	0.00
Acenaphthene	83-32-9	1.24E-05	2013 AER/TRI	0.00	0.00
Acenaphthylene	208-96-8	1.44E-04	2013 AER/TRI	0.00	0.01
Acetaldehyde	75-07-0	5.14E-01	2013 AER/TRI	0.00	18.33
Acrolein	107-02-8	0.00E+00	2013 AER/TRI	-	-
Ammonia	7664-41-7	0.00E+00	2013 AER/TRI	-	-
Anthracene	120-12-7	3.54E-05	2013 AER/TRI	0.00	0.00
Antimony	7440-36-0	0.00E+00	2013 AER/TRI	-	-
Arsenic	7440-38-2	2.53E-03	2013 AER/TRI	0.00	0.09
Barium	7440-39-3	0.00E+00	2013 AER/TRI	-	-
Benzene	71-43-2	2.06E-01	2013 AER/TRI	0.00	7.35
Benzo(a)anthracene	56-55-3	1.08E-05	2013 AER/TRI	0.00	0.00
Benzo(a)pyrene	50-32-8	3.42E-06	2013 AER/TRI	0.00	0.00
Benzo(b)fluoranthene	205-99-2	1.56E-04	2013 AER/TRI	0.00	0.01
Benzo(e)pyrene	192-97-2	2.15E-05	2013 AER/TRI	0.00	0.00
Benzo(g,h,i)perylene	191-24-2	3.85E-06	2013 AER/TRI	0.00	0.00
Benzo(k)fluoranthene	207-08-9	3.05E-05	2013 AER/TRI	0.00	0.00
Beryllium	7440-41-7	1.55E-04	2013 AER/TRI	0.00	0.01
Cadmium	7440-43-9	2.38E-03	2013 AER/TRI	0.00	0.08
Carbon Disulfide	75-15-0	0.00E+00	2013 AER/TRI	-	-
Carbonyl Sulfide	463-58-1	0.00E+00	2013 AER/TRI	-	-
Chromium	7440-47-3	1.39E-03	2013 AER/TRI	0.00	0.05
Chromium (Hexavalent)	18540-29-9	5.12E-05	2013 AER/TRI	0.00	0.00
Chrysene	218-01-9	9.87E-05	2013 AER/TRI	0.00	0.00
Copper	7440-50-8	3.66E-03	2013 AER/TRI	0.00	0.13
Cyanide compounds	57-12-5	0.00E+00	2013 AER/TRI	-	-
Dibenz(a,h)anthracene	53-70-3	1.61E-06	2013 AER/TRI	0.00	0.00
Dimethyl disulfide	624-92-0	0.00E+00	2013 AER/TRI	-	-
Ethylbenzene	100-41-4	0.00E+00	2013 AER/TRI	-	-
Fluoranthene	206-44-0	1.54E-04	2013 AER/TRI	0.00	0.01
Fluorene	86-73-7	8.40E-05	2013 AER/TRI	0.00	0.00
Formaldehyde	50-00-0	1.75E+00	2013 AER/TRI	0.01	62.28
Hydrochloric acid	7647-01-0	2.82E+00	2013 AER/TRI	0.01	100.44
Hydrogen sulfide	7783-06-4	2.74E-01	2013 AER/TRI	0.00	9.77
Indeno(1,2,3-cd)pyrene	193-39-5	4.54E-06	2013 AER/TRI	0.00	0.00
Lead	7439-92-1	2.85E-03	2013 AER/TRI	0.00	0.10
Manganese	7439-96-5	1.39E-01	2013 AER/TRI	0.00	4.96
Mercury	7439-97-6	2.60E-04	2013 AER/TRI	0.00	0.01
Methyl mercaptan	74-93-1	0.00E+00	2013 AER/TRI	-	-
Naphthalene	91-20-3	1.36E-03	2013 AER/TRI	0.00	0.05
Nickel	7440-02-0	1.62E-02	2013 AER/TRI	0.00	0.58
Perylene	198-55-0	0.00E+00	2013 AER/TRI	-	-
Phenanthrene	85-01-8	3.11E-04	2013 AER/TRI	0.00	0.01
Phenol	108-95-2	6.25E-02	2013 AER/TRI	0.00	2.23
Phosphorus	7723-14-0	0.00E+00	2013 AER/TRI	-	-
PAHs, total, with individ. components also reported	1150	1.54E-04	2013 AER/TRI	0.00	0.01
Propylene	115-07-1	0.00E+00	2013 AER/TRI	-	-
Pyrene	129-00-0	6.75E-05	2013 AER/TRI	0.00	0.00
Selenium	7782-49-2	3.27E-01	2013 AER/TRI	0.00	11.67
Silver	7440-22-4	0.00E+00	2013 AER/TRI	-	-
Sulfuric Acid	7664-93-9	~~5.63E-01~~	~~2013 AER/TRI~~ Appendix A, Table A-26	~~0.00~~ 6.52E-02	~~20.09~~ 570.92
Thallium	7440-28-0	0.00E+00	2013 AER/TRI	-	-
Toluene	108-88-3	8.40E-01	2013 AER/TRI	0.00	29.96
Xylenes (mixed)	1330-20-7	0.00E+00	2013 AER/TRI	-	-
Zinc	7440-66-6	9.69E-02	2013 AER/TRI	0.00	3.46

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Appendix A: Summary of Emissions

Table A-11: Wilmington Combustion Unit Toxic Emissions Calculations (Increased Utilization)

Wilmington Boilers 9 & 10 (D724 and D725)

Projected Emisions Characteristics

Est. Incr. in Firing Rate:	5	mmbtu/hr
HHV	1228	mmbtu/mmscf
Fuel:	RFG, NG	

Chemical Name	CAS No.	Projected Emissions Lbs/mmscf	EF Basis	Emissions Increase Emissions (lbs/hr)	Emissions (lbs/year)
2-Methylnaphthalene	91-57-6	1.15E-04	2013 AER/TRI	0.00	0.00
Acenaphthene	83-32-9	1.24E-05	2013 AER/TRI	0.00	0.00
Acenaphthylene	208-96-8	1.44E-04	2013 AER/TRI	0.00	0.01
Acetaldehyde	75-07-0	5.14E-01	2013 AER/TRI	0.00	18.33
Acrolein	107-02-8	0.00E+00	2013 AER/TRI	-	-
Ammonia	7664-41-7	0.00E+00	2013 AER/TRI	-	-
Anthracene	120-12-7	3.54E-05	2013 AER/TRI	0.00	0.00
Antimony	7440-36-0	0.00E+00	2013 AER/TRI	-	-
Arsenic	7440-38-2	2.53E-03	2013 AER/TRI	0.00	0.09
Barium	7440-39-3	0.00E+00	2013 AER/TRI	-	-
Benzene	71-43-2	2.06E-01	2013 AER/TRI	0.00	7.35
Benzo(a)anthracene	56-55-3	1.08E-05	2013 AER/TRI	0.00	0.00
Benzo(a)pyrene	50-32-8	3.42E-06	2013 AER/TRI	0.00	0.00
Benzo(b)fluoranthene	205-99-2	1.56E-04	2013 AER/TRI	0.00	0.01
Benzo(e)pyrene	192-97-2	2.15E-05	2013 AER/TRI	0.00	0.00
Benzo(g,h,i)perylene	191-24-2	3.85E-06	2013 AER/TRI	0.00	0.00
Benzo(k)fluoranthene	207-08-9	3.05E-05	2013 AER/TRI	0.00	0.00
Beryllium	7440-41-7	1.55E-04	2013 AER/TRI	0.00	0.01
Cadmium	7440-43-9	2.38E-03	2013 AER/TRI	0.00	0.08
Carbon Disulfide	75-15-0	0.00E+00	2013 AER/TRI	-	-
Carbonyl Sulfide	463-58-1	0.00E+00	2013 AER/TRI	-	-
Chromium	7440-47-3	1.39E-03	2013 AER/TRI	0.00	0.05
Chromium (Hexavalent)	18540-29-9	5.12E-05	2013 AER/TRI	0.00	0.00
Chrysene	218-01-9	9.87E-05	2013 AER/TRI	0.00	0.00
Copper	7440-50-8	3.66E-03	2013 AER/TRI	0.00	0.13
Cyanide compounds	57-12-5	0.00E+00	2013 AER/TRI	-	-
Dibenz(a,h)anthracene	53-70-3	1.61E-06	2013 AER/TRI	0.00	0.00
Dimethyl disulfide	624-92-0	0.00E+00	2013 AER/TRI	-	-
Ethylbenzene	100-41-4	0.00E+00	2013 AER/TRI	-	-
Fluoranthene	206-44-0	1.54E-04	2013 AER/TRI	0.00	0.01
Fluorene	86-73-7	8.40E-05	2013 AER/TRI	0.00	0.00
Formaldehyde	50-00-0	1.75E+00	2013 AER/TRI	0.01	62.28
Hydrochloric acid	7647-01-0	2.82E+00	2013 AER/TRI	0.01	100.44
Hydrogen sulfide	7783-06-4	2.74E-01	2013 AER/TRI	0.00	9.77
Indeno(1,2,3-cd)pyrene	193-39-5	4.54E-06	2013 AER/TRI	0.00	0.00
Lead	7439-92-1	2.85E-03	2013 AER/TRI	0.00	0.10
Manganese	7439-96-5	1.39E-01	2013 AER/TRI	0.00	4.96
Mercury	7439-97-6	2.60E-04	2013 AER/TRI	0.00	0.01
Methyl mercaptan	74-93-1	0.00E+00	2013 AER/TRI	-	-
Naphthalene	91-20-3	1.36E-03	2013 AER/TRI	0.00	0.05
Nickel	7440-02-0	1.62E-02	2013 AER/TRI	0.00	0.58
Perylene	198-55-0	0.00E+00	2013 AER/TRI	-	-
Phenanthrene	85-01-8	3.11E-04	2013 AER/TRI	0.00	0.01
Phenol	108-95-2	6.25E-02	2013 AER/TRI	0.00	2.23
Phosphorus	7723-14-0	0.00E+00	2013 AER/TRI	-	-
PAHs, total, with individ. components also reported	1150	1.54E-04	2013 AER/TRI	0.00	0.01
Propylene	115-07-1	0.00E+00	2013 AER/TRI	-	-
Pyrene	129-00-0	6.75E-05	2013 AER/TRI	0.00	0.00
Selenium	7782-49-2	3.27E-01	2013 AER/TRI	0.00	11.67
Silver	7440-22-4	0.00E+00	2013 AER/TRI	-	-
Sulfuric Acid	7664-93-9	~~3.81E-01~~	~~2013 AER/TRI~~ Appendix A, Table A-26	~~0.00~~ 1.03E-01	~~13.61~~ 902.68
Thallium	7440-28-0	0.00E+00	2013 AER/TRI	-	-
Toluene	108-88-3	8.40E-01	2013 AER/TRI	0.00	29.96
Xylenes (mixed)	1330-20-7	0.00E+00	2013 AER/TRI	-	-
Zinc	7440-66-6	9.69E-02	2013 AER/TRI	0.00	3.46

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-12: Wilmington FCCU Complex Historic Emissions (Critieria)

FCCU Regenerator (Process 3, Systems 1 and 2)

	2012	2013	Units	Average	Units	Source
NOx	111,147.84	139,465.58	lbs/year	343.31	lbs/day	RECLAIM Data (includes CO boiler and bypass
SOx	152,347.73	130,527.46	lbs/year	387.50	lbs/day	stack emissions)
CO	-	-	lbs/year	-	lbs/day	CO included as part of the CO boiler emissions
PM	41,889.68	30,081.84	lbs/year	98.59	lbs/day	AER
VOC	83,623.68	116,420.40	lbs/year	274.03	lbs/day	AER
CO2	262,313.40	231,410.70	MT/Yr	1,491,060.31	lbs/day	EPA GHG Report
CH4	7.68	6.78	MT/Yr	43.67	lbs/day	EPA GHG Report
N2O	1.54	1.36	MT/Yr	8.74	lbs/day	EPA GHG Report
CO2e	262,951.00	231,984.00	MT/Yr	1,494,717.26	lbs/day	EPA GHG Report

CO Boiler BO-1 (D112)

	2012	2013	Units	Average	Units	Source
NOx	-	-	lbs/year	-	lbs/day	Included with FCCU, above
SOx	-	-	lbs/year	-	lbs/day	Included with FCCU, above
CO	342,534.86	321,488.56	lbs/year	909.62	lbs/day	AER (Includes FCCU emissions)
PM	8,705.12	7,870.48	lbs/year	22.71	lbs/day	AER
VOC	6,299.76	5,695.75	lbs/year	16.43	lbs/day	AER
CO2	74,356.40	70,124.70	MT/Yr	436,336.88	lbs/day	EPA GHG Report
CH4	4.07	3.79	MT/Yr	23.74	lbs/day	EPA GHG Report
N2O	0.81	0.76	MT/Yr	4.74	lbs/day	EPA GHG Report
CO2e	74,694.00	70,445.00	MT/Yr	438,323.76	lbs/day	EPA GHG Report

H2 Heater (D92)

	2012	2013	Units	Average	Units	Source
NOx	5,639.00	6,428.00	lbs/year	16.53	lbs/day	RECLAIM Data
SOx	438.00	494.00	lbs/year	1.28	lbs/day	RECLAIM Data
CO	1,422.40	1,538.85	lbs/year	4.06	lbs/day	AER
PM	304.80	329.75	lbs/year	0.87	lbs/day	AER
VOC	284.48	307.77	lbs/year	0.81	lbs/day	AER
CO2	2,653.80	2,997.00	MT/Yr	17,065.57	lbs/day	EPA GHG Report
CH4	0.14	0.16	MT/Yr	0.91	lbs/day	EPA GHG Report
N2O	0.03	0.03	MT/Yr	0.18	lbs/day	EPA GHG Report
CO2e	2,666.00	3,011.00	MT/Yr	17,144.70	lbs/day	EPA GHG Report

H3/4 Heater (D89 & D90)

	2012	2013	Units	Average	Units	Source
NOx	70,910.00	82,211.00	lbs/year	209.75	lbs/day	RECLAIM Data
SOx	9,989.00	10,150.00	lbs/year	27.59	lbs/day	RECLAIM Data
CO	10,567.23	22,499.00	lbs/year	45.30	lbs/day	AER
PM	17,857.51	17,917.35	lbs/year	49.01	lbs/day	AER
VOC	3,617.53	3,629.73	lbs/year	9.93	lbs/day	AER
CO2	60,179.20	60,748.20	MT/Yr	365,204.06	lbs/day	EPA GHG Report
CH4	3.29	3.28	MT/Yr	19.84	lbs/day	EPA GHG Report
N2O	0.66	0.66	MT/Yr	3.97	lbs/day	EPA GHG Report
CO2e	60,452.00	61,026.00	MT/Yr	366,866.89	lbs/day	EPA GHG Report

H5 Heater (D91)

	2012	2013	Units	Average	Units	Source
NOx	-	-	lbs/year	-	lbs/day	RECLAIM Data
SOx	-	-	lbs/year	-	lbs/day	RECLAIM Data
CO	-	-	lbs/year	-	lbs/day	AER
PM	-	-	lbs/year	-	lbs/day	AER
VOC	-	-	lbs/year	-	lbs/day	AER
CO2	-	-	MT/Yr	-	lbs/day	EPA GHG Report
CH4	-	-	MT/Yr	-	lbs/day	EPA GHG Report
N2O	-	-	MT/Yr	-	lbs/day	EPA GHG Report
CO2e	-	-	MT/Yr	-	lbs/day	EPA GHG Report

Startup Heater B-1 (D1664)

	2012	2013	Units	Average	Units	Source
NOx	988.00	1,202.50	lbs/year	3.00	lbs/day	AER
SOx	4.56	5.55	lbs/year	0.01	lbs/day	AER
CO	266.00	323.75	lbs/year	0.81	lbs/day	AER
PM	57.00	69.38	lbs/year	0.17	lbs/day	AER
VOC	53.20	64.75	lbs/year	0.16	lbs/day	AER
CO2	393.90	471.80	MT/Yr	2,614.44	lbs/day	EPA GHG Report
CH4	0.01	0.01	MT/Yr	0.06	lbs/day	EPA GHG Report
N2O	0.00	0.00	MT/Yr	0.01	lbs/day	EPA GHG Report
CO2e	394.00	472.00	MT/Yr	2,615.34	lbs/day	EPA GHG Report

Fugitive VOC Emissions (Fugitive Components at the FCCU)

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-12: Wilmington FCCU Complex Historic Emissions (Critieria)

	2012	2013	Units	Average	Units	Source
FCCU Recovery	3,392.59	4,633.06	lbs/year	10.99	lbs/day	Guideware database
FCCU Cracking	2,163.26	2,657.65	lbs/year	6.60	lbs/day	Guideware database
Total:	5,555.85	7,290.71	lbs/year	17.60	lbs/day	

* VOC fugitive component emissions from the FCCU Regenerator, CO Boiler, H-2, H-3, H-4, H-5 and Startup Heaters are included as part of the Recovery and Cracking Systems (P3, S1 and S2)

Total Emissions

	2012	2013	Units	Average	Units	Average	Units
NOx	188,684.84	229,307.08	lbs/year	572.59	lbs/day	104.50	tons/year
SOx	162,779.29	141,177.01	lbs/year	416.38	lbs/day	75.99	tons/year
CO	354,790.49	345,850.16	lbs/year	959.78	lbs/day	175.16	tons/year
PM	68,814.11	56,268.80	lbs/year	171.35	lbs/day	31.27	tons/year
VOC	99,434.50	133,409.11	lbs/year	318.96	lbs/day	58.21	tons/year
CO_2	399,896.70	365,752.40	MT/Yr	2,312,281.26	lbs/day	421,991.33	tons/year
CH_4	15.19	14.02	MT/Yr	88.22	lbs/day	16.10	tons/year
N_2O	3.04	2.80	MT/Yr	17.64	lbs/day	3.22	tons/year
CO_2e	401,157.00	366,938.00	MT/Yr	2,319,667.94	lbs/day	423,339.40	tons/year

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-13: Wilmington FCCU Complex Historic Emissions (Toxics from Heaters)

Units (Pounds Per Year)

Chemical Name	CAS No.	FCCU Regenerator 2012	FCCU Regenerator 2013	FCCU Regenerator Average	FCCU COB 2012	FCCU COB 2013	FCCU COB Average	FCCU H2 Heater 2012	FCCU H2 Heater 2013	FCCU H2 Heater Average	FCCU H3 Heater 2012	FCCU H3 Heater 2013	FCCU H3 Heater Average	FCCU H4 Heater 2012	FCCU H4 Heater 2013	FCCU H4 Heater Average	FCCU H5 Heater (Out Of Service for 2012/2013) 2012	FCCU H5 Heater 2013	FCCU H5 Heater Average	FCCU S-Up Heater 2012	FCCU S-Up Heater 2013	FCCU S-Up Heater Average
1,2,4-Trimethylbenzene	95-63-6			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
2-Methylnaphthalene	91-57-6			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			0.00E+00			0.00E+00
Acenaphthene	83-32-9			0.00E+00	4.18E-03	3.92E-03	4.05E-03	6.93E-03	7.78E-03	7.36E-03	6.70E-02	6.72E-02	6.71E-02	9.00E-02	9.03E-02	9.02E-02			0.00E+00			0.00E+00
Acenaphthylene	208-96-8			0.00E+00	2.67E-03	2.51E-03	2.59E-03	2.92E-03	3.28E-03	3.10E-03	2.82E-02	2.83E-02	2.83E-02	3.79E-02	3.81E-02	3.80E-02			0.00E+00			0.00E+00
Anthracene	120-12-7			0.00E+00	9.72E-03	9.12E-03	9.42E-03	1.15E-02	1.29E-02	1.22E-02	1.11E-01	1.12E-01	1.11E-01	1.49E-01	1.50E-01	1.50E-01			0.00E+00			0.00E+00
Antimony	7440-36-0			0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.36E-02	2.55E-02	2.46E-02		2.21E-01	2.21E-01	3.07E-01	2.96E-01	3.01E-01			0.00E+00			0.00E+00
Barium	7440-39-3			0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.64E-01	2.85E-01	2.75E-01	2.55E+00	2.46E+00	2.51E+00	3.42E+00	3.31E+00	3.37E+00			0.00E+00			0.00E+00
Benzo(g,h,i)perylene	191-24-2			0.00E+00	4.41E-03	3.99E-03	4.20E-03	9.53E-04	1.07E-03	1.01E-03	9.21E-03	9.24E-03	9.23E-03	1.24E-02	1.24E-02	1.24E-02			0.00E+00			0.00E+00
Carbonyl sulfide	463-58-1			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			0.00E+00			0.00E+00
Cobalt	7440-48-4			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
Cyclohexane	110-82-7			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
Dichlorobenzene	95-50-1			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
Dioxin and dioxin-like co	1086			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
Ethylene	74-85-1			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
Fluoranthene	206-44-0			0.00E+00	3.89E-02	3.65E-02	3.77E-02	2.78E-02	3.12E-02	2.95E-02	2.69E-01	2.69E-01	2.69E-01	3.61E-01	3.62E-01	3.61E-01			0.00E+00			0.00E+00
Fluorene	86-73-7			0.00E+00	1.41E-02	1.32E-02	1.37E-02	7.08E-02	7.95E-02	7.51E-02	6.84E-01	6.86E-01	6.85E-01	9.19E-01	9.22E-01	9.20E-01			0.00E+00			0.00E+00
Molybdenum Trioxide	1313-27-5			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
Phenanthrene	85-01-8			0.00E+00	9.05E-02	8.49E-02	8.77E-02	5.44E-02	6.11E-02	5.77E-02	5.26E-01	5.28E-01	5.27E-01	7.06E-01	7.09E-01	7.07E-01			0.00E+00			0.00E+00
Phosphorus	7723-14-0			0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.93E-02	3.17E-02	3.05E-02	2.83E-01	2.74E-01	2.78E-01	3.80E-01	3.68E-01	3.74E-01			0.00E+00			0.00E+00
Pyrene	129-00-0			0.00E+00	2.17E-02	2.04E-02	2.10E-02	3.37E-02	3.78E-02	3.58E-02	3.26E-01	3.27E-01	3.26E-01	4.38E-01	4.39E-01	4.38E-01			0.00E+00			0.00E+00
Silver	7440-22-4			0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.35E-02	7.96E-02	7.66E-02	7.11E-01	6.87E-01	6.99E-01	9.55E-01	9.23E-01	9.39E-01			0.00E+00			0.00E+00
Thallium	7440-28-0			0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.64E-01	2.85E-01	2.75E-01	2.55E+00	2.46E+00	2.51E+00	3.42E+00	3.31E+00	3.37E+00			0.00E+00			0.00E+00
Zinc	7440-66-6			0.00E+00	5.36E+01	5.03E+01	5.19E+01	3.71E-01	4.17E-01	3.94E-01	3.59E+00	3.60E+00	3.59E+00	4.82E+00	4.84E+00	4.83E+00			0.00E+00			0.00E+00
Acetaldehyde	75-07-0			0.00E+00	4.55E+00	4.11E+00	4.33E+00	1.96E+00	2.20E+00	2.08E+00	1.89E+01	1.90E+01	1.90E+01	2.54E+01	2.55E+01	2.55E+01			0.00E+00	2.00E-02	3.00E-02	2.50E-02
Arsenic	7440-38-2			0.00E+00	8.06E-01	7.29E-01	7.68E-01	3.88E-02	4.19E-02	4.04E-02	3.75E-01	3.62E-01	3.68E-01	5.03E-01	4.87E-01	4.95E-01			0.00E+00			0.00E+00
Acrolein	107-02-8			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			0.00E+00	2.00E-02	2.00E-02	2.00E-02
Ammonia	7664-41-7	1.41E+04	1.84E+03	7.99E+03	0.00E+00	0.00E+00	0.00E+00	1.30E+02	1.41E+02	1.35E+02	1.26E+03	1.21E+03	1.24E+03	1.69E+03	1.63E+03	1.66E+03			0.00E+00			0.00E+00
Benzene	71-43-2			0.00E+00	2.36E+02	2.13E+02	2.25E+02	9.63E+00	1.08E+01	1.02E+01	9.31E+01	9.34E+01	9.32E+01	1.25E+02	1.25E+02	1.25E+02			0.00E+00	4.00E-02	5.00E-02	4.50E-02
Beryllium	7440-41-7			0.00E+00	1.41E-01	1.32E-01	1.37E-01	1.17E-02	1.27E-02	1.22E-02	1.13E-01	1.09E-01	1.11E-01	1.52E-01	1.47E-01	1.49E-01			0.00E+00			0.00E+00
1,3-Butadiene	106-99-0			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
Cadmium	7440-43-9			0.00E+00	2.73E+00	2.46E+00	2.60E+00	4.51E-02	4.88E-02	4.69E-02	4.36E-01	4.21E-01	4.29E-01	5.86E-01	5.66E-01	5.76E-01			0.00E+00			0.00E+00
Carbon Disulfide	75-15-0			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			0.00E+00			0.00E+00
Chromium (hexavalent)	18540-29-9			0.00E+00	4.69E-02	4.41E-02	4.55E-02	1.06E-02	1.19E-02	1.13E-02	1.03E-01	1.03E-01	1.03E-01	1.38E-01	1.39E-01	1.38E-01			0.00E+00			0.00E+00
Copper	7440-50-8			0.00E+00	5.56E+00	5.22E+00	5.39E+00	1.92E-01	2.08E-01	2.00E-01	1.86E+00	1.80E+00	1.83E+00	2.50E+00	2.41E+00	2.45E+00			0.00E+00			0.00E+00
Carbon Tetrachloride	56-23-5			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
Hydrogen cyanide	74-90-8			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
Ethylbenzene	100-41-4			0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.24E+00	1.34E+00	1.29E+00	1.19E+01	1.15E+01	1.17E+01	1.60E+01	1.55E+01	1.58E+01			0.00E+00	5.00E-02	6.00E-02	5.50E-02
Formaldehyde	50-00-0			0.00E+00	1.83E+01	1.66E+01	1.74E+01	6.55E+01	7.35E+01	6.95E+01	6.33E+02	6.35E+02	6.34E+02	8.50E+02	8.53E+02	8.51E+02			0.00E+00	9.00E-02	1.10E-01	1.00E-01
Hydrochloric acid	7647-01-0			0.00E+00	4.36E+03	4.09E+03	4.22E+03	2.70E+01	3.03E+01	2.87E+01	2.61E+02	2.62E+02	2.61E+02	3.51E+02	3.52E+02	3.51E+02			0.00E+00			0.00E+00
Hydrogen sulfide	7783-06-4			0.00E+00	1.96E+01	9.34E+00	1.45E+01	7.00E-01	3.80E-01	5.40E-01	7.21E+00	3.32E+00	5.27E+00	9.68E+00	4.46E+00	7.07E+00			0.00E+00	5.00E-02	7.00E-02	6.00E-02
Hexane	110-54-3			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00	3.00E-02	4.00E-02	3.50E-02
Lead	7439-92-1			0.00E+00	3.38E+00	3.17E+00	3.27E+00	2.98E-02	3.35E-02	3.17E-02	2.89E-01	2.89E-01	2.89E-01	3.88E-01	3.89E-01	3.88E-01			0.00E+00			0.00E+00
Manganese	7439-96-5			0.00E+00	5.43E+00	5.09E+00	5.26E+00	6.50E-02	7.30E-02	6.90E-02	6.28E-01	6.30E-01	6.29E-01	8.44E-01	8.47E-01	8.45E-01			0.00E+00			0.00E+00
Mercury	7439-97-6			0.00E+00	5.94E-01	5.57E-01	5.76E-01	8.38E-03	9.41E-03	8.89E-03	8.10E-02	8.12E-02	8.11E-02	1.09E-01	1.09E-01	1.09E-01			0.00E+00			0.00E+00
Nickel	7440-02-0			0.00E+00	5.88E+01	5.51E+01	5.69E+01	2.18E-01	2.44E-01	2.31E-01	2.10E+00	2.11E+00	2.11E+00	2.83E+00	2.83E+00	2.83E+00			0.00E+00			0.00E+00
Benzo(a)anthracene	56-55-3			0.00E+00	3.09E-03	2.90E-03	3.00E-03	4.70E-03	5.28E-03	4.99E-03	4.55E-02	4.56E-02	4.55E-02	6.11E-02	6.13E-02	6.12E-02			0.00E+00			0.00E+00
Benzo(a)pyrene	50-32-8			0.00E+00	3.92E-03	3.54E-03	3.73E-03	1.68E-03	1.89E-03	1.79E-03	1.63E-02	1.63E-02	1.63E-02	2.19E-02	2.19E-02	2.19E-02			0.00E+00			0.00E+00
Benzo(b)fluoranthene	205-99-2			0.00E+00	9.21E-03	8.65E-03	8.93E-03	1.16E-02	1.31E-02	1.24E-02	1.13E-01	1.13E-01	1.13E-01	1.51E-01	1.52E-01	1.52E-01			0.00E+00			0.00E+00
Benzo(k)fluoranthene	207-08-9			0.00E+00	1.71E-03	1.60E-03	1.66E-03	3.68E-03	4.14E-03	3.91E-03	3.56E-02	3.57E-02	3.57E-02	4.78E-02	4.80E-02	4.79E-02			0.00E+00			0.00E+00
Chrysene	218-01-9			0.00E+00	2.24E-02	2.10E-02	2.17E-02	1.71E-02	1.92E-02	1.82E-02	1.66E-01	1.66E-01	1.66E-01	2.23E-01	2.23E-01	2.23E-01			0.00E+00			0.00E+00
Dibenz(a,h)anthracene	53-70-3			0.00E+00	2.93E-03	2.65E-03	2.79E-03	5.92E-04	6.65E-04	6.28E-04	5.72E-03	5.74E-03	5.73E-03	7.69E-03	7.71E-03	7.70E-03			0.00E+00			0.00E+00
Tetrachloroethylene	127-18-4			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
7,12-Dimethylbenz(a)ant	57-97-6			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5			0.00E+00	2.93E-03	2.65E-03	2.79E-03	9.82E-04	1.10E-03	1.04E-03	9.49E-03	9.52E-03	9.51E-03	1.28E-02	1.28E-02	1.28E-02			0.00E+00			0.00E+00
3-Methylchloranthrene	56-49-5			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
Phenol	108-95-2			0.00E+00	1.93E+00	1.81E+00	1.87E+00	8.28E-01	9.30E-01	8.79E-01	8.00E+00	8.03E+00	8.02E+00	1.08E+01	1.08E+01	1.08E+01			0.00E+00			0.00E+00
Naphthalene	91-20-3			0.00E+00	3.57E-01	3.35E-01	3.46E-01	4.47E-01	5.02E-01	4.74E-01	4.32E+00	4.33E+00	4.33E+00	5.80E+00	5.82E+00	5.81E+00			0.00E+00	2.00E-03	3.00E-03	2.50E-03
Propylene	115-07-1			0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.33E-02	9.01E-02	8.67E-02	8.05E-01	7.78E-01	7.92E-01	1.08E+00	1.05E+00	1.06E+00			0.00E+00			0.00E+00
Selenium	7782-49-2			0.00E+00	9.24E+00	8.67E+00	8.95E+00	1.23E-01	1.38E-01	1.31E-01	1.19E+00	1.20E+00	1.19E+00	1.60E+00	1.61E+00	1.60E+00			0.00E+00			0.00E+00
Sulfuric Acid	7664-93-9			0.00E+00	2.64E+03	2.26E+03	2.45E+03	5.47E+00	6.18E+00	5.82E+00	1.27E+01	8.06E+00	1.04E+01	1.03E+01	1.54E+01	1.29E+01			0.00E+00			0.00E+00
Toluene	108-88-3			0.00E+00	9.62E+02	8.70E+02	9.16E+02	5.57E+00	6.02E+00	5.79E+00	5.38E+01	5.20E+01	5.29E+01	7.23E+01	6.99E+01	7.11E+01			0.00E+00	2.00E-01	2.50E-01	2.25E-01
Vanadium	7440-62-2			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00			0.00E+00
Xylenes (mixed)	1330-20-7			0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.79E+00	3.13E+00	2.96E+00	2.69E+01	2.70E+01	2.70E+01	3.62E+01	3.63E+01	3.63E+01			0.00E+00	1.50E-01	1.80E-01	1.65E-01
Cyanide compounds	57-12-5			0.00E+00	3.03E+02	2.84E+02	2.93E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			0.00E+00			0.00E+00
Benzo(e)pyrene	192-97-2			0.00E+00	7.44E-03	6.98E-03	7.21E-03	6.50E-03	7.30E-03	6.90E-03	6.28E-02	6.30E-02	6.29E-02	8.44E-02	8.47E-02	8.45E-02			0.00E+00			0.00E+00
Perylene	198-55-0			0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.87E-04	6.59E-04	6.23E-04	5.68E-03	5.70E-03	5.69E-03	7.63E-03	7.65E-03	7.64E-03			0.00E+00			0.00E+00
PAHs, total, with individ.	1150			0.00E+00	3.89E-02	3.65E-02	3.77E-02	2.78E-02	3.12E-02	2.95E-02	2.69E-01	2.69E-01	2.69E-01	3.61E-01	3.62E-01	3.61E-01			0.00E+00	1.00E-03	1.00E-03	1.00E-03

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-14: Wilmington FCCU Complex Historic Emissions (Toxics from Fugitive Components)

		FCCU Complex (lbs/year)		
Chemical Name	**CAS No.**	**2012**	**2013**	**Average**
1,2,4-Trimethylbenzene	95-63-6	3.88E+02	2.43E+01	2.06E+02
1,2-Dibromoethane	106-93-4	8.77E-01	0.00E+00	4.39E-01
1,3-Butadiene	106-99-0	2.64E+02	6.15E+01	1.63E+02
2,4-Dimethylphenol	105-67-9	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	208-96-8	0.00E+00	0.00E+00	0.00E+00
Acetone	67-64-1	0.00E+00	0.00E+00	0.00E+00
Ammonia	7664-41-7	2.29E+02	4.93E+00	1.17E+02
Anthracene	120-12-7	0.00E+00	0.00E+00	0.00E+00
Benzene	71-43-2	3.53E+02	7.26E+00	1.80E+02
Butyl alcohol (n-)	71-36-3	0.00E+00	0.00E+00	0.00E+00
Carbon disulfide	75-15-0	0.00E+00	0.00E+00	0.00E+00
Chloroform	67-66-3	0.00E+00	0.00E+00	0.00E+00
Cresols (mixtures of) {cresylic acid}	1319-77-3	6.75E+01	0.00E+00	3.37E+01
Cumene	98-82-8	2.99E+01	9.33E-01	1.54E+01
Cyclohexane	110-82-7	1.44E+02	5.34E-01	7.21E+01
Dichloroethane (1,2)	107-06-2	9.24E-01	0.00E+00	4.62E-01
Diethanolamine	111-42-2	1.14E+03	4.28E+02	7.82E+02
Ethylbenzene	100-41-4	3.00E+02	1.02E+01	1.55E+02
Ethylene	74-85-1	1.19E+03	1.17E+02	6.54E+02
Fluorene	86-73-7	0.00E+00	0.00E+00	0.00E+00
Hexane	110-54-3	9.81E+02	4.03E+01	5.11E+02
Hydrogen sulfide	7783-06-4	1.51E+03	1.18E+02	8.13E+02
Methane	74-82-8	0.00E+00	0.00E+00	0.00E+00
Methanol	67-56-1	6.70E+02	0.00E+00	3.35E+02
Methylene chloride	75-09-2	0.00E+00	0.00E+00	0.00E+00
Methyl tert-butyl ether	1634-04-4	0.00E+00	0.00E+00	0.00E+00
Naphthalene	91-20-3	7.90E+01	8.41E+00	4.37E+01
Phenanthrene	85-01-8	7.50E-01	0.00E+00	3.75E-01
Phenol	108-95-2	5.96E+01	1.17E+01	3.56E+01
Propylene	115-07-1	1.14E+03	1.64E+02	6.50E+02
Propylene	100-42-5	3.16E+00	0.00E+00	1.58E+00
Toluene	108-88-3	1.50E+03	3.15E+01	7.68E+02
Trichloroethane (1,1,1)	71-55-6	3.01E+02	0.00E+00	1.51E+02
Xylenes (mixed)	1330-20-7	9.90E+02	5.14E+01	5.20E+02
Benzo(g,h,i)perylene	191-24-2	0.00E+00	0.00E+00	0.00E+00
PAHs (see Chrysene)	999999	5.38E+00	2.18E+00	3.78E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	0.00E+00	0.00E+00	0.00E+00
Benzo(a)anthracene	56-55-3	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	50-32-8	0.00E+00	0.00E+00	0.00E+00
Benzo(b)fluoranthene	205-99-2	0.00E+00	0.00E+00	0.00E+00
Benzo(k)fluoranthene	207-08-9	0.00E+00	0.00E+00	0.00E+00
Chrysene	218-01-9	5.38E+00	2.18E+00	3.78E+00
Dibenz(a,h)anthracene	53-70-3	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	0.00E+00	0.00E+00	0.00E+00

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-15: Fugitive Component Emissions (Increases of VOC)

Screening Value (ppmv): 500

			Carson																	
			LPG Railcar Load/Unload		HCU Mods		Interconnect Piping		Mid Barrel Distillate		LHU Mods		NHDS Mods		Naphtha Isom		Alkylation		Wet Jet Treater	
Component Type	CAS #	VOC EF (lbs/comp/ year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)
Valves	BSV	-	176	-	-	-	143	-	23	-	123	-	200	-	152	-	174	-	-	-
	GV	4.55	159	722.77	-	-	-	-	-	-	23	104.55	45	204.56	-	-	58	263.65	-	-
	LL	4.55	158	718.23	-	-	375	1,704.65	8	36.37	195	886.42	135	613.68	53	240.92	205	931.88	-	-
	HL	4.55	-	-	128	581.85	125	568.22	-	-	-	-	-	-	-	-	-	-	1,005	4,568.47
Pumps	Sealles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dbl Mech Seal or Equiv	46.83	3	140.48	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
	Single Mech Seal	46.83	-	-	3	140.48	-	-	-	-	-	-	-	-	-	-	-	-	4	187.30
Compressor	GV	9.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pressure Relief Valves	All	-	8	-	-	-	39	-	-	-	4	-	10	-	5	-	5	-	26	-
Flanges	GV and LL	6.99	761	5,319.53	-	-	124	866.78	68	475.33	409	2,858.99	430	3,005.78	289	2,020.16	559	3,907.51	25	174.75
Connectors	GV and LL	2.86	1,000	2,861.38	-	-	810	2,317.72	23	65.81	439	1,256.15	483	1,382.05	366	1,047.27	533	1,525.12	-	-
Other	GV and LL	9.09	4	36.36	-	-	34	309.05	23	209.06	13	118.16	38	345.40	16	145.43	28	254.51	-	-
Process Drain w/P-Trap or Seal Pot	All	9.09	-	-	2	18.18	-	-	-	-	1	9.09	-	-	-	-	1	9.09	7	63.63
Flanges	HL	6.99	-	-	173	1,209.30	245	1,712.60	-	-	-	-	-	-	-	-	-	-	1,286	8,989.38
Connectors	HL	2.86	-	-	170	486.44	357	1,021.51	-	-	-	-	-	-	-	-	-	-	1,348	3,857.14
Other	HL	9.09	-	-	4	36.36	18	163.61	-	-	-	-	-	-	-	-	-	-	63	572.64
		Totals:		9,798.75		2,472.61		8,664.14		786.57		5,233.36		5,551.46		3,453.79		6,891.76		18,413.32

			Carson (cont)					
			51 Vac		Interconnect at FCCU		Crude Tanks (Fug Ems)	
Component Type	CAS #	VOC EF (lbs/comp/ year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)
Valves	BSV	-	92	-	-	-	-	-
	GV	4.55	-	-	-	-	-	-
	LL	4.55	24	109.10	-	-	-	-
	HL	4.55	165	750.05	72	327.29	722	3,282.03
Pumps	Sealles	-	-	-	-	-	-	-
	Dbl Mech Seal or Equiv	46.83	-	-	-	-	-	-
	Single Mech Seal	46.83	3	140.48	-	-	6	280.95
Compressor	GV	9.09	-	-	-	-	-	-
Pressure Relief Valves	All	-	-	-	2	-	50	-
Flanges	GV and LL	6.99	36	251.65	-	-	96	671.06
Connectors	GV and LL	2.86	51	145.93	-	-	-	-
Other	GV and LL	9.09	-	-	-	-	-	-
Process Drain w/P-Trap or Seal Pot	All	9.09	2	18.18	-	-	3	27.27
Flanges	HL	6.99	248	1,733.57	100	699.02	1,090	7,619.30
Connectors	HL	2.86	378	1,081.60	63	180.27	866	2,477.96
Other	HL	9.09	6	54.54	7	63.63	149	1,354.35
		Totals:		4,285.08		1,270.21		15,712.91

Table A-15: Fugitive Component Emissions (Increases of VOC)

			Wilmington																
			FCCU S/D	PSTU		HCU		HTU 1		HTU 2		HTU 4		Interconnect		Crude Tanks (Fug Ems)		CRU 3	
Component Type	CAS #	VOC EF (lbs/comp/year)	FCCU S/D	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)	Comp. Count Increase	VOC Emissions (lbs/year)
Valves	BSV	-	See FCCU (W) Calcs	275	-	215	-	44	-	50	-	18	-	217	-	60.00	-	251.00	-
	GV	4.55	See FCCU (W) Calcs	26	118.19	6	27.27	8	36.37	35	159.10	-	-	-	-	-	-	(8.00)	(36.37)
	LL	4.55	See FCCU (W) Calcs	60	272.74	5	22.73	32	145.46	24	109.10	-	-	450	2,045.58	48.00	218.20	1.00	4.55
	HL	4.55	See FCCU (W) Calcs	-	-	166	754.59	-	-	-	-	110	500.03	167	759.14	-	-	-	-
Pumps	Sealles	-	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dbl Mech Seal or Equiv	46.83	See FCCU (W) Calcs	6	280.95	1	46.83	3	140.48	-	-	-	-	4	187.30	-	-	7.00	327.78
	Single Mech Seal	46.83	See FCCU (W) Calcs	-	-	1	46.83	-	-	-	-	-	-	4	187.30	6.00	280.95	-	-
Compressor	GV	9.09	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pressure Relief Valves	All	-	See FCCU (W) Calcs	8	-	9	-	2	-	2	-	6	-	36	-	-	-	4.00	-
Flanges	GV and LL	6.99	See FCCU (W) Calcs	582	4,068.29	381	2,663.26	75	524.26	100	699.02	2	13.98	564	3,942.46	117.00	817.85	404.00	2,824.03
Connectors	GV and LL	2.86	See FCCU (W) Calcs	125	357.67	124	354.81	129	369.12	140	400.59	-	-	949	2,715.45	-	-	108.00	309.03
Other	GV and LL	9.09	See FCCU (W) Calcs	44	399.94	19	172.70	7	63.63	2	18.18	2	18.18	123	1,118.02	-	-	24.00	218.15
Process Drain w/P-Trap or Seal Pot	All	9.09	See FCCU (W) Calcs	15	136.34	2	18.18	-	-	-	-	1	9.09	2	18.18	-	-	10.00	90.90
Flanges	HL	6.99	See FCCU (W) Calcs	-	-	290	2,027.15	-	-	-	-	163	1,139.40	223	1,558.81	-	-	-	-
Connectors	HL	2.86	See FCCU (W) Calcs	-	-	496	1,419.25	-	-	-	-	158	452.10	324	927.09	-	-	-	-
Other	HL	9.09	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	19	172.70	13	118.16	-	-	-	-
		Totals:	-		5,634.13		7,553.60		1,279.32		1,385.99		2,305.48		13,577.50		1,317.00		3,738.07

Notes:
1) Coker Bottom Heads project will not affect fugitive component emissions.
2) ATS Plant project fugitive components are not expected to contain VOC in the process streams.
3) Sulfuric Acid Regeneration Plant project fugitive components are not expected to contain VOC in the process streams.
4) Calculations based on SCAQMD Guidelines for Fugitive Emissions Calculations, June 2003 (reference to CAPCOA California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities, February 1999), evaluated at 500 ppmv.

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-16: Fugitive Component Emissions (Increases of Toxics)

		Project Emissions - Carson (lbs/yr)													
Chemical	CAS #	LPG Railcar Load/Unload	HCU Mods	Mid Barrel Distillate Treater	LHU Mods	NHDS Mods	Naphtha Isom	Alkylation	51 Vac	Interconnect Piping - Pigging Station	Interconnect Piping - OSBL 1	Interconnect Piping - OSBL 2	Interconnect Piping - FCCU	Wet Jet Treater	Crude Tanks (Fug Ems)
1,3-Butadiene	106-99-0	7.84	-	-	0.01	0.02	0.40	0.22	-	8.57	0.36	0.32	-	-	-
Acetaldehyde	75-07-0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	7664-41-7	-	-	-	0.00	0.00	0.02	-	-	-	-	-	-	-	-
Benzene	71-43-2	0.46	-	10.24	5.41	5.53	-	0.01	0.03	39.87	1.68	1.50	0.01	-	74.16
Chloroform	67-66-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cresols (mixtures of) {cresylic acid}	1319-77-3	-	0.12	0.02	-	-	-	-	0.30	0.38	0.03	0.02	0.09	1.84	-
diethanolamine	111-42-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	100-41-4	-	1.84	4.98	-	-	-	-	0.62	57.91	2.44	2.18	0.18	4.05	43.21
Ethylene Glycol	107-21-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrogen cyanide	74-90-8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrogen sulfide	7783-06-4	3.12	-	-	102.60	106.98	0.78	2.11	-	0.00	0.00	0.00	-	-	-
Methanol	67-56-1	-	-	-	-	-	-	-	-	0.03	0.00	0.00	-	-	-
Methyl tert-butyl ether	1634-04-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	91-20-3	-	90.42	0.02	-	-	-	-	2.46	8.39	0.35	0.32	0.73	127.05	8.64
n-Hexane	110-54-3	0.42	-	24.19	8.27	9.33	25.90	0.10	-	63.57	2.68	2.39	-	-	249.84
PAHs, total, with individ. components also reported	1150	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	108-95-2	-	0.12	0.02	-	-	-	-	0.35	0.24	0.01	0.01	0.10	1.29	-
Propylene	115-07-1	7,920.76	-	-	0.73	1.42	23.96	5.64	-	3,891.85	164.10	146.36	-	-	-
Tetrachloroethylene	127-18-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	108-88-3	-	0.65	15.40	255.59	261.19	0.95	0.53	0.66	347.30	14.64	13.06	0.20	3.87	133.25
Xylenes (mixed)	1330-20-7	-	12.74	17.16	15.68	-	-	-	2.72	232.42	9.80	8.74	0.81	22.10	185.41
1,2,4-Trimethylbenzene	95-63-6	-	15.44	5.00	-	-	-	-	31.11	88.81	3.74	3.34	9.22	101.27	-
2,2,4-Trimethylpentane	540-84-1	-	-	0.14	-	-	-	0.60	-	272.22	11.48	10.24	-	-	-
2,4-Dimethylphenol	105-67-9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	67-64-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbonyl sulfide	463-58-1	-	-	-	-	-	-	-	-	0.02	0.00	0.00	-	-	-
Cumene	98-82-8	-	0.12	0.15	-	-	-	-	-	3.61	0.15	0.14	-	-	6.87
Cyclohexane	110-82-7	0.10	-	37.27	85.33	87.19	-	0.53	-	48.59	2.05	1.83	-	-	-
Ethylene	74-85-1	2.24	-	-	0.18	0.34	5.81	1.51	-	0.10	0.00	0.00	-	-	-
Isoprene	78-79-5	-	-	-	-	-	-	1.92	-	0.53	0.02	0.02	-	-	-
Phenanthrene	85-01-8	-	0.06	-	-	-	-	-	4.18	2.83	0.38	0.26	1.24	-	-
Benz[a]anthracene	56-55-3	--	--	--	--	--	--	--	--	--	--	--	--	--	0.29
Chrysene	218-01-9	--	--	--	--	--	--	--	--	--	--	--	--	--	0.58
Benzo[b]fluoranthene	205-99-2	--	--	--	--	--	--	--	--	--	--	--	--	--	0.63
Benzo(a)pyrene	50-32-8	--	--	--	--	--	--	--	--	--	--	--	--	--	0.12
Dibenzo[a,h]anthracene	53-70-3	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04
Sulfuric Acid	7664-93-9	--	--	--	--	--	--	--	--	--	--	--	--	--	-

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-16: Fugitive Component Emissions (Increases of Toxics)

		Project Emissions - Wilmington (lbs/yr)												
Chemical	CAS #	FCCU S/D	PSTU	HCU	HTU 1	HTU 2	HTU 4	Interconnect Piping - Pigging Station	Interconnect Piping - OSBL 1	Interconnect Piping - OSBL 2	Interconnect Piping - Propane Area	Crude Tanks (Fug Ems)	CRU 3	Sulfuric Acid Plant (Fug Ems)
1,3-Butadiene	106-99-0	See FCCU (W) Calcs	0.00	-	-	0.06	-	7.63	1.10	1.21	7.91	-	0.19	NA
1,3-Butadiene	106-99-0	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	-	-	-	NA
Acetaldehyde	75-07-0	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	-	-	-	NA
Ammonia	7664-41-7	See FCCU (W) Calcs	-	93.11	-	19.67	0.02	35.51	5.10	5.63	36.80	6.22	-	NA
Benzene	71-43-2	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	-	-	-	NA
Chloroform	67-66-3	See FCCU (W) Calcs	-	0.21	0.13	-	0.16	0.31	0.07	0.07	0.22	-	-	NA
Cresols (mixtures of) {cresylic acid}	1319-77-3	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	-	-	-	NA
diethanolamine	111-42-2	See FCCU (W) Calcs	-	98.10	0.28	1.76	0.33	51.57	7.40	8.18	53.45	3.62	-	NA
Ethylbenzene	100-41-4	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	-	-	-	NA
Ethylene Glycol	107-21-1	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	-	-	-	NA
Hydrogen cyanide	74-90-8	See FCCU (W) Calcs	1.80	-	-	0.03	-	0.00	0.00	0.00	0.00	-	8.24	NA
Hydrogen sulfide	7783-06-4	See FCCU (W) Calcs	-	-	-	-	-	0.03	0.00	0.00	0.03	-	-	NA
Methanol	67-56-1	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	-	-	-	NA
Methyl tert-butyl ether	1634-04-4	See FCCU (W) Calcs	-	157.33	8.83	0.03	1.32	7.47	1.07	1.19	7.75	0.72	-	NA
Naphthalene	91-20-3	See FCCU (W) Calcs	-	58.27	-	121.54	-	56.62	8.13	8.98	58.68	20.94	37.38	NA
n-Hexane	110-54-3	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	-	-	-	NA
PAHs, total, with individ. components also reported	1150	See FCCU (W) Calcs	-	0.21	0.09	-	0.19	0.21	0.03	0.03	0.22	-	-	NA
Phenol	108-95-2	See FCCU (W) Calcs	4.78	-	-	-	-	3,465.98	497.61	549.88	3,592.26	-	0.35	NA
Propylene	115-07-1	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	-	-	-	NA
Tetrachloroethylene	127-18-4	See FCCU (W) Calcs	-	716.80	0.27	16.64	0.36	309.29	44.41	49.07	320.56	11.17	-	NA
Toluene	108-88-3	See FCCU (W) Calcs	-	587.90	1.54	37.12	1.46	206.99	29.72	32.84	214.53	15.54	-	NA
Xylenes (mixed)	1330-20-7	See FCCU (W) Calcs	-	113.20	7.04	2.67	16.74	79.09	11.36	12.55	81.97	-	-	NA
1,2,4-Trimethylbenzene	95-63-6	See FCCU (W) Calcs	-	0.29	-	7.76	-	242.43	34.81	38.46	251.26	-	-	NA
2,2,4-Trimethylpentane	540-84-1	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	-	-	-	NA
2,4-Dimethylphenol	105-67-9	See FCCU (W) Calcs	-	-	-	-	-	-	-	-	-	-	-	NA
Acetone	67-64-1	See FCCU (W) Calcs	-	-	-	-	-	0.02	0.00	0.00	0.02	-	-	NA
Carbonyl sulfide	463-58-1	See FCCU (W) Calcs	-	3.61	-	0.20	-	3.21	0.46	0.51	3.33	0.58	-	NA
Cumene	98-82-8	See FCCU (W) Calcs	-	2.74	-	34.79	-	43.27	6.21	6.87	44.85	-	-	NA
Cyclohexane	110-82-7	See FCCU (W) Calcs	1.29	-	-	-	-	0.09	0.01	0.01	0.09	-	0.04	NA
Ethylene	74-85-1	See FCCU (W) Calcs	-	-	-	1.07	-	0.47	0.07	0.07	0.49	-	-	NA
Isoprene	78-79-5	See FCCU (W) Calcs	-	0.12	-	-	2.25	1.98	0.78	0.78	-	-	-	NA
Phenanthrene	85-01-8	--	--	--	--	--	--	--	--	--	--	0.02	--	--
Benz[a]anthracene	56-55-3	--	--	--	--	--	--	--	--	--	--	0.05	--	--
Chrysene	218-01-9	--	--	--	--	--	--	--	--	--	--	0.05	--	--
Benzo[b]fluoranthene	205-99-2	--	--	--	--	--	--	--	--	--	--	0.01	--	--
Benzo(a)pyrene	50-32-8	--	--	--	--	--	--	--	--	--	--	0.00	--	--
Dibenzo[a,h]anthracene	53-70-3	--	--	--	--	--	--	--	--	--	--	-	--	--

Notes:
1) Coker Bottom Heads project will not affect fugitive component emissions.
2) ATS Plant project fugitive components are not expected to contain VOC in the process streams.
3) Sulfuric Acid Regeneration Plant project fugitive components are not expected to contain VOC in the process streams.

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-17: Carson Storage Tank Emissions

CRUDE TANKS
Number of New Tanks: 6

Tank 500,000 BBL - New (lbs/year Each Tank)

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Cresols	Cumene	Cyclohexane	Dibenzo(a,h)anthracene	Ethylbenzene	n-Hexane	Isoprene	Methanol	Naphthalene	Phenanthrene	Propylene	Toluene	1,2,4 Trimethylbenzene	2,2,4 Trimethylbenzene	Xylenes (mixed)
Post Project Emissions (lbs/year):	6,844.20	28.58	0.06	0.03	0.14	0.13	-	1.91	-	0.01	12.26	113.35	-	-	2.35	-	-	40.72	-	-	52.25
Total Emission Increase (lbs/year):	41,065.20	171.48	0.36	0.18	0.84	0.78	-	11.46	-	0.06	73.56	680.10	-	-	14.10	-	-	244.32	-	-	313.50
Total Emission Increase (lbs/day):	112.51	0.47	0.00	0.00	0.00	0.00	-	0.03	-	0.00	0.20	1.86	-	-	0.04	-	-	0.67	-	-	0.86

OTHER TANKS (INCREASED UTILIZATION)

Tank 14 (lbs/year) - Domed External Floating Roof Tank

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Cresols	Cumene	Cyclohexane	Dibenzo(a,h)anthracene	Ethylbenzene	n-Hexane	Isoprene	Methanol	Naphthalene	Phenanthrene	Propylene	Toluene	1,2,4 Trimethylbenzene	2,2,4 Trimethylbenzene	Xylenes (mixed)
2012	89.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.17	-	-	-	-	-
2013	130.32	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	0.25	-	-	-	-	-
Baseline Emissions (lbs/year)	109.82	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	0.21	-	-	-	-	-
Baseline Emissions (lbs/day)	0.30	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-
Post Project Emissions (lbs/year):	306.66	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-	0.60	-	-	-	-	-
Emissions Increase (lbs/year):	196.84	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-	0.39	-	-	-	-	-

Tank will not be physically modified or require permitting with the SCAQMD; however, tank will likely experience an increase in utilization as a result of the project.

Tank 31 (lbs/year) - Domed External Floating Roof Tank

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Cresols	Cumene	Cyclohexane	Dibenzo(a,h)anthracene	Ethylbenzene	n-Hexane	Isoprene	Methanol	Naphthalene	Phenanthrene	Propylene	Toluene	1,2,4 Trimethylbenzene	2,2,4 Trimethylbenzene	Xylenes (mixed)
2012	744.23	4.66	-	-	-	-	-	-	-	-	1.83	-	-	-	-	-	-	18.86	-	-	8.55
2013	1,110.85	6.77	-	-	-	-	-	0.01	0.98	-	1.03	5.26	0.74	-	0.08	-	4.65	10.28	0.52	0.03	4.01
Baseline Emissions (lbs/year)	927.54	5.72	-	-	-	-	-	0.01	0.49	-	1.43	2.63	0.37	-	0.04	-	2.33	14.57	0.26	0.02	6.28
Baseline Emissions (lbs/day)	2.54	0.02	-	-	-	-	-	0.00	0.00	-	0.00	0.01	0.00	-	0.00	-	0.01	0.04	0.00	0.00	0.02
Post Project Emissions (lbs/year):	1,055.88	8.08	-	-	-	-	-	0.03	1.03	-	3.79	5.39	0.75	-	0.22	-	4.90	23.56	1.16	0.04	18.46
Emissions Increase (lbs/year):	128.34	2.37	-	-	-	-	-	0.03	0.54	-	2.36	2.76	0.38	-	0.18	-	2.58	8.99	0.90	0.03	12.18

Tank will not be physically modified or require permitting with the SCAQMD; however, tank will likely experience an increase in utilization as a result of the project.

Tank 62 (lbs/year) - Fixed Roof Tank on VRS

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Cresols	Cumene	Cyclohexane	Dibenzo(a,h)anthracene	Ethylbenzene	n-Hexane	Isoprene	Methanol	Naphthalene	Phenanthrene	Propylene	Toluene	1,2,4 Trimethylbenzene	2,2,4 Trimethylbenzene	Xylenes (mixed)
2012	66.22	1.87	-	-	-	-	-	-	0.06	-	0.20	1.85	-	-	-	-	-	4.35	0.04	-	1.10
2013	142.69	4.40	-	-	-	-	-	0.01	0.13	-	0.47	4.38	-	-	-	-	-	10.16	0.09	0.01	2.19
Baseline Emissions (lbs/year)	104.46	3.14	-	-	-	-	-	0.01	0.10	-	0.34	3.12	-	-	-	-	-	7.26	0.07	0.01	1.65
Baseline Emissions (lbs/day)	0.29	0.01	-	-	-	-	-	0.00	0.00	-	0.00	0.01	-	-	-	-	-	0.02	0.00	0.00	0.00
Post Project Emissions (lbs/year):	6,521.09	157.50	-	-	-	-	-	0.28	4.80	-	16.25	158.18	-	-	0.01	-	-	356.60	2.98	0.26	76.93
Emissions Increase (lbs/year):	6,416.63	154.37	-	-	-	-	-	0.28	4.70	-	15.92	155.06	-	-	0.01	-	-	349.34	2.91	0.25	75.28

*Tank will not be physically modified or require permitting with the SCAQMD; however, tank will likely experience an increase in utilization as a result of the project.
**VRS control efficiency conservatively estimated at 99%

Tank 63 (lbs/year) - Fixed Roof Tank on VRS

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Cresols	Cumene	Cyclohexane	Dibenzo(a,h)anthracene	Ethylbenzene	n-Hexane	Isoprene	Methanol	Naphthalene	Phenanthrene	Propylene	Toluene	1,2,4 Trimethylbenzene	2,2,4 Trimethylbenzene	Xylenes (mixed)
2012	71.80	2.06	-	-	-	-	-	-	0.06	-	0.23	2.03	-	-	-	-	-	4.83	0.04	-	1.24
2013	151.35	4.80	-	-	-	-	-	0.01	0.14	-	0.53	4.75	-	-	-	-	-	11.22	0.10	0.01	2.45
Baseline Emissions (lbs/year)	111.58	3.43	-	-	-	-	-	0.01	0.10	-	0.38	3.39	-	-	-	-	-	8.03	0.07	0.01	1.85
Baseline Emissions (lbs/day)	0.31	0.01	-	-	-	-	-	0.00	0.00	-	0.00	0.01	-	-	-	-	-	0.02	0.00	0.00	0.01
Post Project Emissions (lbs/year):	6,944.84	154.27	-	-	-	-	-	0.28	4.79	-	16.23	157.94	-	-	0.01	-	-	356.06	2.97	0.26	76.81
Emissions Increase (lbs/year):	6,833.26	150.84	-	-	-	-	-	0.28	4.69	-	15.85	154.55	-	-	0.01	-	-	348.04	2.90	0.25	74.97

*Tank will not be physically modified or require permitting with the SCAQMD; however, tank will likely experience an increase in utilization as a result of the project.
**VRS control efficiency conservatively estimated at 99%

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-17: Carson Storage Tank Emissions

Tank 64 (lbs/year) - Domed External Floating Roof Tank

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Cresols	Cumene	Cyclohexane	Dibenzo(a,h)anthracene	Ethylbenzene	n-Hexane	Isoprene	Methanol	Naphthalene	Phenanthrene	Propylene	Toluene	1,2,4 Trimethylbenzene	2,2,4 Trimethylbenzene	Xylenes (mixed)
2012	462.48	-	-	-	-	-	-	0.03	-	-	0.01	-	-	-	-	-	-	-	-	123.21	-
2013	614.59	-	-	-	-	-	-	0.06	-	-	0.02	-	-	-	0.01	-	-	-	0.01	166.00	0.02
Baseline Emissions (lbs/year)	538.54	-	-	-	-	-	-	0.05	-	-	0.02	-	-	-	0.01	-	-	-	0.01	144.61	0.01
Baseline Emissions (lbs/day)	1.48	-	-	-	-	-	-	0.00	-	-	0.00	-	-	-	0.00	-	-	-	0.00	0.40	0.00
Post Project Emissions (lbs/year):	653.64	-	-	-	-	-	-	0.07	-	-	0.02	-	-	-	0.02	-	-	-	0.01	145.53	0.03
Emissions Increase (lbs/year):	115.11	-	-	-	-	-	-	0.03	-	-	0.01	-	-	-	0.02	-	-	-	0.01	0.93	0.02

Tank will not be physically modified or require permitting with the SCAQMD; however, tank will likely experience an increase in utilization as a result of the project.

Tank 502 (lbs/year) - Fixed Roof Tank

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Cresols	Cumene	Cyclohexane	Dibenzo(a,h)anthracene	Ethylbenzene	n-Hexane	Isoprene	Methanol	Naphthalene	Phenanthrene	Propylene	Toluene	1,2,4 Trimethylbenzene	2,2,4 Trimethylbenzene	Xylenes (mixed)
2012	13,337.86	-	-	-	-	-	1.28	-	-	-	-	-	-	-	-	0.21	-	-	-	-	-
2013	13,715.97	-	-	-	-	-	1.31	-	-	-	-	-	-	-	-	0.22	-	-	-	-	-
Baseline Emissions (lbs/year)	13,526.92	-	-	-	-	-	1.30	-	-	-	-	-	-	-	-	0.22	-	-	-	-	-
Baseline Emissions (lbs/day)	37.06	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-
Post Project Emissions (lbs/year):	23,230.99	-	-	-	-	-	1.74	-	-	-	-	-	-	-	-	0.26	-	-	-	-	-
Emissions Increase (lbs/year):	9,704.08	-	-	-	-	-	0.45	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-

Tank will not be physically modified or require permitting with the SCAQMD; however, tank will likely experience an increase in utilization as a result of the project.

Tank 959 (lbs/year) - Fixed Roof Tank on VRS

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Cresols	Cumene	Cyclohexane	Dibenzo(a,h)anthracene	Ethylbenzene	n-Hexane	Isoprene	Methanol	Naphthalene	Phenanthrene	Propylene	Toluene	1,2,4 Trimethylbenzene	2,2,4 Trimethylbenzene	Xylenes (mixed)
2012	0.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2013	1.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baseline Emissions (lbs/year)	0.85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baseline Emissions (lbs/day)	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post Project Emissions (lbs/year):	95.19	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-
Emissions Increase (lbs/year):	94.34	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-

*Tank will not be physically modified or require permitting with the SCAQMD; however, tank will likely experience an increase in utilization as a result of the project.
**VRS control efficiency conservatively estimated at 99%

TOTAL PROJECT EMISSIONS INCREASE

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Cresols	Cumene	Cyclohexane	Dibenzo(a,h)anthracene	Ethylbenzene	n-Hexane	Isoprene	Methanol	Naphthalene	Phenanthrene	Propylene	Toluene	1,2,4 Trimethylbenzene	2,2,4 Trimethylbenzene	Xylenes (mixed)
Total Baseline Emissions (lbs/year):	15,319.69	12.28	-	-	-	-	1.30	0.06	0.69	-	2.16	9.14	0.37	-	0.05	0.43	2.33	29.85	0.40	144.63	9.78
Total Project Emissions (lbs/year):	79,873.48	491.33	0.36	0.18	0.84	0.78	1.77	12.13	10.61	0.06	109.85	1,001.61	0.75	-	14.37	0.86	4.90	980.54	7.12	146.09	485.73
Emissions Increase (lbs/year):	64,553.79	479.05	0.36	0.18	0.84	0.78	0.47	12.07	9.93	0.06	107.69	992.48	0.38	-	14.32	0.44	2.58	950.69	6.72	1.46	475.95
Emissions Increase (lbs/day):	176.86	1.31	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.30	2.72	0.00	-	0.04	0.00	0.01	2.60	0.02	0.00	1.30

** EPA TANKS 4.0.9d was used to estimate emissions from storage tanks; all inputs and calculations were performed in accordance with the User's Guide to TANKS. **

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-18: Wilmington Storage Tank Emissions

Tank 80035 (lbs/year) - Remove From Service

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
2012	228.71	-	-	-	-	-	-	0.04	-	-	-	-	0.01	-	-	0.02	0.31
2013	173.41	-	-	-	-	-	-	0.03	-	-	-	-	-	-	-	0.01	0.23
Baseline Emissions (lbs/year)	201.06	-	-	-	-	-	-	0.04	-	-	-	-	0.01	-	-	0.02	0.27
Baseline Emissions (lbs/day)	0.55	-	-	-	-	-	-	0.00	-	-	-	-	0.00	-	-	0.00	0.00
Post Project Emissions (lbs/year):	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Emissions Increase (lbs/year):	(201.06)	-	-	-	-	-	-	(0.04)	-	-	-	-	(0.01)	-	-	(0.02)	(0.27)

Tank 80036 (lbs/year) - Remove From Service

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
2012	225.01	-	-	-	-	-	-	0.04	-	-	-	-	0.01	-	-	0.02	0.30
2013	237.73	-	-	-	-	-	-	0.04	-	-	-	-	0.01	-	-	0.02	0.32
Baseline Emissions (lbs/year)	231.37	-	-	-	-	-	-	0.04	-	-	-	-	0.01	-	-	0.02	0.31
Baseline Emissions (lbs/day)	0.63	-	-	-	-	-	-	0.00	-	-	-	-	0.00	-	-	0.00	0.00
Post Project Emissions (lbs/year):	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Emissions Increase (lbs/year):	(231.37)	-	-	-	-	-	-	(0.04)	-	-	-	-	(0.01)	-	-	(0.02)	(0.31)

Tank 80038 (lbs/year) - Throughput Increase and Connection to VRS

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
2012	2,703.87	-	-	-	-	-	-	-	-	-	-	98.08	0.50	-	23.75	2.22	-
2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baseline Emissions (lbs/year)	1,351.94	-	-	-	-	-	-	-	-	-	-	49.04	0.25	-	11.88	1.11	-
Baseline Emissions (lbs/day)	3.70	-	-	-	-	-	-	-	-	-	-	0.13	0.00	-	0.03	0.00	-
Post Project Emissions (lbs/year):	16,200.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Emissions Increase (lbs/year):	14,848.07	-	-	-	-	-	-	-	-	-	-	(49.04)	(0.25)	-	(11.88)	(1.11)	-

VRS control efficiency conservatively estimated at 99%

Tank 80060 (lbs/year) - Throughput Increase and Conversion to IFR

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baseline Emissions (lbs/year)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baseline Emissions (lbs/day)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post Project Emissions (lbs/year):	7,168.18	28.23	0.05	0.02	0.11	-	0.10	1.50	0.01	9.83		120.79	1.82	-	34.70	-	41.64
Emissions Increase (lbs/year):	7,168.18	28.23	0.05	0.02	0.11	-	0.10	1.50	0.01	9.83	-	120.79	1.82	-	34.70	-	41.64

Tank 80067 (lbs/year) - Throughput Increase and Conversion to IFR

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
2012	466.74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2013	325.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baseline Emissions (lbs/year)	395.91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baseline Emissions (lbs/day)	1.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post Project Emissions (lbs/year):	5,627.52	20.96	0.03	0.01	0.06	-	0.05	0.83	0.01	5.59	-	96.30	0.97	-	21.64	-	23.46
Emissions Increase (lbs/year):	5,231.62	20.96	0.03	0.01	0.06	-	0.05	0.83	0.01	5.59	-	96.30	0.97	-	21.64	-	23.46

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-18: Wilmington Storage Tank Emissions

Tank 80079 (lbs/year) - Throughput Increase

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
2012	2,602.78	12.28	0.02	0.01	0.05	-	0.05	0.70	0.01	4.55	-	51.75	0.85	-	15.73	-	19.31
2013	1,546.00	8.81	-	-	-	-	-	0.09	-	0.65	-	97.03	0.01	-	5.66	0.27	2.44
Baseline Emissions (lbs/year)	2,074.39	10.55	0.01	0.01	0.03	-	0.03	0.40	0.01	2.60	-	74.39	0.43	-	10.70	0.14	10.88
Baseline Emissions (lbs/day)	5.68	0.03	0.00	0.00	0.00	-	0.00	0.00	0.00	0.01	-	0.20	0.00	-	0.03	0.00	0.03
* 2012 data based on the PTE of the ta	0.02																
Post Project Emissions (lbs/year):	5,263.26	21.62	0.05	0.02	0.11	-	0.10	1.48	0.01	9.47	-	85.22	1.83	-	31.26	-	40.41
Emissions Increase (lbs/year):	3,188.87	11.08	0.04	0.02	0.09	-	0.08	1.09	0.01	6.87	-	10.83	1.40	-	20.57	(0.14)	29.54

Tank 300035 (lbs/year) - New Tank

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
Post Project Emissions (lbs/year):	10,847.35	41.52	0.06	0.03	0.14	-	0.13	1.92	0.02	12.77	-	184.24	2.30	-	46.96	-	53.89

Tank 300036 (lbs/year) - New Tank

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
Post Project Emissions (lbs/year):	10,847.35	41.52	0.06	0.03	0.14	-	0.13	1.92	0.02	12.77	-	184.24	2.30	-	46.96	-	53.89

PROJECT EMISSIONS INCREASE

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
Total Baseline Emissions (lbs/year):	4,254.66	10.55	0.01	0.01	0.03	-	0.03	0.47	0.01	2.60	-	123.43	0.70	-	22.57	1.28	11.46
Total Project Emissions (lbs/year):	55,953.66	153.85	0.25	0.11	0.56	-	0.51	7.65	0.07	50.43	-	670.79	9.22	-	181.52	-	213.29
Emissions Increase (lbs/year):	51,699.00	143.31	0.24	0.11	0.54	-	0.49	7.18	0.07	47.83	-	547.36	8.53	-	158.95	(1.28)	201.84
Emissions Increase (lbs/day):	141.64	0.39	0.00	0.00	0.00	-	0.00	0.02	0.00	0.13	-	1.50	0.02	-	0.44	(0.00)	0.55

OTHER TANKS (INCREASED UTILIZATION)

Tank 80044 (lbs/year) - Vertical Fixed Roof Tank on Vapor Recovery

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
2012	11,250.49	30.24	-	-	-	-	-	-	62.32	4.97	-	192.80	0.02	25.80	75.30	2.18	24.32
2013	11,693.31	31.43	-	-	-	-	-	-	64.78	5.17	-	200.39	0.02	26.82	78.26	2.27	25.27
Baseline Emissions (lbs/year)	11,471.90	30.84	-	-	-	-	-	-	63.55	5.07	-	196.60	0.02	26.31	76.78	2.23	24.80
Baseline Emissions (lbs/day)	31.43	0.08	-	-	-	-	-	-	0.17	0.01	-	0.54	0.00	0.07	0.21	0.01	0.07
Post Project Emissions (lbs/year):	12,574.19	35.64	-	-	-	-	-	-	73.33	5.97	-	226.21	0.04	28.35	89.55	2.26	31.65
Emissions Increase (lbs/year):	1,102.29	4.80	-	-	-	-	-	-	9.78	0.90	-	29.61	0.02	2.04	12.77	0.04	6.86

*Tank will not be physically modified or require permitting with the SCAQMD; however, tank will likely experience an increase in utilization as a result of the project.
**VRS control efficiency conservatively estimated at 99%

Tank 80074 (lbs/year) - Vertical Fixed Roof Tank on Vapor Recovery

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
2012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baseline Emissions (lbs/year)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baseline Emissions (lbs/day)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post Project Emissions (lbs/year):	53.15	-	-	-	-	0.01	-	1.09	-	2.04	-	-	0.08	-	10.08	2.39	5.95
Emissions Increase (lbs/year):	53.15	-	-	-	-	0.01	-	1.09	-	2.04	-	-	0.08	-	10.08	2.39	5.95

*Tank will not be physically modified or require permitting with the SCAQMD; however, tank will likely experience an increase in utilization as a result of the project.
**VRS control efficiency conservatively estimated at 99%

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-18: Wilmington Storage Tank Emissions

Tank 80211 (lbs/year) - Domed External Floating Roof Tank

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
2012	155.62	1.10	-	-	-	-	-	0.01	0.28	2.52	-	1.65	0.06	-	14.07	2.57	13.98
2013	153.27	1.09	-	-	-	-	-	0.01	0.28	2.43	-	1.64	0.05	-	13.78	2.44	13.44
Baseline Emissions (lbs/year)	154.45	1.10	-	-	-	-	-	0.01	0.28	2.48	-	1.65	0.06	-	13.93	2.51	13.71
Baseline Emissions (lbs/day)	0.42	0.00	-	-	-	-	-	0.00	0.00	0.01	-	0.00	0.00	-	0.04	0.01	0.04
Post Project Emissions (lbs/year):	271.95	1.14	-	-	-	-	-	0.02	0.32	5.16	-	2.04	0.14	-	21.18	6.52	30.23
Emissions Increase (lbs/year):	117.51	0.04	-	-	-	-	-	0.01	0.04	2.69	-	0.40	0.09	-	7.26	4.02	16.52

Tank will not be physically modified or require permitting with the SCAQMD; however, tank will likely experience an increase in utilization as a result of the project.

Tank 80215 (lbs/year) - Domed External Floating Roof Tank

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
2012	1,162.48	9.49	-	-	-	-	-	-	0.98	1.72	23.39	13.23	0.09	6.65	13.34	2.93	9.86
2013	1,152.67	9.28	-	-	-	-	-	-	0.95	1.57	-	13.03	0.08	6.65	12.63	2.61	8.98
Baseline Emissions (lbs/year)	1,157.58	9.39	-	-	-	-	-	-	0.97	1.65	11.70	13.13	0.09	6.65	12.99	2.77	9.42
Baseline Emissions (lbs/day)	3.17	0.03	-	-	-	-	-	-	0.00	0.00	0.03	0.04	0.00	0.02	0.04	0.01	0.03
Post Project Emissions (lbs/year):	1,272.15	8.98	-	-	-	-	-	-	1.04	2.51	26.09	15.57	0.14	8.14	16.11	4.83	14.91
Emissions Increase (lbs/year):	114.58	(0.40)	-	-	-	-	-	-	0.08	0.87	14.40	2.44	0.06	1.49	3.13	2.06	5.49

Tank will not be physically modified or require permitting with the SCAQMD; however, tank will likely experience an increase in utilization as a result of the project.

Tank 80217 (lbs/year) - Domed External Floating Roof Tank

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
2012	181.38	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	-	0.01
2013	161.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baseline Emissions (lbs/year)	171.23	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	-	0.01
Baseline Emissions (lbs/day)	0.47	-	-	-	-	-	-	-	-	-	-	0.00	-	-	0.00	-	0.00
Post Project Emissions (lbs/year):	285.80	2.74	-	-	-	-	-	0.19	-	1.44	-	15.49	0.18	-	7.92	0.66	6.31
Emissions Increase (lbs/year):	114.58	2.74	-	-	-	-	-	0.19	-	1.44	-	15.49	0.18	-	7.92	0.66	6.31

Tank will not be physically modified or require permitting with the SCAQMD; however, tank will likely experience an increase in utilization as a result of the project.

OTHER (INCREASED UTILIZATION) EMISSIONS INCREASE

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
Total Baseline Emissions (lbs/year):	12,955.15	41.32	-	-	-	-	-	0.01	64.80	9.19	11.70	211.38	0.16	32.96	103.70	7.50	47.93
Total Project Emissions (lbs/year):	14,457.24	48.50	-	-	-	0.01	-	1.30	74.69	17.12	26.09	259.31	0.58	36.49	144.85	16.66	89.06
Emissions Increase (lbs/year):	1,502.10	7.18	-	-	-	0.01	-	1.29	9.89	7.93	14.40	47.93	0.42	3.53	41.15	9.16	41.13
Emissions Increase (lbs/day):	4.12	0.02	-	-	-	0.00	-	0.00	0.03	0.02	0.04	0.13	0.00	0.01	0.11	0.03	0.11

TOTAL EMISSIONS INCREASE

	VOC	Benzene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Biphenyl	Chrysene	Cumene	Cyclohexane	Ethylbenzene	Ethylene	n-Hexane	Naphthalene	Propylene	Toluene	1,2,4 Trimethylbenzene	Xylenes (mixed)
Total Baseline Emissions (lbs/year):	17,209.81	51.86	0.01	0.01	0.03	-	0.03	0.48	64.80	11.79	11.70	334.81	0.86	32.96	126.27	8.78	59.39
Total Project Emissions (lbs/year):	70,410.90	202.35	0.25	0.11	0.56	0.01	0.51	8.95	74.76	67.55	26.09	930.10	9.80	36.49	326.37	16.66	302.35
Emissions Increase (lbs/year):	53,201.10	150.49	0.24	0.11	0.54	0.01	0.49	8.47	9.96	55.76	14.40	595.29	8.95	3.53	200.10	7.88	242.96
Emissions Increase (lbs/day):	145.76	0.41	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.15	0.04	1.63	0.02	0.01	0.55	0.02	0.67

** EPA TANKS 4.0.9d was used to estimate emissions from storage tanks; all inputs and calculations were performed in accordance with the User's Guide to TANKS. **

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-19: Characteristic Stream Speciations

							Hybrid		Hybrid				Hybrid
MSDS Number		APPC656	CCT	NA	APPC878	RS004	RS004RS119	RS006	RS006RS030	RS008	RS022	RS030	RS030RS099RS123
Stream Name		Propylene	CCT	NA	B-B Stock	Refinery Fuel Gas (C1-C5)	Max of Refinery Fuel Gas (C1-C5) & Naphtha/H2 Mixed Phase Refinery Stream	Sweet Butanes	Max of Sweet Butanes &	Plant Hydrogen	Sour Refinery Gas	Refinery Propane Stream (C2-C4)	Max of Refinery Propane Stream (C2-C4) & Sweet Pentane-Isopentane & Iso-Octene
Data Source		MSDS	Wort case analysis of crudes (Sept 2014)	NA	Winbliss Speciations-13.xls	Winbliss Speciations-13.xls & MSDS	Hybrid	speciations-13.xls	Hybrid	Winbliss Speciations-13.xls & MSDS	Winbliss Speciations-13.xls & MSDS	Winbliss Speciations-13.xls	Hybrid
Chemical	CAS No.	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%
1,2,4-Trimethylbenzene	95-63-6	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Butadiene	106-99-0	-	-	-	0.17801	0.01155	0.01155	0.08000	0.08000	0.00497	0.03791	0.00007	0.00007
2,2,4-Trimethylpentane	540-84-1	-	-	-	-	-	-	-	-	-	-	-	0.00900
2,4-Dimethylphenol	105-67-9	-	-	-	-	-	-	-	-		-	-	-
Acetaldehyde	75-07-0	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	67-64-1	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia	7664-41-7	-	-	-	-	0.00050	0.00050	-	-	-	-	-	-
Benzene	71-43-2	-	0.47200	-	-	-	0.10340	0.00467	0.00467	-	-	-	-
Chloroform	67-66-3	-	-	-	-	-	-	-	-	-	-	-	-
Carbonyl sulfide	463-58-1	-	-	-	0.00040	-	-	-	-	-	-	-	-
Cresols (mixtures of) {cresylic acid}	1319-77-3	-	-	-	-	-	-	-	-	-	-	-	-
Cumene	98-82-8	-	0.04370	-	-	-	-	-	-	-	-	-	-
Cyclohexane	110-82-7	-	-	-	-	-	1.63059	0.00100	0.00100	-	-	-	0.00800
diethanolamine	111-42-2	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	100-41-4	-	0.27500	-	-	-	-	-	-	-	-	-	-
Ethylene	74-85-1	-	-	-	0.00206	0.16832	0.16832	-	-	0.00117	0.00898	0.02281	0.02281
Ethylene Glycol	107-21-1	-	-	-	-	-	-	-	-	-	-	-	-
Hydrogen cyanide	74-90-8	-	-	-	-	-	-	-	-	-	-	-	-
Hydrogen sulfide	7783-06-4	-	-	-	0.00005	0.02264	0.02264	-	-	0.22044	0.05816	0.03186	0.03186
Isoprene	78-79-5	-	-	-	-	-	-	-	-	-	-	-	0.02892
Methanol	67-56-1	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	1634-04-4	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	91-20-3	-	0.05500	-	-	-	-	-	-	-	-	-	-
n-Hexane	110-54-3	-	1.59000	-	-	0.75000	0.75000	0.00433	0.00433	1.00000	0.50000	-	0.00130
PAHs, total, with individ. components also reported	1150	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	85-01-8	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	108-95-2	-	-	-	-	-	-	-	-	-	-	-	-
Propylene	115-07-1	80.83443	-	-	0.52368	0.69364	0.69364	0.00500	0.00500	0.00949	0.01346	0.08490	0.08490
Tetrachloroethylene	127-18-4	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	108-88-3	-	0.84800	-	-	0.02750	4.88385	-	-	-	-	-	0.00800
Xylenes (mixed)	1330-20-7	-	1.18000	-	-	-	15.00000	-	-	-	-	-	-
Benz[a]anthracene	56-55-3	-	0.00185	-	-	-	-	-	-	-	-	-	-
Chrysene	218-01-9	-	0.00369	-	-	-	-	-	-	-	-	-	-
Benzo[b]fluoranthene	205-99-2	-	0.00399	-	-	-	-	-	-	-	-	-	-
Benzo[a]pyrene	50-32-8	-	0.00074	-	-	-	-	-	-	-	-	-	-
Dibenzo[a,h]anthracene	53-70-3	-	0.00025	-	-	-	-	-	-	-	-	-	-

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-19: Characteristic Stream Speciations

		Hybrid									Hybrid		
MSDS Number		APPC656RS030 RS006	RS099	RS101	RS108	RS110	RS119	RS120	RS123	RS140	RS140APPC6 56APPC878	RS197	RS203
Stream Name		Max of Propylene & Sweet Butanes & Refinery Propane Stream (C2-C4)	Sweet Pentane-Isopentane	Sour Naphtha Gasoline	Jet Cut Bottoms	Sweet Naphtha (High Benzene)	Naphtha/H2 Mixed Phase Refinery Stream	Sour Naphtha/H2 Mixed Phase Refinery Stream	Iso-Octene	Unleaded Gasoline	Max of Unleaded Gasoline & Propylene &	Crude Oil	Sweet Distillate {FCC Jet Cut Bttms}
Data Source		Hybrid	speciations-13.xls	speciations-13.xls	speciations-13.xls	speciations-13.xls	Winbliss Speciations-13.xls & MSDS	Winbliss Speciations-13.xls & MSDS	MSDS (No Toxics)	speciations-13.xls & EDMS	Hybrid	crude speciation-13.xls	speciations-13.xls & EDMS
Chemical	CAS No.	wt%	wt%	wt%		wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%
1,2,4-Trimethylbenzene	95-63-6	-	-	0.21778	0.63520	2.64396	-	-	-	1.84459	1.84459	0.12911	0.62433
1,3-Butadiene	106-99-0	0.08000	-	0.00487		-	-	-	-	0.00050	0.17801	-	-
2,2,4-Trimethylpentane	540-84-1	-	0.00900	0.63233	0.01820	0.00892	-	-	-	5.65395	5.65395	0.00039	-
2,4-Dimethylphenol	105-67-9	-	-	-		-	-	-	-	-	-	-	-
Acetaldehyde	75-07-0	-	-	-		-	-	-	-	-	-	-	-
Acetone	67-64-1	-	-	-		-	-	-	-	-	-	-	-
Ammonia	7664-41-7	-	-	-		-	-	-	-	-	-	-	-
Benzene	71-43-2	0.00467	-	1.58978	1.30140	2.84007	0.10340	0.10340	-	0.82809	0.82809	0.19908	-
Chloroform	67-66-3	-	-	-		-	-	-	-	-	-	-	-
Carbonyl sulfide	463-58-1	-	-	-		-	-	-	-	-	0.00040	-	-
Cresols (mixtures of) {cresylic acid}	1319-77-3	-	-	-	0.00200	-	-	-	-	0.00500	0.00500	0.00050	0.00500
Cumene	98-82-8	-	-	0.01656	0.01940	0.10355	-	-	-	0.07491	0.07491	0.02067	0.00500
Cyclohexane	110-82-7	0.00100	0.00800	2.62429	4.73870	0.08352	1.63059	1.63059	-	1.00918	1.00918	0.51380	-
diethanolamine	111-42-2	-	-	-		-	-	-	-	-	-	-	-
Ethylbenzene	100-41-4	-	-	0.14333	0.63360	2.89587	-	-	-	1.20273	1.20273	0.13140	0.07433
Ethylene	74-85-1	0.02281	-	-		-	-	-	-	-	0.00206	-	-
Ethylene Glycol	107-21-1	-	-	-		-	-	-	-	-	-	-	-
Hydrogen cyanide	74-90-8	-	-	-		-	-	-	-	-	-	-	-
Hydrogen sulfide	7783-06-4	0.03186	-	-		-	0.02000	2.00000	-	-	0.00005	-	-
Isoprene	78-79-5	-	0.02892	0.08747		-	-	-	-	0.01101	0.01101	-	-
Methanol	67-56-1	-	-	-		-	-	-	-	0.00059	0.00059	-	-
Methyl tert-butyl ether	1634-04-4	-	-	-		-	-	-	-	-	-	-	-
Naphthalene	91-20-3	-	-	0.00233	0.00310	0.06063	-	-	-	0.17430	0.17430	0.06800	3.65700
n-Hexane	110-54-3	0.00433	0.00130	9.88765	3.07500	1.77734	0.14586	0.14586	-	1.32045	1.32045	1.07333	-
PAHs, total, with individ. components also reported	1150	-	-	-		-	-	-	-	-	-	0.20100	-
Phenanthrene	85-01-8	-	-	-		-	-	-	-	-	-	-	0.00230
Phenol	108-95-2	-	-	-	0.00200	-	-	-	-	0.00500	0.00500	0.00500	0.00500
Propylene	115-07-1	80.83443	0.00400	-		-	-	-	-	0.00300	80.83443	-	-
Tetrachloroethylene	127-18-4	-	-	-		-	-	-	-	-	-	-	-
Toluene	108-88-3	-	0.00800	0.72307	1.95790	21.82951	4.88385	4.88385	-	7.21341	7.21341	0.38463	0.02633
Xylenes (mixed)	1330-20-7	-	-	1.08067	2.18210	17.26414	15.00000	-	-	4.82736	4.82736	0.63467	0.51533
Benz[a]anthracene	56-55-3	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	218-01-9	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b]fluoranthene	205-99-2	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[a]pyrene	50-32-8	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo[a,h]anthracene	53-70-3	-	-	-	-	-	-	-	-	-	-	-	-

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-19: Characteristic Stream Speciations

MSDS Number		RS205	RS206	Hybrid RS206RS905	RS207	Hybrid RS206RS207	RS307	RS905	RS925	RS937
Stream Name		Light Cycle Oil	Stove Oil w/Sulfur	Max of Stove Oil w/Sulfur & Spent Caustic	Distillates w/Sulfur Compounds	Max of Stove Oil w/Sulfur & Distillates w/Sulfur Compounds	Gas Oil	Spent Caustic	Rich Amines	Lean Amines
Data Source		Toxic Studies	Toxic Studies	Hybrid	Toxic Studies	Hybrid	2000 EDMS & MSDS	MSDS	Toxic Studies	Toxic Studies
Chemical	CAS No.	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%
1,2,4-Trimethylbenzene	95-63-6	0.41600	0.55000	0.55000	0.72600	0.72600	-	-	-	-
1,3-Butadiene	106-99-0	-	-	-	-	-	-	-	-	-
2,2,4-Trimethylpentane	540-84-1	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	105-67-9	-	-	-	-	-	-	-	-	-
Acetaldehyde	75-07-0	-	-	-	-	-	-	-	-	-
Acetone	67-64-1	-	-	-	-	-	-	-	-	-
Ammonia	7664-41-7	-	-	-	-	-	-	-	-	-
Benzene	71-43-2	-	-	-	0.00080	0.00080	-	-	-	-
Chloroform	67-66-3	-	-	-	-	-	-	-	-	-
Carbonyl sulfide	463-58-1	-	-	-	-	-	-	-	-	-
Cresols (mixtures of) {cresylic acid}	1319-77-3	0.00500	0.01000	0.01000	0.00694	0.01000	0.00500	-	-	-
Cumene	98-82-8	-	-	-	-	-	-	-	-	-
Cyclohexane	110-82-7	-	-	-	-	-	-	-	-	-
diethanolamine	111-42-2	-	-	-	-	-	-	-	25.00000	-
Ethylbenzene	100-41-4	0.00200	0.02200	0.02200	0.01450	0.02200	-	-	-	-
Ethylene	74-85-1	-	-	-	-	-	-	-	-	-
Ethylene Glycol	107-21-1	-	-	-	-	-	-	-	-	-
Hydrogen cyanide	74-90-8	0.00001	-	-	-	-	-	-	-	-
Hydrogen sulfide	7783-06-4	-	-	-	-	-	-	0.80000	3.38000	0.05410
Isoprene	78-79-5	-	-	-	-	-	-	-	-	-
Methanol	67-56-1	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	1634-04-4	-	-	-	-	-	-	-	-	-
Naphthalene	91-20-3	0.28000	0.69000	0.69000	0.05740	0.69000	-	-	-	-
n-Hexane	110-54-3	-	-	-	-	-	-	-	-	-
PAHs, total, with individ. components also reported	1150	-	-	-	-	-	-	-	-	-
Phenanthrene	85-01-8	0.31740	-	-	0.09760	0.09760	0.10000	-	-	-
Phenol	108-95-2	-	0.00700	0.00700	0.00813	0.00813	-	-	-	-
Propylene	115-07-1	-	-	-	-	-	-	-	-	-
Tetrachloroethylene	127-18-4	-	-	-	-	-	-	-	-	-
Toluene	108-88-3	-	0.02100	0.02100	0.01550	0.02100	-	-	-	-
Xylenes (mixed)	1330-20-7	-	0.12000	0.12000	0.06340	0.12000	-	-	-	-
Benz[a]anthracene	56-55-3	-	-	-	-	-	-	-	-	-
Chrysene	218-01-9	-	-	-	-	-	-	-	-	-
Benzo[b]fluoranthene	205-99-2	-	-	-	-	-	-	-	-	-
Benzo[a]pyrene	50-32-8	-	-	-	-	-	-	-	-	-
Dibenzo[a,h]anthracene	53-70-3	-	-	-	-	-	-	-	-	-

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-20: Summary of GHG Emissions Changes

	Emissions Change (tons/year)				(metric tons/yr)
CARSON	**CO2**	**CH4**	**N2O**	**CO2e**	**CO2e**
51 Vac Heater	65,747.97	1.24	0.12	65,815.84	59,706.82
FCCU Regenerator (Increased Utilization)	109,893.81	3.22	0.64	110,163.35	99,937.99
FCCU Pre-Heater (Increased Utilization)	5,538.59	0.31	0.06	5,564.56	5,048.06
FCCU Cogeneration Units 1-4	22,105.25	1.22	0.24	22,208.18	20,146.82
Naphtha HDS ULNB Conversion	4,304.45	0.08	0.01	4,310.10	3,910.04
HC R-1 Heater (Increased Utilization)	7,840.91	0.43	0.09	7,877.67	7,146.47
HC R-2 Heater (Increased Utilization)	10,453.67	0.58	0.12	10,502.69	9,527.83
LHU Heater (Increased Utilization)	2,607.62	0.14	0.03	2,619.87	2,376.70
Subtotals:	**228,492.27**	**7.22**	**1.32**	**229,062.28**	**207,800.72**
WILMINGTON					
HC H-300 Heater Duty Bump	30,978.46	(0.06)	(0.11)	30,946.20	28,073.77
HC H-301 Heater Duty Bump (incl with H-300)	(see H-300)	(see H-300)	(see H-300)	(see H-300)	(see H-300)
H-100 Heater Duty Bump	36,500.80	2.14	0.43	36,686.95	33,281.67
Sulfuric Acid Regen Plant Process Air Heater	10,247.20	0.19	0.02	10,257.78	9,305.65
Sulfuric Acid Regen Plant Decomp. Furnace	21,519.11	0.41	0.04	21,541.34	19,541.87
Sulfuric Acid Regen Plant Converter Heater	2,561.80	0.05	0.00	2,564.45	2,326.41
Sulfuric Acid Regen Plant Process Vent	--	--	--	--	--
Subtotals:	**101,807.37**	**2.72**	**0.39**	**101,996.71**	**92,529.38**
WILMINGTON - CRUDE INCREASE EFFECTS					
H-101 Heater (Increased Utilization)	3,746.10	0.20	0.04	3,763.20	3,413.90
H-30 Heater (Increased Utilization)	2,195.52	0.12	0.02	2,205.50	2,000.79
H-21/22 (Increased Utilization)	2,192.92	0.12	0.02	2,202.93	1,998.45
H-510 (Increased Utilization)	213.78	0.01	0.00	214.76	194.82
H-501A, B, 502, 503/504 (Increased Utilization)	856.40	0.05	0.01	860.31	780.46
Boilers 7 & 8 (Increased Utilization)	2,680.51	0.15	0.03	2,692.75	2,442.81
Boilers 9 & 10 (Increased Utilization)	2,680.59	0.14	0.03	2,692.83	2,442.88
SRP Boilers H-1601/1602 (Increased Utilization)	58.42	0.00	0.00	58.56	53.12
SRP Incinerator F-704 (Increased Sulfur Load)	36.13	0.00	0.00	36.30	32.93
SRP Incinerator F-754 (Increased Sulfur Load)	36.70	0.00	0.00	36.87	33.45
Subtotals:	**14,697.06**	**0.79**	**0.16**	**14,764.01**	**13,393.62**
FCCU SHUTDOWN (HISTORIC ACTUAL EMISSIONS)					
FCCU	(272,118.51)	(7.97)	(1.59)	(272,785.90)	(247,465.91)
CO Boiler	(79,631.48)	(4.33)	(0.87)	(79,994.09)	(72,569.03)
H2 Heater	(3,114.47)	(0.17)	(0.03)	(3,128.91)	(2,838.48)
H3/H4 Heater	(66,649.74)	(3.62)	(0.72)	(66,953.21)	(60,738.61)
H5 Heater	-	-	-	-	-
Startup Heater	(477.13)	(0.01)	(0.00)	(477.30)	(433.00)
Fugitive Components	--	--	--	--	--
Subtotals:	**(421,991.33)**	**(16.10)**	**(3.22)**	**(423,339.40)**	**(384,045.04)**
STORAGE TANK EMISSIONS					
Carson Crude Tank Emissions	--	--	--	-	-
Carson Other Tank Emissions	--	--	--	-	-
Wilmington Tank Emissions	--	--	--	-	-
Subtotals:	**-**	**-**	**-**	**-**	-
Fugitive Component Emissions	--	--	--	-	-
Total Combined Emissions	**(76,994.62)**	**(5.36)**	**(1.36)**	**(77,516.39)**	**(70,321.32)**

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-21: Summary of Train Emissions

GP9 Operational Locomotive Emissions

Parameters

Locomotive	EMD GP9	
Engine Model	EMD 567C	
Engine Size	1750	bhp
Engine Tier	T0+	
Average Load Factor (See Below)	8.9%	
Operating Hours	1.3	hour/day
Daily Work	206.6	bhp-hr/day
Brake Specific Fuel Consumption (1)	15.2	bhp-hr/gal
Fuel Usage	13.6	gal/day

(1) EPA, Emission Factors for Locomotives, 2009.

Typical Power Distribution by Notch (2)

Notch	Idle (3)	1	2	3	4	5	6	7	8
Percent of Rated Power	1.0%	4.5%	11.5%	23.5%	35.0%	48.5%	64.0%	85.0%	100.0%
Average Percentage of Time in Notch	59.8%	12.4%	12.3%	5.8%	3.6%	3.6%	1.5%	0.2%	0.8%
Average Load Factor									8.9%

(2) EPA, Locomotive Emission Standards Regulatory Support Document, April 1998.

(3) Assumes 17 bhp for idle. All EMD model engines idled at 17 bhp or less in the EPA Locomotive Emissions Standard Regulatory Support Document.

Criteria Pollutant Emissions (4)

	HC	VOC (5)	CO	NOx	SOx (6)	PM10	PM2.5 (7)
Emission Factors (g/bhp-hr)	0.57	0.60	1.83	10.60	0.01	0.23	0.21
Emission Factors (g/gal)	8.66	9.12	27.82	161.12	0.10	3.50	3.22
Emission Factors (lb/gal)	0.02	0.02	0.06	0.36	0.00	0.01	0.01
Daily Emissions (lb/day)	0.26	0.27	0.83	4.83	0.00	0.10	0.10

(4) Emisson factors from the EPA Emission Factors for Locomotive Document, 2009.

(5) VOC emissions scaled from HC emission factors. EPA, Emission Factors for Locomotives, 2009.

(6) Based on 15 ppm S.

(7) PM2.5 emissions scaled from PM10 emissions. Port of Long Beach (POLB), 2012 Air Emissions Inventory, 2013.

GHG Emissions (8)

	CO2	CH4	N2O	CO2e (9)
Emission Factors (g/bhp-hr)	672	0.11	0.04	686.89
Emission Factors (g/gal)	10217	1.67	0.61	10440.68
Emission Factors (lb/gal)	22.52	0.00	0.00	23.02
Daily Emissions (lb/day)	306.09	0.05	0.02	312.79
Annual Emissions (lb/yr) (10)	111721.86	18.22	6.66	114167.76
Annual Emissions (MT/yr)	50.68	0.01	0.00	51.79

(8) CO2 emission factor from Emission Factors for Locomotives, 2009. CH4 and N2O emissions scaled up from HC and NOx emissions in the POLB, 2012 Air Emissions Inventory, 2013.

(9) Based on State global warming potentials.

(10) Based on 365 days of operations.

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-21: Summary of Train Emissions

SW1200 Operational Locomotive Emissions

Parameters

Locomotive	EMD SW1200	
Engine Model	EMD 567E	
Engine Size	1200	bhp
Engine Tier	T0+	
Average Load Factor (See Below)	9.1%	
Operating Hours	2.7	hour/day
Daily Work	291.8	bhp-hr/day
Brake Specific Fuel Consumption (1)	15.2	bhp-hr/gal
Fuel Usage	19.2	gal/day

(1) EPA, Emission Factors for Locomotives, 2009.

Typical Power Distribution by Notch (2)

Notch	Idle (3)	1	2	3	4	5	6	7	8
Percent of Rated Power	1.4%	4.5%	11.5%	23.5%	35.0%	48.5%	64.0%	85.0%	100.0%
Average Percentage of Time in Notch	59.8%	12.4%	12.3%	5.8%	3.6%	3.6%	1.5%	0.2%	0.8%
Average Load Factor									9.1%

(2) EPA, Locomotive Emission Standards Regulatory Support Document, April 1998.

(3) Assumes 17 bhp for idle. All EMD model engines idled at 17 bhp or less in the EPA Locomotive Emissions Standard Regulatory Support Document.

Criteria Pollutant Emissions (4)

	HC	VOC (5)	CO	NOx	SOx (6)	PM10	PM2.5 (7)
Emission Factors (g/bhp-hr)	0.57	0.60	1.83	10.60	0.01	0.23	0.21
Emission Factors (g/gal)	8.66	9.12	27.82	161.12	0.10	3.50	3.22
Emission Factors (lb/gal)	0.02	0.02	0.06	0.36	0.00	0.01	0.01
Daily Emissions (lb/day)	0.37	0.39	1.18	6.82	0.00	0.15	0.14

(4) Emisson factors from the EPA Emission Factors for Locomotive Document, 2009.

(5) VOC emissions scaled from HC emission factors. EPA, Emission Factors for Locomotives, 2009.

(6) Based on 15 ppm S.

(7) PM2.5 emissions scaled from PM10 emissions. Port of Long Beach (POLB), 2012 Air Emissions Inventory, 2013.

GHG Emissions (8)

	CO2	CH4	N2O	CO2e (9)
Emission Factors (g/bhp-hr)	672	0.11	0.04	686.89
Emission Factors (g/gal)	10217	1.67	0.61	10440.68
Emission Factors (lb/gal)	22.52	0.00	0.00	23.02
Daily Emissions (lb/day)	432.40	0.07	0.03	441.87
Annual Emissions (lb/yr) (10)	157826.87	25.74	9.40	161282.14
Annual Emissions (MT/yr)	71.59	0.01	0.00	73.16

(8) CO2 emission factor from Emission Factors for Locomotives, 2009. CH4 and N2O emissions scaled up from HC and NOx emissions in the POLB, 2012 Air Emissions Inventory, 2013.

(9) Based on State global warming potentials.

(10) Based on 365 days of operations.

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-22: Carson Cogen Emissions Calculations (Increased Utilization) - Annual Average

Carson Cogeneration System (Process 17, Systems 1-4)

Anticipated Incremental Increase in Firing Rate: 42 **mmbtu/hr**

	Incremental Increase Emissions (Lbs/Day)	Increase (TPY)	Baseline + Incremental Basis
NOx	20.60	3.76	Baseline Emissions + Incremental Increase in Firing Rate * PTE EF
SOx	2.50	0.46	Baseline Emissions + Incremental Increase in Firing Rate * PTE EF
CO	4.50	0.82	Baseline Emissions + Incremental Increase in Firing Rate * PTE EF
PM	9.85	1.80	Baseline Emissions + Incremental Increase in Firing Rate * PTE EF
VOC	4.15	0.76	Baseline Emissions + Incremental Increase in Firing Rate * PTE EF
CO2	121,124.66	22,105.25	Baseline Emissions + Incremental Increase in Firing Rate * PTE EF
CH4	6.67	1.22	Baseline Emissions + Incremental Increase in Firing Rate * PTE EF
N2O	1.33	0.24	Baseline Emissions + Incremental Increase in Firing Rate * PTE EF
CO2e	121,688.67	22,208.18	Baseline Emissions + Incremental Increase in Firing Rate * PTE EF

Note 1: Criteria pollutant EFs are based on EFs used during permitting (and permit conditions). GHG EFs are calculated based on emissions reported in the 2012/2013 AER.

Note 2: Cogen maximum daily emissions will not increase; however, annual average emissions will increase. Calculations here are for estimation of the annual average emissions increase.

Note 3: The 42 mmbtu/hr increase is estimated based on an estimated additional 30,000 pounds per hour of 600 psi steam.

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-23: Carson Cogeneration Unit Toxic Emissions Calculations (Increased Utilization) - Annual Average

Est. Incr. in Firing Rate:	42	mmbtu/hr
HHV	1107	mmbtu/mmscf
Fuel:	NG, RFG and Butane	

Chemical Name	CAS No.	HARP?	R1401 Code	FlueCogen Lbs/MMscf	EF Basis	Emissions Increase Emissions (lbs/hr)	Emissions Increase Emissions (lbs/year)
1,2,4-Trimethylbenzene	95-63-6	HARP	0-NA	**0**	**Delta AQS, Cogen Source Testing, December 2006**	0.00E+00	0.00E+00
2-Methylnaphthalene	91-57-6	HARP	0-NA	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Acenaphthene	83-32-9	HARP	0-NA	1.781911E-06	Delta AQS, Cogen Source Testing, December 2006	6.76E-08	5.92E-04
Acenaphthylene	208-96-8	HARP	0-NA	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Anthracene	120-12-7	HARP	0-NA	2.301351E-06	Delta AQS, Cogen Source Testing, December 2006	8.73E-08	7.65E-04
Antimony	7440-36-0	HARP	0-NA	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Barium	7440-39-3	HARP	0-NA	5.191374E-04	Delta AQS, Cogen Source Testing, December 2006	1.97E-05	1.73E-01
Benzo(g,h,i)perylene	191-24-2	HARP	0-NA	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Carbonyl sulfide	463-58-1	HARP	0-NA			0.00E+00	0.00E+00
Cobalt	7440-48-4	HARP	0-NA	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Cyclohexane	110-82-7	HARP	0-NA			0.00E+00	0.00E+00
Dichlorobenzene	95-50-1	HARP	0-NA	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Dioxin and dioxin-like compounds	1086	HARP	0-NA	9.909331E-08	Delta AQS, Cogen Source Testing, December 2006	3.76E-09	3.29E-05
Ethylene	74-85-1	HARP	0-NA			0.00E+00	0.00E+00
Fluoranthene	206-44-0	HARP	0-NA	1.625603E-06	Delta AQS, Cogen Source Testing, December 2006	6.17E-08	5.40E-04
Fluorene	86-73-7	HARP	0-NA	5.015570E-06	Delta AQS, Cogen Source Testing, December 2006	1.90E-07	1.67E-03
Molybdenum	7439-98-7	Not HARP	0-NA	2.796390E-04	Delta AQS, Cogen Source Testing, December 2006	1.06E-05	9.30E-02
Molybdenum Trioxide	1313-27-5	HARP	0-NA			0.00E+00	0.00E+00
Phenanthrene	85-01-8	HARP	0-NA	1.372805E-05	Delta AQS, Cogen Source Testing, December 2006	5.21E-07	4.56E-03
Phosphorus	7723-14-0	HARP	0-NA			0.00E+00	0.00E+00
Pyrene	129-00-0	HARP	0-NA	2.125788E-06	Delta AQS, Cogen Source Testing, December 2006	8.07E-08	7.07E-04
Silver	7440-22-4	HARP	0-NA	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Thallium	7440-28-0	HARP	0-NA	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Zinc	7440-66-6	HARP	0-NA	3.736567E-03	Delta AQS, Cogen Source Testing, December 2006	1.42E-04	1.24E+00
Chromium	7440-47-3	HARP	0-NA - Accounted for in Cr6	2.348448E-04	Delta AQS, Cogen Source Testing, December 2006	8.91E-06	7.81E-02
Acetaldehyde	75-07-0	HARP	A1	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Arsenic	7440-38-2	HARP	A13	1.094460E-04	Delta AQS, Cogen Source Testing, December 2006	4.15E-06	3.64E-02
Acrolein	107-02-8	HARP	A3	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Ammonia	7664-41-7	HARP	A9	20 ppmv	Current permitted BACT limit	1.15E+00	1.00E+04
Benzene	71-43-2	HARP	B1	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Beryllium	7440-41-7	HARP	B4	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
1,3-Butadiene	106-99-0	HARP	B9			0.00E+00	0.00E+00
Cadmium	7440-43-9	HARP	C1	1.408315E-04	Delta AQS, Cogen Source Testing, December 2006	5.34E-06	4.68E-02
Carbon Disulfide	75-15-0	HARP	C2			0.00E+00	0.00E+00
Chromium (hexavalent)	18540-29-9	HARP	C20	1.640000E-05	Delta AQS, Cogen Source Testing, December 2006	6.22E-07	5.45E-03
Copper	7440-50-8	HARP	C28	4.477999E-04	Delta AQS, Cogen Source Testing, December 2006	1.70E-05	1.49E-01
Carbon Tetrachloride	56-23-5	HARP	C3			0.00E+00	0.00E+00
Hydrogen cyanide	74-90-8	HARP	C36			0.00E+00	0.00E+00
Ethylbenzene	100-41-4	HARP	E4	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Formaldehyde	50-00-0	HARP	F3	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Hydrochloric acid	7647-01-0	HARP	H11	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Hydrogen sulfide	7783-06-4	HARP	H12	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Hexane	110-54-3	HARP	H8	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Lead	7439-92-1	HARP	L1	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Manganese	7439-96-5	HARP	M2	1.981667E-02	Delta AQS, Cogen Source Testing, December 2006	7.52E-04	6.59E+00
Mercury	7439-97-6	HARP	M3	3.053272E-04	Delta AQS, Cogen Source Testing, December 2006	1.16E-05	1.02E-01
Nickel	7440-02-0	HARP	N1	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Benzo(a)anthracene	56-55-3	HARP	P10	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Benzo(a)pyrene	50-32-8	HARP	P11	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Benzo(b)fluoranthene	205-99-2	HARP	P12	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-23: Carson Cogeneration Unit Toxic Emissions Calculations (Increased Utilization) - Annual Average

Benzo(k)fluoranthene	207-08-9	HARP	P14	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Chrysene	218-01-9	HARP	P15	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	53-70-3	HARP	P17	2.184634E-10	Delta AQS, Cogen Source Testing, December 2006	8.29E-12	7.26E-08
Tetrachloroethylene	127-18-4	HARP	P2			0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	57-97-6	HARP	P24	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	193-39-5	HARP	P27	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
3-Methylchloranthrene	56-49-5	HARP	P28	0.000000E+00	AP-42, July 1998, Tables 1.4-3, 1.4-4 {use zero for D & E rated factors}	0.00E+00	0.00E+00
Phenol	108-95-2	HARP	P3	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Naphthalene	91-20-3	HARP	P30	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00
Propylene	115-07-1	HARP	P78			0.00E+00	0.00E+00
Selenium	7782-49-2	HARP	S1	2.529635E-04	Delta AQS, Cogen Source Testing, December 2006	9.60E-06	8.41E-02
Sulfuric Acid	7664-93-9	HARP	S8	1.880000E-04	Avg. historic test data.	7.13E-06	6.25E-02
Toluene	108-88-3	HARP	T3	6.920242E-03	Delta AQS, Cogen Source Testing, December 2006	2.63E-04	2.30E+00
Vanadium	7440-62-2	HARP	V2	1.256655E-03	Delta AQS, Cogen Source Testing, December 2006	4.77E-05	4.18E-01
Xylenes (mixed)	1330-20-7	HARP	X1	0.000000E+00	Delta AQS, Cogen Source Testing, December 2006	0.00E+00	0.00E+00

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-24: Sulfuric Acid Regeneration Plant (SARP) Process Vent Emissions

Sulfuric Acid Regeneration Plant:

Operating hours in year: 8760

Est Production Rate: 400 (tpd)

H2SO4 EF: 0.015 (lbs/ton produced)

Vent rate	16000	scfm
SO2 conc	400	ppmv
SO2 MW	64.06	lb/lb-mol
MVC	379.48	scf/lb-mol
Control eff.	**98%**	
SO2 emissions	1.30	lb/hr
	11,357	lb/yr
	5.7	tpy

H2SO4 Emissions:	6.00	(lbs/day)	
H2SO4 Emissions:	1.10	(tpy)	
H2SO4 Emissions:	0.25	(lbs/hr)	
PM Emissions:	1.10	(tpy)	(assumes all H2SO4 is condensible PM-10)

* SO2 vent conditions are estimated and will be finalized upon final design of the SARP system. Vendor confirms the ability to comply with the 5.7 tpy SO2 emissions rate provided in this PSD analysis.
** H2SO4 EF based on vendor guarantee of performance.

Wed 10/19/2016 9:04 AM
BAILEY, KIRK W <Kirk-Wayne.Bailey@dupont.com>
Tesoro-Los Angeles Sulfuric Acid Regeneration Plant
To Mike Waller
Cc Christman, June M.; Shao, John

Mike-

I confirmed with the MECS Engineering Department, that the emissions limit requests (< 1 TPY mist, < 5.7 TPY SO2) from Tesoro for the proposed 400 STPD Carson spent acid regeneration facility are feasible and within the design capabilities of MECS based on the following criteria:

To meet the required emissions for Acid Mist and SO2, MECS would design a spent acid regeneration plant with the following characteristics:

- Dual Absorption Plant
- Advanced Catalyst Loadings
  - Maximize SO3 to SO2 conversion and limit the amount of SO2 reaching the tail gas scrubber
- Specific Design Criteria for Final Absorbing Tower with Mist Eliminators
  - Minimize acid mist formation
  - Minimize acid vapor concentration
- Tail Gas Scrubber with Mist Eliminators
  - Scrub the residual SO2 from the gas stream
  - Remove acid mist

Acid Mist Emissions

MECS has designed and guaranteed plants that meet the 0.015 pound of acid mist per ton of acid produced requirement.

SO2 Emissions

MECS has designed and guaranteed plants that meet the required emission concentration to achieve the < 5.7 TPY of SO2. There are MECS designed plants that currently operate at the SO2 concentration needed to achieve the total tons of SO2 emitted per year for the Tesoro proposed facility.

Thanks
Kirk

Kirk Bailey
Sales Manager, MECS Inc.

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-25: Onroad Truck Emissions

Carson Operations

Assumptions

Idling Time	15	min/trip
Route Distance	1.75	miles/trip
Trucks per Peak Hour	4	
Trucks per Day	15	
Trucks per Year	5475	

Idling Emissions

Pollutant	Emission Factor (lb/hr)	lb/hr	lb/day	lb/yr
VOC	5.78E-03	5.78E-03	2.17E-02	7.91E+00
CO	1.86E-02	1.86E-02	6.97E-02	2.55E+01
NOx	1.46E-01	1.46E-01	5.49E-01	2.00E+02
SOx	1.19E-04	1.19E-04	4.45E-04	1.63E-01
PM	1.15E-03	1.15E-03	4.31E-03	1.57E+00
CO2	1.31E+01	1.31E+01	4.90E+01	1.79E+04

Travel Emissions

Pollutant	Emission Factor (lb/mi)	lb/hr	lb/day	lb/yr
VOC	5.35E-03	3.75E-02	1.40E-01	5.13E+01
CO	1.82E-02	1.28E-01	4.78E-01	1.75E+02
NOx	5.88E-02	4.12E-01	1.54E+00	5.63E+02
SOx	3.71E-05	2.60E-04	9.73E-04	3.55E-01
PM	2.18E-04	1.53E-03	5.73E-03	2.09E+00
CO2	1.32E+01	9.22E+01	3.46E+02	1.26E+05

Total Emissions (Carson)

Pollutant	lb/hr	lb/day	lb/yr
VOC	4.32E-02	1.62E-01	5.92E+01
CO	1.46E-01	5.48E-01	2.00E+02
NOx	5.58E-01	2.09E+00	7.64E+02
SOx	3.78E-04	1.42E-03	5.18E-01
PM	2.68E-03	1.00E-02	3.67E+00
CO2	1.05E+02	3.95E+02	1.44E+05

Wilmington Operations

Assumptions

Idling Time	15	min/trip
Route Distance	0.75	miles/trip
Trucks per Peak Hour	2	
T7 Trucks per Day	2	
T7 Trucks per Year	730	

Idling Emissions

Pollutant	Emission Factor (lb/hr)	lb/hr	lb/day	lb/yr
VOC	5.78E-03	2.89E-03	2.89E-03	1.05E+00
CO	1.86E-02	9.30E-03	9.30E-03	3.39E+00
NOx	1.46E-01	7.32E-02	7.32E-02	2.67E+01
SOx	1.19E-04	5.94E-05	5.94E-05	2.17E-02
PM	1.15E-03	5.75E-04	5.75E-04	2.10E-01
CO2	1.31E+01	6.53E+00	6.53E+00	2.38E+03

Travel Emissions

Pollutant	Emission Factor (lb/mi)	lb/hr	lb/day	lb/yr
VOC	5.35E-03	8.03E-03	8.03E-03	2.93E+00
CO	1.82E-02	2.73E-02	2.73E-02	9.98E+00
NOx	5.88E-02	8.82E-02	8.82E-02	3.22E+01
SOx	3.71E-05	5.56E-05	5.56E-05	2.03E-02
PM	2.18E-04	3.28E-04	3.28E-04	1.20E-01
CO2	1.32E+01	1.98E+01	1.98E+01	7.21E+03

Total Emissions (Wilmington)

Pollutant	lb/hr	lb/day	lb/yr
VOC	1.09E-02	1.09E-02	3.99E+00
CO	3.66E-02	3.66E-02	1.34E+01
NOx	1.61E-01	1.61E-01	5.89E+01
SOx	1.15E-04	1.15E-04	4.20E-02
PM	9.03E-04	9.03E-04	3.29E-01
CO2	2.63E+01	2.63E+01	9.59E+03

Total Emissions (Carson and Wilmington)

Pollutant	lb/hr	lb/day	lb/yr
VOC	5.42E-02	1.73E-01	7.31E+01
CO	1.83E-01	5.85E-01	2.47E+02
NOx	7.19E-01	2.25E+00	9.62E+02
SOx	4.93E-04	1.53E-03	6.57E-01
PM	3.58E-03	1.09E-02	4.73E+00
CO2	1.32E+02	4.21E+02	1.78E+05
		MT/Yr CO2:	80.58

Wilmington Operations - Coke Handling

Assumptions

Idling Time	15	min/trip
Route Distance	1	miles/trip
Trucks per Year	1460	

Idling Emissions

Pollutant	Emission Factor (lb/hr)	lb/yr
VOC	5.78E-03	2.11E+00
CO	1.86E-02	6.79E+00
NOx	1.46E-01	5.34E+01
SOx	1.19E-04	4.33E-02
PM	1.15E-03	4.20E-01
CO2	1.31E+01	4.77E+03

Travel Emissions

Pollutant	Emission Factor (lb/mi)	lb/yr
VOC	5.35E-03	7.81E+00
CO	1.82E-02	2.66E+01
NOx	5.88E-02	8.59E+01
SOx	3.71E-05	5.41E-02
PM	2.18E-04	3.19E-01
CO2	1.32E+01	1.92E+04

Total Emissions (Wilmington Coke Handling)

Pollutant	lb/yr
VOC	9.92E+00
CO	3.34E+01
NOx	1.39E+02
SOx	9.75E-02
PM	7.39E-01
CO2	2.40E+04

* Wilmington Operations Coke Handling Truck maximum hourly and daily emissions will not increase; however, annual average emissions will increase. Calculations here are for estimation of the annual average emissions increase.

Idling Emission Factors

EMFAC2014 (v1.0.7) Emission Rates
Region Type: Air District
Region: South Coast AQMD
Calendar Year: 2016
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, g/hour for RUNEX, PMBW and PMTW

Region	CalYr	VehClass	MdlYr	Speed	Fuel	Population	VMT	ROG_IDLEX	CO_IDLEX	NOx_IDLEX	SOx_IDLEX	PM10_IDLEX	CO2_IDLEX
South Coast AQMD	2016	HHDT	2007	Aggregated	DSL	3,343.88	347,398.51	2.62	8.44	66.40	0.05	0.52	5,926.22

Low Speed Emission Factors

EMFAC2014 (v1.0.7) Emission Rates
Region Type: Air District
Region: South Coast AQMD
Calendar Year: 2016
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, g/mile for RUNEX, PMBW and PMTW

Region	CalYr	VehClass	MdlYr	Speed	Fuel	VMT	ROG_RUNEX	CO_RUNEX	NOx_RUNEX	SOx_RUNEX	PM10_RUNEX	CO2_RUNEX
South Coast AQMD	2016	HHDT	2007	5	DSL	939.39	2.43	8.27	26.67	0.02	0.10	5973.64975

EMFAC Database: https://www.arb.ca.gov/emfac/2014
EMFAC User's Guide: https://www.arb.ca.gov/msei/emfac2014_users_guide.pdf

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-26: H2SO4 Emissions from Refinery Heaters

Equipment Description	Fuel Type	2012 Reported H2SO4, lbs	2013 Reported H2SO4, lbs	Baseline H2SO4, lbs/yr	Post Mod SO2, lbs/yr	SO2 to SO3[1], mol%	Post Mod SO2, mol/yr	Post Mod SO3, mol/yr	SO2 to SO3[6] (SCR), wt%	SCR Add'l Post Mod SO3, mol/yr	Stack Temp, degF	Stack Moisture[2], %	Conversion of SO3 to H2SO4	Post Mod H2SO4[3], lbs/yr	Incremental Increase H2SO4, lbs/yr	Incremental Increase H2SO4, tpy	Incremental Increase H2SO4, lbs/hr
Carson 51 Vacuum Unit Heater (D63) - Duty Bump to 360 MMBtu/Hr[4]	NG	-	-	55.00	1,802.06	2.54%	28	0.715	0.30%	0.068	344.26	16.39%	0.9950	76.3	21.3	0.01	0.0024346
Wilmington H-100 Heater - Duty Bump to 302.4 MMBtu/Hr	RFG	35.34	48.26	41.80	91,250.00	2.54%	1,426	36.302	0.30%	3.419	665.60	8.90%	0.5000	1,946.3	1,904.5	0.95	0.2174120
Carson NHDS Ultra-Low NOx Burner Installation (RW0053; D1433)[4]	NG	-	-	0.65	240.90	2.54%	4	0.096			600.08	12.14%	0.7800	7.3	6.7	0.00	0.0007598
Wilmington HCU Heaters H-300 and H-301 Duty Bump (Also install ULNB and SCR)[5]	RFG to NG	22.92	31.97	27.45	492.30	2.54%	8	0.196	0.30%	0.018	450.00	2.55%	0.9300	19.5	(7.9)	0.00	(0.0009038)
Wilmington H-101 Heater (D32)	RFG	183.44	224.61	204.03	16,402.21	2.54%	256	6.510			463.73	11.60%	0.9500	606.0	402.0	0.20	0.0458928
Wilmington H-30 Heater (D157)	RFG	0.83	1.20	1.02	2,781.55	2.54%	43	1.104			575.60	3.96%	0.6300	68.2	67.1	0.03	0.0076646
Wilmington H-21/H-22 Heater (D158)	RFG	0.03	0.04	0.04	2,042.64	2.54%	32	0.811			640.40	4.35%	0.4400	35.0	34.9	0.02	0.0039864
Wilmington H-510 Heater (D218)	RFG	1.03	1.52	1.28	3,871.75	2.54%	60	1.537			649.40	12.34%	0.6400	96.4	95.1	0.05	0.0108562
Wilmington H-501A, H-501B, H-502, H-503/504 Heater (D216, D217, D214 and D215)	RFG	108.00	162.00	135.00	8,841.14	2.54%	138	3.517	0.30%	0.331	300.20	9.73%	0.9990	376.8	241.8	0.12	0.0276004
Wilmington SRP H-1601/H-1602 Boilers (D76 and D77)	RFG	11.12	69.23	40.17	3,979.63	2.54%	62	1.579			344.30	15.30%	0.9950	154.0	113.8	0.06	0.0129948
Wilmington SRP Incinerators F-704 (C56)	RFG	2.20	3.15	2.68	11,800.66	2.54%	184	4.683			541.13	5.00%	0.6800	312.1	309.4	0.15	0.0353226
Wilmington SRP Incinerators F-754 (C54)	RFG	2.07	8.77	5.42	8,864.16	2.54%	139	3.518			602.33	4.90%	0.6800	234.4	229.0	0.11	0.0261435
Wilmington Boilers 7 and 8 (D722 and D723)	RFG	288.00	505.00	396.50	26,745.70	2.54%	418	10.615			500.00	9.11%	0.9300	967.4	570.9	0.29	0.0651739
Wilmington Boilers 9 and 10 (D724 and D725)	RFG	337.00	262.00	299.50	32,536.20	2.54%	508	12.913			500.00	12.00%	0.9500	1,202.2	902.7	0.45	0.1030459
Carson HC R-1 Heater (D625) - Affected Unit; No Physical Change	RFG	47.80	187.40	117.60	4,602.85	2.54%	72	1.827			521.28	13.78%	0.9300	166.5	48.9	0.02	0.0055811
Carson HC R-2 Heater (D627) - Affected Unit; No Physical Change	RFG	26.70	132.70	79.70	6,203.70	2.54%	97	2.462			586.99	13.74%	0.8200	197.9	118.2	0.06	0.0134879
Carson LHU Heater (D425) - Affected Unit; No Physical Change	RFG	14.90	17.00	15.95	1,133.31	2.54%	18	0.450			618.28	13.83%	0.7500	33.1	17.1	0.01	0.0019531
Carson FCCU Pre-Heater (D250)	RFG	164.10	171.30	167.70	7,408.68	3.58%	116	4.144			519.91	13.01%	0.9400	381.8	214.1	0.11	0.0244368
Wilmington Sulfuric Acid Plant Process Air Heater	NG	-	-	-	102.46	2.54%	2	0.041			450.00	12.90%	0.9700	3.9	3.9	0.00	0.0004413
Wilmington Sulfuric Acid Plant Decomposition Furnace	NG	-	-	-	215.16	2.54%	3	0.086	0.30%	0.008	180.00	12.90%	1.0000	9.2	9.2	0.00	0.0010478
Wilmington Sulfuric Acid Plant Converter Heater	NG	-	-	-	25.61	2.54%	0	0.010			450.00	12.90%	0.9700	1.0	1.0	0.00	0.0001103
		1,245.48	1,826.16	1,591.47	231,342.65		3,614.73			3.84				6,895.14	5,303.67	2.65	

Notes:
1. References: Delta Source Test dated March 18, 2003 conducted on the No. 3 Reformer Reaction Heater North Stack (1.5%).
Delta Source Test dated April 11, 2007 conducted on the FCCU Preheater (3.58%).
Other heaters based on the average of these results (1.5% + 3.58%)/2 = 2.54%)
2. Average moisture content from RATA test results.
3. Reference: Crane, Springer, Siegell, "New Method Estimates Sulfuric Acid Emissions from Fired Heaters," Oil and Gas Jour nal, September 30, 2002.
4. H2SO4 emissions unintentionally excluded from previous baseline calculations for the 51 Vacuum Unit and NHDS heaters. H2 SO4 baseline emissions from these heaters are calculated and included here based on the Crane, Springer, Siegell method.
5. H2SO4 emissions decrease results from the conversion of this heater from refinery fuel gas to natural gas.
6. SO2 to SO3 conversion (wt%) based on vendor estimate for heater/SCR combinations and operating conditions at the Tesoro L os Angeles Refinery.

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-27: Wilmington Coke Handling Emissions (Increased Utilization)

Production	Projected Increase (Annual)
Tons of Delayed Coke:	40,150
MTons of Delayed Coke:	40.15
Number of Coke Trucks	1,579

Emissions	
Emissions (controlled), lbs/yr	145.90
Emissions (controlled), tons/yr	0.07

365 Days in reporting period

* Wilmington Operations Coke Handling maximum hourly and daily emissions will not increase; however, annual average emissions will increase. Calculations here are for estimation of the annual average emissions increase.

LOADING/UNLOADING CONVEYOR EMISSION RATE

			Source/Comment
Loading/Unloading Conveyor Emission Rate, lbs/day = [(E_1 * PT * Thru) + (E_2 * VMT) + (E_3)] * Eff			
1. Loading of Coke onto Conveyors			
13.2.4 Aggregrate Handling & Storage Piles, AP-42 11/2006			
E_1 (lb/ton) = Load In/Out Factor = k_L (0.0032) x (WS/5)^1.3 / (M/2)^1.4	0.000148	lbs/ton	Calculated
k_L = particle size multiplier	0.35		AP-42, Table "Aerodynamic Particle Size Multiplier (k)", 13.2.4-4
WS = mean wind speed	6.36	mph	Meteorological data for Long Beach from TANKS 4.0
M = material moisture content	10.62	%	See tab Coke Analysis
PT = Number of Pile Transfers =	10		
Thru = Daily Facility Throughput =	110	tons/day	Operating Data
Emissions = 0.16 lbs/day			
Eff = Efficiency of Fugitive Dust Controls =	0.95		Enclosure and Waterspray, See reference (1), App. C, pg C-2 (transfer drops)
Loading Conveyor Emission Rate (uncontrolled) =	0.16	lbs/day	Calculated
Loading Conveyor Emission Rate (controlled) =	**0.01**	lbs/day	Calculated
	2.97	lbs/yr	

TRUCK LOADING EMISSION RATE

Loading/Unloading Emission Rate, lbs/day = [E_5 x Thru] x Eff			
5. Coke Loading onto Trucks			
13.2.4 Aggregrate Handling & Storage Piles, AP-42 11/2006			
E_5 (lb/ton) = Load In/Out Factor = k_L (0.0032) x (WS/5)^1.3 / (M/2)^1.4	0.000148	lbs/ton	Calculated
k_L = particle size multiplier	0.35		"Aerodynamic Particle Size Multiplier (k)" table, 13.2.4-4
WS = mean wind speed	6.36	mph	Meteorological data for Long Beach from TANKS 4.0
M = material moisture content	10.62	%	
Thru = Daily Facility Throughput =	110	tons/day	Operating Data
Eff = Efficiency of Fugitive Dust Controls =	0.95		Enclosure and waterspray, See reference (1), page 121 (transfer drops)
Emissions = 0.02 lbs/day			
Truck Loading Emission Rate (uncontrolled) =	0.02	lbs/day	Calculated
Truck Loading Emission Rate (controlled) =	**0.00**	lbs/day	Calculated
	0.30	lbs/yr	

TRANSPORT EMISSION RATE - WIND EROSION

6. Wind Erosion of Pile Surfaces within Transport Truck
13.2.5 Industrial Wind Erosion, AP-42 11/2006
$E_6 = k_F \sum P_i$

k_F = Particle Size Multiplier	0.5		AP-42, Section 13.2.5, pg 13.2.5-3
∑ = Sum from 1 to N, where N = # of surface disturbances per year	1,579	# / year	Assumed one disturbance per truck truck leaving the facility
P_i = erosion potential corresponding to the observed (or probable) fastest mile of wind for the ith period between disturbances, g/m2			

Using Procedure outlines in AP-42, Section 13.2.5, pg 13.2.5-8

Step 1: Determine threshold friction velocity for erodible material of interest

u_t = threshold friction velocity (m/s) 0.55 m/s — AP-42, Section 13.2.5, Table 13.2.5-2

Step 2: Divide the exposed surface area into subareas of constant frequency of disturbance (N).

Step 3: Tabulate fastest mile values (u^+) for each frequency of disturbance and correct them to 10 m (u^+) using Equation 5.5

$u_{10}^+ = u^+$ (wind speed) + u_{truck} (truck speed)

u^+ =	6.6	m/s	Review of SCAQMD met modeling data for Long Beach shows 99th percent wind speed to be 15 miles/hr or 6.6 m/s. Data is already at 10 meters, therefore no adjustment necessary.
u_{truck} =	4.47	m/s	Speed limit is 10 mph along the paved road out of refinery
u_{10}^+ =	11.07	m/s	

Step 4: Convert fastest mile values (u_{10}) to equivalent friction velocities (u*), taking into account (a) the uniform wind exposure of nonelevated surfaces, using Eq. 4, or (b) the nonuniform wind exposure of elevated surfaces (piles), using Eq. 6 and 7.

From Table 13.2.5-4, using u_{10}^+ = 11.07

$u^*(u_s/u_r=0.2)$ = 0.22
$u^*(u_s/u_r=0.6)$ = 0.66
$u^*(u_s/u_r=0.9)$ = 1.00
$u^*(u_s/u_r=1.1)$ = 1.22

Step 5: For elevated surfaces (piles), subdivide areas of constant N into subareas of constant u* (i. e., within the isopleth values of u_s/u_r in Figure 13.2.5-2 and Table 13.2.5-3) and determine the size of each subarea. — AP-42, Section 13.2.5, Figure 13.2.5-2, Pile B3

Each truck pulls two identical trailers. The surface area for a pile is based on the dimensions of the trailer.
A = Length * Width
Area of pile = 12096 in^2
Total Area = 15.61 m^2

Pile Subarea	Percent	Area (m^2)
0.2a	3%	0.47
0.2b	25%	3.90
0.6a	28%	4.37
0.6b	26%	4.06
0.9	14%	2.19
1.1	4%	0.62

Tesoro Los Angeles Refinery Integration and Compliance Project
Appendix A: Summary of Emissions

Table A-27: Wilmington Coke Handling Emissions (Increased Utilization)

Step 6: For each subarea of constant N and u*, calculate the erosion potential (P_i) using Eq. 3

$P_i = 58(u^* - u_t)^2 + 25(u^* - u_t)$

$P_i = 0$ for $u^* \leq u_t$ (for 15 miles/hr, $u^* < u_t^*$ for pile subareas 0.2a and 0.2b. Therefore, only three P_i are calculated)

u* = friction velocity (m/s)			See below
u_t = threshold friction velocity (m/s)	0.55	m/s	AP-42, Section 13.2.5, Table 13.2.5-2

$P_i = P_{0.6}$ =	3.452	g/m^2
$P_i = P_{0.9}$ =	22.995	g/m^2
$P_i = P_{1.1}$ =	42.7862	g/m^2

Step 7: Multiply the resulting emission factor for each subarea by the size of the subarea, and add the emission contributions of all subareas.

P (lbs) = 106 g

Emissions (E_6) = 184.53 lbs/yr
Emissions (E_6) = 0.51 lbs/day

Eff = Efficiency of Fugitive Dust Controls =	0.85		Slot Tops, See reference (1), page 123
Wind Erosion Emission Rate (uncontrolled) =	0.51	lbs/day	Calculated
Wind Erosion Emission Rate (controlled) =	**0.08**	lbs/day	Calculated
	27.68	lbs/yr	

TRANSPORT EMISSION RATE - TRAVEL ON PAVED ROADS

7. Coke track out (inside facility on paved road)
13.2.1 Paved Roads, AP-42 11/2006

Transport Emission Rate, lbs/day = (k x s x WF x Vehicle x VMT / days) x Eff — Based on AP-42, Section 13.2.1, Eq. 1

k = Particle Size Multiplier =	0.016	lb/VMT	See reference (1), page 125
s = Silt Factor = (Baseline SL/2)^0.65	1.38		Calculated
Baseline SL =	3.28	g/m^2	See reference (1), page 125
WF = Vehicle Factor = (W/3)^1.5	28.6		Calculated
W = mean vehicle weight =	28.1	tons	See reference (1), page 126
Vehicle = Number of Vehicles per year =	1579		Calculated using truck logs, see tab 'Truck Loading'
VMT = Vehicle Miles Traveled =	0.31	miles	Est. 0.31 miles for paved road from loading to outside facility
Eff = Efficiency of Fugitive Dust Controls = Controlled SL =	0.25	g/m^2	Spray Roads, See reference (1), page 126
s = Silt Factor = (Controlled SL/2)^0.65 =	0.26		Calculated
Transport Emission Rate (uncontrolled) =	1.68	lbs/day	Calculated
Transport Emission Rate (controlled) =	**0.31**	lbs/day	Calculated
	114.96	lbs/yr	

Reference Documents:
(1) Jones, D., C. Tupac, R. Lem, "Proposed Amended Rule 1158 - Storage, Handling and Transport of Coke, Coal and Sulfur," South Coast Air Quality Management District, March 12, 1999.

TAC - Toxic Air Contaminants

TAC	Weight Percent	Emission (lb)
Chlorine	0.0154	0.0224625
Vanadium	0.0798	0.1164490
Nickel	0.0524	0.0764270
Aluminum	0.0121	0.0177189
Chromium	0.0002	0.0002550
Lead	0.00003	0.0000400

ATTACHMENT B: STORAGE TANK EMISSIONS CALCULATIONS

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TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Carson Crude Tank (DEFR)
City:	Long Beach
State:	California
Company:	Tesoro
Type of Tank:	Domed External Floating Roof Tank
Description:	New

Tank Dimensions

Diameter (ft):	240.00
Volume (gallons):	21,000,000.00
Turnovers:	51.10

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	Gray/Light
Shell Condition	Good

Roof Characteristics

Type:	Pontoon
Fitting Category	Detail

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	5
Automatic Gauge Float Well/Bolted Cover, Gasketed	2
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	4
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Sock	34
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Sock	101
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Carson Crude Tank (DEFR) - Domed External Floating Roof Tank
Long Beach, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TSO Light Crude Oil (RVP 10.5 psia)	Jan	65.62	58.33	72.92	66.55	8.7251	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.3622	N/A	N/A	78.1100	0.0047	0.0030	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoroanthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1317	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.2108	N/A	N/A	86.1700	0.0159	0.0165	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0629	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0032	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3924	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.5669	N/A	N/A	49.5359	0.9548	0.9781	217.40	
Xylenes (mixed isomers)						0.1098	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Feb	67.37	59.29	75.45	66.55	8.9707	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.4278	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoroanthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1396	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3104	N/A	N/A	86.1700	0.0159	0.0168	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0670	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0034	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4137	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.8340	N/A	N/A	49.5273	0.9548	0.9777	217.40	
Xylenes (mixed isomers)						0.1166	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Mar	69.41	60.32	78.50	66.55	9.2643	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.5076	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoroanthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1495	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4315	N/A	N/A	86.1700	0.0159	0.0171	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0721	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0037	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61

Toluene						0.4397	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.1530	N/A	N/A	49.5172	0.9548	0.9772	217.40	
Xylenes (mixed isomers)						0.1249	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Apr	72.51	61.77	83.24	66.55	9.7236	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.6358	N/A	N/A	78.1100	0.0047	0.0033	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoroanthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1656	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6251	N/A	N/A	86.1700	0.0159	0.0176	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0805	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0043	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4819	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.6520	N/A	N/A	49.5016	0.9548	0.9765	217.40	
Xylenes (mixed isomers)						0.1385	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	May	74.48	63.71	85.25	66.55	10.0253	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.7221	N/A	N/A	78.1100	0.0047	0.0033	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoroanthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1766	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.7549	N/A	N/A	86.1700	0.0159	0.0179	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0863	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0046	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5106	N/A	N/A	92.1300	0.0085	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.9795	N/A	N/A	49.4916	0.9548	0.9760	217.40	
Xylenes (mixed isomers)						0.1478	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Jun	76.44	65.30	87.59	66.55	10.3327	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.8117	N/A	N/A	78.1100	0.0047	0.0034	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoroanthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1882	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.8893	N/A	N/A	86.1700	0.0159	0.0182	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0924	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0050	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5405	N/A	N/A	92.1300	0.0085	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.3130	N/A	N/A	49.4815	0.9548	0.9756	217.40	
Xylenes (mixed isomers)						0.1576	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Jul	79.23	67.05	91.41	66.55	10.7812	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.9454	N/A	N/A	78.1100	0.0047	0.0035	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoroanthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.2058	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21

Hexane (-n)						3.0893	N/A	N/A	86.1700	0.0159	0.0187	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.1017	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0056	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5855	N/A	N/A	92.1300	0.0085	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.7995	N/A	N/A	49.4670	0.9548	0.9749	217.40	
Xylenes (mixed isomers)						0.1725	N/A	N/A	106.1700	0.0118	0.0008	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Aug	79.03	67.58	90.49	66.55	10.7489	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.9357	N/A	N/A	78.1100	0.0047	0.0035	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoroanthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.2045	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						3.0748	N/A	N/A	86.1700	0.0159	0.0186	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.1010	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0056	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5822	N/A	N/A	92.1300	0.0085	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.7645	N/A	N/A	49.4680	0.9548	0.9750	217.40	
Xylenes (mixed isomers)						0.1714	N/A	N/A	106.1700	0.0118	0.0008	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Sep	76.38	66.46	86.31	66.55	10.3233	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.8089	N/A	N/A	78.1100	0.0047	0.0034	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoroanthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1878	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.8852	N/A	N/A	86.1700	0.0159	0.0182	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0922	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0050	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5395	N/A	N/A	92.1300	0.0085	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.3029	N/A	N/A	49.4818	0.9548	0.9756	217.40	
Xylenes (mixed isomers)						0.1573	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Oct	72.86	64.16	81.56	66.55	9.7779	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.6512	N/A	N/A	78.1100	0.0047	0.0033	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoroanthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1676	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6483	N/A	N/A	86.1700	0.0159	0.0177	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0815	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0043	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4870	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.7109	N/A	N/A	49.4998	0.9548	0.9764	217.40	
Xylenes (mixed isomers)						0.1401	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Nov	68.45	60.79	76.12	66.55	9.1259	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.4697	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoroanthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439

Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1448	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3742	N/A	N/A	86.1700	0.0159	0.0170	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0697	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0036	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4274	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.0026	N/A	N/A	49.5220	0.9548	0.9774	217.40	
Xylenes (mixed isomers)						0.1209	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Dec	65.40	58.35	72.46	66.55	8.6945	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.3542	N/A	N/A	78.1100	0.0047	0.0030	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoroanthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1307	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1985	N/A	N/A	86.1700	0.0159	0.0165	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0624	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0031	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3898	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.5337	N/A	N/A	49.5370	0.9548	0.9781	217.40	
Xylenes (mixed isomers)						0.1090	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11

Appendix B-3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Carson Crude Tank (DEFR) - Domed External Floating Roof Tank
Long Beach, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	53.1055	55.4944	58.4707	63.4233	66.8972	70.6398	76.5257	76.0836	70.5227	64.0346	57.0502	52.8148
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seal-related Wind Speed Exponent:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Value of Vapor Pressure Function:	0.2213	0.2312	0.2436	0.2643	0.2787	0.2943	0.3189	0.3170	0.2938	0.2668	0.2377	0.2201
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	8.7251	8.9707	9.2643	9.7236	10.0253	10.3327	10.7812	10.7489	10.3233	9.7779	9.1259	8.6945
Tank Diameter (ft):	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Withdrawal Losses (lb):	356.3852	356.3852	356.3852	356.3852	356.3852	356.3852	356.3852	356.3852	356.3852	356.3852	356.3852	356.3852
Net Throughput (gal/mo.):	89,425,000.0000	89,425,000.0000	89,425,000.0000	89,425,000.0000	89,425,000.0000	89,425,000.0000	89,425,000.0000	89,425,000.0000	89,425,000.0000	89,425,000.0000	89,425,000.0000	89,425,000.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
Average Organic Liquid Density (lb/gal):	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000
Tank Diameter (ft):	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000	240.0000
Roof Fitting Losses (lb):	125.1187	130.7472	137.7594	149.4280	157.6127	166.4302	180.2978	179.2561	166.1544	150.8683	134.4127	124.4338
Value of Vapor Pressure Function:	0.2213	0.2312	0.2436	0.2643	0.2787	0.2943	0.3189	0.3170	0.2938	0.2668	0.2377	0.2201
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	339.2700	339.2700	339.2700	339.2700	339.2700	339.2700	339.2700	339.2700	339.2700	339.2700	339.2700	339.2700
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Losses (lb):	534.6094	542.6269	552.6154	569.2366	580.8951	593.4553	613.2088	611.7250	593.0624	571.2882	547.8481	533.6338

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	5	1.60	0.00	0.00	42.5367
Automatic Gauge Float Well/Bolted Cover, Gasketed	2	2.80	0.00	0.00	29.7757
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	32.9659
Sample Pipe or Well (24-in. Diam.)/Slotted Pipe-Sliding Cover, Gask.	4	43.00	0.00	0.00	914.5382
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1	0.47	0.02	0.97	2.4990
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Sock	34	1.20	0.14	0.65	216.9370
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Sock	101	0.49	0.16	0.14	263.1424
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00	3.7751
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1	56.00	0.00	0.00	297.7566

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

Carson Crude Tank (DEFR) - Domed External Floating Roof Tank
Long Beach, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
TSO Light Crude Oil (RVP 10.5 psia)	765.06	4,276.62	1,802.52	0.00	6,844.20
Benzene	2.50	20.19	5.89	0.00	28.58
Benzo(a)anthracene	0.00	0.06	0.00	0.00	0.06
Benzo(a)pyrene	0.00	0.03	0.00	0.00	0.03
Benzo(b)fluoroanthene	0.00	0.14	0.00	0.00	0.14
Chrysene	0.00	0.13	0.00	0.00	0.13
Dibenzo(a,h)anthracene	0.00	0.01	0.00	0.00	0.01
Ethylbenzene	0.15	11.76	0.35	0.00	12.26
Hexane (-n)	13.51	68.00	31.84	0.00	113.35
Isopropyl benzene	0.01	1.87	0.03	0.00	1.91
Naphthalene	0.00	2.35	0.00	0.00	2.35
Toluene	1.33	36.27	3.13	0.00	40.72
Unidentified Components	747.02	4,083.49	1,760.00	0.00	6,590.51
Xylenes (mixed isomers)	0.53	50.46	1.25	0.00	52.25

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	014
City:	Carson
State:	California
Company:	Tesoro
Type of Tank:	Domed External Floating Roof Tank
Description:	

Tank Dimensions

Diameter (ft):	200.00
Volume (gallons):	14,570,461.93
Turnovers:	16.05

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good

Roof Characteristics

Type:	Pontoon
Fitting Category	Detail

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	2
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	3
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Gasketed	38
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Gasketed	75
Automatic Gauge Float Well/Bolted Cover, Gasketed	1

Meterological Data used in Emissions Calculations: Long Beach (AVG70), California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

014 - Domed External Floating Roof Tank
Carson, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TK 014 - RS307 Gas Oils (C20-C50)	Jan	67.48	62.48	72.48	70.02	0.0080	N/A	N/A	190.0000			400.00	Option 1: VP60 = .008 VP70 = .008
Cresols (mixed isomers)						0.0016	N/A	N/A	108.1400	0.0001	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	N/A	N/A	178.2300	0.0020	0.0000	178.23	Option 1: VP60 = .0000209 VP70 = .0000209
Unidentified Components						0.0080	N/A	N/A	190.0032	0.9980	1.0000	401.05	
TK 014 - RS307 Gas Oils (C20-C50)	Feb	68.47	63.36	73.58	70.02	0.0080	N/A	N/A	190.0000			400.00	Option 1: VP60 = .008 VP70 = .008
Cresols (mixed isomers)						0.0017	N/A	N/A	108.1400	0.0001	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	N/A	N/A	178.2300	0.0020	0.0000	178.23	Option 1: VP60 = .0000209 VP70 = .0000209
Unidentified Components						0.0080	N/A	N/A	190.0034	0.9980	1.0000	401.05	
TK 014 - RS307 Gas Oils (C20-C50)	Mar	69.47	64.27	74.68	70.02	0.0080	N/A	N/A	190.0000			400.00	Option 1: VP60 = .008 VP70 = .008
Cresols (mixed isomers)						0.0018	N/A	N/A	108.1400	0.0001	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	N/A	N/A	178.2300	0.0020	0.0000	178.23	Option 1: VP60 = .0000209 VP70 = .0000209
Unidentified Components						0.0080	N/A	N/A	190.0036	0.9980	1.0000	401.05	
TK 014 - RS307 Gas Oils (C20-C50)	Apr	71.40	65.59	77.20	70.02	0.0080	N/A	N/A	190.0000			400.00	Option 1: VP70 = .008 VP80 = .008
Cresols (mixed isomers)						0.0020	N/A	N/A	108.1400	0.0001	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	N/A	N/A	178.2300	0.0020	0.0000	178.23	Option 1: VP70 = .0000209 VP80 = .0000209
Unidentified Components						0.0080	N/A	N/A	190.0040	0.9980	1.0000	401.05	
TK 014 - RS307 Gas Oils (C20-C50)	May	72.97	67.48	78.45	70.02	0.0080	N/A	N/A	190.0000			400.00	Option 1: VP70 = .008 VP80 = .008
Cresols (mixed isomers)						0.0022	N/A	N/A	108.1400	0.0001	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	N/A	N/A	178.2300	0.0020	0.0000	178.23	Option 1: VP70 = .0000209 VP80 = .0000209
Unidentified Components						0.0080	N/A	N/A	190.0043	0.9980	1.0000	401.05	
TK 014 - RS307 Gas Oils (C20-C50)	Jun	74.67	69.04	80.30	70.02	0.0080	N/A	N/A	190.0000			400.00	Option 1: VP70 = .008 VP80 = .008
Cresols (mixed isomers)						0.0024	N/A	N/A	108.1400	0.0001	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	N/A	N/A	178.2300	0.0020	0.0000	178.23	Option 1: VP70 = .0000209 VP80 = .0000209
Unidentified Components						0.0080	N/A	N/A	190.0047	0.9980	1.0000	401.05	
TK 014 - RS307 Gas Oils (C20-C50)	Jul	76.95	70.74	83.16	70.02	0.0080	N/A	N/A	190.0000			400.00	Option 1: VP70 = .008 VP80 = .008
Cresols (mixed isomers)						0.0027	N/A	N/A	108.1400	0.0001	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	N/A	N/A	178.2300	0.0020	0.0000	178.23	Option 1: VP70 = .0000209 VP80 = .0000209
Unidentified Components						0.0080	N/A	N/A	190.0052	0.9980	1.0000	401.05	
TK 014 - RS307 Gas Oils (C20-C50)	Aug	77.29	71.32	83.27	70.02	0.0080	N/A	N/A	190.0000			400.00	Option 1: VP70 = .008 VP80 = .008
Cresols (mixed isomers)						0.0027	N/A	N/A	108.1400	0.0001	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	N/A	N/A	178.2300	0.0020	0.0000	178.23	Option 1: VP70 = .0000209 VP80 = .0000209
Unidentified Components						0.0080	N/A	N/A	190.0053	0.9980	1.0000	401.05	
TK 014 - RS307 Gas Oils (C20-C50)	Sep	75.86	70.34	81.38	70.02	0.0080	N/A	N/A	190.0000			400.00	Option 1: VP70 = .008 VP80 = .008
Cresols (mixed isomers)						0.0026	N/A	N/A	108.1400	0.0001	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	N/A	N/A	178.2300	0.0020	0.0000	178.23	Option 1: VP70 = .0000209 VP80 = .0000209
Unidentified Components						0.0080	N/A	N/A	190.0050	0.9980	1.0000	401.05	
TK 014 - RS307 Gas Oils (C20-C50)	Oct	73.45	68.17	78.73	70.02	0.0080	N/A	N/A	190.0000			400.00	Option 1: VP70 = .008 VP80 = .008
Cresols (mixed isomers)						0.0023	N/A	N/A	108.1400	0.0001	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	N/A	N/A	178.2300	0.0020	0.0000	178.23	Option 1: VP70 = .0000209 VP80 = .0000209
Unidentified Components						0.0080	N/A	N/A	190.0044	0.9980	1.0000	401.05	
TK 014 - RS307 Gas Oils (C20-C50)	Nov	70.00	64.91	75.09	70.02	0.0080	N/A	N/A	190.0000			400.00	Option 1: VP60 = .008 VP70 = .008
Cresols (mixed isomers)						0.0019	N/A	N/A	108.1400	0.0001	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	N/A	N/A	178.2300	0.0020	0.0000	178.23	Option 1: VP60 = .0000209 VP70 = .0000209
Unidentified Components						0.0080	N/A	N/A	190.0037	0.9980	1.0000	401.05	

TK 014 - RS307 Gas Oils (C20-C50)	Dec	67.46	62.52	72.39	70.02	0.0080	N/A	N/A	190.0000			400.00	Option 1: VP60 = .008 VP70 = .008
Cresols (mixed isomers)						0.0016	N/A	N/A	108.1400	0.0001	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	N/A	N/A	178.2300	0.0020	0.0000	178.23	Option 1: VP60 = .0000209 VP70 = .0000209
Unidentified Components						0.0080	N/A	N/A	190.0032	0.9980	1.0000	401.05	

Appendix B-3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

014 - Domed External Floating Roof Tank
Carson, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	0.2585	0.2585	0.2585	0.2585	0.2585	0.2585	0.2585	0.2585	0.2585	0.2585	0.2585	0.2585
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seal-related Wind Speed Exponent:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Value of Vapor Pressure Function:	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Tank Diameter (ft):	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000
Vapor Molecular Weight (lb/lb-mole):	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	25.0194	25.0194	25.0194	25.0194	25.0194	25.0194	25.0194	25.0194	25.0194	25.0194	25.0194	25.0194
Net Throughput (gal/mo.):	19,485,607.9100	19,485,607.9100	19,485,607.9100	19,485,607.9100	19,485,607.9100	19,485,607.9100	19,485,607.9100	19,485,607.9100	19,485,607.9100	19,485,607.9100	19,485,607.9100	19,485,607.9100
Shell Clingage Factor (bbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	7.6250	7.6250	7.6250	7.6250	7.6250	7.6250	7.6250	7.6250	7.6250	7.6250	7.6250	7.6250
Tank Diameter (ft):	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000	200.0000
Roof Fitting Losses (lb):	0.2767	0.2767	0.2767	0.2767	0.2767	0.2767	0.2767	0.2767	0.2767	0.2767	0.2767	0.2767
Value of Vapor Pressure Function:	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Vapor Molecular Weight (lb/lb-mole):	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	128.4600	128.4600	128.4600	128.4600	128.4600	128.4600	128.4600	128.4600	128.4600	128.4600	128.4600	128.4600
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Losses (lb):	25.5547	25.5547	25.5547	25.5547	25.5547	25.5547	25.5547	25.5547	25.5547	25.5547	25.5547	25.5547

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	2	1.60	0.00	0.00	0.0827
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	3	6.20	1.20	0.94	0.4808
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	1	14.00	3.70	0.78	0.3619
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00	0.0184
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Gasketed	38	1.30	0.08	0.65	1.2771
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Gasketed	75	0.53	0.11	0.13	1.0276
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	0.0724

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

014 - Domed External Floating Roof Tank
Carson, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
TK 014 - RS307 Gas Oils (C20-C50)	3.10	300.23	3.32	0.00	306.66
Cresols (mixed isomers)	0.00	0.02	0.00	0.00	0.02
Phenanthrene	0.00	0.60	0.00	0.00	0.60
Unidentified Components	3.10	299.62	3.32	0.00	306.04

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	031
City:	Carson
State:	California
Company:	Tesoro
Type of Tank:	Domed External Floating Roof Tank
Description:	

Tank Dimensions

Diameter (ft):	117.00
Volume (gallons):	3,217,016.99
Turnovers:	29.18

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good

Roof Characteristics

Type:	Double Deck
Fitting Category	Detail

Tank Construction and Rim-Seal System

Construction:	Riveted
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	2
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Roof Drain (3-in. Diameter)/90% Closed	1
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	24
Slotted Guide-Pole/Sample Well/Gask Sliding Covr, w. Float,Sleeve,Wiper	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Long Beach (AVG70), California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

031 - Domed External Floating Roof Tank
Carson, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TK 031 - RBC	Jan	67.48	62.48	72.48	70.02	3.7275	N/A	N/A	70.0000			90.00	Option 1: VP60 = 3.72747149951 VP70 = 3.72747149951
Benzene						1.4320	N/A	N/A	78.1100	0.0090	0.0045	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1402	N/A	N/A	106.1700	0.0211	0.0010	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Toluene						0.4151	N/A	N/A	92.1300	0.1055	0.0151	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.7300	N/A	N/A	69.5784	0.7516	0.9751	87.50	
Xylenes (mixed isomers)						0.1110	N/A	N/A	106.1700	0.1128	0.0043	106.17	Option 2: A=7.005, B=1466, C=215
TK 031 - RBC	Feb	68.47	63.36	73.58	70.02	3.7275	N/A	N/A	70.0000			90.00	Option 1: VP60 = 3.72747149951 VP70 = 3.72747149951
Benzene						1.4702	N/A	N/A	78.1100	0.0090	0.0046	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1449	N/A	N/A	106.1700	0.0211	0.0011	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Toluene						0.4275	N/A	N/A	92.1300	0.1055	0.0156	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.7272	N/A	N/A	69.5651	0.7516	0.9744	87.50	
Xylenes (mixed isomers)						0.1148	N/A	N/A	106.1700	0.1128	0.0045	106.17	Option 2: A=7.005, B=1466, C=215
TK 031 - RBC	Mar	69.47	64.27	74.68	70.02	3.7275	N/A	N/A	70.0000			90.00	Option 1: VP60 = 3.72747149951 VP70 = 3.72747149951
Benzene						1.5100	N/A	N/A	78.1100	0.0090	0.0047	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1498	N/A	N/A	106.1700	0.0211	0.0011	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Toluene						0.4405	N/A	N/A	92.1300	0.1055	0.0160	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.7244	N/A	N/A	69.5512	0.7516	0.9736	87.50	
Xylenes (mixed isomers)						0.1188	N/A	N/A	106.1700	0.1128	0.0046	106.17	Option 2: A=7.005, B=1466, C=215
TK 031 - RBC	Apr	71.40	65.59	77.20	70.02	3.7275	N/A	N/A	70.0000			90.00	Option 1: VP70 = 3.72747149951 VP80 = 3.72747149951
Benzene						1.5888	N/A	N/A	78.1100	0.0090	0.0049	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1597	N/A	N/A	106.1700	0.0211	0.0012	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Toluene						0.4664	N/A	N/A	92.1300	0.1055	0.0170	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.7187	N/A	N/A	69.5234	0.7516	0.9720	87.50	
Xylenes (mixed isomers)						0.1267	N/A	N/A	106.1700	0.1128	0.0049	106.17	Option 2: A=7.005, B=1466, C=215
TK 031 - RS118 Catalytic Cracked Naphtha	May	72.97	67.48	78.45	70.02	3.7275	N/A	N/A	70.0000			90.00	Option 1: VP70 = 3.72747149951 VP80 = 3.72747149951
1,2,4-Trimethylbenzene						0.0338	N/A	N/A	120.1900	0.0242	0.0003	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8561	N/A	N/A	114.2300	0.0002	0.0001	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.6556	N/A	N/A	78.1100	0.0145	0.0083	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cresols (mixed isomers)						0.0022	N/A	N/A	108.1400	0.0000	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Cyclohexane						1.7036	N/A	N/A	84.1600	0.0026	0.0015	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1681	N/A	N/A	106.1700	0.0114	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6549	N/A	N/A	86.1700	0.0091	0.0083	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isoprene						10.2705	N/A	N/A	68.1100	0.0003	0.0012	68.11	Option 1: VP70 = 9.668 VP80 = 11.699
Isopropyl benzene						0.0818	N/A	N/A	120.2000	0.0005	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0071	N/A	N/A	128.1700	0.0052	0.0000	128.17	Option 3: A=47362, B=7.927
Propylene						180.6074	N/A	N/A	42.0800	0.0001	0.0081	42.08	Option 3: A=19693, B=7.4463
Toluene						0.4885	N/A	N/A	92.1300	0.0404	0.0068	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1714	N/A	N/A	70.0029	0.8457	0.9626	88.49	
Xylenes (mixed isomers)						0.1335	N/A	N/A	106.1700	0.0458	0.0021	106.17	Option 2: A=7.005, B=1466, C=215
TK 031 - RS118 Catalytic Cracked Naphtha	Jun	74.67	69.04	80.30	70.02	3.7275	N/A	N/A	70.0000			90.00	Option 1: VP70 = 3.72747149951 VP80 = 3.72747149951
1,2,4-Trimethylbenzene						0.0360	N/A	N/A	120.1900	0.0242	0.0003	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8964	N/A	N/A	114.2300	0.0002	0.0001	114.23	Option 2: A=6.8118, B=1257.84, C=220.74

Benzene						1.7306	N/A	N/A	78.1100	0.0145	0.0086	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cresols (mixed isomers)						0.0024	N/A	N/A	108.1400	0.0000	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Cyclohexane						1.7790	N/A	N/A	84.1600	0.0026	0.0016	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1777	N/A	N/A	106.1700	0.0114	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.7678	N/A	N/A	86.1700	0.0091	0.0087	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isoprene						10.6165	N/A	N/A	68.1100	0.0003	0.0013	68.11	Option 1: VP70 = 9.668 VP80 = 11.699
Isopropyl benzene						0.0869	N/A	N/A	120.2000	0.0005	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0076	N/A	N/A	128.1700	0.0052	0.0000	128.17	Option 3: A=47362, B=7.927
Propylene						185.2757	N/A	N/A	42.0800	0.0001	0.0084	42.08	Option 3: A=19693, B=7.4463
Toluene						0.5134	N/A	N/A	92.1300	0.0404	0.0072	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1651	N/A	N/A	69.9940	0.8457	0.9610	88.49	
Xylenes (mixed isomers)						0.1412	N/A	N/A	106.1700	0.0458	0.0022	106.17	Option 2: A=7.005, B=1466, C=215
TK 031 - RS118 Catalytic Cracked Naphtha	Jul	76.95	70.74	83.16	70.02	3.7275	N/A	N/A	70.0000			90.00	Option 1: VP70 = 3.72747149951 VP80 = 3.72747149951
1,2,4-Trimethylbenzene						0.0392	N/A	N/A	120.1900	0.0242	0.0003	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.9529	N/A	N/A	114.2300	0.0002	0.0001	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.8354	N/A	N/A	78.1100	0.0145	0.0091	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cresols (mixed isomers)						0.0027	N/A	N/A	108.1400	0.0000	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Cyclohexane						1.8842	N/A	N/A	84.1600	0.0026	0.0017	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1913	N/A	N/A	106.1700	0.0114	0.0008	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.9248	N/A	N/A	86.1700	0.0091	0.0091	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isoprene						11.0796	N/A	N/A	68.1100	0.0003	0.0013	68.11	Option 1: VP70 = 9.668 VP80 = 11.699
Isopropyl benzene						0.0940	N/A	N/A	120.2000	0.0005	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0082	N/A	N/A	128.1700	0.0052	0.0000	128.17	Option 3: A=47362, B=7.927
Propylene						191.6636	N/A	N/A	42.0800	0.0001	0.0086	42.08	Option 3: A=19693, B=7.4463
Toluene						0.5484	N/A	N/A	92.1300	0.0404	0.0076	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1563	N/A	N/A	69.9810	0.8457	0.9588	88.49	
Xylenes (mixed isomers)						0.1522	N/A	N/A	106.1700	0.0458	0.0024	106.17	Option 2: A=7.005, B=1466, C=215
TK 031 - RS118 Catalytic Cracked Naphtha	Aug	77.29	71.32	83.27	70.02	3.7275	N/A	N/A	70.0000			90.00	Option 1: VP70 = 3.72747149951 VP80 = 3.72747149951
1,2,4-Trimethylbenzene						0.0397	N/A	N/A	120.1900	0.0242	0.0003	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.9616	N/A	N/A	114.2300	0.0002	0.0001	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.8517	N/A	N/A	78.1100	0.0145	0.0092	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cresols (mixed isomers)						0.0027	N/A	N/A	108.1400	0.0000	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Cyclohexane						1.9005	N/A	N/A	84.1600	0.0026	0.0017	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1934	N/A	N/A	106.1700	0.0114	0.0008	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.9492	N/A	N/A	86.1700	0.0091	0.0092	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isoprene						11.1496	N/A	N/A	68.1100	0.0003	0.0013	68.11	Option 1: VP70 = 9.668 VP80 = 11.699
Isopropyl benzene						0.0951	N/A	N/A	120.2000	0.0005	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0083	N/A	N/A	128.1700	0.0052	0.0000	128.17	Option 3: A=47362, B=7.927
Propylene						192.6436	N/A	N/A	42.0800	0.0001	0.0087	42.08	Option 3: A=19693, B=7.4463
Toluene						0.5539	N/A	N/A	92.1300	0.0404	0.0077	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1549	N/A	N/A	69.9790	0.8457	0.9585	88.49	
Xylenes (mixed isomers)						0.1539	N/A	N/A	106.1700	0.0458	0.0024	106.17	Option 2: A=7.005, B=1466, C=215
TK 031 - RS118 Catalytic Cracked Naphtha	Sep	75.86	70.34	81.38	70.02	3.7275	N/A	N/A	70.0000			90.00	Option 1: VP70 = 3.72747149951 VP80 = 3.72747149951
1,2,4-Trimethylbenzene						0.0377	N/A	N/A	120.1900	0.0242	0.0003	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.9254	N/A	N/A	114.2300	0.0002	0.0001	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.7845	N/A	N/A	78.1100	0.0145	0.0089	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cresols (mixed isomers)						0.0026	N/A	N/A	108.1400	0.0000	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Cyclohexane						1.8331	N/A	N/A	84.1600	0.0026	0.0017	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1847	N/A	N/A	106.1700	0.0114	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.8487	N/A	N/A	86.1700	0.0091	0.0089	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isoprene						10.8577	N/A	N/A	68.1100	0.0003	0.0013	68.11	Option 1: VP70 = 9.668 VP80 = 11.699
Isopropyl benzene						0.0905	N/A	N/A	120.2000	0.0005	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0079	N/A	N/A	128.1700	0.0052	0.0000	128.17	Option 3: A=47362, B=7.927
Propylene						188.5822	N/A	N/A	42.0800	0.0001	0.0085	42.08	Option 3: A=19693, B=7.4463
Toluene						0.5314	N/A	N/A	92.1300	0.0404	0.0074	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1606	N/A	N/A	69.9874	0.8457	0.9599	88.49	
Xylenes (mixed isomers)						0.1468	N/A	N/A	106.1700	0.0458	0.0023	106.17	Option 2: A=7.005, B=1466, C=215

TK 031 - RS118 Catalytic Cracked Naphtha	Oct	73.45	68.17	78.73	70.02	3.7275	N/A	N/A	70.0000			90.00	Option 1: VP70 = 3.72747149951 VP80 = 3.72747149951
1,2,4-Trimethylbenzene						0.0344	N/A	N/A	120.1900	0.0242	0.0003	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8674	N/A	N/A	114.2300	0.0002	0.0001	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.6767	N/A	N/A	78.1100	0.0145	0.0084	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cresols (mixed isomers)						0.0023	N/A	N/A	108.1400	0.0000	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Cyclohexane						1.7248	N/A	N/A	84.1600	0.0026	0.0016	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1708	N/A	N/A	106.1700	0.0114	0.0007	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6867	N/A	N/A	86.1700	0.0091	0.0084	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isoprene						10.3693	N/A	N/A	68.1100	0.0003	0.0012	68.11	Option 1: VP70 = 9.668 VP80 = 11.699
Isopropyl benzene						0.0833	N/A	N/A	120.2000	0.0005	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0073	N/A	N/A	128.1700	0.0052	0.0000	128.17	Option 3: A=47362, B=7.927
Propylene						181.9313	N/A	N/A	42.0800	0.0001	0.0082	42.08	Option 3: A=19693, B=7.4463
Toluene						0.4955	N/A	N/A	92.1300	0.0404	0.0069	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1696	N/A	N/A	70.0004	0.8457	0.9622	88.49	
Xylenes (mixed isomers)						0.1357	N/A	N/A	106.1700	0.0458	0.0021	106.17	Option 2: A=7.005, B=1466, C=215
TK 031 - RS118 Catalytic Cracked Naphtha	Nov	70.00	64.91	75.09	70.02	3.7275	N/A	N/A	70.0000			90.00	Option 1: VP60 = 3.72747149951 VP70 = 3.72747149951
1,2,4-Trimethylbenzene						0.0302	N/A	N/A	120.1900	0.0242	0.0003	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7894	N/A	N/A	114.2300	0.0002	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.5313	N/A	N/A	78.1100	0.0145	0.0076	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cresols (mixed isomers)						0.0019	N/A	N/A	108.1400	0.0000	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Cyclohexane						1.5785	N/A	N/A	84.1600	0.0026	0.0014	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1525	N/A	N/A	106.1700	0.0114	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4674	N/A	N/A	86.1700	0.0091	0.0077	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isoprene						9.6679	N/A	N/A	68.1100	0.0003	0.0012	68.11	Option 1: VP60 = 7.677 VP70 = 9.668
Isopropyl benzene						0.0737	N/A	N/A	120.2000	0.0005	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0064	N/A	N/A	128.1700	0.0052	0.0000	128.17	Option 3: A=47362, B=7.927
Propylene						172.6894	N/A	N/A	42.0800	0.0001	0.0078	42.08	Option 3: A=19693, B=7.4463
Toluene						0.4475	N/A	N/A	92.1300	0.0404	0.0062	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1818	N/A	N/A	70.0171	0.8457	0.9652	88.49	
Xylenes (mixed isomers)						0.1209	N/A	N/A	106.1700	0.0458	0.0019	106.17	Option 2: A=7.005, B=1466, C=215
TK 031 - RS118 Catalytic Cracked Naphtha	Dec	67.46	62.52	72.39	70.02	3.7275	N/A	N/A	70.0000			90.00	Option 1: VP60 = 3.72747149951 VP70 = 3.72747149951
1,2,4-Trimethylbenzene						0.0274	N/A	N/A	120.1900	0.0242	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7358	N/A	N/A	114.2300	0.0002	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.4311	N/A	N/A	78.1100	0.0145	0.0071	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cresols (mixed isomers)						0.0016	N/A	N/A	108.1400	0.0000	0.0000	108.14	Option 2: A=7.151, B=1601, C=175
Cyclohexane						1.4775	N/A	N/A	84.1600	0.0026	0.0013	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1401	N/A	N/A	106.1700	0.0114	0.0005	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3154	N/A	N/A	86.1700	0.0091	0.0072	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isoprene						9.1616	N/A	N/A	68.1100	0.0003	0.0011	68.11	Option 1: VP60 = 7.677 VP70 = 9.668
Isopropyl benzene						0.0673	N/A	N/A	120.2000	0.0005	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0058	N/A	N/A	128.1700	0.0052	0.0000	128.17	Option 3: A=47362, B=7.927
Propylene						166.1126	N/A	N/A	42.0800	0.0001	0.0075	42.08	Option 3: A=19693, B=7.4463
Toluene						0.4148	N/A	N/A	92.1300	0.0404	0.0058	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1904	N/A	N/A	70.0279	0.8457	0.9673	88.49	
Xylenes (mixed isomers)						0.1109	N/A	N/A	106.1700	0.0458	0.0018	106.17	Option 2: A=7.005, B=1466, C=215

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

031 - Domed External Floating Roof Tank
Carson, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	54.7792	54.7792	54.7792	54.7792	54.7792	54.7792	54.7792	54.7792	54.7792	54.7792	54.7792	54.7792
Seal Factor A (lb-mole/ft-yr):	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seal-related Wind Speed Exponent:	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000
Value of Vapor Pressure Function:	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	3.7275	3.7275	3.7275	3.7275	3.7275	3.7275	3.7275	3.7275	3.7275	3.7275	3.7275	3.7275
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Vapor Molecular Weight (lb/lb-mole):	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	30.9404	30.9404	30.9404	30.9404	5.0661	5.0661	5.0661	5.0661	5.0661	5.0661	5.0661	5.0661
Net Throughput (gal/mo.):	18,141,386.1000	18,141,386.1000	18,141,386.1000	18,141,386.1000	2,663,389.2300	2,663,389.2300	2,663,389.2300	2,663,389.2300	2,663,389.2300	2,663,389.2300	2,663,389.2300	2,663,389.2300
Shell Clingage Factor (bbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	5.9250	5.9250	5.9250	5.9250	6.6080	6.6080	6.6080	6.6080	6.6080	6.6080	6.6080	6.6080
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Roof Fitting Losses (lb):	19.5196	19.5196	19.5196	19.5196	19.5196	19.5196	19.5196	19.5196	19.5196	19.5196	19.5196	19.5196
Value of Vapor Pressure Function:	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730	0.0730
Vapor Molecular Weight (lb/lb-mole):	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	45.8600	45.8600	45.8600	45.8600	45.8600	45.8600	45.8600	45.8600	45.8600	45.8600	45.8600	45.8600
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Losses (lb):	105.2392	105.2392	105.2392	105.2392	79.3649	79.3649	79.3649	79.3649	79.3649	79.3649	79.3649	79.3649

		Roof Fitting Loss Factors			
Roof Fitting/Status	Quantity	KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	2	1.60	0.00	0.00	16.3444
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	14.3013
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1	0.47	0.02	0.97	2.4006
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00	3.6264
Roof Drain (3-in. Diameter)/90% Closed	1	1.80	0.14	1.10	9.1937
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	24	0.82	0.53	0.14	100.5179
Slotted Guide-Pole/Sample Well/Gask Sliding Covr, w. Float,Sleeve,Wiper	1	11.00	9.90	0.89	56.1838
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	31.6672

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

031 - Domed External Floating Roof Tank
Carson, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
TK 031 - RBC	219.12	123.76	78.08	0.00	420.96
Benzene	1.02	1.12	0.36	0.00	2.50
Ethylbenzene	0.24	2.61	0.08	0.00	2.93
Toluene	3.49	13.05	1.24	0.00	17.78
Unidentified Components	213.37	93.02	76.03	0.00	382.42
Xylenes (mixed isomers)	1.00	13.96	0.36	0.00	15.32
TK 031 - RS118 Catalytic Cracked Naphtha	438.23	40.53	156.16	0.00	634.92
1,2,4-Trimethylbenzene	0.13	0.98	0.05	0.00	1.16
2,2,4-Trimethylpentane	0.02	0.01	0.01	0.00	0.04
Benzene	3.69	0.59	1.31	0.00	5.58
Cresols (mixed isomers)	0.00	0.00	0.00	0.00	0.00
Cyclohexane	0.68	0.11	0.24	0.00	1.03
Ethylbenzene	0.30	0.46	0.11	0.00	0.86
Hexane (-n)	3.70	0.37	1.32	0.00	5.39
Isoprene	0.54	0.01	0.19	0.00	0.75
Isopropyl benzene	0.01	0.02	0.00	0.00	0.03
Naphthalene	0.01	0.21	0.00	0.00	0.22
Propylene	3.61	0.01	1.29	0.00	4.90
Toluene	3.05	1.64	1.09	0.00	5.78
Unidentified Components	421.56	34.28	150.21	0.00	606.05
Xylenes (mixed isomers)	0.95	1.85	0.34	0.00	3.14

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification		
User Identification:	062	
City:	Carson	
State:	California	
Company:	Tesoro	
Type of Tank:	Vertical Fixed Roof Tank	
Description:		
Tank Dimensions		
Shell Height (ft):		40.60
Diameter (ft):		135.58
Liquid Height (ft) :		38.60
Avg. Liquid Height (ft):		19.84
Volume (gallons):		4,168,695.79
Turnovers:		36.41
Net Throughput(gal/yr):		151,770,331.23
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	White/White	
Shell Condition	Good	
Roof Color/Shade:	White/White	
Roof Condition:	Good	
Roof Characteristics		
Type:	Cone	
Height (ft)		0.00
Slope (ft/ft) (Cone Roof)		0.06
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.01

Meterological Data used in Emissions Calculations: Long Beach (AVG70), California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

062 - Vertical Fixed Roof Tank
Carson, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TK 062 - RS110 Sweet Naphtha, High Benzene	Jan	67.48	62.48	72.48	70.02	2.4571	2.4571	2.4571	70.0000			90.00	Option 1: VP60 = 2.45713546989882 VP70 = 2.45713546989882
1,2,4-Trimethylbenzene						0.0274	0.0226	0.0332	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7362	0.6396	0.8448	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.4320	1.2506	1.6345	78.1100	0.0284	0.0213	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.4784	1.2952	1.6824	84.1600	0.0008	0.0006	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1402	0.1183	0.1654	106.1700	0.0290	0.0021	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3168	2.0404	2.6233	86.1700	0.0178	0.0215	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0673	0.0561	0.0804	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0058	0.0049	0.0070	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4151	0.3565	0.4815	92.1300	0.2183	0.0474	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1598	4.1017	4.1038	68.3176	0.5049	0.8965	83.75	
Xylenes (mixed isomers)						0.1110	0.0935	0.1314	106.1700	0.1726	0.0100	106.17	Option 2: A=7.005, B=1466, C=215
TK 062 - RS110 Sweet Naphtha, High Benzene	Feb	68.47	63.36	73.58	70.02	2.4571	2.4571	2.4571	70.0000			90.00	Option 1: VP60 = 2.45713546989882 VP70 = 2.45713546989882
1,2,4-Trimethylbenzene						0.0285	0.0234	0.0346	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7567	0.6557	0.8703	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.4702	1.2810	1.6821	78.1100	0.0284	0.0218	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.5170	1.3259	1.7302	84.1600	0.0008	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1449	0.1219	0.1715	106.1700	0.0290	0.0022	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3749	2.0868	2.6948	86.1700	0.0178	0.0221	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0697	0.0579	0.0836	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0061	0.0050	0.0073	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4275	0.3662	0.4973	92.1300	0.2183	0.0488	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1493	4.0884	4.0906	68.2634	0.5049	0.8935	83.75	
Xylenes (mixed isomers)						0.1148	0.0964	0.1362	106.1700	0.1726	0.0104	106.17	Option 2: A=7.005, B=1466, C=215
TK 062 - RS110 Sweet Naphtha, High Benzene	Mar	69.47	64.27	74.68	70.02	2.4571	2.4571	2.4571	70.0000			90.00	Option 1: VP60 = 2.45713546989882 VP70 = 2.45713546989882
1,2,4-Trimethylbenzene						0.0296	0.0242	0.0360	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7780	0.6728	0.8966	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.5100	1.3130	1.7309	78.1100	0.0284	0.0224	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.5571	1.3582	1.7793	84.1600	0.0008	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1498	0.1257	0.1778	106.1700	0.0290	0.0023	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4352	2.1357	2.7683	86.1700	0.0178	0.0226	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0723	0.0599	0.0869	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0063	0.0052	0.0076	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4405	0.3765	0.5135	92.1300	0.2183	0.0503	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1383	4.0747	4.0769	68.2066	0.5049	0.8904	83.75	
Xylenes (mixed isomers)						0.1188	0.0994	0.1413	106.1700	0.1726	0.0107	106.17	Option 2: A=7.005, B=1466, C=215
TK 062 - RS110 Sweet Naphtha, High Benzene	Apr	71.40	65.59	77.20	70.02	2.4571	2.4571	2.4571	70.0000			90.00	Option 1: VP70 = 2.45713546989882 VP80 = 2.45713546989882
1,2,4-Trimethylbenzene						0.0319	0.0255	0.0396	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8202	0.6983	0.9593	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.5888	1.3608	1.8474	78.1100	0.0284	0.0236	78.11	Option 2: A=6.905, B=1211.033, C=220.79

Cyclohexane						1.6364	1.4066	1.8962	84.1600	0.0008	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1597	0.1315	0.1929	106.1700	0.0290	0.0024	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5542	2.2087	2.9428	86.1700	0.0178	0.0238	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0774	0.0628	0.0948	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0067	0.0054	0.0083	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4664	0.3920	0.5524	92.1300	0.2183	0.0533	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1165	4.0420	4.0443	68.0928	0.5049	0.8843	83.75	
Xylenes (mixed isomers)						0.1267	0.1041	0.1534	106.1700	0.1726	0.0114	106.17	Option 2: A=7.005, B=1466, C=215
TK 062 - RS110 Sweet Naphtha, High Benzene	May	72.97	67.48	78.45	70.02	2.4571	2.4571	2.4571	70.0000			90.00	Option 1: VP70 = 2.45713546989882 VP80 = 2.45713546989882
1,2,4-Trimethylbenzene						0.0338	0.0274	0.0414	120.1900	0.0264	0.0005	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8561	0.7362	0.9917	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.6556	1.4319	1.9073	78.1100	0.0284	0.0246	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.7036	1.4784	1.9563	84.1600	0.0008	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1681	0.1402	0.2007	106.1700	0.0290	0.0025	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6549	2.3168	3.0323	86.1700	0.0178	0.0247	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0818	0.0673	0.0990	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0071	0.0058	0.0087	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4885	0.4150	0.5726	92.1300	0.2183	0.0558	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.0980	4.0251	4.0275	67.9948	0.5049	0.8790	83.75	
Xylenes (mixed isomers)						0.1335	0.1110	0.1598	106.1700	0.1726	0.0121	106.17	Option 2: A=7.005, B=1466, C=215
TK 062 - RS110 Sweet Naphtha, High Benzene	Jun	74.67	69.04	80.30	70.02	2.4571	2.4571	2.4571	70.0000			90.00	Option 1: VP70 = 2.45713546989882 VP80 = 2.45713546989882
1,2,4-Trimethylbenzene						0.0360	0.0291	0.0443	120.1900	0.0264	0.0005	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8964	0.7688	1.0411	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.7306	1.4929	1.9987	78.1100	0.0284	0.0257	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.7790	1.5398	2.0479	84.1600	0.0008	0.0008	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1777	0.1477	0.2128	106.1700	0.0290	0.0027	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.7678	2.4092	3.1687	86.1700	0.0178	0.0257	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0869	0.0712	0.1054	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0076	0.0062	0.0093	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.5134	0.4349	0.6035	92.1300	0.2183	0.0586	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.0770	3.9992	4.0017	67.8831	0.5049	0.8731	83.75	
Xylenes (mixed isomers)						0.1412	0.1171	0.1696	106.1700	0.1726	0.0128	106.17	Option 2: A=7.005, B=1466, C=215
TK 062 - RS110 Sweet Naphtha, High Benzene	Jul	76.95	70.74	83.16	70.02	2.4571	2.4571	2.4571	70.0000			90.00	Option 1: VP70 = 2.45713546989882 VP80 = 2.45713546989882
1,2,4-Trimethylbenzene						0.0392	0.0311	0.0492	120.1900	0.0264	0.0005	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.9529	0.8055	1.1219	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.8354	1.5614	2.1478	78.1100	0.0284	0.0273	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.8842	1.6088	2.1970	84.1600	0.0008	0.0008	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1913	0.1562	0.2329	106.1700	0.0290	0.0029	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.9248	2.5129	3.3902	86.1700	0.0178	0.0272	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0940	0.0756	0.1161	120.2000	0.0010	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0082	0.0066	0.0102	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.5484	0.4574	0.6542	92.1300	0.2183	0.0626	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.0477	3.9568	3.9595	67.7242	0.5049	0.8648	83.75	
Xylenes (mixed isomers)						0.1522	0.1239	0.1858	106.1700	0.1726	0.0137	106.17	Option 2: A=7.005, B=1466, C=215
TK 062 - RS110 Sweet Naphtha, High Benzene	Aug	77.29	71.32	83.27	70.02	2.4571	2.4571	2.4571	70.0000			90.00	Option 1: VP70 = 2.45713546989882 VP80 = 2.45713546989882
1,2,4-Trimethylbenzene						0.0397	0.0318	0.0493	120.1900	0.0264	0.0005	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.9616	0.8185	1.1250	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.8517	1.5856	2.1535	78.1100	0.0284	0.0275	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.9005	1.6332	2.2027	84.1600	0.0008	0.0008	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1934	0.1593	0.2337	106.1700	0.0290	0.0029	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.9492	2.5494	3.3986	86.1700	0.0178	0.0274	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0951	0.0772	0.1165	120.2000	0.0010	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0083	0.0067	0.0103	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.5539	0.4654	0.6562	92.1300	0.2183	0.0633	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.0431	3.9552	3.9579	67.6992	0.5049	0.8635	83.75	
Xylenes (mixed isomers)						0.1539	0.1264	0.1864	106.1700	0.1726	0.0139	106.17	Option 2: A=7.005, B=1466, C=215

Appendix B-3

TK 062 - RS110 Sweet Naphtha, High Benzene	Sep	75.86	70.34	81.38	70.02	2.4571	2.4571	2.4571	70.0000			90.00	Option 1: VP70 = 2.45713546989882 VP80 = 2.45713546989882
1,2,4-Trimethylbenzene						0.0377	0.0306	0.0461	120.1900	0.0264	0.0005	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.9254	0.7968	1.0709	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.7845	1.5452	2.0537	78.1100	0.0284	0.0265	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.8331	1.5925	2.1029	84.1600	0.0008	0.0008	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1847	0.1542	0.2202	106.1700	0.0290	0.0028	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.8487	2.4884	3.2505	86.1700	0.0178	0.0265	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0905	0.0746	0.1093	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0079	0.0065	0.0096	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.5314	0.4521	0.6221	92.1300	0.2183	0.0607	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.0620	3.9835	3.9862	67.8017	0.5049	0.8688	83.75	
Xylenes (mixed isomers)						0.1468	0.1223	0.1755	106.1700	0.1726	0.0133	106.17	Option 2: A=7.005, B=1466, C=215
TK 062 - RS110 Sweet Naphtha, High Benzene	Oct	73.45	68.17	78.73	70.02	2.4571	2.4571	2.4571	70.0000			90.00	Option 1: VP70 = 2.45713546989882 VP80 = 2.45713546989882
1,2,4-Trimethylbenzene						0.0344	0.0282	0.0419	120.1900	0.0264	0.0005	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8674	0.7506	0.9990	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.6767	1.4588	1.9209	78.1100	0.0284	0.0249	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.7248	1.5054	1.9699	84.1600	0.0008	0.0008	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1708	0.1435	0.2025	106.1700	0.0290	0.0026	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6867	2.3575	3.0526	86.1700	0.0178	0.0250	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0833	0.0690	0.1000	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0073	0.0060	0.0088	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4955	0.4238	0.5772	92.1300	0.2183	0.0566	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.0921	4.0212	4.0237	67.9635	0.5049	0.8773	83.75	
Xylenes (mixed isomers)						0.1357	0.1137	0.1612	106.1700	0.1726	0.0123	106.17	Option 2: A=7.005, B=1466, C=215
TK 062 - RS110 Sweet Naphtha, High Benzene	Nov	70.00	64.91	75.09	70.02	2.4571	2.4571	2.4571	70.0000			90.00	Option 1: VP60 = 2.45713546989882 VP70 = 2.45713546989882
1,2,4-Trimethylbenzene						0.0302	0.0248	0.0366	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7894	0.6852	0.9065	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.5313	1.3362	1.7494	78.1100	0.0284	0.0228	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.5785	1.3817	1.7979	84.1600	0.0008	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1525	0.1285	0.1801	106.1700	0.0290	0.0023	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4674	2.1711	2.7960	86.1700	0.0178	0.0229	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0737	0.0613	0.0881	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0064	0.0053	0.0077	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4475	0.3840	0.5197	92.1300	0.2183	0.0511	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1324	4.0695	4.0718	68.1760	0.5049	0.8888	83.75	
Xylenes (mixed isomers)						0.1209	0.1017	0.1432	106.1700	0.1726	0.0109	106.17	Option 2: A=7.005, B=1466, C=215
TK 062 - RS110 Sweet Naphtha, High Benzene	Dec	67.46	62.52	72.39	70.02	2.4571	2.4571	2.4571	70.0000			90.00	Option 1: VP60 = 2.45713546989882 VP70 = 2.45713546989882
1,2,4-Trimethylbenzene						0.0274	0.0226	0.0331	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7358	0.6403	0.8428	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.4311	1.2519	1.6309	78.1100	0.0284	0.0213	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.4775	1.2965	1.6787	84.1600	0.0008	0.0006	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1401	0.1184	0.1650	106.1700	0.0290	0.0021	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3154	2.0423	2.6177	86.1700	0.0178	0.0215	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0673	0.0561	0.0802	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0058	0.0049	0.0070	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4148	0.3569	0.4803	92.1300	0.2183	0.0474	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.1601	4.1027	4.1048	68.3189	0.5049	0.8966	83.75	
Xylenes (mixed isomers)						0.1109	0.0936	0.1310	106.1700	0.1726	0.0100	106.17	Option 2: A=7.005, B=1466, C=215

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

062 - Vertical Fixed Roof Tank
Carson, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	2,886.0048	2,655.8227	2,986.2413	3,207.3453	3,108.7371	3,067.9459	3,475.7214	3,335.6426	2,992.7005	2,983.5160	2,817.4343	2,849.9503
Vapor Space Volume (cu ft):	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583
Vapor Density (lb/cu ft):	0.0304	0.0303	0.0303	0.0302	0.0301	0.0300	0.0299	0.0298	0.0299	0.0301	0.0303	0.0304
Vapor Space Expansion Factor:	0.0372	0.0380	0.0386	0.0430	0.0405	0.0414	0.0456	0.0438	0.0405	0.0389	0.0377	0.0367
Vented Vapor Saturation Factor:	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583	320,104.4583
Tank Diameter (ft):	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800
Vapor Space Outage (ft):	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723
Tank Shell Height (ft):	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000
Average Liquid Height (ft):	19.8400	19.8400	19.8400	19.8400	19.8400	19.8400	19.8400	19.8400	19.8400	19.8400	19.8400	19.8400
Roof Outage (ft):	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123
Roof Outage (Cone Roof)												
Roof Outage (ft):	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123
Roof Height (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Roof Slope (ft/ft):	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Shell Radius (ft):	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900
Vapor Density												
Vapor Density (lb/cu ft):	0.0304	0.0303	0.0303	0.0302	0.0301	0.0300	0.0299	0.0298	0.0299	0.0301	0.0303	0.0304
Vapor Molecular Weight (lb/lb-mole):	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571
Daily Avg. Liquid Surface Temp. (deg. R):	527.1505	528.1374	529.1414	531.0655	532.6365	534.3402	536.6201	536.9649	535.5275	533.1229	529.6696	527.1266
Daily Average Ambient Temp. (deg. F):	61.5417	62.9917	64.1917	67.3417	70.4917	74.0917	78.7417	80.0917	78.0917	73.7917	66.9417	61.6917
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R):	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900
Tank Paint Solar Absorptance (Shell):	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	886.7697	1,146.6138	1,501.0044	1,901.7164	2,039.4116	2,128.5644	2,302.7457	2,117.1427	1,702.1536	1,320.4777	993.3724	819.8257
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.0372	0.0380	0.0386	0.0430	0.0405	0.0414	0.0456	0.0438	0.0405	0.0389	0.0377	0.0367
Daily Vapor Temperature Range (deg. R):	19.9890	20.4339	20.8248	23.2362	21.9476	22.5160	24.8571	23.9016	22.0703	21.1175	20.3525	19.7424
Daily Vapor Pressure Range (psia):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Breather Vent Press. Setting Range(psia):	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571
Daily Avg. Liquid Surface Temp. (deg R):	527.1505	528.1374	529.1414	531.0655	532.6365	534.3402	536.6201	536.9649	535.5275	533.1229	529.6696	527.1266
Daily Min. Liquid Surface Temp. (deg R):	522.1532	523.0290	523.9352	525.2565	527.1496	528.7112	530.4059	530.9895	530.0100	527.8436	524.5815	522.1910
Daily Max. Liquid Surface Temp. (deg R):	532.1477	533.2459	534.3476	536.8746	538.1234	539.9692	542.8344	542.9403	541.0451	538.4023	534.7577	532.0622
Daily Ambient Temp. Range (deg. R):	21.9000	20.8000	19.0000	19.7000	17.0000	17.2000	19.3000	19.2000	19.4000	20.6000	21.7000	22.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572	0.2572
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571
Vapor Space Outage (ft):	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723	22.1723

Working Losses (lb):	51,311.7892	51,311.7892	51,311.7892	51,311.7892	51,311.7892	51,311.7892	51,311.7892	51,311.7892	51,311.7892	51,311.7892	51,311.7892	51,311.7892
Vapor Molecular Weight (lb/lb-mole):	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571	2.4571
Net Throughput (gal/mo.):	12,647,527.6000	12,647,527.6000	12,647,527.6000	12,647,527.6000	12,647,527.6000	12,647,527.6000	12,647,527.6000	12,647,527.6000	12,647,527.6000	12,647,527.6000	12,647,527.6000	12,647,527.6000
Annual Turnovers:	36.4072	36.4072	36.4072	36.4072	36.4072	36.4072	36.4072	36.4072	36.4072	36.4072	36.4072	36.4072
Turnover Factor:	0.9907	0.9907	0.9907	0.9907	0.9907	0.9907	0.9907	0.9907	0.9907	0.9907	0.9907	0.9907
Maximum Liquid Volume (gal):	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900
Maximum Liquid Height (ft):	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000
Tank Diameter (ft):	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800
Working Loss Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	54,197.7940	53,967.6119	54,298.0306	54,519.1345	54,420.5263	54,379.7351	54,787.5106	54,647.4318	54,304.4898	54,295.3052	54,129.2235	54,161.7395

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

062 - Vertical Fixed Roof Tank
Carson, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
TK 062 - RS110 Sweet Naphtha, High Benzene	615,741.47	36,367.06	652,108.53
1,2,4-Trimethylbenzene	280.98	16.72	297.70
2,2,4-Trimethylpentane	24.35	1.45	25.79
Benzene	14,867.50	882.57	15,750.07
Cyclohexane	452.65	26.87	479.51
Ethylbenzene	1,534.18	91.19	1,625.37
Hexane (-n)	14,931.76	886.11	15,817.87
Isopropyl benzene	26.79	1.59	28.38
Naphthalene	1.37	0.08	1.45
Toluene	33,660.14	1,999.39	35,659.52
Unidentified Components	542,700.85	32,029.48	574,730.33
Xylenes (mixed isomers)	7,260.91	431.62	7,692.52

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification		
User Identification:	063	
City:	Carson	
State:	California	
Company:	Tesoro	
Type of Tank:	Vertical Fixed Roof Tank	
Description:		
Tank Dimensions		
Shell Height (ft):		40.60
Diameter (ft):		135.58
Liquid Height (ft) :		38.60
Avg. Liquid Height (ft):		19.23
Volume (gallons):		4,168,695.79
Turnovers:		36.59
Net Throughput(gal/yr):		152,541,609.91
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	White/White	
Shell Condition	Good	
Roof Color/Shade:	White/White	
Roof Condition:	Good	
Roof Characteristics		
Type:	Cone	
Height (ft)		0.00
Slope (ft/ft) (Cone Roof)		0.06
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.01

Meterological Data used in Emissions Calculations: Long Beach (AVG70), California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

063 - Vertical Fixed Roof Tank
Carson, California

		Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp	Vapor Pressure (psia)			Vapor Mol.	Liquid Mass	Vapor Mass	Mol.	Basis for Vapor Pressure
Mixture/Component	Month	Avg.	Min.	Max.	(deg F)	Avg.	Min.	Max.	Weight.	Fract.	Fract.	Weight	Calculations
TK 063 - RS110 Sweet Naphtha, High Benzene	Jan	67.48	62.48	72.48	70.02	2.6207	2.6207	2.6207	70.0000			90.00	Option 1: VP60 = 2.62068828008307 VP70 = 2.62068828008307
1,2,4-Trimethylbenzene						0.0274	0.0226	0.0332	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7362	0.6396	0.8448	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.4320	1.2506	1.6345	78.1100	0.0284	0.0200	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.4784	1.2952	1.6824	84.1600	0.0008	0.0006	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1402	0.1183	0.1654	106.1700	0.0290	0.0020	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3168	2.0404	2.6233	86.1700	0.0178	0.0202	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0673	0.0561	0.0804	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0058	0.0049	0.0070	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4151	0.3565	0.4815	92.1300	0.2183	0.0445	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.4613	4.4031	4.4052	68.4312	0.5049	0.9030	83.75	
Xylenes (mixed isomers)						0.1110	0.0935	0.1314	106.1700	0.1726	0.0094	106.17	Option 2: A=7.005, B=1466, C=215
TK 063 - RS110 Sweet Naphtha, High Benzene	Feb	68.47	63.36	73.58	70.02	2.6207	2.6207	2.6207	70.0000			90.00	Option 1: VP60 = 2.62068828008307 VP70 = 2.62068828008307
1,2,4-Trimethylbenzene						0.0285	0.0234	0.0346	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7567	0.6557	0.8703	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.4702	1.2810	1.6821	78.1100	0.0284	0.0205	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.5170	1.3259	1.7302	84.1600	0.0008	0.0006	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1449	0.1219	0.1715	106.1700	0.0290	0.0021	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3749	2.0868	2.6948	86.1700	0.0178	0.0207	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0697	0.0579	0.0836	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0061	0.0050	0.0073	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4275	0.3662	0.4973	92.1300	0.2183	0.0458	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.4507	4.3898	4.3920	68.3810	0.5049	0.9002	83.75	
Xylenes (mixed isomers)						0.1148	0.0964	0.1362	106.1700	0.1726	0.0097	106.17	Option 2: A=7.005, B=1466, C=215
TK 063 - RS110 Sweet Naphtha, High Benzene	Mar	69.47	64.27	74.68	70.02	2.6207	2.6207	2.6207	70.0000			90.00	Option 1: VP60 = 2.62068828008307 VP70 = 2.62068828008307
1,2,4-Trimethylbenzene						0.0296	0.0242	0.0360	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7780	0.6728	0.8966	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.5100	1.3130	1.7309	78.1100	0.0284	0.0210	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.5571	1.3582	1.7793	84.1600	0.0008	0.0006	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1498	0.1257	0.1778	106.1700	0.0290	0.0021	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4352	2.1357	2.7683	86.1700	0.0178	0.0212	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0723	0.0599	0.0869	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0063	0.0052	0.0076	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4405	0.3765	0.5135	92.1300	0.2183	0.0472	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.4397	4.3761	4.3784	68.3283	0.5049	0.8973	83.75	
Xylenes (mixed isomers)						0.1188	0.0994	0.1413	106.1700	0.1726	0.0101	106.17	Option 2: A=7.005, B=1466, C=215
TK 063 - RS110 Sweet Naphtha, High Benzene	Apr	71.40	65.59	77.20	70.02	2.6207	2.6207	2.6207	70.0000			90.00	Option 1: VP70 = 2.62068828008307 VP80 = 2.62068828008307
1,2,4-Trimethylbenzene						0.0319	0.0255	0.0396	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8202	0.6983	0.9593	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.5888	1.3608	1.8474	78.1100	0.0284	0.0221	78.11	Option 2: A=6.905, B=1211.033, C=220.79

Cyclohexane						1.6364	1.4066	1.8962	84.1600	0.0008	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1597	0.1315	0.1929	106.1700	0.0290	0.0023	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5542	2.2087	2.9428	86.1700	0.0178	0.0223	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0774	0.0628	0.0948	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0067	0.0054	0.0083	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4664	0.3920	0.5524	92.1300	0.2183	0.0500	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.4179	4.3434	4.3458	68.2229	0.5049	0.8915	83.75	
Xylenes (mixed isomers)						0.1267	0.1041	0.1534	106.1700	0.1726	0.0107	106.17	Option 2: A=7.005, B=1466, C=215
TK 063 - RS110 Sweet Naphtha, High Benzene	May	72.97	67.48	78.45	70.02	2.6207	2.6207	2.6207	70.0000			90.00	Option 1: VP70 = 2.62068828008307 VP80 = 2.62068828008307
1,2,4-Trimethylbenzene						0.0338	0.0274	0.0414	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8561	0.7362	0.9917	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.6556	1.4319	1.9073	78.1100	0.0284	0.0231	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.7036	1.4784	1.9563	84.1600	0.0008	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1681	0.1402	0.2007	106.1700	0.0290	0.0024	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6549	2.3168	3.0323	86.1700	0.0178	0.0231	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0818	0.0673	0.0990	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0071	0.0058	0.0087	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4885	0.4150	0.5726	92.1300	0.2183	0.0523	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.3994	4.3265	4.3289	68.1322	0.5049	0.8866	83.75	
Xylenes (mixed isomers)						0.1335	0.1110	0.1598	106.1700	0.1726	0.0113	106.17	Option 2: A=7.005, B=1466, C=215
TK 063 - RS110 Sweet Naphtha, High Benzene	Jun	74.67	69.04	80.30	70.02	2.6207	2.6207	2.6207	70.0000			90.00	Option 1: VP70 = 2.62068828008307 VP80 = 2.62068828008307
1,2,4-Trimethylbenzene						0.0360	0.0291	0.0443	120.1900	0.0264	0.0005	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8964	0.7688	1.0411	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.7306	1.4929	1.9987	78.1100	0.0284	0.0241	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.7790	1.5398	2.0479	84.1600	0.0008	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1777	0.1477	0.2128	106.1700	0.0290	0.0025	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.7678	2.4092	3.1687	86.1700	0.0178	0.0241	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0869	0.0712	0.1054	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0076	0.0062	0.0093	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.5134	0.4349	0.6035	92.1300	0.2183	0.0550	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.3785	4.3006	4.3032	68.0288	0.5049	0.8810	83.75	
Xylenes (mixed isomers)						0.1412	0.1171	0.1696	106.1700	0.1726	0.0120	106.17	Option 2: A=7.005, B=1466, C=215
TK 063 - RS110 Sweet Naphtha, High Benzene	Jul	76.95	70.74	83.16	70.02	2.6207	2.6207	2.6207	70.0000			90.00	Option 1: VP70 = 2.62068828008307 VP80 = 2.62068828008307
1,2,4-Trimethylbenzene						0.0392	0.0311	0.0492	120.1900	0.0264	0.0005	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.9529	0.8055	1.1219	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.8354	1.5614	2.1478	78.1100	0.0284	0.0256	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.8842	1.6088	2.1970	84.1600	0.0008	0.0008	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1913	0.1562	0.2329	106.1700	0.0290	0.0027	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.9248	2.5129	3.3902	86.1700	0.0178	0.0255	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0940	0.0756	0.1161	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0082	0.0066	0.0102	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.5484	0.4574	0.6542	92.1300	0.2183	0.0587	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.3491	4.2583	4.2609	67.8820	0.5049	0.8732	83.75	
Xylenes (mixed isomers)						0.1522	0.1239	0.1858	106.1700	0.1726	0.0129	106.17	Option 2: A=7.005, B=1466, C=215
TK 063 - RS110 Sweet Naphtha, High Benzene	Aug	77.29	71.32	83.27	70.02	2.6207	2.6207	2.6207	70.0000			90.00	Option 1: VP70 = 2.62068828008307 VP80 = 2.62068828008307
1,2,4-Trimethylbenzene						0.0397	0.0318	0.0493	120.1900	0.0264	0.0005	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.9616	0.8185	1.1250	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.8517	1.5856	2.1535	78.1100	0.0284	0.0258	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.9005	1.6332	2.2027	84.1600	0.0008	0.0008	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1934	0.1593	0.2337	106.1700	0.0290	0.0027	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.9492	2.5494	3.3986	86.1700	0.0178	0.0257	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0951	0.0772	0.1165	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0083	0.0067	0.0103	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.5539	0.4654	0.6562	92.1300	0.2183	0.0593	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.3446	4.2566	4.2593	67.8589	0.5049	0.8720	83.75	
Xylenes (mixed isomers)						0.1539	0.1264	0.1864	106.1700	0.1726	0.0130	106.17	Option 2: A=7.005, B=1466, C=215

TK 063 - RS110 Sweet Naphtha, High Benzene	Sep	75.86	70.34	81.38	70.02	2.6207	2.6207	2.6207	70.0000			90.00	Option 1: VP70 = 2.62068828008307 VP80 = 2.62068828008307
1,2,4-Trimethylbenzene						0.0377	0.0306	0.0461	120.1900	0.0264	0.0005	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.9254	0.7968	1.0709	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.7845	1.5452	2.0537	78.1100	0.0284	0.0249	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.8331	1.5925	2.1029	84.1600	0.0008	0.0008	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1847	0.1542	0.2202	106.1700	0.0290	0.0026	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.8487	2.4884	3.2505	86.1700	0.0178	0.0248	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0905	0.0746	0.1093	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0079	0.0065	0.0096	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.5314	0.4521	0.6221	92.1300	0.2183	0.0569	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.3634	4.2850	4.2876	67.9536	0.5049	0.8770	83.75	
Xylenes (mixed isomers)						0.1468	0.1223	0.1755	106.1700	0.1726	0.0124	106.17	Option 2: A=7.005, B=1466, C=215
TK 063 - RS110 Sweet Naphtha, High Benzene	Oct	73.45	68.17	78.73	70.02	2.6207	2.6207	2.6207	70.0000			90.00	Option 1: VP70 = 2.62068828008307 VP80 = 2.62068828008307
1,2,4-Trimethylbenzene						0.0344	0.0282	0.0419	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8674	0.7506	0.9990	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.6767	1.4588	1.9209	78.1100	0.0284	0.0234	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.7248	1.5054	1.9699	84.1600	0.0008	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1708	0.1435	0.2025	106.1700	0.0290	0.0024	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6867	2.3575	3.0526	86.1700	0.0178	0.0234	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0833	0.0690	0.1000	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0073	0.0060	0.0088	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4955	0.4238	0.5772	92.1300	0.2183	0.0531	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.3935	4.3226	4.3251	68.1032	0.5049	0.8850	83.75	
Xylenes (mixed isomers)						0.1357	0.1137	0.1612	106.1700	0.1726	0.0115	106.17	Option 2: A=7.005, B=1466, C=215
TK 063 - RS110 Sweet Naphtha, High Benzene	Nov	70.00	64.91	75.09	70.02	2.6207	2.6207	2.6207	70.0000			90.00	Option 1: VP60 = 2.62068828008307 VP70 = 2.62068828008307
1,2,4-Trimethylbenzene						0.0302	0.0248	0.0366	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7894	0.6852	0.9065	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.5313	1.3362	1.7494	78.1100	0.0284	0.0213	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.5785	1.3817	1.7979	84.1600	0.0008	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1525	0.1285	0.1801	106.1700	0.0290	0.0022	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4674	2.1711	2.7960	86.1700	0.0178	0.0215	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0737	0.0613	0.0881	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0064	0.0053	0.0077	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4475	0.3840	0.5197	92.1300	0.2183	0.0479	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.4339	4.3709	4.3732	68.3000	0.5049	0.8957	83.75	
Xylenes (mixed isomers)						0.1209	0.1017	0.1432	106.1700	0.1726	0.0102	106.17	Option 2: A=7.005, B=1466, C=215
TK 063 - RS110 Sweet Naphtha, High Benzene	Dec	67.46	62.52	72.39	70.02	2.6207	2.6207	2.6207	70.0000			90.00	Option 1: VP60 = 2.62068828008307 VP70 = 2.62068828008307
1,2,4-Trimethylbenzene						0.0274	0.0226	0.0331	120.1900	0.0264	0.0004	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7358	0.6403	0.8428	114.2300	0.0001	0.0000	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.4311	1.2519	1.6309	78.1100	0.0284	0.0199	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.4775	1.2965	1.6787	84.1600	0.0008	0.0006	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1401	0.1184	0.1650	106.1700	0.0290	0.0020	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3154	2.0423	2.6177	86.1700	0.0178	0.0202	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0673	0.0561	0.0802	120.2000	0.0010	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0058	0.0049	0.0070	128.1700	0.0006	0.0000	128.17	Option 3: A=47362, B=7.927
Toluene						0.4148	0.3569	0.4803	92.1300	0.2183	0.0444	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						4.4615	4.4041	4.4062	68.4324	0.5049	0.9030	83.75	
Xylenes (mixed isomers)						0.1109	0.0936	0.1310	106.1700	0.1726	0.0094	106.17	Option 2: A=7.005, B=1466, C=215

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

063 - Vertical Fixed Roof Tank
Carson, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	2,951.6794	2,716.2740	3,054.2273	3,280.4515	3,179.5493	3,137.8463	3,554.9911	3,411.6868	3,060.8698	3,051.4451	2,881.5588	2,914.7945
Vapor Space Volume (cu ft):	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132
Vapor Density (lb/cu ft):	0.0324	0.0324	0.0323	0.0322	0.0321	0.0320	0.0319	0.0318	0.0319	0.0321	0.0323	0.0324
Vapor Space Expansion Factor:	0.0372	0.0379	0.0386	0.0430	0.0405	0.0414	0.0456	0.0438	0.0405	0.0389	0.0377	0.0367
Vented Vapor Saturation Factor:	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132	328,911.1132
Tank Diameter (ft):	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800
Vapor Space Outage (ft):	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823
Tank Shell Height (ft):	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000	40.6000
Average Liquid Height (ft):	19.2300	19.2300	19.2300	19.2300	19.2300	19.2300	19.2300	19.2300	19.2300	19.2300	19.2300	19.2300
Roof Outage (ft):	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123
Roof Outage (Cone Roof)												
Roof Outage (ft):	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123	1.4123
Roof Height (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Roof Slope (ft/ft):	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Shell Radius (ft):	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900	67.7900
Vapor Density												
Vapor Density (lb/cu ft):	0.0324	0.0324	0.0323	0.0322	0.0321	0.0320	0.0319	0.0318	0.0319	0.0321	0.0323	0.0324
Vapor Molecular Weight (lb/lb-mole):	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207
Daily Avg. Liquid Surface Temp. (deg. R):	527.1505	528.1374	529.1414	531.0655	532.6365	534.3402	536.6201	536.9649	535.5275	533.1229	529.6696	527.1266
Daily Average Ambient Temp. (deg. F):	61.5417	62.9917	64.1917	67.3417	70.4917	74.0917	78.7417	80.0917	78.0917	73.7917	66.9417	61.6917
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R):	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900	529.6900
Tank Paint Solar Absorptance (Shell):	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	886.7697	1,146.6138	1,501.0044	1,901.7164	2,039.4116	2,128.5644	2,302.7457	2,117.1427	1,702.1536	1,320.4777	993.3724	819.8257
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.0372	0.0379	0.0386	0.0430	0.0405	0.0414	0.0456	0.0438	0.0405	0.0389	0.0377	0.0367
Daily Vapor Temperature Range (deg. R):	19.9890	20.4339	20.8248	23.2362	21.9476	22.5160	24.8571	23.9016	22.0703	21.1175	20.3525	19.7424
Daily Vapor Pressure Range (psia):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Breather Vent Press. Setting Range(psia):	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207
Daily Avg. Liquid Surface Temp. (deg R):	527.1505	528.1374	529.1414	531.0655	532.6365	534.3402	536.6201	536.9649	535.5275	533.1229	529.6696	527.1266
Daily Min. Liquid Surface Temp. (deg R):	522.1532	523.0290	523.9352	525.2565	527.1496	528.7112	530.4059	530.9895	530.0100	527.8436	524.5815	522.1910
Daily Max. Liquid Surface Temp. (deg R):	532.1477	533.2459	534.3476	536.8746	538.1234	539.9692	542.8344	542.9403	541.0451	538.4023	534.7577	532.0622
Daily Ambient Temp. Range (deg. R):	21.9000	20.8000	19.0000	19.7000	17.0000	17.2000	19.3000	19.2000	19.4000	20.6000	21.7000	22.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401	0.2401
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207
Vapor Space Outage (ft):	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823	22.7823

Working Losses (lb):	54,774.0145	54,774.0145	54,774.0145	54,774.0145	54,774.0145	54,774.0145	54,774.0145	54,774.0145	54,774.0145	54,774.0145	54,774.0145	54,774.0145
Vapor Molecular Weight (lb/lb-mole):	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000	70.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207	2.6207
Net Throughput (gal/mo.):	12,711,800.8200	12,711,800.8200	12,711,800.8200	12,711,800.8200	12,711,800.8200	12,711,800.8200	12,711,800.8200	12,711,800.8200	12,711,800.8200	12,711,800.8200	12,711,800.8200	12,711,800.8200
Annual Turnovers:	36.5922	36.5922	36.5922	36.5922	36.5922	36.5922	36.5922	36.5922	36.5922	36.5922	36.5922	36.5922
Turnover Factor:	0.9865	0.9865	0.9865	0.9865	0.9865	0.9865	0.9865	0.9865	0.9865	0.9865	0.9865	0.9865
Maximum Liquid Volume (gal):	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900	4,168,695.7900
Maximum Liquid Height (ft):	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000	38.6000
Tank Diameter (ft):	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800	135.5800
Working Loss Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	57,725.6938	57,490.2885	57,828.2418	58,054.4659	57,953.5638	57,911.8608	58,329.0055	58,185.7012	57,834.8842	57,825.4596	57,655.5733	57,688.8090

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

063 - Vertical Fixed Roof Tank
Carson, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
TK 063 - RS110 Sweet Naphtha, High Benzene	657,288.17	37,195.37	694,483.55
1,2,4-Trimethylbenzene	281.22	16.03	297.25
2,2,4-Trimethylpentane	24.37	1.39	25.76
Benzene	14,880.22	846.34	15,726.55
Cyclohexane	453.03	25.76	478.80
Ethylbenzene	1,535.49	87.45	1,622.94
Hexane (-n)	14,944.53	849.73	15,794.26
Isopropyl benzene	26.81	1.53	28.34
Naphthalene	1.37	0.08	1.45
Toluene	33,688.91	1,917.31	35,606.22
Unidentified Components	584,185.10	33,035.86	617,220.97
Xylenes (mixed isomers)	7,267.12	413.90	7,681.01

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	064
City:	Carson
State:	California
Company:	Tesoro
Type of Tank:	Domed External Floating Roof Tank
Description:	

Tank Dimensions

Diameter (ft):	134.58
Volume (gallons):	4,107,428.31
Turnovers:	32.58

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good

Roof Characteristics

Type:	Double Deck
Fitting Category	Detail

Tank Construction and Rim-Seal System

Construction:	Riveted
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	2
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	30
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Stub Drain (1-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Float, Wiper	1
Roof Drain (3-in. Diameter)/Open	1

Meterological Data used in Emissions Calculations: Long Beach (AVG70), California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

064 - Domed External Floating Roof Tank
Carson, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TK 064 - APPC648 Alkylate	Jan	67.48	62.48	72.48	70.02	2.1361	N/A	N/A	55.0000			90.00	Option 1: VP60 = 2.13609846282044 VP70 = 2.13609846282044
1,2,4-Trimethylbenzene						0.0274	N/A	N/A	120.1900	0.0001	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7362	N/A	N/A	114.2300	0.2957	0.1668	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Ethylbenzene						0.1402	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.0673	N/A	N/A	120.2000	0.0003	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0058	N/A	N/A	128.1700	0.0001	0.0000	128.17	Option 3: A=47362, B=7.927
Unidentified Components						2.5630	N/A	N/A	49.8279	0.7036	0.8332	82.62	
Xylenes (mixed isomers)						0.1110	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=7.005, B=1466, C=215
TK 064 - APPC648 Alkylate	Feb	68.47	63.36	73.58	70.02	2.1361	N/A	N/A	55.0000			90.00	Option 1: VP60 = 2.13609846282044 VP70 = 2.13609846282044
1,2,4-Trimethylbenzene						0.0285	N/A	N/A	120.1900	0.0001	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7567	N/A	N/A	114.2300	0.2957	0.1714	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Ethylbenzene						0.1449	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.0697	N/A	N/A	120.2000	0.0003	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0061	N/A	N/A	128.1700	0.0001	0.0000	128.17	Option 3: A=47362, B=7.927
Unidentified Components						2.5567	N/A	N/A	49.6712	0.7036	0.8286	82.62	
Xylenes (mixed isomers)						0.1148	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=7.005, B=1466, C=215
TK 064 - APPC648 Alkylate	Mar	69.47	64.27	74.68	70.02	2.1361	N/A	N/A	55.0000			90.00	Option 1: VP60 = 2.13609846282044 VP70 = 2.13609846282044
1,2,4-Trimethylbenzene						0.0296	N/A	N/A	120.1900	0.0001	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7780	N/A	N/A	114.2300	0.2957	0.1762	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Ethylbenzene						0.1498	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.0723	N/A	N/A	120.2000	0.0003	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0063	N/A	N/A	128.1700	0.0001	0.0000	128.17	Option 3: A=47362, B=7.927
Unidentified Components						2.5503	N/A	N/A	49.5074	0.7036	0.8237	82.62	
Xylenes (mixed isomers)						0.1188	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=7.005, B=1466, C=215
TK 064 - APPC648 Alkylate	Apr	71.40	65.59	77.20	70.02	2.1361	N/A	N/A	55.0000			90.00	Option 1: VP70 = 2.13609846282044 VP80 = 2.13609846282044
1,2,4-Trimethylbenzene						0.0319	N/A	N/A	120.1900	0.0001	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8202	N/A	N/A	114.2300	0.2957	0.1858	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Ethylbenzene						0.1597	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.0774	N/A	N/A	120.2000	0.0003	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0067	N/A	N/A	128.1700	0.0001	0.0000	128.17	Option 3: A=47362, B=7.927
Unidentified Components						2.5374	N/A	N/A	49.1801	0.7036	0.8142	82.62	
Xylenes (mixed isomers)						0.1267	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=7.005, B=1466, C=215
TK 064 - APPC648 Alkylate	May	72.97	67.48	78.45	70.02	2.1361	N/A	N/A	55.0000			90.00	Option 1: VP70 = 2.13609846282044 VP80 = 2.13609846282044
1,2,4-Trimethylbenzene						0.0338	N/A	N/A	120.1900	0.0001	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8561	N/A	N/A	114.2300	0.2957	0.1939	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Ethylbenzene						0.1681	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.0818	N/A	N/A	120.2000	0.0003	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0071	N/A	N/A	128.1700	0.0001	0.0000	128.17	Option 3: A=47362, B=7.927
Unidentified Components						2.5265	N/A	N/A	48.8995	0.7036	0.8061	82.62	

Xylenes (mixed isomers)						0.1335	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=7.005, B=1466, C=215
TK 064 - APPC648 Alkylate	Jun	74.67	69.04	80.30	70.02	2.1361	N/A	N/A	55.0000			90.00	Option 1: VP70 = 2.13609846282044 VP80 = 2.13609846282044
1,2,4-Trimethylbenzene						0.0360	N/A	N/A	120.1900	0.0001	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8964	N/A	N/A	114.2300	0.2957	0.2030	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Ethylbenzene						0.1777	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.0869	N/A	N/A	120.2000	0.0003	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0076	N/A	N/A	128.1700	0.0001	0.0000	128.17	Option 3: A=47362, B=7.927
Unidentified Components						2.5143	N/A	N/A	48.5808	0.7036	0.7969	82.62	
Xylenes (mixed isomers)						0.1412	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=7.005, B=1466, C=215
TK 064 - APPC648 Alkylate	Jul	76.95	70.74	83.16	70.02	2.1361	N/A	N/A	55.0000			90.00	Option 1: VP70 = 2.13609846282044 VP80 = 2.13609846282044
1,2,4-Trimethylbenzene						0.0392	N/A	N/A	120.1900	0.0001	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.9529	N/A	N/A	114.2300	0.2957	0.2158	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Ethylbenzene						0.1913	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.0940	N/A	N/A	120.2000	0.0003	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0082	N/A	N/A	128.1700	0.0001	0.0000	128.17	Option 3: A=47362, B=7.927
Unidentified Components						2.4971	N/A	N/A	48.1296	0.7036	0.7841	82.62	
Xylenes (mixed isomers)						0.1522	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=7.005, B=1466, C=215
TK 064 - APPC648 Alkylate	Aug	77.29	71.32	83.27	70.02	2.1361	N/A	N/A	55.0000			90.00	Option 1: VP70 = 2.13609846282044 VP80 = 2.13609846282044
1,2,4-Trimethylbenzene						0.0397	N/A	N/A	120.1900	0.0001	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.9616	N/A	N/A	114.2300	0.2957	0.2178	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Ethylbenzene						0.1934	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.0951	N/A	N/A	120.2000	0.0003	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0083	N/A	N/A	128.1700	0.0001	0.0000	128.17	Option 3: A=47362, B=7.927
Unidentified Components						2.4944	N/A	N/A	48.0588	0.7036	0.7821	82.62	
Xylenes (mixed isomers)						0.1539	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=7.005, B=1466, C=215
TK 064 - APPC648 Alkylate	Sep	75.86	70.34	81.38	70.02	2.1361	N/A	N/A	55.0000			90.00	Option 1: VP70 = 2.13609846282044 VP80 = 2.13609846282044
1,2,4-Trimethylbenzene						0.0377	N/A	N/A	120.1900	0.0001	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.9254	N/A	N/A	114.2300	0.2957	0.2096	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Ethylbenzene						0.1847	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.0905	N/A	N/A	120.2000	0.0003	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0079	N/A	N/A	128.1700	0.0001	0.0000	128.17	Option 3: A=47362, B=7.927
Unidentified Components						2.5054	N/A	N/A	48.3494	0.7036	0.7903	82.62	
Xylenes (mixed isomers)						0.1468	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=7.005, B=1466, C=215
TK 064 - APPC648 Alkylate	Oct	73.45	68.17	78.73	70.02	2.1361	N/A	N/A	55.0000			90.00	Option 1: VP70 = 2.13609846282044 VP80 = 2.13609846282044
1,2,4-Trimethylbenzene						0.0344	N/A	N/A	120.1900	0.0001	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.8674	N/A	N/A	114.2300	0.2957	0.1965	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Ethylbenzene						0.1708	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.0833	N/A	N/A	120.2000	0.0003	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0073	N/A	N/A	128.1700	0.0001	0.0000	128.17	Option 3: A=47362, B=7.927
Unidentified Components						2.5231	N/A	N/A	48.8100	0.7036	0.8035	82.62	
Xylenes (mixed isomers)						0.1357	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=7.005, B=1466, C=215
TK 064 - APPC648 Alkylate	Nov	70.00	64.91	75.09	70.02	2.1361	N/A	N/A	55.0000			90.00	Option 1: VP60 = 2.13609846282044 VP70 = 2.13609846282044
1,2,4-Trimethylbenzene						0.0302	N/A	N/A	120.1900	0.0001	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7894	N/A	N/A	114.2300	0.2957	0.1788	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Ethylbenzene						0.1525	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.0737	N/A	N/A	120.2000	0.0003	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0064	N/A	N/A	128.1700	0.0001	0.0000	128.17	Option 3: A=47362, B=7.927
Unidentified Components						2.5468	N/A	N/A	49.4193	0.7036	0.8212	82.62	
Xylenes (mixed isomers)						0.1209	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=7.005, B=1466, C=215
TK 064 - APPC648 Alkylate	Dec	67.46	62.52	72.39	70.02	2.1361	N/A	N/A	55.0000			90.00	Option 1: VP60 = 2.13609846282044 VP70 = 2.13609846282044
1,2,4-Trimethylbenzene						0.0274	N/A	N/A	120.1900	0.0001	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
2,2,4-Trimethylpentane						0.7358	N/A	N/A	114.2300	0.2957	0.1666	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Ethylbenzene						0.1401	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.0673	N/A	N/A	120.2000	0.0003	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78

Naphthalene	0.0058	N/A	N/A	128.1700	0.0001	0.0000	128.17	Option 3: A=47362, B=7.927
Unidentified Components	2.5631	N/A	N/A	49.8316	0.7036	0.8333	82.62	
Xylenes (mixed isomers)	0.1109	N/A	N/A	106.1700	0.0001	0.0000	106.17	Option 2: A=7.005, B=1466, C=215

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

064 - Domed External Floating Roof Tank
Carson, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	26.6152	26.6152	26.6152	26.6152	26.6152	26.6152	26.6152	26.6152	26.6152	26.6152	26.6152	26.6152
Seal Factor A (lb-mole/ft-yr):	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seal-related Wind Speed Exponent:	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000
Value of Vapor Pressure Function:	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.1361	2.1361	2.1361	2.1361	2.1361	2.1361	2.1361	2.1361	2.1361	2.1361	2.1361	2.1361
Tank Diameter (ft):	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800
Vapor Molecular Weight (lb/lb-mole):	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	16.7654	16.7654	16.7654	16.7654	16.7654	16.7654	16.7654	16.7654	16.7654	16.7654	16.7654	16.7654
Net Throughput (gal/mo.):	11,150,950.3200	11,150,950.3200	11,150,950.3200	11,150,950.3200	11,150,950.3200	11,150,950.3200	11,150,950.3200	11,150,950.3200	11,150,950.3200	11,150,950.3200	11,150,950.3200	11,150,950.3200
Shell Clingage Factor (bbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	6.0080	6.0080	6.0080	6.0080	6.0080	6.0080	6.0080	6.0080	6.0080	6.0080	6.0080	6.0080
Tank Diameter (ft):	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800	134.5800
Roof Fitting Losses (lb):	11.0892	11.0892	11.0892	11.0892	11.0892	11.0892	11.0892	11.0892	11.0892	11.0892	11.0892	11.0892
Value of Vapor Pressure Function:	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392	0.0392
Vapor Molecular Weight (lb/lb-mole):	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000	55.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	61.6800	61.6800	61.6800	61.6800	61.6800	61.6800	61.6800	61.6800	61.6800	61.6800	61.6800	61.6800
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Losses (lb):	54.4699	54.4699	54.4699	54.4699	54.4699	54.4699	54.4699	54.4699	54.4699	54.4699	54.4699	54.4699

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	2	1.60	0.00	0.00	6.9038
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	6.0408
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00	1.5318
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	30	0.82	0.53	0.14	53.0730
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1	0.47	0.02	0.97	1.0140
Stub Drain (1-in. Diameter)/	1	1.20	0.00	0.00	2.5889
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	13.3761
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Float, Wiper	1	21.00	7.90	1.80	45.3062
Roof Drain (3-in. Diameter)/Open	1	1.50	0.21	1.70	3.2362

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

064 - Domed External Floating Roof Tank
Carson, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
TK 064 - APPC648 Alkylate	319.38	201.19	133.07	0.00	653.64
1,2,4-Trimethylbenzene	0.00	0.01	0.00	0.00	0.01
2,2,4-Trimethylpentane	60.74	59.48	25.31	0.00	145.53
Ethylbenzene	0.00	0.02	0.00	0.00	0.02
Isopropyl benzene	0.01	0.07	0.00	0.00	0.07
Naphthalene	0.00	0.02	0.00	0.00	0.02
Unidentified Components	258.63	141.56	107.76	0.00	507.95
Xylenes (mixed isomers)	0.00	0.02	0.00	0.00	0.03

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification		
User Identification:	502	
City:	Carson	
State:	California	
Company:	Tesoro	
Type of Tank:	Vertical Fixed Roof Tank	
Description:		
Tank Dimensions		
Shell Height (ft):		25.00
Diameter (ft):		613.54
Liquid Height (ft) :		26.00
Avg. Liquid Height (ft):		17.69
Volume (gallons):		50,866,896.31
Turnovers:		8.58
Net Throughput(gal/yr):		436,426,355.00
Is Tank Heated (y/n):	Y	
Paint Characteristics		
Shell Color/Shade:	White/White	
Shell Condition	Good	
Roof Color/Shade:	White/White	
Roof Condition:	Good	
Roof Characteristics		
Type:	Cone	
Height (ft)		0.00
Slope (ft/ft) (Cone Roof)		0.06
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Long Beach (AVG90), California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

502 - Vertical Fixed Roof Tank
Carson, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TK 502 - RS307 Gas Oils (C20-C50)	Jan	92.12	86.68	97.56	90.02	0.0080	0.0080	0.0080	190.0000			400.00	Option 1: VP80 = .008 VP90 = .008
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0080	0.0080	0.0080	190.0109	0.9980	0.9999	401.05	
TK 502 - RS307 Gas Oils (C20-C50)	Feb	92.12	86.68	97.56	90.02	0.0080	0.0080	0.0080	190.0000			400.00	Option 1: VP80 = .008 VP90 = .008
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0080	0.0080	0.0080	190.0109	0.9980	0.9999	401.05	
TK 502 - RS307 Gas Oils (C20-C50)	Mar	92.12	86.68	97.56	90.02	0.0080	0.0080	0.0080	190.0000			400.00	Option 1: VP80 = .008 VP90 = .008
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0080	0.0080	0.0080	190.0109	0.9980	0.9999	401.05	
TK 502 - RS307 Gas Oils (C20-C50)	Apr	92.12	86.68	97.56	90.02	0.0080	0.0080	0.0080	190.0000			400.00	Option 1: VP80 = .008 VP90 = .008
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0080	0.0080	0.0080	190.0109	0.9980	0.9999	401.05	
TK 502 - RS307 Gas Oils (C20-C50)	May	92.12	86.68	97.56	90.02	0.0080	0.0080	0.0080	190.0000			400.00	Option 1: VP80 = .008 VP90 = .008
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0080	0.0080	0.0080	190.0109	0.9980	0.9999	401.05	
TK 502 - RS307 Gas Oils (C20-C50)	Jun	92.12	86.68	97.56	90.02	0.0080	0.0080	0.0080	190.0000			400.00	Option 1: VP80 = .008 VP90 = .008
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0080	0.0080	0.0080	190.0109	0.9980	0.9999	401.05	
TK 502 - RS307 Gas Oils (C20-C50)	Jul	92.12	86.68	97.56	90.02	0.0080	0.0080	0.0080	190.0000			400.00	Option 1: VP80 = .008 VP90 = .008
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0080	0.0080	0.0080	190.0109	0.9980	0.9999	401.05	
TK 502 - RS307 Gas Oils (C20-C50)	Aug	92.12	86.68	97.56	90.02	0.0080	0.0080	0.0080	190.0000			400.00	Option 1: VP80 = .008 VP90 = .008
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0080	0.0080	0.0080	190.0109	0.9980	0.9999	401.05	
TK 502 - RS307 Gas Oils (C20-C50)	Sep	92.12	86.68	97.56	90.02	0.0080	0.0080	0.0080	190.0000			400.00	Option 1: VP80 = .008 VP90 = .008
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0080	0.0080	0.0080	190.0109	0.9980	0.9999	401.05	
TK 502 - RS307 Gas Oils (C20-C50)	Oct	92.12	86.68	97.56	90.02	0.0080	0.0080	0.0080	190.0000			400.00	Option 1: VP80 = .008 VP90 = .008
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0080	0.0080	0.0080	190.0109	0.9980	0.9999	401.05	
TK 502 - RS307 Gas Oils (C20-C50)	Nov	92.12	86.68	97.56	90.02	0.0080	0.0080	0.0080	190.0000			400.00	Option 1: VP80 = .008 VP90 = .008
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0080	0.0080	0.0080	190.0109	0.9980	0.9999	401.05	

TK 502 - RS307 Gas Oils (C20-C50)	Dec	92.12	86.68	97.56	90.02	0.0080	0.0080	0.0080	190.0000			400.00	Option 1: VP80 = .008 VP90 = .008
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0080	0.0080	0.0080	190.0109	0.9980	0.9999	401.05	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

502 - Vertical Fixed Roof Tank
Carson, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	631.5945	570.4725	631.5945	611.2205	631.5945	611.2205	631.5945	631.5945	611.2205	631.5945	611.2205	631.5945
Vapor Space Volume (cu ft):	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904
Vapor Density (lb/cu ft):	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Vapor Space Expansion Factor:	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197
Vented Vapor Saturation Factor:	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904	4,050,692.0904
Tank Diameter (ft):	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400
Vapor Space Outage (ft):	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010
Tank Shell Height (ft):	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000
Average Liquid Height (ft):	17.6900	17.6900	17.6900	17.6900	17.6900	17.6900	17.6900	17.6900	17.6900	17.6900	17.6900	17.6900
Roof Outage (ft):	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910
Roof Outage (Cone Roof)												
Roof Outage (ft):	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910	6.3910
Roof Height (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Roof Slope (ft/ft):	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Shell Radius (ft):	306.7700	306.7700	306.7700	306.7700	306.7700	306.7700	306.7700	306.7700	306.7700	306.7700	306.7700	306.7700
Vapor Density												
Vapor Density (lb/cu ft):	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Vapor Molecular Weight (lb/lb-mole):	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Daily Avg. Liquid Surface Temp. (deg. R):	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919
Daily Average Ambient Temp. (deg. F):	81.5417	82.9917	84.1917	87.3417	90.4917	94.0917	98.7417	100.0917	98.0917	93.7917	86.9417	81.6917
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R):	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900
Tank Paint Solar Absorptance (Shell):	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	886.7697	1,146.6138	1,501.0044	1,901.7164	2,039.4116	2,128.5644	2,302.7457	2,117.1427	1,702.1536	1,320.4777	993.3724	819.8257
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197
Daily Vapor Temperature Range (deg. R):	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745
Daily Vapor Pressure Range (psia):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Breather Vent Press. Setting Range(psia):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Daily Avg. Liquid Surface Temp. (deg R):	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919
Daily Min. Liquid Surface Temp. (deg R):	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547
Daily Max. Liquid Surface Temp. (deg R):	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292
Daily Ambient Temp. Range (deg. R):	21.9000	20.8000	19.0000	19.7000	17.0000	17.2000	19.3000	19.2000	19.4000	20.6000	21.7000	22.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942	0.9942
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Vapor Space Outage (ft):	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010	13.7010

Working Losses (lb):	1,316.2065	1,316.2065	1,316.2065	1,316.2065	1,316.2065	1,316.2065	1,316.2065	1,316.2065	1,316.2065	1,316.2065	1,316.2065	1,316.2065
Vapor Molecular Weight (lb/lb-mole):	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Net Throughput (gal/mo.):	36,368,862.9100	36,368,862.9100	36,368,862.9100	36,368,862.9100	36,368,862.9100	36,368,862.9100	36,368,862.9100	36,368,862.9100	36,368,862.9100	36,368,862.9100	36,368,862.9100	36,368,862.9100
Annual Turnovers:	8.5798	8.5798	8.5798	8.5798	8.5798	8.5798	8.5798	8.5798	8.5798	8.5798	8.5798	8.5798
Turnover Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Maximum Liquid Volume (gal):	50,866,896.3100	50,866,896.3100	50,866,896.3100	50,866,896.3100	50,866,896.3100	50,866,896.3100	50,866,896.3100	50,866,896.3100	50,866,896.3100	50,866,896.3100	50,866,896.3100	50,866,896.3100
Maximum Liquid Height (ft):	26.0000	26.0000	26.0000	26.0000	26.0000	26.0000	26.0000	26.0000	26.0000	26.0000	26.0000	26.0000
Tank Diameter (ft):	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400	613.5400
Working Loss Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	1,947.8010	1,886.6789	1,947.8010	1,927.4270	1,947.8010	1,927.4270	1,947.8010	1,947.8010	1,927.4270	1,947.8010	1,927.4270	1,947.8010

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

502 - Vertical Fixed Roof Tank
Carson, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
TK 502 - RS307 Gas Oils (C20-C50)	15,794.48	7,436.52	23,230.99
Cresols (mixed isomers)	1.18	0.56	1.74
Phenanthrene	0.17	0.08	0.26
Unidentified Components	15,793.12	7,435.88	23,229.00

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification	
User Identification:	959
City:	Carson
State:	California
Company:	Tesoro
Type of Tank:	Vertical Fixed Roof Tank
Description:	
Tank Dimensions	
Shell Height (ft):	52.00
Diameter (ft):	150.00
Liquid Height (ft) :	50.00
Avg. Liquid Height (ft):	41.05
Volume (gallons):	6,609,584.54
Turnovers:	30.65
Net Throughput(gal/yr):	202,580,574.00
Is Tank Heated (y/n):	Y
Paint Characteristics	
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good
Roof Characteristics	
Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06
Breather Vent Settings	
Vacuum Settings (psig):	0.00
Pressure Settings (psig)	0.00

Meterological Data used in Emissions Calculations: Long Beach (AVG90), California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

959 - Vertical Fixed Roof Tank
Carson, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TK 959 - RS307 Gas Oils (C20-C50)	Jan	92.12	86.68	97.56	90.02	0.0098	0.0098	0.0098	190.0000			400.00	Option 1: VP80 = 9.8426168039863E-03 VP90 = 9.8426168039863E-03
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0099	0.0099	0.0099	190.0089	0.9980	0.9999	401.05	
TK 959 - RS307 Gas Oils (C20-C50)	Feb	92.12	86.68	97.56	90.02	0.0098	0.0098	0.0098	190.0000			400.00	Option 1: VP80 = 9.8426168039863E-03 VP90 = 9.8426168039863E-03
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0099	0.0099	0.0099	190.0089	0.9980	0.9999	401.05	
TK 959 - RS307 Gas Oils (C20-C50)	Mar	92.12	86.68	97.56	90.02	0.0098	0.0098	0.0098	190.0000			400.00	Option 1: VP80 = 9.8426168039863E-03 VP90 = 9.8426168039863E-03
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0099	0.0099	0.0099	190.0089	0.9980	0.9999	401.05	
TK 959 - RS307 Gas Oils (C20-C50)	Apr	92.12	86.68	97.56	90.02	0.0098	0.0098	0.0098	190.0000			400.00	Option 1: VP80 = 9.8426168039863E-03 VP90 = 9.8426168039863E-03
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0099	0.0099	0.0099	190.0089	0.9980	0.9999	401.05	
TK 959 - RS307 Gas Oils (C20-C50)	May	92.12	86.68	97.56	90.02	0.0098	0.0098	0.0098	190.0000			400.00	Option 1: VP80 = 9.8426168039863E-03 VP90 = 9.8426168039863E-03
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0099	0.0099	0.0099	190.0089	0.9980	0.9999	401.05	
TK 959 - RS307 Gas Oils (C20-C50)	Jun	92.12	86.68	97.56	90.02	0.0098	0.0098	0.0098	190.0000			400.00	Option 1: VP80 = 9.8426168039863E-03 VP90 = 9.8426168039863E-03
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0099	0.0099	0.0099	190.0089	0.9980	0.9999	401.05	
TK 959 - RS307 Gas Oils (C20-C50)	Jul	92.12	86.68	97.56	90.02	0.0098	0.0098	0.0098	190.0000			400.00	Option 1: VP80 = 9.8426168039863E-03 VP90 = 9.8426168039863E-03
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0099	0.0099	0.0099	190.0089	0.9980	0.9999	401.05	
TK 959 - RS307 Gas Oils (C20-C50)	Aug	92.12	86.68	97.56	90.02	0.0098	0.0098	0.0098	190.0000			400.00	Option 1: VP80 = 9.8426168039863E-03 VP90 = 9.8426168039863E-03
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0099	0.0099	0.0099	190.0089	0.9980	0.9999	401.05	
TK 959 - RS307 Gas Oils (C20-C50)	Sep	92.12	86.68	97.56	90.02	0.0098	0.0098	0.0098	190.0000			400.00	Option 1: VP80 = 9.8426168039863E-03 VP90 = 9.8426168039863E-03
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0099	0.0099	0.0099	190.0089	0.9980	0.9999	401.05	

TK 959 - RS307 Gas Oils (C20-C50)	Oct	92.12	86.68	97.56	90.02	0.0098	0.0098	0.0098	190.0000			400.00	Option 1: VP80 = 9.8426168039863E-03 VP90 = 9.8426168039863E-03
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0099	0.0099	0.0099	190.0089	0.9980	0.9999	401.05	
TK 959 - RS307 Gas Oils (C20-C50)	Nov	92.12	86.68	97.56	90.02	0.0098	0.0098	0.0098	190.0000			400.00	Option 1: VP80 = 9.8426168039863E-03 VP90 = 9.8426168039863E-03
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0099	0.0099	0.0099	190.0089	0.9980	0.9999	401.05	
TK 959 - RS307 Gas Oils (C20-C50)	Dec	92.12	86.68	97.56	90.02	0.0098	0.0098	0.0098	190.0000			400.00	Option 1: VP80 = 9.8426168039863E-03 VP90 = 9.8426168039863E-03
Cresols (mixed isomers)						0.0057	0.0044	0.0073	108.1400	0.0001	0.0001	108.14	Option 2: A=7.151, B=1601, C=175
Phenanthrene						0.0000	0.0000	0.0000	178.2300	0.0020	0.0000	178.23	Option 1: VP80 = .0000209 VP90 = .0000209
Unidentified Components						0.0099	0.0099	0.0099	190.0089	0.9980	0.9999	401.05	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

959 - Vertical Fixed Roof Tank
Carson, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	42.3874	38.2853	42.3874	41.0200	42.3874	41.0200	42.3874	42.3874	41.0200	42.3874	41.0200	42.3874
Vapor Space Volume (cu ft):	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264
Vapor Density (lb/cu ft):	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Vapor Space Expansion Factor:	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197
Vented Vapor Saturation Factor:	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264	221,114.1264
Tank Diameter (ft):	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000
Vapor Space Outage (ft):	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125
Tank Shell Height (ft):	52.0000	52.0000	52.0000	52.0000	52.0000	52.0000	52.0000	52.0000	52.0000	52.0000	52.0000	52.0000
Average Liquid Height (ft):	41.0500	41.0500	41.0500	41.0500	41.0500	41.0500	41.0500	41.0500	41.0500	41.0500	41.0500	41.0500
Roof Outage (ft):	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625
Roof Outage (Cone Roof)												
Roof Outage (ft):	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625
Roof Height (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Roof Slope (ft/ft):	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Shell Radius (ft):	75.0000	75.0000	75.0000	75.0000	75.0000	75.0000	75.0000	75.0000	75.0000	75.0000	75.0000	75.0000
Vapor Density												
Vapor Density (lb/cu ft):	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Vapor Molecular Weight (lb/lb-mole):	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098
Daily Avg. Liquid Surface Temp. (deg. R):	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919
Daily Average Ambient Temp. (deg. F):	81.5417	82.9917	84.1917	87.3417	90.4917	94.0917	98.7417	100.0917	98.0917	93.7917	86.9417	81.6917
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R):	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900	549.6900
Tank Paint Solar Absorptance (Shell):	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	886.7697	1,146.6138	1,501.0044	1,901.7164	2,039.4116	2,128.5644	2,302.7457	2,117.1427	1,702.1536	1,320.4777	993.3724	819.8257
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197	0.0197
Daily Vapor Temperature Range (deg. R):	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745	10.8745
Daily Vapor Pressure Range (psia):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Breather Vent Press. Setting Range(psia):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098
Daily Avg. Liquid Surface Temp. (deg R):	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919	551.7919
Daily Min. Liquid Surface Temp. (deg R):	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547	546.3547
Daily Max. Liquid Surface Temp. (deg R):	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292	557.2292
Daily Ambient Temp. Range (deg. R):	21.9000	20.8000	19.0000	19.7000	17.0000	17.2000	19.3000	19.2000	19.4000	20.6000	21.7000	22.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935	0.9935
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098
Vapor Space Outage (ft):	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125	12.5125

Working Losses (lb):	751.6773	751.6773	751.6773	751.6773	751.6773	751.6773	751.6773	751.6773	751.6773	751.6773	751.6773	751.6773
Vapor Molecular Weight (lb/lb-mole):	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098	0.0098
Net Throughput (gal/mo.):	16,881,714.5000	16,881,714.5000	16,881,714.5000	16,881,714.5000	16,881,714.5000	16,881,714.5000	16,881,714.5000	16,881,714.5000	16,881,714.5000	16,881,714.5000	16,881,714.5000	16,881,714.5000
Annual Turnovers:	30.6495	30.6495	30.6495	30.6495	30.6495	30.6495	30.6495	30.6495	30.6495	30.6495	30.6495	30.6495
Turnover Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Maximum Liquid Volume (gal):	6,609,584.5400	6,609,584.5400	6,609,584.5400	6,609,584.5400	6,609,584.5400	6,609,584.5400	6,609,584.5400	6,609,584.5400	6,609,584.5400	6,609,584.5400	6,609,584.5400	6,609,584.5400
Maximum Liquid Height (ft):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Tank Diameter (ft):	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000
Working Loss Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	794.0647	789.9627	794.0647	792.6973	794.0647	792.6973	794.0647	794.0647	792.6973	794.0647	792.6973	794.0647

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

959 - Vertical Fixed Roof Tank
Carson, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
TK 959 - RS307 Gas Oils (C20-C50)	9,020.13	499.08	9,519.20
Cresols (mixed isomers)	0.55	0.03	0.58
Phenanthrene	0.08	0.00	0.09
Unidentified Components	9,019.50	499.04	9,518.54

TANKS 4.0.9d
Emissions Report - Detail Format
Total Emissions Summaries - All Tanks in Report

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

Tank Identification				Losses (lbs)
014	Tesoro	Domed External Floating Roof Tank	Carson, California	306.66
031	Tesoro	Domed External Floating Roof Tank	Carson, California	1,055.88
062	Tesoro	Vertical Fixed Roof Tank	Carson, California	652,108.53
063	Tesoro	Vertical Fixed Roof Tank	Carson, California	694,483.55
064	Tesoro	Domed External Floating Roof Tank	Carson, California	653.64
502	Tesoro	Vertical Fixed Roof Tank	Carson, California	23,230.99
959	Tesoro	Vertical Fixed Roof Tank	Carson, California	9,519.20
Total Emissions for all Tanks:				1,381,358.45

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Wilmington 300035/36
City:	Long Beach
State:	California
Company:	Tesoro
Type of Tank:	Internal Floating Roof Tank
Description:	New Tanks

Tank Dimensions

Diameter (ft):	180.00
Volume (gallons):	12,600,000.00
Turnovers:	60.00
Self Supp. Roof? (y/n):	N
No. of Columns:	10.00
Eff. Col. Diam. (ft):	0.70

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Characteristics

Deck Fitting Category:	Detail
Deck Type:	Welded

Deck Fitting/Status	Quantity
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Pole Sleeve	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Roof Leg or Hanger Well/Adjustable	101
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Unslotted Guide-Pole Well/Gasketed Sliding Cover	1
Column Well (24-in. Diam.)/Pipe Col.-Sliding Cover, Gask.	10
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Wilmington 300035/36 - Internal Floating Roof Tank
Long Beach, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TSO Light Crude Oil (RVP 10.5 psia)	Jan	65.62	58.33	72.92	66.55	8.7251	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.3622	N/A	N/A	78.1100	0.0047	0.0030	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1317	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.2108	N/A	N/A	86.1700	0.0159	0.0165	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0629	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0032	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3924	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.5591	N/A	N/A	49.5363	0.9553	0.9781	217.32	
Xylenes (mixed isomers)						0.1098	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Feb	67.37	59.29	75.45	66.55	8.9707	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.4278	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1396	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3104	N/A	N/A	86.1700	0.0159	0.0168	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0670	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0034	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4137	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.8260	N/A	N/A	49.5277	0.9553	0.9777	217.32	
Xylenes (mixed isomers)						0.1166	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Mar	69.41	60.32	78.50	66.55	9.2643	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.5076	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1495	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4315	N/A	N/A	86.1700	0.0159	0.0171	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0721	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0037	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4397	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.1447	N/A	N/A	49.5176	0.9553	0.9772	217.32	

Xylenes (mixed isomers)						0.1249	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Apr	72.51	61.77	83.24	66.55	9.7236	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.6358	N/A	N/A	78.1100	0.0047	0.0033	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1656	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6251	N/A	N/A	86.1700	0.0159	0.0176	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0805	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0043	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4819	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.6432	N/A	N/A	49.5021	0.9553	0.9765	217.32	
Xylenes (mixed isomers)						0.1385	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	May	74.48	63.71	85.25	66.55	10.0253	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.7221	N/A	N/A	78.1100	0.0047	0.0033	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1766	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.7549	N/A	N/A	86.1700	0.0159	0.0179	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0863	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0046	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5106	N/A	N/A	92.1300	0.0085	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.9705	N/A	N/A	49.4921	0.9553	0.9761	217.32	
Xylenes (mixed isomers)						0.1478	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Jun	76.44	65.30	87.59	66.55	10.3327	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.8117	N/A	N/A	78.1100	0.0047	0.0034	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1882	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.8893	N/A	N/A	86.1700	0.0159	0.0182	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0924	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0050	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5405	N/A	N/A	92.1300	0.0085	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.3037	N/A	N/A	49.4820	0.9553	0.9756	217.32	
Xylenes (mixed isomers)						0.1576	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Jul	79.23	67.05	91.41	66.55	10.7812	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.9454	N/A	N/A	78.1100	0.0047	0.0035	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.2058	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						3.0893	N/A	N/A	86.1700	0.0159	0.0187	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.1017	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0056	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5855	N/A	N/A	92.1300	0.0085	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.7898	N/A	N/A	49.4675	0.9553	0.9749	217.32	

Xylenes (mixed isomers)						0.1725	N/A	N/A	106.1700	0.0118	0.0008	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Aug	79.03	67.58	90.49	66.55	10.7489	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.9357	N/A	N/A	78.1100	0.0047	0.0035	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.2045	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						3.0748	N/A	N/A	86.1700	0.0159	0.0186	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.1010	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0056	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5822	N/A	N/A	92.1300	0.0085	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.7548	N/A	N/A	49.4685	0.9553	0.9750	217.32	
Xylenes (mixed isomers)						0.1714	N/A	N/A	106.1700	0.0118	0.0008	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Sep	76.38	66.46	86.31	66.55	10.3233	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.8089	N/A	N/A	78.1100	0.0047	0.0034	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1878	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.8852	N/A	N/A	86.1700	0.0159	0.0182	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0922	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0050	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5395	N/A	N/A	92.1300	0.0085	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.2936	N/A	N/A	49.4823	0.9553	0.9756	217.32	
Xylenes (mixed isomers)						0.1573	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Oct	72.86	64.16	81.56	66.55	9.7779	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.6512	N/A	N/A	78.1100	0.0047	0.0033	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1676	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6483	N/A	N/A	86.1700	0.0159	0.0177	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0815	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0043	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4870	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.7021	N/A	N/A	49.5003	0.9553	0.9764	217.32	
Xylenes (mixed isomers)						0.1401	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Nov	68.45	60.79	76.12	66.55	9.1259	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.4697	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1448	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3742	N/A	N/A	86.1700	0.0159	0.0170	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0697	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0036	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4274	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.9944	N/A	N/A	49.5224	0.9553	0.9775	217.32	

Xylenes (mixed isomers)						0.1209	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Dec	65.40	58.35	72.46	66.55	8.6945	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.3542	N/A	N/A	78.1100	0.0047	0.0030	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1307	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1985	N/A	N/A	86.1700	0.0159	0.0165	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0624	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0031	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3898	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.5259	N/A	N/A	49.5374	0.9553	0.9782	217.32	
Xylenes (mixed isomers)						0.1090	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Wilmington 300035/36 - Internal Floating Roof Tank
Long Beach, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	39.8291	41.6208	43.8530	47.5675	50.1729	52.9798	57.3943	57.0627	52.8920	48.0260	42.7877	39.6111
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Value of Vapor Pressure Function:	0.2213	0.2312	0.2436	0.2643	0.2787	0.2943	0.3189	0.3170	0.2938	0.2668	0.2377	0.2201
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	8.7251	8.9707	9.2643	9.7236	10.0253	10.3327	10.7812	10.7489	10.3233	9.7779	9.1259	8.6945
Tank Diameter (ft):	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Withdrawal Losses (lb):	347.7836	347.7836	347.7836	347.7836	347.7836	347.7836	347.7836	347.7836	347.7836	347.7836	347.7836	347.7836
Number of Columns:	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000
Effective Column Diameter (ft):	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000
Net Throughput (gal/mo.):	63,000,000.0000	63,000,000.0000	63,000,000.0000	63,000,000.0000	63,000,000.0000	63,000,000.0000	63,000,000.0000	63,000,000.0000	63,000,000.0000	63,000,000.0000	63,000,000.0000	63,000,000.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
Average Organic Liquid Density (lb/gal):	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000
Tank Diameter (ft):	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000
Deck Fitting Losses (lb):	423.4312	442.4795	466.2106	505.6997	533.3985	563.2394	610.1706	606.6452	562.3060	510.5740	454.8843	421.1135
Value of Vapor Pressure Function:	0.2213	0.2312	0.2436	0.2643	0.2787	0.2943	0.3189	0.3170	0.2938	0.2668	0.2377	0.2201
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	1,148.1700	1,148.1700	1,148.1700	1,148.1700	1,148.1700	1,148.1700	1,148.1700	1,148.1700	1,148.1700	1,148.1700	1,148.1700	1,148.1700
Deck Seam Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft):	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000	180.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Total Losses (lb):	811.0439	831.8839	857.8473	901.0509	931.3551	964.0028	1,015.3485	1,011.4915	962.9816	906.3837	845.4556	808.5082

		Roof Fitting Loss Factors			
Roof Fitting/Status	Quantity	KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Pole Sleeve	1	11.00	46.00	1.40	58.4879
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	32.9659
Roof Leg or Hanger Well/Adjustable	101	7.90	0.00	0.00	4,242.5002
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1	0.47	0.02	0.97	2.4990
Unslotted Guide-Pole Well/Gasketed Sliding Cover	1	25.00	13.00	2.20	132.9271
Column Well (24-in. Diam.)/Pipe Col.-Sliding Cover, Gask.	10	25.00	0.00	0.00	1,329.2707
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	8.5073
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1	56.00	0.00	0.00	297.7566

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

Wilmington 300035/36 - Internal Floating Roof Tank
Long Beach, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
TSO Light Crude Oil (RVP 10.5 psia)	573.80	4,173.40	6,100.15	0.00	10,847.35
Benzene	1.88	19.70	19.95	0.00	41.52
Benzo(a)anthracene	0.00	0.06	0.00	0.00	0.06
Benzo(a)pyrene	0.00	0.03	0.00	0.00	0.03
Benzo(b)fluoranthene	0.00	0.14	0.00	0.00	0.14
Chrysene	0.00	0.13	0.00	0.00	0.13
Dibenzo(a,h)anthracene	0.00	0.02	0.00	0.00	0.02
Ethylbenzene	0.11	11.48	1.18	0.00	12.77
Hexane (-n)	10.14	66.36	107.75	0.00	184.24
Isopropyl benzene	0.01	1.82	0.09	0.00	1.92
Naphthalene	0.00	2.30	0.01	0.00	2.30
Toluene	1.00	35.39	10.58	0.00	46.96
Unidentified Components	560.27	3,986.75	5,956.36	0.00	10,503.38
Xylenes (mixed isomers)	0.40	49.25	4.24	0.00	53.89

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification		
User Identification:	Wilmington 80038	
City:	Wilmington	
State:	California	
Company:	Tesoro	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	D587	
Tank Dimensions		
Shell Height (ft):		41.67
Diameter (ft):		117.17
Liquid Height (ft) :		40.00
Avg. Liquid Height (ft):		22.87
Volume (gallons):		3,360,000.00
Turnovers:		90.00
Net Throughput(gal/yr):		302,400,000.00
Is Tank Heated (y/n):	Y	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Cone	
Height (ft)		1.22
Slope (ft/ft) (Cone Roof)		0.02
Breather Vent Settings		
Vacuum Settings (psig):		-0.87
Pressure Settings (psig)		0.87

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Wilmington 80038 - Vertical Fixed Roof Tank
Wilmington, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TSO Light Gas Oil (TVP <3.0 @ 150 F - July 2013)	Jan	150.00	150.00	150.00	150.00	3.0000	3.0000	3.0000	150.0000			200.00	
Chrysene						0.0000	0.0000	0.0000	228.2800	0.0001	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Unidentified Components						3.0002	3.0002	3.0002	150.0000	0.9999	1.0000	200.00	
TSO Light Gas Oil (TVP <3.0 @ 150 F - July 2013)	Feb	150.00	150.00	150.00	150.00	3.0000	3.0000	3.0000	150.0000			200.00	
Chrysene						0.0000	0.0000	0.0000	228.2800	0.0001	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Unidentified Components						3.0002	3.0002	3.0002	150.0000	0.9999	1.0000	200.00	
TSO Light Gas Oil (TVP <3.0 @ 150 F - July 2013)	Mar	150.00	150.00	150.00	150.00	3.0000	3.0000	3.0000	150.0000			200.00	
Chrysene						0.0000	0.0000	0.0000	228.2800	0.0001	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Unidentified Components						3.0002	3.0002	3.0002	150.0000	0.9999	1.0000	200.00	
TSO Light Gas Oil (TVP <3.0 @ 150 F - July 2013)	Apr	150.00	150.00	150.00	150.00	3.0000	3.0000	3.0000	150.0000			200.00	
Chrysene						0.0000	0.0000	0.0000	228.2800	0.0001	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Unidentified Components						3.0002	3.0002	3.0002	150.0000	0.9999	1.0000	200.00	
TSO Light Gas Oil (TVP <3.0 @ 150 F - July 2013)	May	150.00	150.00	150.00	150.00	3.0000	3.0000	3.0000	150.0000			200.00	
Chrysene						0.0000	0.0000	0.0000	228.2800	0.0001	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Unidentified Components						3.0002	3.0002	3.0002	150.0000	0.9999	1.0000	200.00	
TSO Light Gas Oil (TVP <3.0 @ 150 F - July 2013)	Jun	150.00	150.00	150.00	150.00	3.0000	3.0000	3.0000	150.0000			200.00	
Chrysene						0.0000	0.0000	0.0000	228.2800	0.0001	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Unidentified Components						3.0002	3.0002	3.0002	150.0000	0.9999	1.0000	200.00	
TSO Light Gas Oil (TVP <3.0 @ 150 F - July 2013)	Jul	150.00	150.00	150.00	150.00	3.0000	3.0000	3.0000	150.0000			200.00	
Chrysene						0.0000	0.0000	0.0000	228.2800	0.0001	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Unidentified Components						3.0002	3.0002	3.0002	150.0000	0.9999	1.0000	200.00	
TSO Light Gas Oil (TVP <3.0 @ 150 F - July 2013)	Aug	150.00	150.00	150.00	150.00	3.0000	3.0000	3.0000	150.0000			200.00	
Chrysene						0.0000	0.0000	0.0000	228.2800	0.0001	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Unidentified Components						3.0002	3.0002	3.0002	150.0000	0.9999	1.0000	200.00	
TSO Light Gas Oil (TVP <3.0 @ 150 F - July 2013)	Sep	150.00	150.00	150.00	150.00	3.0000	3.0000	3.0000	150.0000			200.00	
Chrysene						0.0000	0.0000	0.0000	228.2800	0.0001	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Unidentified Components						3.0002	3.0002	3.0002	150.0000	0.9999	1.0000	200.00	
TSO Light Gas Oil (TVP <3.0 @ 150 F - July 2013)	Oct	150.00	150.00	150.00	150.00	3.0000	3.0000	3.0000	150.0000			200.00	
Chrysene						0.0000	0.0000	0.0000	228.2800	0.0001	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Unidentified Components						3.0002	3.0002	3.0002	150.0000	0.9999	1.0000	200.00	
TSO Light Gas Oil (TVP <3.0 @ 150 F - July 2013)	Nov	150.00	150.00	150.00	150.00	3.0000	3.0000	3.0000	150.0000			200.00	
Chrysene						0.0000	0.0000	0.0000	228.2800	0.0001	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Unidentified Components						3.0002	3.0002	3.0002	150.0000	0.9999	1.0000	200.00	
TSO Light Gas Oil (TVP <3.0 @ 150 F - July 2013)	Dec	150.00	150.00	150.00	150.00	3.0000	3.0000	3.0000	150.0000			200.00	
Chrysene						0.0000	0.0000	0.0000	228.2800	0.0001	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Unidentified Components						3.0002	3.0002	3.0002	150.0000	0.9999	1.0000	200.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Wilmington 80038 - Vertical Fixed Roof Tank
Wilmington, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vapor Space Volume (cu ft):	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445
Vapor Density (lb/cu ft):	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688
Vapor Space Expansion Factor:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vented Vapor Saturation Factor:	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445	207,097.4445
Tank Diameter (ft):	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700
Vapor Space Outage (ft):	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067
Tank Shell Height (ft):	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700
Average Liquid Height (ft):	22.8700	22.8700	22.8700	22.8700	22.8700	22.8700	22.8700	22.8700	22.8700	22.8700	22.8700	22.8700
Roof Outage (ft):	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067
Roof Outage (Cone Roof)												
Roof Outage (ft):	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067
Roof Height (ft):	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200
Roof Slope (ft/ft):	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200
Shell Radius (ft):	58.5850	58.5850	58.5850	58.5850	58.5850	58.5850	58.5850	58.5850	58.5850	58.5850	58.5850	58.5850
Vapor Density												
Vapor Density (lb/cu ft):	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688	0.0688
Vapor Molecular Weight (lb/lb-mole):	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
Daily Avg. Liquid Surface Temp. (deg. R):	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700
Daily Average Ambient Temp. (deg. F):	55.8500	57.3000	58.5000	61.6500	64.8000	68.4000	73.0500	74.4000	72.4000	68.1000	61.2500	56.0000
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R):	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700
Tank Paint Solar Absorptance (Shell):	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	886.7697	1,146.6138	1,501.0044	1,901.7164	2,039.4116	2,128.5644	2,302.7457	2,117.1427	1,702.1536	1,320.4777	993.3724	819.8257
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Daily Vapor Temperature Range (deg. R):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Daily Vapor Pressure Range (psia):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Breather Vent Press. Setting Range(psia):	1.7400	1.7400	1.7400	1.7400	1.7400	1.7400	1.7400	1.7400	1.7400	1.7400	1.7400	1.7400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
Daily Avg. Liquid Surface Temp. (deg R):	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700
Daily Min. Liquid Surface Temp. (deg R):	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700
Daily Max. Liquid Surface Temp. (deg R):	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700	609.6700
Daily Ambient Temp. Range (deg. R):	21.9000	20.8000	19.0000	19.7000	17.0000	17.2000	19.3000	19.2000	19.4000	20.6000	21.7000	22.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467	0.2467
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
Vapor Space Outage (ft):	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067	19.2067
Working Losses (lb):	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000
Vapor Molecular Weight (lb/lb-mole):	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000	150.0000
Vapor Pressure at Daily Average Liquid												

Surface Temperature (psia):	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
Net Throughput (gal/mo.):	25,200,000.0000	25,200,000.0000	25,200,000.0000	25,200,000.0000	25,200,000.0000	25,200,000.0000	25,200,000.0000	25,200,000.0000	25,200,000.0000	25,200,000.0000	25,200,000.0000	25,200,000.0000
Annual Turnovers:	90.0000	90.0000	90.0000	90.0000	90.0000	90.0000	90.0000	90.0000	90.0000	90.0000	90.0000	90.0000
Turnover Factor:	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
Maximum Liquid Volume (gal):	3,360,000.0000	3,360,000.0000	3,360,000.0000	3,360,000.0000	3,360,000.0000	3,360,000.0000	3,360,000.0000	3,360,000.0000	3,360,000.0000	3,360,000.0000	3,360,000.0000	3,360,000.0000
Maximum Liquid Height (ft):	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000
Tank Diameter (ft):	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700	117.1700
Working Loss Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000	135,000.0000

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

Wilmington 80038 - Vertical Fixed Roof Tank
Wilmington, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
TSO Light Gas Oil (TVP <3.0 @ 150 F - July 2013)	1,620,000.00	0.00	1,620,000.00
Chrysene	0.00	0.00	0.00
Unidentified Components	1,620,000.00	0.00	1,620,000.00

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Wilmington 80060 (Convert to IFR)
City:	Wilmington
State:	California
Company:	Tesoro
Type of Tank:	Internal Floating Roof Tank
Description:	D602 I&C Project - Convert to IFR - Crude Oil

Tank Dimensions

Diameter (ft):		117.00
Volume (gallons):		3,364,206.66
Turnovers:		112.36
Self Supp. Roof? (y/n):	N	
No. of Columns:		8.00
Eff. Col. Diam. (ft):		1.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Characteristics

Deck Fitting Category:	Detail
Deck Type:	Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Gask.	8
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1
Roof Leg or Hanger Well/Adjustable	40
Slotted Guide-Pole/Sample Well/Gask Sliding Covr, w. Float,Sleeve,Wiper	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Wilmington 80060 (Convert to IFR) - Internal Floating Roof Tank
Wilmington, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TSO Light Crude Oil (RVP 10.5 psia)	Jan	65.62	58.33	72.92	66.55	8.7251	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.3622	N/A	N/A	78.1100	0.0047	0.0030	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1317	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.2108	N/A	N/A	86.1700	0.0159	0.0165	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0629	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0032	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3924	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.5591	N/A	N/A	49.5363	0.9553	0.9781	217.32	
Xylenes (mixed isomers)						0.1098	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Feb	67.37	59.29	75.45	66.55	8.9707	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.4278	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1396	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3104	N/A	N/A	86.1700	0.0159	0.0168	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0670	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0034	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4137	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.8260	N/A	N/A	49.5277	0.9553	0.9777	217.32	
Xylenes (mixed isomers)						0.1166	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Mar	69.41	60.32	78.50	66.55	9.2643	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.5076	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1495	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4315	N/A	N/A	86.1700	0.0159	0.0171	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0721	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0037	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4397	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.1447	N/A	N/A	49.5176	0.9553	0.9772	217.32	

Xylenes (mixed isomers)						0.1249	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Apr	72.51	61.77	83.24	66.55	9.7236	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.6358	N/A	N/A	78.1100	0.0047	0.0033	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1656	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6251	N/A	N/A	86.1700	0.0159	0.0176	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0805	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0043	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4819	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.6432	N/A	N/A	49.5021	0.9553	0.9765	217.32	
Xylenes (mixed isomers)						0.1385	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	May	74.48	63.71	85.25	66.55	10.0253	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.7221	N/A	N/A	78.1100	0.0047	0.0033	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1766	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.7549	N/A	N/A	86.1700	0.0159	0.0179	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0863	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0046	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5106	N/A	N/A	92.1300	0.0085	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.9705	N/A	N/A	49.4921	0.9553	0.9761	217.32	
Xylenes (mixed isomers)						0.1478	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Jun	76.44	65.30	87.59	66.55	10.3327	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.8117	N/A	N/A	78.1100	0.0047	0.0034	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1882	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.8893	N/A	N/A	86.1700	0.0159	0.0182	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0924	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0050	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5405	N/A	N/A	92.1300	0.0085	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.3037	N/A	N/A	49.4820	0.9553	0.9756	217.32	
Xylenes (mixed isomers)						0.1576	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Jul	79.23	67.05	91.41	66.55	10.7812	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.9454	N/A	N/A	78.1100	0.0047	0.0035	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.2058	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						3.0893	N/A	N/A	86.1700	0.0159	0.0187	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.1017	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0056	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5855	N/A	N/A	92.1300	0.0085	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.7898	N/A	N/A	49.4675	0.9553	0.9749	217.32	

Xylenes (mixed isomers)						0.1725	N/A	N/A	106.1700	0.0118	0.0008	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Aug	79.03	67.58	90.49	66.55	10.7489	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.9357	N/A	N/A	78.1100	0.0047	0.0035	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.2045	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						3.0748	N/A	N/A	86.1700	0.0159	0.0186	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.1010	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0056	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5822	N/A	N/A	92.1300	0.0085	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.7548	N/A	N/A	49.4685	0.9553	0.9750	217.32	
Xylenes (mixed isomers)						0.1714	N/A	N/A	106.1700	0.0118	0.0008	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Sep	76.38	66.46	86.31	66.55	10.3233	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.8089	N/A	N/A	78.1100	0.0047	0.0034	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1878	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.8852	N/A	N/A	86.1700	0.0159	0.0182	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0922	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0050	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5395	N/A	N/A	92.1300	0.0085	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.2936	N/A	N/A	49.4823	0.9553	0.9756	217.32	
Xylenes (mixed isomers)						0.1573	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Oct	72.86	64.16	81.56	66.55	9.7779	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.6512	N/A	N/A	78.1100	0.0047	0.0033	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1676	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6483	N/A	N/A	86.1700	0.0159	0.0177	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0815	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0043	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4870	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.7021	N/A	N/A	49.5003	0.9553	0.9764	217.32	
Xylenes (mixed isomers)						0.1401	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Nov	68.45	60.79	76.12	66.55	9.1259	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.4697	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1448	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3742	N/A	N/A	86.1700	0.0159	0.0170	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0697	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0036	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4274	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.9944	N/A	N/A	49.5224	0.9553	0.9775	217.32	

Xylenes (mixed isomers)						0.1209	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Dec	65.40	58.35	72.46	66.55	8.6945	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.3542	N/A	N/A	78.1100	0.0047	0.0030	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1307	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1985	N/A	N/A	86.1700	0.0159	0.0165	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0624	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0031	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3898	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.5259	N/A	N/A	49.5374	0.9553	0.9782	217.32	
Xylenes (mixed isomers)						0.1090	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Wilmington 80060 (Convert to IFR) - Internal Floating Roof Tank
Wilmington, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	25.8889	27.0535	28.5045	30.9189	32.6124	34.4369	37.3063	37.0908	34.3798	31.2169	27.8120	25.7472
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Value of Vapor Pressure Function:	0.2213	0.2312	0.2436	0.2643	0.2787	0.2943	0.3189	0.3170	0.2938	0.2668	0.2377	0.2201
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	8.7251	8.9707	9.2643	9.7236	10.0253	10.3327	10.7812	10.7489	10.3233	9.7779	9.1259	8.6945
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Withdrawal Losses (lb):	275.1192	275.1192	275.1192	275.1192	275.1192	275.1192	275.1192	275.1192	275.1192	275.1192	275.1192	275.1192
Number of Columns:	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
Effective Column Diameter (ft):	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Net Throughput (gal/mo.):	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
Average Organic Liquid Density (lb/gal):	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Deck Fitting Losses (lb):	242.5149	253.4246	267.0163	289.6332	305.4973	322.5883	349.4676	347.4484	322.0537	292.4249	260.5293	241.1875
Value of Vapor Pressure Function:	0.2213	0.2312	0.2436	0.2643	0.2787	0.2943	0.3189	0.3170	0.2938	0.2668	0.2377	0.2201
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000
Deck Seam Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Total Losses (lb):	543.5230	555.5973	570.6399	595.6712	613.2289	632.1443	661.8930	659.6583	631.5527	598.7609	563.4605	542.0538

Roof Fitting/Status	Quantity	KFa(lb-mole/yr)	Roof Fitting Loss Factors KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	8.5073
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	14.8878
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Gask.	8	33.00	0.00	0.00	1,403.7098
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1	56.00	0.00	0.00	297.7566
Roof Leg or Hanger Well/Adjustable	40	7.90	0.00	0.00	1,680.1981
Slotted Guide-Pole/Sample Well/Gask Sliding Covr, w. Float,Sleeve,Wiper	1	11.00	9.90	0.89	58.4879
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	32.9659

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

Wilmington 80060 (Convert to IFR) - Internal Floating Roof Tank
Wilmington, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
TSO Light Crude Oil (RVP 10.5 psia)	372.97	3,301.43	3,493.79	0.00	7,168.18
Benzene	1.22	15.58	11.42	0.00	28.23
Benzo(a)anthracene	0.00	0.05	0.00	0.00	0.05
Benzo(a)pyrene	0.00	0.02	0.00	0.00	0.02
Benzo(b)fluoranthene	0.00	0.11	0.00	0.00	0.11
Chrysene	0.00	0.10	0.00	0.00	0.10
Dibenzo(a,h)anthracene	0.00	0.01	0.00	0.00	0.01
Ethylbenzene	0.07	9.08	0.68	0.00	9.83
Hexane (-n)	6.59	52.49	61.71	0.00	120.79
Isopropyl benzene	0.01	1.44	0.05	0.00	1.50
Naphthalene	0.00	1.82	0.00	0.00	1.82
Toluene	0.65	28.00	6.06	0.00	34.70
Unidentified Components	364.18	3,153.78	3,411.43	0.00	6,929.38
Xylenes (mixed isomers)	0.26	38.96	2.43	0.00	41.64

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification	
User Identification:	Wilmington 80067 (Convert to IFR)
City:	Wilmington
State:	California
Company:	Tesoro
Type of Tank:	Internal Floating Roof Tank
Description:	D609 I&C Project - Convert to IFR - Crude Oil
Tank Dimensions	
Diameter (ft):	117.00
Volume (gallons):	3,323,993.81
Turnovers:	60.65
Self Supp. Roof? (y/n):	N
No. of Columns:	8.00
Eff. Col. Diam. (ft):	1.00
Paint Characteristics	
Internal Shell Condition:	Light Rust
Shell Color/Shade:	Gray/Light
Shell Condition	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good
Rim-Seal System	
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted
Deck Characteristics	
Deck Fitting Category:	Detail
Deck Type:	Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Gask.	8
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1
Roof Leg or Hanger Well/Adjustable	40
Slotted Guide-Pole/Sample Well/Gask Sliding Covr, w. Float,Sleeve,Wiper	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Wilmington 80067 (Convert to IFR) - Internal Floating Roof Tank
Wilmington, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TSO Light Crude Oil (RVP 10.5 psia)	Jan	65.62	58.33	72.92	66.55	8.7251	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.3622	N/A	N/A	78.1100	0.0047	0.0030	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1317	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.2108	N/A	N/A	86.1700	0.0159	0.0165	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0629	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0032	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3924	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.5591	N/A	N/A	49.5363	0.9553	0.9781	217.32	
Xylenes (mixed isomers)						0.1098	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Feb	67.37	59.29	75.45	66.55	8.9707	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.4278	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1396	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3104	N/A	N/A	86.1700	0.0159	0.0168	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0670	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0034	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4137	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.8260	N/A	N/A	49.5277	0.9553	0.9777	217.32	
Xylenes (mixed isomers)						0.1166	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Mar	69.41	60.32	78.50	66.55	9.2643	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.5076	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1495	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4315	N/A	N/A	86.1700	0.0159	0.0171	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0721	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0037	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4397	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.1447	N/A	N/A	49.5176	0.9553	0.9772	217.32	

Xylenes (mixed isomers)						0.1249	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Apr	72.51	61.77	83.24	66.55	9.7236	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.6358	N/A	N/A	78.1100	0.0047	0.0033	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1656	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6251	N/A	N/A	86.1700	0.0159	0.0176	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0805	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0043	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4819	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.6432	N/A	N/A	49.5021	0.9553	0.9765	217.32	
Xylenes (mixed isomers)						0.1385	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	May	74.48	63.71	85.25	66.55	10.0253	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.7221	N/A	N/A	78.1100	0.0047	0.0033	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1766	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.7549	N/A	N/A	86.1700	0.0159	0.0179	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0863	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0046	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5106	N/A	N/A	92.1300	0.0085	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.9705	N/A	N/A	49.4921	0.9553	0.9761	217.32	
Xylenes (mixed isomers)						0.1478	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Jun	76.44	65.30	87.59	66.55	10.3327	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.8117	N/A	N/A	78.1100	0.0047	0.0034	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1882	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.8893	N/A	N/A	86.1700	0.0159	0.0182	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0924	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0050	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5405	N/A	N/A	92.1300	0.0085	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.3037	N/A	N/A	49.4820	0.9553	0.9756	217.32	
Xylenes (mixed isomers)						0.1576	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Jul	79.23	67.05	91.41	66.55	10.7812	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.9454	N/A	N/A	78.1100	0.0047	0.0035	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.2058	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						3.0893	N/A	N/A	86.1700	0.0159	0.0187	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.1017	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0056	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5855	N/A	N/A	92.1300	0.0085	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.7898	N/A	N/A	49.4675	0.9553	0.9749	217.32	

Xylenes (mixed isomers)						0.1725	N/A	N/A	106.1700	0.0118	0.0008	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Aug	79.03	67.58	90.49	66.55	10.7489	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.9357	N/A	N/A	78.1100	0.0047	0.0035	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.2045	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						3.0748	N/A	N/A	86.1700	0.0159	0.0186	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.1010	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0056	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5822	N/A	N/A	92.1300	0.0085	0.0019	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.7548	N/A	N/A	49.4685	0.9553	0.9750	217.32	
Xylenes (mixed isomers)						0.1714	N/A	N/A	106.1700	0.0118	0.0008	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Sep	76.38	66.46	86.31	66.55	10.3233	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.8089	N/A	N/A	78.1100	0.0047	0.0034	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1878	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.8852	N/A	N/A	86.1700	0.0159	0.0182	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0922	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0050	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.5395	N/A	N/A	92.1300	0.0085	0.0018	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.2936	N/A	N/A	49.4823	0.9553	0.9756	217.32	
Xylenes (mixed isomers)						0.1573	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Oct	72.86	64.16	81.56	66.55	9.7779	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.6512	N/A	N/A	78.1100	0.0047	0.0033	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1676	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.6483	N/A	N/A	86.1700	0.0159	0.0177	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0815	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0043	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4870	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.7021	N/A	N/A	49.5003	0.9553	0.9764	217.32	
Xylenes (mixed isomers)						0.1401	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Nov	68.45	60.79	76.12	66.55	9.1259	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.4697	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1448	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3742	N/A	N/A	86.1700	0.0159	0.0170	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0697	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0036	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4274	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.9944	N/A	N/A	49.5224	0.9553	0.9775	217.32	

Xylenes (mixed isomers)						0.1209	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Dec	65.40	58.35	72.46	66.55	8.6945	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.3542	N/A	N/A	78.1100	0.0047	0.0030	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1307	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1985	N/A	N/A	86.1700	0.0159	0.0165	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0624	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0031	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3898	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.5259	N/A	N/A	49.5374	0.9553	0.9782	217.32	
Xylenes (mixed isomers)						0.1090	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Wilmington 80067 (Convert to IFR) - Internal Floating Roof Tank
Wilmington, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	25.8889	27.0535	28.5045	30.9189	32.6124	34.4369	37.3063	37.0908	34.3798	31.2169	27.8120	25.7472
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Value of Vapor Pressure Function:	0.2213	0.2312	0.2436	0.2643	0.2787	0.2943	0.3189	0.3170	0.2938	0.2668	0.2377	0.2201
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	8.7251	8.9707	9.2643	9.7236	10.0253	10.3327	10.7812	10.7489	10.3233	9.7779	9.1259	8.6945
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Withdrawal Losses (lb):	146.7302	146.7302	146.7302	146.7302	146.7302	146.7302	146.7302	146.7302	146.7302	146.7302	146.7302	146.7302
Number of Columns:	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
Effective Column Diameter (ft):	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Net Throughput (gal/mo.):	16,800,000.0000	16,800,000.0000	16,800,000.0000	16,800,000.0000	16,800,000.0000	16,800,000.0000	16,800,000.0000	16,800,000.0000	16,800,000.0000	16,800,000.0000	16,800,000.0000	16,800,000.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
Average Organic Liquid Density (lb/gal):	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Deck Fitting Losses (lb):	242.5149	253.4246	267.0163	289.6332	305.4973	322.5883	349.4676	347.4484	322.0537	292.4249	260.5293	241.1875
Value of Vapor Pressure Function:	0.2213	0.2312	0.2436	0.2643	0.2787	0.2943	0.3189	0.3170	0.2938	0.2668	0.2377	0.2201
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000	657.6000
Deck Seam Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Total Losses (lb):	415.1341	427.2083	442.2510	467.2823	484.8399	503.7554	533.5041	531.2694	503.1637	470.3720	435.0715	413.6649

		Roof Fitting Loss Factors			
Roof Fitting/Status	Quantity	KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	8.5073
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	14.8878
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Gask.	8	33.00	0.00	0.00	1,403.7098
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1	56.00	0.00	0.00	297.7566
Roof Leg or Hanger Well/Adjustable	40	7.90	0.00	0.00	1,680.1981
Slotted Guide-Pole/Sample Well/Gask Sliding Covr, w. Float,Sleeve,Wiper	1	11.00	9.90	0.89	58.4879
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	32.9659

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

Wilmington 80067 (Convert to IFR) - Internal Floating Roof Tank
Wilmington, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
TSO Light Crude Oil (RVP 10.5 psia)	372.97	1,760.76	3,493.79	0.00	5,627.52
Benzene	1.22	8.31	11.42	0.00	20.96
Benzo(a)anthracene	0.00	0.03	0.00	0.00	0.03
Benzo(a)pyrene	0.00	0.01	0.00	0.00	0.01
Benzo(b)fluoranthene	0.00	0.06	0.00	0.00	0.06
Chrysene	0.00	0.05	0.00	0.00	0.05
Dibenzo(a,h)anthracene	0.00	0.01	0.00	0.00	0.01
Ethylbenzene	0.07	4.84	0.68	0.00	5.59
Hexane (-n)	6.59	28.00	61.71	0.00	96.30
Isopropyl benzene	0.01	0.77	0.05	0.00	0.83
Naphthalene	0.00	0.97	0.00	0.00	0.97
Toluene	0.65	14.93	6.06	0.00	21.64
Unidentified Components	364.18	1,682.01	3,411.43	0.00	5,457.62
Xylenes (mixed isomers)	0.26	20.78	2.43	0.00	23.46

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification	
User Identification:	Wilmington 80079
City:	Wilmington
State:	California
Company:	Tesoro
Type of Tank:	Internal Floating Roof Tank
Description:	D621
Tank Dimensions	
Diameter (ft):	117.00
Volume (gallons):	3,349,038.00
Turnovers:	112.87
Self Supp. Roof? (y/n):	N
No. of Columns:	8.00
Eff. Col. Diam. (ft):	1.10
Paint Characteristics	
Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good
Rim-Seal System	
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted
Deck Characteristics	
Deck Fitting Category:	Detail
Deck Type:	Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Gask.	8
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Float, Wiper	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Unslotted Guide-Pole Well/Gasketed Sliding Cover, w. Sleeve	1

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Wilmington 80079 - Internal Floating Roof Tank
Wilmington, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TSO Light Crude Oil (RVP 10.5 psia)	Jan	61.79	56.79	66.79	64.33	8.2036	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.2270	N/A	N/A	78.1100	0.0047	0.0029	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1155	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0042	N/A	N/A	86.1700	0.0159	0.0159	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0546	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0027	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3490	N/A	N/A	92.1300	0.0085	0.0015	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						8.9922	N/A	N/A	49.5548	0.9553	0.9790	217.32	
Xylenes (mixed isomers)						0.0962	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Feb	62.78	57.67	67.88	64.33	8.3354	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.2607	N/A	N/A	78.1100	0.0047	0.0029	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1195	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0558	N/A	N/A	86.1700	0.0159	0.0161	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0567	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0028	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3597	N/A	N/A	92.1300	0.0085	0.0015	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.1356	N/A	N/A	49.5501	0.9553	0.9787	217.32	
Xylenes (mixed isomers)						0.0996	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Mar	63.78	58.57	68.99	64.33	8.4712	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.2957	N/A	N/A	78.1100	0.0047	0.0030	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1236	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1093	N/A	N/A	86.1700	0.0159	0.0162	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0588	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0029	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3710	N/A	N/A	92.1300	0.0085	0.0015	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.2832	N/A	N/A	49.5452	0.9553	0.9785	217.32	

Xylenes (mixed isomers)						0.1031	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Apr	65.70	59.89	71.51	64.33	8.7362	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.3652	N/A	N/A	78.1100	0.0047	0.0030	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1320	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.2152	N/A	N/A	86.1700	0.0159	0.0165	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0631	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0032	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3934	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.5712	N/A	N/A	49.5359	0.9553	0.9781	217.32	
Xylenes (mixed isomers)						0.1101	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	May	67.27	61.79	72.76	64.33	8.9571	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.4241	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1392	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3049	N/A	N/A	86.1700	0.0159	0.0168	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0668	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0034	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4125	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.8112	N/A	N/A	49.5282	0.9553	0.9777	217.32	
Xylenes (mixed isomers)						0.1162	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Jun	68.98	63.35	74.61	64.33	9.2015	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.4904	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1474	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4054	N/A	N/A	86.1700	0.0159	0.0170	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0710	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0037	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4341	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.0766	N/A	N/A	49.5198	0.9553	0.9773	217.32	
Xylenes (mixed isomers)						0.1231	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Jul	71.26	65.04	77.47	64.33	9.5365	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.5831	N/A	N/A	78.1100	0.0047	0.0032	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1589	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5456	N/A	N/A	86.1700	0.0159	0.0174	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0771	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0040	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4645	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.4402	N/A	N/A	49.5084	0.9553	0.9768	217.32	

Xylenes (mixed isomers)						0.1329	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Aug	71.60	65.63	77.58	64.33	9.5879	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.5975	N/A	N/A	78.1100	0.0047	0.0032	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1608	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5674	N/A	N/A	86.1700	0.0159	0.0175	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0780	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0041	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4693	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.4960	N/A	N/A	49.5066	0.9553	0.9767	217.32	
Xylenes (mixed isomers)						0.1344	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Sep	70.17	64.65	75.68	64.33	9.3748	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.5381	N/A	N/A	78.1100	0.0047	0.0032	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP70 = .000000003 VP80 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP70 = .0000000016 VP80 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP70 = .000000000000406 VP80 = .000000000000406
Ethylbenzene						0.1533	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4776	N/A	N/A	86.1700	0.0159	0.0172	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0741	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0039	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4497	N/A	N/A	92.1300	0.0085	0.0017	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.2647	N/A	N/A	49.5139	0.9553	0.9771	217.32	
Xylenes (mixed isomers)						0.1281	N/A	N/A	106.1700	0.0118	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Oct	67.76	62.48	73.04	64.33	9.0264	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.4428	N/A	N/A	78.1100	0.0047	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1415	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3332	N/A	N/A	86.1700	0.0159	0.0169	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0680	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0035	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.4186	N/A	N/A	92.1300	0.0085	0.0016	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.8864	N/A	N/A	49.5258	0.9553	0.9776	217.32	
Xylenes (mixed isomers)						0.1181	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Nov	64.31	59.22	69.40	64.33	8.5433	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.3145	N/A	N/A	78.1100	0.0047	0.0030	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1259	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1380	N/A	N/A	86.1700	0.0159	0.0163	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0600	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0030	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3770	N/A	N/A	92.1300	0.0085	0.0015	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.3616	N/A	N/A	49.5427	0.9553	0.9784	217.32	

Xylenes (mixed isomers)						0.1050	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO Light Crude Oil (RVP 10.5 psia)	Dec	61.76	56.83	66.70	64.33	8.2004	N/A	N/A	50.0000			205.00	Option 4: RVP=10.5
Benzene						1.2262	N/A	N/A	78.1100	0.0047	0.0029	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Benzo(a)anthracene						0.0000	N/A	N/A	228.3000	0.0000	0.0000	228.30	Option 1: VP60 = .000000003 VP70 = .000000003
Benzo(a)pyrene						0.0000	N/A	N/A	252.3100	0.0000	0.0000	252.31	Option 2: A=9.3, B=3700, C=270
Benzo(b)fluoranthene						0.0000	N/A	N/A	252.3000	0.0000	0.0000	252.30	Option 1: VP60 = .0000000016 VP70 = .0000000016
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Dibenzo(a,h)anthracene						0.0000	N/A	N/A	278.3000	0.0000	0.0000	278.30	Option 1: VP60 = .000000000000406 VP70 = .000000000000406
Ethylbenzene						0.1154	N/A	N/A	106.1700	0.0028	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0030	N/A	N/A	86.1700	0.0159	0.0159	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0546	N/A	N/A	120.2000	0.0004	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0027	N/A	N/A	128.2000	0.0006	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Toluene						0.3487	N/A	N/A	92.1300	0.0085	0.0015	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						8.9888	N/A	N/A	49.5549	0.9553	0.9790	217.32	
Xylenes (mixed isomers)						0.0961	N/A	N/A	106.1700	0.0118	0.0006	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Wilmington 80079 - Internal Floating Roof Tank
Wilmington, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	23.5518	24.1265	24.7295	25.9407	26.9879	28.1887	29.9127	30.1861	29.0688	27.3236	25.0545	23.5381
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Value of Vapor Pressure Function:	0.2013	0.2062	0.2114	0.2217	0.2307	0.2409	0.2557	0.2580	0.2485	0.2335	0.2141	0.2012
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	8.2036	8.3354	8.4712	8.7362	8.9571	9.2015	9.5365	9.5879	9.3748	9.0264	8.5433	8.2004
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Withdrawal Losses (lb):	276.8799	276.8799	276.8799	276.8799	276.8799	276.8799	276.8799	276.8799	276.8799	276.8799	276.8799	276.8799
Number of Columns:	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
Effective Column Diameter (ft):	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000	1.1000
Net Throughput (gal/mo.):	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000	31,500,000.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
Average Organic Liquid Density (lb/gal):	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Deck Fitting Losses (lb):	119.9061	122.8318	125.9019	132.0684	137.4000	143.5132	152.2908	153.6827	147.9943	139.1091	127.5569	119.8364
Value of Vapor Pressure Function:	0.2013	0.2062	0.2114	0.2217	0.2307	0.2409	0.2557	0.2580	0.2485	0.2335	0.2141	0.2012
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	357.4000	357.4000	357.4000	357.4000	357.4000	357.4000	357.4000	357.4000	357.4000	357.4000	357.4000	357.4000
Deck Seam Losses (lb):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length (ft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Total Losses (lb):	420.3378	423.8382	427.5113	434.8890	441.2679	448.5817	459.0835	460.7487	453.9430	443.3127	429.4914	420.2544

Roof Fitting/Status	Quantity	KFa(lb-mole/yr)	Roof Fitting Loss Factors KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	7.2657
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Gask.	8	33.00	0.00	0.00	1,198.8332
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1	56.00	0.00	0.00	254.2980
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Float, Wiper	1	21.00	7.90	1.80	95.3617
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	28.1544
Unslotted Guide-Pole Well/Gasketed Sliding Cover, w. Sleeve	1	8.60	12.00	0.81	39.0529

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

Wilmington 80079 - Internal Floating Roof Tank
Wilmington, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
TSO Light Crude Oil (RVP 10.5 psia)	318.61	3,322.56	1,622.09	0.00	5,263.26
Benzene	0.97	15.68	4.96	0.00	21.62
Benzo(a)anthracene	0.00	0.05	0.00	0.00	0.05
Benzo(a)pyrene	0.00	0.02	0.00	0.00	0.02
Benzo(b)fluoranthene	0.00	0.11	0.00	0.00	0.11
Chrysene	0.00	0.10	0.00	0.00	0.10
Dibenzo(a,h)anthracene	0.00	0.01	0.00	0.00	0.01
Ethylbenzene	0.06	9.14	0.28	0.00	9.47
Hexane (-n)	5.32	52.83	27.08	0.00	85.22
Isopropyl benzene	0.00	1.45	0.02	0.00	1.48
Naphthalene	0.00	1.83	0.00	0.00	1.83
Toluene	0.51	28.18	2.58	0.00	31.26
Unidentified Components	311.55	3,173.96	1,586.16	0.00	5,071.67
Xylenes (mixed isomers)	0.20	39.21	1.01	0.00	40.41

TANKS 4.0.9d
Emissions Report - Detail Format
Total Emissions Summaries - All Tanks in Report

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

Tank Identification				Losses (lbs)
Wilmington 300035/36	Tesoro	Internal Floating Roof Tank	Long Beach, California	10,847.35
Wilmington 80038	Tesoro	Vertical Fixed Roof Tank	Wilmington, California	1,620,000.00
Wilmington 80060 (Convert to IFR)	Tesoro	Internal Floating Roof Tank	Wilmington, California	7,168.18
Wilmington 80067 (Convert to IFR)	Tesoro	Internal Floating Roof Tank	Wilmington, California	5,627.52
Wilmington 80079	Tesoro	Internal Floating Roof Tank	Wilmington, California	5,263.26
Total Emissions for all Tanks:				1,648,906.31

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification		
User Identification:	I&C 80044	
City:	Wilmington	
State:	California	
Company:	Tesoro	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	D592	
Tank Dimensions		
Shell Height (ft):		41.67
Diameter (ft):		117.00
Liquid Height (ft) :		40.00
Avg. Liquid Height (ft):		21.00
Volume (gallons):		3,351,338.55
Turnovers:		75.34
Net Throughput(gal/yr):		252,486,803.73
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	White/White	
Shell Condition	Good	
Roof Color/Shade:	White/White	
Roof Condition:	Good	
Roof Characteristics		
Type:	Cone	
Height (ft)		1.22
Slope (ft/ft) (Cone Roof)		0.02
Breather Vent Settings		
Vacuum Settings (psig):		-0.03
Pressure Settings (psig)		0.03

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

I&C 80044 - Vertical Fixed Roof Tank
Wilmington, California

		Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp	Vapor Pressure (psia)			Vapor Mol.	Liquid Mass	Vapor Mass	Mol.	Basis for Vapor Pressure
Mixture/Component	Month	Avg.	Min.	Max.	(deg F)	Avg.	Min.	Max.	Weight.	Fract.	Fract.	Weight	Calculations
TSO TK 80044 GASOLINE	Jan	61.79	56.79	66.79	64.33	5.3300	5.3300	5.3300	68.0000			92.00	Option 1: VP60 = 5.33 VP70 = 5.33
1,2,4-Trimethylbenzene						0.0219	0.0179	0.0267	120.1900	0.0314	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2270	1.0677	1.4055	78.1100	0.0080	0.0025	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.2713	1.1099	1.4517	84.1600	0.0159	0.0051	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1155	0.0970	0.1369	106.1700	0.0138	0.0004	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0042	1.7591	2.2767	86.1700	0.0313	0.0159	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	157.4770	157.4770	42.0800	0.0001	0.0023	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.3490	0.2985	0.4065	92.1300	0.0694	0.0062	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8323	6.7983	6.8063	67.5884	0.7414	0.9653	90.03	
Xylenes (mixed isomers)						0.0962	0.0807	0.1143	106.1700	0.0873	0.0021	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO TK 80044 GASOLINE	Feb	62.78	57.67	67.88	64.33	5.3300	5.3300	5.3300	68.0000			92.00	Option 1: VP60 = 5.33 VP70 = 5.33
1,2,4-Trimethylbenzene						0.0228	0.0186	0.0279	120.1900	0.0314	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2607	1.0943	1.4475	78.1100	0.0080	0.0026	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.3054	1.1369	1.4941	84.1600	0.0159	0.0053	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1195	0.1000	0.1421	106.1700	0.0138	0.0004	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0558	1.8002	2.3404	86.1700	0.0313	0.0163	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	157.4770	157.4770	42.0800	0.0001	0.0023	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.3597	0.3069	0.4201	92.1300	0.0694	0.0063	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8274	6.7919	6.8002	67.5737	0.7414	0.9644	90.03	
Xylenes (mixed isomers)						0.0996	0.0832	0.1186	106.1700	0.0873	0.0022	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO TK 80044 GASOLINE	Mar	63.78	58.57	68.99	64.33	5.3300	5.3300	5.3300	68.0000			92.00	Option 1: VP60 = 5.33 VP70 = 5.33
1,2,4-Trimethylbenzene						0.0237	0.0193	0.0291	120.1900	0.0314	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2957	1.1224	1.4907	78.1100	0.0080	0.0026	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.3408	1.1654	1.5376	84.1600	0.0159	0.0054	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1236	0.1033	0.1474	106.1700	0.0138	0.0004	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1093	1.8435	2.4059	86.1700	0.0313	0.0168	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	157.4770	157.4770	42.0800	0.0001	0.0023	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.3710	0.3157	0.4342	92.1300	0.0694	0.0065	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8223	6.7854	6.7939	67.5583	0.7414	0.9635	90.03	
Xylenes (mixed isomers)						0.1031	0.0859	0.1231	106.1700	0.0873	0.0023	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO TK 80044 GASOLINE	Apr	65.70	59.89	71.51	64.33	5.3300	5.3300	5.3300	68.0000			92.00	Option 1: VP60 = 5.33 VP70 = 5.33
1,2,4-Trimethylbenzene						0.0256	0.0203	0.0320	120.1900	0.0314	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3652	1.1645	1.5937	78.1100	0.0080	0.0028	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.4110	1.2080	1.6413	84.1600	0.0159	0.0057	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1320	0.1081	0.1603	106.1700	0.0138	0.0005	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.2152	1.9082	2.5617	86.1700	0.0313	0.0176	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	157.4770	157.4770	42.0800	0.0001	0.0023	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.3934	0.3291	0.4680	92.1300	0.0694	0.0069	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8122	6.7699	6.7789	67.5277	0.7414	0.9616	90.03	
Xylenes (mixed isomers)						0.1101	0.0900	0.1340	106.1700	0.0873	0.0024	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TSO TK 80044 GASOLINE	May	67.27	61.79	72.76	64.33	5.3300	5.3300	5.3300	68.0000			92.00	Option 1: VP60 = 5.33 VP70 = 5.33
1,2,4-Trimethylbenzene						0.0272	0.0219	0.0335	120.1900	0.0314	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4241	1.2270	1.6467	78.1100	0.0080	0.0029	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.4704	1.2713	1.6947	84.1600	0.0159	0.0059	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1392	0.1155	0.1670	106.1700	0.0138	0.0005	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3049	2.0041	2.6416	86.1700	0.0313	0.0183	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	157.4770	157.4770	42.0800	0.0001	0.0023	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.4125	0.3490	0.4856	92.1300	0.0694	0.0073	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8036	6.7616	6.7712	67.5015	0.7414	0.9600	90.03	
Xylenes (mixed isomers)						0.1162	0.0962	0.1397	106.1700	0.0873	0.0026	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO TK 80044 GASOLINE	Jun	68.98	63.35	74.61	64.33	5.3300	5.3300	5.3300	68.0000			92.00	Option 1: VP60 = 5.33 VP70 = 5.33
1,2,4-Trimethylbenzene						0.0291	0.0233	0.0359	120.1900	0.0314	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4904	1.2806	1.7278	78.1100	0.0080	0.0030	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.5373	1.3255	1.7761	84.1600	0.0159	0.0062	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1474	0.1218	0.1774	106.1700	0.0138	0.0005	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4054	2.0862	2.7635	86.1700	0.0313	0.0191	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	157.4770	157.4770	42.0800	0.0001	0.0023	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.4341	0.3661	0.5125	92.1300	0.0694	0.0077	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.7940	6.7492	6.7594	67.4720	0.7414	0.9583	90.03	
Xylenes (mixed isomers)						0.1231	0.1016	0.1484	106.1700	0.0873	0.0027	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO TK 80044 GASOLINE	Jul	71.26	65.04	77.47	64.33	5.3300	5.3300	5.3300	68.0000			92.00	Option 1: VP70 = 5.33 VP80 = 5.33
1,2,4-Trimethylbenzene						0.0317	0.0249	0.0400	120.1900	0.0314	0.0003	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5831	1.3410	1.8601	78.1100	0.0080	0.0032	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.6306	1.3866	1.9090	84.1600	0.0159	0.0066	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1589	0.1291	0.1945	106.1700	0.0138	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5456	2.1785	2.9618	86.1700	0.0313	0.0202	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0014	0.0000	128.17	Option 1: VP70 = .009175 VP80 = .009175
Propylene						157.4770	157.4770	157.4770	42.0800	0.0001	0.0023	42.08	Option 1: VP70 = 157.477 VP80 = 157.477
Toluene						0.4645	0.3856	0.5567	92.1300	0.0694	0.0082	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.7805	6.7293	6.7400	67.4305	0.7414	0.9558	90.03	
Xylenes (mixed isomers)						0.1329	0.1077	0.1630	106.1700	0.0873	0.0029	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO TK 80044 GASOLINE	Aug	71.60	65.63	77.58	64.33	5.3300	5.3300	5.3300	68.0000			92.00	Option 1: VP70 = 5.33 VP80 = 5.33
1,2,4-Trimethylbenzene						0.0321	0.0255	0.0401	120.1900	0.0314	0.0003	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5975	1.3624	1.8652	78.1100	0.0080	0.0032	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.6451	1.4081	1.9140	84.1600	0.0159	0.0066	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1608	0.1317	0.1952	106.1700	0.0138	0.0006	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5674	2.2110	2.9694	86.1700	0.0313	0.0204	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0014	0.0000	128.17	Option 1: VP70 = .009175 VP80 = .009175
Propylene						157.4770	157.4770	157.4770	42.0800	0.0001	0.0023	42.08	Option 1: VP70 = 157.477 VP80 = 157.477
Toluene						0.4693	0.3925	0.5584	92.1300	0.0694	0.0083	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.7784	6.7283	6.7393	67.4240	0.7414	0.9554	90.03	
Xylenes (mixed isomers)						0.1344	0.1099	0.1635	106.1700	0.0873	0.0030	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO TK 80044 GASOLINE	Sep	70.17	64.65	75.68	64.33	5.3300	5.3300	5.3300	68.0000			92.00	Option 1: VP70 = 5.33 VP80 = 5.33
1,2,4-Trimethylbenzene						0.0304	0.0246	0.0374	120.1900	0.0314	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5381	1.3267	1.7765	78.1100	0.0080	0.0031	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.5853	1.3721	1.8251	84.1600	0.0159	0.0064	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1533	0.1274	0.1836	106.1700	0.0138	0.0005	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4776	2.1566	2.8367	86.1700	0.0313	0.0197	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0014	0.0000	128.17	Option 1: VP70 = .009175 VP80 = .009175
Propylene						157.4770	157.4770	157.4770	42.0800	0.0001	0.0023	42.08	Option 1: VP70 = 157.477 VP80 = 157.477
Toluene						0.4497	0.3810	0.5287	92.1300	0.0694	0.0079	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.7870	6.7416	6.7522	67.4507	0.7414	0.9570	90.03	
Xylenes (mixed isomers)						0.1281	0.1062	0.1537	106.1700	0.0873	0.0028	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO TK 80044 GASOLINE	Oct	67.76	62.48	73.04	64.33	5.3300	5.3300	5.3300	68.0000			92.00	Option 1: VP60 = 5.33 VP70 = 5.33
1,2,4-Trimethylbenzene						0.0277	0.0226	0.0339	120.1900	0.0314	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4428	1.2506	1.6588	78.1100	0.0080	0.0029	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.4893	1.2952	1.7068	84.1600	0.0159	0.0060	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1415	0.1183	0.1685	106.1700	0.0138	0.0005	106.17	Option 2: A=6.975, B=1424.255, C=213.21

Hexane (-n)						2.3332	2.0403	2.6598	86.1700	0.0313	0.0185	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	157.4770	157.4770	42.0800	0.0001	0.0023	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.4186	0.3565	0.4895	92.1300	0.0694	0.0074	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8009	6.7596	6.7694	67.4932	0.7414	0.9595	90.03	
Xylenes (mixed isomers)						0.1181	0.0986	0.1410	106.1700	0.0873	0.0026	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO TK 80044 GASOLINE	Nov	64.31	59.22	69.40	64.33	5.3300	5.3300	5.3300	68.0000			92.00	Option 1: VP60 = 5.33 VP70 = 5.33
1,2,4-Trimethylbenzene						0.0242	0.0198	0.0295	120.1900	0.0314	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3145	1.1428	1.5070	78.1100	0.0080	0.0027	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.3598	1.1860	1.5540	84.1600	0.0159	0.0055	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1259	0.1056	0.1494	106.1700	0.0138	0.0004	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1380	1.8749	2.4306	86.1700	0.0313	0.0170	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	157.4770	157.4770	42.0800	0.0001	0.0023	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.3770	0.3222	0.4396	92.1300	0.0694	0.0066	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8196	6.7828	6.7916	67.5500	0.7414	0.9630	90.03	
Xylenes (mixed isomers)						0.1050	0.0879	0.1248	106.1700	0.0873	0.0023	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO TK 80044 GASOLINE	Dec	61.76	56.83	66.70	64.33	5.3300	5.3300	5.3300	68.0000			92.00	Option 1: VP60 = 5.33 VP70 = 5.33
1,2,4-Trimethylbenzene						0.0219	0.0180	0.0266	120.1900	0.0314	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2262	1.0688	1.4023	78.1100	0.0080	0.0025	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.2705	1.1110	1.4485	84.1600	0.0159	0.0051	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1154	0.0971	0.1365	106.1700	0.0138	0.0004	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0030	1.7608	2.2718	86.1700	0.0313	0.0159	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	157.4770	157.4770	42.0800	0.0001	0.0023	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.3487	0.2989	0.4054	92.1300	0.0694	0.0061	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8324	6.7987	6.8068	67.5888	0.7414	0.9653	90.03	
Xylenes (mixed isomers)						0.0961	0.0808	0.1140	106.1700	0.0873	0.0021	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

I&C 80044 - Vertical Fixed Roof Tank
Wilmington, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	2,089.2452	1,929.4494	2,175.8644	2,377.2623	2,282.3122	2,260.3371	2,597.2582	2,478.1248	2,196.9006	2,175.9095	2,044.2226	2,058.5048
Vapor Space Volume (cu ft):	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919
Vapor Density (lb/cu ft):	0.0648	0.0646	0.0645	0.0643	0.0641	0.0639	0.0636	0.0636	0.0637	0.0640	0.0645	0.0648
Vapor Space Expansion Factor:	0.0319	0.0327	0.0334	0.0378	0.0352	0.0362	0.0404	0.0386	0.0353	0.0336	0.0324	0.0315
Vented Vapor Saturation Factor:	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919	226,601.8919
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Vapor Space Outage (ft):	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767
Tank Shell Height (ft):	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700	41.6700
Average Liquid Height (ft):	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000
Roof Outage (ft):	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067
Roof Outage (Cone Roof)												
Roof Outage (ft):	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067
Roof Height (ft):	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200
Roof Slope (ft/ft):	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200
Shell Radius (ft):	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000
Vapor Density												
Vapor Density (lb/cu ft):	0.0648	0.0646	0.0645	0.0643	0.0641	0.0639	0.0636	0.0636	0.0637	0.0640	0.0645	0.0648
Vapor Molecular Weight (lb/lb-mole):	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300
Daily Avg. Liquid Surface Temp. (deg. R):	521.4588	522.4458	523.4497	525.3739	526.9448	528.6485	530.9285	531.2732	529.8359	527.4313	523.9780	521.4349
Daily Average Ambient Temp. (deg. F):	55.8500	57.3000	58.5000	61.6500	64.8000	68.4000	73.0500	74.4000	72.4000	68.1000	61.2500	56.0000
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R):	523.9983	523.9983	523.9983	523.9983	523.9983	523.9983	523.9983	523.9983	523.9983	523.9983	523.9983	523.9983
Tank Paint Solar Absorptance (Shell):	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	886.7697	1,146.6138	1,501.0044	1,901.7164	2,039.4116	2,128.5644	2,302.7457	2,117.1427	1,702.1536	1,320.4777	993.3724	819.8257
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.0319	0.0327	0.0334	0.0378	0.0352	0.0362	0.0404	0.0386	0.0353	0.0336	0.0324	0.0315
Daily Vapor Temperature Range (deg. R):	19.9890	20.4339	20.8248	23.2362	21.9476	22.5160	24.8571	23.9016	22.0703	21.1175	20.3525	19.7424
Daily Vapor Pressure Range (psia):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Breather Vent Press. Setting Range(psia):	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300
Daily Avg. Liquid Surface Temp. (deg R):	521.4588	522.4458	523.4497	525.3739	526.9448	528.6485	530.9285	531.2732	529.8359	527.4313	523.9780	521.4349
Daily Min. Liquid Surface Temp. (deg R):	516.4615	517.3373	518.2435	519.5648	521.4579	523.0195	524.7142	525.2978	524.3183	522.1519	518.8899	516.4993
Daily Max. Liquid Surface Temp. (deg R):	526.4561	527.5542	528.6559	531.1829	532.4317	534.2775	537.1427	537.2486	535.3534	532.7106	529.0661	526.3705
Daily Ambient Temp. Range (deg. R):	21.9000	20.8000	19.0000	19.7000	17.0000	17.2000	19.3000	19.2000	19.4000	20.6000	21.7000	22.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438	0.1438
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300
Vapor Space Outage (ft):	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767	21.0767

Working Losses (lb):	102,562.8186	102,562.8186	102,562.8186	102,562.8186	102,562.8186	102,562.8186	102,562.8186	102,562.8186	102,562.8186	102,562.8186	102,562.8186	102,562.8186
Vapor Molecular Weight (lb/lb-mole):	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000	68.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300	5.3300
Net Throughput (gal/mo.):	21,040,566.9700	21,040,566.9700	21,040,566.9700	21,040,566.9700	21,040,566.9700	21,040,566.9700	21,040,566.9700	21,040,566.9700	21,040,566.9700	21,040,566.9700	21,040,566.9700	21,040,566.9700
Annual Turnovers:	75.3391	75.3391	75.3391	75.3391	75.3391	75.3391	75.3391	75.3391	75.3391	75.3391	75.3391	75.3391
Turnover Factor:	0.5649	0.5649	0.5649	0.5649	0.5649	0.5649	0.5649	0.5649	0.5649	0.5649	0.5649	0.5649
Maximum Liquid Volume (gal):	3,351,338.5454	3,351,338.5454	3,351,338.5454	3,351,338.5454	3,351,338.5454	3,351,338.5454	3,351,338.5454	3,351,338.5454	3,351,338.5454	3,351,338.5454	3,351,338.5454	3,351,338.5454
Maximum Liquid Height (ft):	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Working Loss Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	104,652.0638	104,492.2679	104,738.6830	104,940.0808	104,845.1308	104,823.1557	105,160.0767	105,040.9433	104,759.7192	104,738.7281	104,607.0411	104,621.3234

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

I&C 80044 - Vertical Fixed Roof Tank
Wilmington, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
TSO TK 80044 GASOLINE	1,230,753.82	26,665.39	1,257,419.21
1,2,4-Trimethylbenzene	260.51	5.69	266.20
Benzene	3,487.79	76.02	3,563.82
Cyclohexane	7,176.43	156.40	7,332.83
Ethylbenzene	584.63	12.76	597.39
Hexane (-n)	22,138.17	482.37	22,620.53
Naphthalene	4.05	0.09	4.13
Propylene	2,774.72	60.12	2,834.84
Toluene	8,764.08	191.17	8,955.26
Unidentified Components	1,182,465.83	25,613.14	1,208,078.96
Xylenes (mixed isomers)	3,097.62	67.63	3,165.25

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification		
User Identification:	I&C 80074	
City:	Wilmington	
State:	California	
Company:	Tesoro	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	D616	
Tank Dimensions		
Shell Height (ft):		41.75
Diameter (ft):		117.00
Liquid Height (ft) :		40.00
Avg. Liquid Height (ft):		21.00
Volume (gallons):		3,357,772.60
Turnovers:		97.56
Net Throughput(gal/yr):		327,600,000.00
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Cone	
Height (ft)		1.22
Slope (ft/ft) (Cone Roof)		0.02
Breather Vent Settings		
Vacuum Settings (psig):		-0.03
Pressure Settings (psig)		0.03

Meterological Data used in Emissions Calculations: Long Beach, California (TSO 80) (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

I&C 80074 - Vertical Fixed Roof Tank
Wilmington, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TSO DIESEL	Jan	147.08	138.91	155.24	147.39	0.0090	0.0090	0.0090	130.0000			188.00	
1,2,4-Trimethylbenzene						0.3602	0.2876	0.4478	120.1900	0.0006	0.0365	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Biphenyl						0.0007	0.0007	0.0007	154.2100	0.0026	0.0003	154.21	
Ethylbenzene						1.3252	1.0884	1.6033	106.1700	0.0002	0.0319	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.7466	0.6051	0.9149	120.2000	0.0001	0.0168	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0011	0.0015	128.17	
Toluene						3.1284	2.6192	3.7159	92.1300	0.0003	0.1609	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0051	0.0034	0.0043	152.8405	0.9946	0.6591	188.44	
Xylenes (mixed isomers)						1.1351	0.9300	1.3768	106.1700	0.0005	0.0930	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO DIESEL	Feb	149.11	139.91	158.31	147.39	0.0090	0.0090	0.0090	130.0000			188.00	
1,2,4-Trimethylbenzene						0.3805	0.2958	0.4851	120.1900	0.0006	0.0385	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Biphenyl						0.0007	0.0007	0.0007	154.2100	0.0026	0.0003	154.21	
Ethylbenzene						1.3904	1.1152	1.7198	106.1700	0.0002	0.0335	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.7859	0.6211	0.9859	120.2000	0.0001	0.0177	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0011	0.0015	128.17	
Toluene						3.2672	2.6773	3.9590	92.1300	0.0003	0.1680	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0049	0.0031	0.0039	154.8227	0.9946	0.6428	188.44	
Xylenes (mixed isomers)						1.1918	0.9532	1.4781	106.1700	0.0005	0.0977	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO DIESEL	Mar	151.54	140.98	162.11	147.39	0.0090	0.0090	0.0090	130.0000			188.00	
1,2,4-Trimethylbenzene						0.4061	0.3047	0.5348	120.1900	0.0006	0.0411	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Biphenyl						0.0007	0.0007	0.0007	154.2100	0.0026	0.0003	154.21	
Ethylbenzene						1.4719	1.1446	1.8732	106.1700	0.0002	0.0355	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.8351	0.6386	1.0799	120.2000	0.0001	0.0188	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0011	0.0015	128.17	
Toluene						3.4396	2.7410	4.2769	92.1300	0.0003	0.1769	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0047	0.0026	0.0035	157.5187	0.9946	0.6225	188.44	
Xylenes (mixed isomers)						1.2625	0.9787	1.6118	106.1700	0.0005	0.1035	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO DIESEL	Apr	155.08	142.48	167.68	147.39	0.0090	0.0090	0.0090	130.0000			188.00	
1,2,4-Trimethylbenzene						0.4459	0.3177	0.6156	120.1900	0.0006	0.0451	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Biphenyl						0.0007	0.0007	0.0007	154.2100	0.0026	0.0003	154.21	
Ethylbenzene						1.5975	1.1872	2.1189	106.1700	0.0002	0.0385	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.9113	0.6639	1.2315	120.2000	0.0001	0.0205	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0011	0.0015	128.17	
Toluene						3.7036	2.8328	4.7810	92.1300	0.0003	0.1904	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0043	0.0019	0.0028	162.2424	0.9946	0.5912	188.44	
Xylenes (mixed isomers)						1.3717	1.0155	1.8261	106.1700	0.0005	0.1124	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO DIESEL	May	157.21	144.44	169.97	147.39	0.0090	0.0090	0.0090	130.0000			188.00	
1,2,4-Trimethylbenzene						0.4714	0.3352	0.6517	120.1900	0.0006	0.0477	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Biphenyl						0.0007	0.0007	0.0007	154.2100	0.0026	0.0003	154.21	
Ethylbenzene						1.6771	1.2444	2.2275	106.1700	0.0002	0.0404	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.9598	0.6982	1.2988	120.2000	0.0001	0.0216	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0011	0.0015	128.17	
Toluene						3.8701	2.9557	5.0022	92.1300	0.0003	0.1990	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0041	0.0015	0.0025	165.6660	0.9946	0.5714	188.44	

Xylenes (mixed isomers)						1.4410	1.0651	1.9210	106.1700	0.0005	0.1181	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO DIESEL	Jun	159.27	146.04	172.50	147.39	0.0090	0.0090	0.0090	130.0000			188.00	
1,2,4-Trimethylbenzene						0.4973	0.3502	0.6935	120.1900	0.0006	0.0503	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Biphenyl						0.0007	0.0007	0.0007	154.2100	0.0026	0.0003	154.21	
Ethylbenzene						1.7575	1.2930	2.3521	106.1700	0.0002	0.0424	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						1.0090	0.7273	1.3764	120.2000	0.0001	0.0227	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0011	0.0015	128.17	
Toluene						4.0373	3.0597	5.2548	92.1300	0.0003	0.2076	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0038	0.0011	0.0021	169.5321	0.9946	0.5514	188.44	
Xylenes (mixed isomers)						1.5109	1.1072	2.0300	106.1700	0.0005	0.1238	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO DIESEL	Jul	162.25	147.81	176.68	147.39	0.0090	0.0090	0.0090	130.0000			188.00	
1,2,4-Trimethylbenzene						0.5368	0.3675	0.7678	120.1900	0.0006	0.0543	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Biphenyl						0.0007	0.0007	0.0007	154.2100	0.0026	0.0003	154.21	
Ethylbenzene						1.8793	1.3486	2.5717	106.1700	0.0002	0.0453	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						1.0837	0.7607	1.5136	120.2000	0.0001	0.0244	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0011	0.0015	128.17	
Toluene						4.2894	3.1783	5.6968	92.1300	0.0003	0.2206	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0035	0.0004	0.0015	176.3567	0.9946	0.5211	188.44	
Xylenes (mixed isomers)						1.6171	1.1555	2.2222	106.1700	0.0005	0.1325	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO DIESEL	Aug	161.85	148.31	175.38	147.39	0.0090	0.0090	0.0090	130.0000			188.00	
1,2,4-Trimethylbenzene						0.5313	0.3725	0.7440	120.1900	0.0006	0.0538	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Biphenyl						0.0007	0.0007	0.0007	154.2100	0.0026	0.0003	154.21	
Ethylbenzene						1.8624	1.3646	2.5016	106.1700	0.0002	0.0449	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						1.0733	0.7703	1.4697	120.2000	0.0001	0.0241	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0011	0.0015	128.17	
Toluene						4.2546	3.2123	5.5561	92.1300	0.0003	0.2188	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0035	0.0006	0.0017	175.3320	0.9946	0.5253	188.44	
Xylenes (mixed isomers)						1.6024	1.1693	2.1608	106.1700	0.0005	0.1313	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO DIESEL	Sep	158.74	147.14	170.33	147.39	0.0090	0.0090	0.0090	130.0000			188.00	
1,2,4-Trimethylbenzene						0.4905	0.3609	0.6575	120.1900	0.0006	0.0497	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Biphenyl						0.0007	0.0007	0.0007	154.2100	0.0026	0.0003	154.21	
Ethylbenzene						1.7365	1.3273	2.2449	106.1700	0.0002	0.0419	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.9961	0.7479	1.3096	120.2000	0.0001	0.0224	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0011	0.0015	128.17	
Toluene						3.9937	3.1330	5.0375	92.1300	0.0003	0.2054	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0039	0.0014	0.0024	168.4794	0.9946	0.5566	188.44	
Xylenes (mixed isomers)						1.4927	1.1370	1.9362	106.1700	0.0005	0.1223	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO DIESEL	Oct	154.80	144.80	164.79	147.39	0.0090	0.0090	0.0090	130.0000			188.00	
1,2,4-Trimethylbenzene						0.4426	0.3386	0.5725	120.1900	0.0006	0.0448	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Biphenyl						0.0007	0.0007	0.0007	154.2100	0.0026	0.0003	154.21	
Ethylbenzene						1.5871	1.2553	1.9884	106.1700	0.0002	0.0383	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.9050	0.7047	1.1508	120.2000	0.0001	0.0204	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0011	0.0015	128.17	
Toluene						3.6818	2.9791	4.5140	92.1300	0.0003	0.1893	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0043	0.0022	0.0032	161.8212	0.9946	0.5938	188.44	
Xylenes (mixed isomers)						1.3626	1.0745	1.7122	106.1700	0.0005	0.1117	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO DIESEL	Nov	150.02	141.39	158.66	147.39	0.0090	0.0090	0.0090	130.0000			188.00	
1,2,4-Trimethylbenzene						0.3900	0.3082	0.4895	120.1900	0.0006	0.0395	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Biphenyl						0.0007	0.0007	0.0007	154.2100	0.0026	0.0003	154.21	
Ethylbenzene						1.4206	1.1562	1.7334	106.1700	0.0002	0.0342	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.8041	0.6455	0.9942	120.2000	0.0001	0.0181	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	0.0092	0.0092	128.1700	0.0011	0.0015	128.17	
Toluene						3.3312	2.7660	3.9873	92.1300	0.0003	0.1713	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0048	0.0030	0.0039	155.7918	0.9946	0.6353	188.44	
Xylenes (mixed isomers)						1.2180	0.9887	1.4900	106.1700	0.0005	0.0998	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO DIESEL	Dec	146.78	138.92	154.64	147.39	0.0090	0.0090	0.0090	130.0000			188.00	
1,2,4-Trimethylbenzene						0.3574	0.2877	0.4409	120.1900	0.0006	0.0362	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Biphenyl						0.0007	0.0007	0.0007	154.2100	0.0026	0.0003	154.21	
Ethylbenzene						1.3160	1.0886	1.5816	106.1700	0.0002	0.0317	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopropyl benzene						0.7411	0.6052	0.9016	120.2000	0.0001	0.0167	120.20	Option 2: A=6.963, B=1460.793, C=207.78

Naphthalene	0.0092	0.0092	0.0092	128.1700	0.0011	0.0015	128.17	
Toluene	3.1088	2.6196	3.6703	92.1300	0.0003	0.1599	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components	0.0051	0.0035	0.0043	152.5724	0.9946	0.6614	188.44	
Xylenes (mixed isomers)	1.1272	0.9302	1.3578	106.1700	0.0005	0.0924	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

I&C 80074 - Vertical Fixed Roof Tank
Wilmington, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	62.3855	63.6650	81.0133	93.3244	97.1099	96.8764	108.6255	101.6648	84.4605	75.5240	63.5032	59.9596
Vapor Space Volume (cu ft):	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971
Vapor Density (lb/cu ft):	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Vapor Space Expansion Factor:	0.0497	0.0564	0.0651	0.0779	0.0787	0.0814	0.0888	0.0830	0.0709	0.0610	0.0526	0.0478
Vented Vapor Saturation Factor:	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971	227,461.9971
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Vapor Space Outage (ft):	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567
Tank Shell Height (ft):	41.7500	41.7500	41.7500	41.7500	41.7500	41.7500	41.7500	41.7500	41.7500	41.7500	41.7500	41.7500
Average Liquid Height (ft):	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000	21.0000
Roof Outage (ft):	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067
Roof Outage (Cone Roof)												
Roof Outage (ft):	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067	0.4067
Roof Height (ft):	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200	1.2200
Roof Slope (ft/ft):	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200
Shell Radius (ft):	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000	58.5000
Vapor Density												
Vapor Density (lb/cu ft):	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Vapor Molecular Weight (lb/lb-mole):	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090
Daily Avg. Liquid Surface Temp. (deg. R):	606.7452	608.7791	611.2109	614.7495	616.8752	618.9381	621.9198	621.5168	618.4074	614.4651	609.6939	606.4516
Daily Average Ambient Temp. (deg. F):	135.8500	137.3000	138.5000	141.6500	144.8000	148.4000	153.0500	154.4000	152.4000	148.1000	141.2500	136.0000
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R):	607.0583	607.0583	607.0583	607.0583	607.0583	607.0583	607.0583	607.0583	607.0583	607.0583	607.0583	607.0583
Tank Paint Solar Absorptance (Shell):	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	886.7697	1,146.6138	1,501.0044	1,901.7164	2,039.4116	2,128.5644	2,302.7457	2,117.1427	1,702.1536	1,320.4777	993.3724	819.8257
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.0497	0.0564	0.0651	0.0779	0.0787	0.0814	0.0888	0.0830	0.0709	0.0610	0.0526	0.0478
Daily Vapor Temperature Range (deg. R):	32.6521	36.8075	42.2591	50.3927	51.0704	52.9119	57.7403	54.1344	46.3770	39.9739	34.5378	31.4495
Daily Vapor Pressure Range (psia):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Breather Vent Press. Setting Range(psia):	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090
Daily Avg. Liquid Surface Temp. (deg R):	606.7452	608.7791	611.2109	614.7495	616.8752	618.9381	621.9198	621.5168	618.4074	614.4651	609.6939	606.4516
Daily Min. Liquid Surface Temp. (deg R):	598.5822	599.5772	600.6461	602.1513	604.1076	605.7101	607.4847	607.9832	606.8132	604.4716	601.0594	598.5892
Daily Max. Liquid Surface Temp. (deg R):	614.9082	617.9810	621.7756	627.3477	629.6428	632.1661	636.3549	635.0504	630.0017	624.4585	618.3283	614.3139
Daily Ambient Temp. Range (deg. R):	21.9000	20.8000	19.0000	19.7000	17.0000	17.2000	19.3000	19.2000	19.4000	20.6000	21.7000	22.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090
Vapor Space Outage (ft):	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567	21.1567

Working Losses (lb):	360.5949	360.5949	360.5949	360.5949	360.5949	360.5949	360.5949	360.5949	360.5949	360.5949	360.5949	360.5949
Vapor Molecular Weight (lb/lb-mole):	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090
Net Throughput (gal/mo.):	27,300,000.0000	27,300,000.0000	27,300,000.0000	27,300,000.0000	27,300,000.0000	27,300,000.0000	27,300,000.0000	27,300,000.0000	27,300,000.0000	27,300,000.0000	27,300,000.0000	27,300,000.0000
Annual Turnovers:	97.5647	97.5647	97.5647	97.5647	97.5647	97.5647	97.5647	97.5647	97.5647	97.5647	97.5647	97.5647
Turnover Factor:	0.4742	0.4742	0.4742	0.4742	0.4742	0.4742	0.4742	0.4742	0.4742	0.4742	0.4742	0.4742
Maximum Liquid Volume (gal):	3,357,772.6007	3,357,772.6007	3,357,772.6007	3,357,772.6007	3,357,772.6007	3,357,772.6007	3,357,772.6007	3,357,772.6007	3,357,772.6007	3,357,772.6007	3,357,772.6007	3,357,772.6007
Maximum Liquid Height (ft):	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000	40.0000
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Working Loss Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total Losses (lb):	422.9804	424.2599	441.6082	453.9193	457.7048	457.4713	469.2204	462.2596	445.0554	436.1189	424.0981	420.5545

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

I&C 80074 - Vertical Fixed Roof Tank
Wilmington, California

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
TSO DIESEL	4,327.14	988.11	5,315.25
1,2,4-Trimethylbenzene	193.84	45.41	239.24
Biphenyl	1.20	0.27	1.47
Ethylbenzene	165.32	38.61	203.93
Isopropyl benzene	88.02	20.59	108.61
Naphthalene	6.70	1.53	8.23
Toluene	817.78	190.57	1,008.35
Unidentified Components	2,571.64	578.40	3,150.04
Xylenes (mixed isomers)	482.64	112.74	595.38

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	I&C 80211
City:	Wilmington
State:	California
Company:	Tesoro
Type of Tank:	Domed External Floating Roof Tank
Description:	D650

Tank Dimensions

Diameter (ft):	117.00
Volume (gallons):	3,360,000.00
Turnovers:	30.60

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good

Roof Characteristics

Type:	Double Deck
Fitting Category	Detail

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Roof Drain (3-in. Diameter)/90% Closed	1
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Sock	34
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

I&C 80211 - Domed External Floating Roof Tank
Wilmington, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TSO FCCU NAPHTHA HVY	Jan	61.79	56.79	66.79	64.33	0.9300	N/A	N/A	60.0000			90.00	Option 1: VP60 = .93 VP70 = .93
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0396	0.0014	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2270	N/A	N/A	78.1100	0.0028	0.0054	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.2713	N/A	N/A	84.1600	0.0008	0.0016	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1155	N/A	N/A	106.1700	0.0280	0.0052	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0042	N/A	N/A	86.1700	0.0036	0.0116	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0546	N/A	N/A	120.2000	0.0001	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0008	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.3490	N/A	N/A	92.1300	0.0910	0.0512	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2294	N/A	N/A	57.6008	0.6657	0.8975	84.72	
Xylenes (mixed isomers)						0.0962	N/A	N/A	106.1700	0.1677	0.0260	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA HVY	Feb	62.78	57.67	67.88	64.33	0.9300	N/A	N/A	60.0000			90.00	Option 1: VP60 = .93 VP70 = .93
1,2,4-Trimethylbenzene						0.0228	N/A	N/A	120.1900	0.0396	0.0015	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2607	N/A	N/A	78.1100	0.0028	0.0056	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.3054	N/A	N/A	84.1600	0.0008	0.0016	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1195	N/A	N/A	106.1700	0.0280	0.0054	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0558	N/A	N/A	86.1700	0.0036	0.0119	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0567	N/A	N/A	120.2000	0.0001	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0008	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.3597	N/A	N/A	92.1300	0.0910	0.0528	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2267	N/A	N/A	57.5190	0.6657	0.8943	84.72	
Xylenes (mixed isomers)						0.0996	N/A	N/A	106.1700	0.1677	0.0269	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA HVY	Mar	63.78	58.57	68.99	64.33	0.9300	N/A	N/A	60.0000			90.00	Option 1: VP60 = .93 VP70 = .93
1,2,4-Trimethylbenzene						0.0237	N/A	N/A	120.1900	0.0396	0.0015	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2957	N/A	N/A	78.1100	0.0028	0.0058	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.3408	N/A	N/A	84.1600	0.0008	0.0017	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1236	N/A	N/A	106.1700	0.0280	0.0056	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1093	N/A	N/A	86.1700	0.0036	0.0122	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0588	N/A	N/A	120.2000	0.0001	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0008	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.3710	N/A	N/A	92.1300	0.0910	0.0544	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2239	N/A	N/A	57.4332	0.6657	0.8910	84.72	
Xylenes (mixed isomers)						0.1031	N/A	N/A	106.1700	0.1677	0.0279	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA HVY	Apr	65.70	59.89	71.51	64.33	0.9300	N/A	N/A	60.0000			90.00	Option 1: VP60 = .93 VP70 = .93
1,2,4-Trimethylbenzene						0.0256	N/A	N/A	120.1900	0.0396	0.0016	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3652	N/A	N/A	78.1100	0.0028	0.0061	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.4110	N/A	N/A	84.1600	0.0008	0.0017	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1320	N/A	N/A	106.1700	0.0280	0.0060	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.2152	N/A	N/A	86.1700	0.0036	0.0128	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0631	N/A	N/A	120.2000	0.0001	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0008	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.3934	N/A	N/A	92.1300	0.0910	0.0577	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2184	N/A	N/A	57.2609	0.6657	0.8843	84.72	
Xylenes (mixed isomers)						0.1101	N/A	N/A	106.1700	0.1677	0.0298	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TSO FCCU NAPHTHA HVY	May	67.27	61.79	72.76	64.33	0.9300	N/A	N/A	60.0000			90.00	Option 1: VP60 = .93 VP70 = .93
1,2,4-Trimethylbenzene						0.0272	N/A	N/A	120.1900	0.0396	0.0017	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4241	N/A	N/A	78.1100	0.0028	0.0063	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.4704	N/A	N/A	84.1600	0.0008	0.0018	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1392	N/A	N/A	106.1700	0.0280	0.0063	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3049	N/A	N/A	86.1700	0.0036	0.0133	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0668	N/A	N/A	120.2000	0.0001	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0008	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.4125	N/A	N/A	92.1300	0.0910	0.0605	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2137	N/A	N/A	57.1122	0.6657	0.8785	84.72	
Xylenes (mixed isomers)						0.1162	N/A	N/A	106.1700	0.1677	0.0314	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA HVY	Jun	68.98	63.35	74.61	64.33	0.9300	N/A	N/A	60.0000			90.00	Option 1: VP60 = .93 VP70 = .93
1,2,4-Trimethylbenzene						0.0291	N/A	N/A	120.1900	0.0396	0.0019	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4904	N/A	N/A	78.1100	0.0028	0.0066	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.5373	N/A	N/A	84.1600	0.0008	0.0019	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1474	N/A	N/A	106.1700	0.0280	0.0066	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4054	N/A	N/A	86.1700	0.0036	0.0139	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0710	N/A	N/A	120.2000	0.0001	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0008	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.4341	N/A	N/A	92.1300	0.0910	0.0637	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2083	N/A	N/A	56.9423	0.6657	0.8721	84.72	
Xylenes (mixed isomers)						0.1231	N/A	N/A	106.1700	0.1677	0.0333	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA HVY	Jul	71.26	65.04	77.47	64.33	0.9300	N/A	N/A	60.0000			90.00	Option 1: VP70 = .93 VP80 = .93
1,2,4-Trimethylbenzene						0.0317	N/A	N/A	120.1900	0.0396	0.0020	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5831	N/A	N/A	78.1100	0.0028	0.0070	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.6306	N/A	N/A	84.1600	0.0008	0.0020	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1589	N/A	N/A	106.1700	0.0280	0.0072	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5456	N/A	N/A	86.1700	0.0036	0.0147	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0771	N/A	N/A	120.2000	0.0001	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0008	0.0000	128.17	Option 1: VP70 = .009175 VP80 = .009175
Toluene						0.4645	N/A	N/A	92.1300	0.0910	0.0682	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2008	N/A	N/A	56.7002	0.6657	0.8629	84.72	
Xylenes (mixed isomers)						0.1329	N/A	N/A	106.1700	0.1677	0.0359	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA HVY	Aug	71.60	65.63	77.58	64.33	0.9300	N/A	N/A	60.0000			90.00	Option 1: VP70 = .93 VP80 = .93
1,2,4-Trimethylbenzene						0.0321	N/A	N/A	120.1900	0.0396	0.0021	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5975	N/A	N/A	78.1100	0.0028	0.0071	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.6451	N/A	N/A	84.1600	0.0008	0.0020	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1608	N/A	N/A	106.1700	0.0280	0.0073	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5674	N/A	N/A	86.1700	0.0036	0.0149	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0780	N/A	N/A	120.2000	0.0001	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0008	0.0000	128.17	Option 1: VP70 = .009175 VP80 = .009175
Toluene						0.4693	N/A	N/A	92.1300	0.0910	0.0689	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.1996	N/A	N/A	56.6621	0.6657	0.8615	84.72	
Xylenes (mixed isomers)						0.1344	N/A	N/A	106.1700	0.1677	0.0363	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA HVY	Sep	70.17	64.65	75.68	64.33	0.9300	N/A	N/A	60.0000			90.00	Option 1: VP70 = .93 VP80 = .93
1,2,4-Trimethylbenzene						0.0304	N/A	N/A	120.1900	0.0396	0.0019	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5381	N/A	N/A	78.1100	0.0028	0.0068	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.5853	N/A	N/A	84.1600	0.0008	0.0020	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1533	N/A	N/A	106.1700	0.0280	0.0069	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4776	N/A	N/A	86.1700	0.0036	0.0143	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0741	N/A	N/A	120.2000	0.0001	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0008	0.0000	128.17	Option 1: VP70 = .009175 VP80 = .009175
Toluene						0.4497	N/A	N/A	92.1300	0.0910	0.0660	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2044	N/A	N/A	56.8184	0.6657	0.8674	84.72	
Xylenes (mixed isomers)						0.1281	N/A	N/A	106.1700	0.1677	0.0346	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA HVY	Oct	67.76	62.48	73.04	64.33	0.9300	N/A	N/A	60.0000			90.00	Option 1: VP60 = .93 VP70 = .93
1,2,4-Trimethylbenzene						0.0277	N/A	N/A	120.1900	0.0396	0.0018	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4428	N/A	N/A	78.1100	0.0028	0.0064	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.4893	N/A	N/A	84.1600	0.0008	0.0018	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1415	N/A	N/A	106.1700	0.0280	0.0064	106.17	Option 2: A=6.975, B=1424.255, C=213.21

Hexane (-n)						2.3332	N/A	N/A	86.1700	0.0036	0.0135	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0680	N/A	N/A	120.2000	0.0001	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0008	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.4186	N/A	N/A	92.1300	0.0910	0.0614	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2122	N/A	N/A	57.0646	0.6657	0.8767	84.72	
Xylenes (mixed isomers)						0.1181	N/A	N/A	106.1700	0.1677	0.0319	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA HVY	Nov	64.31	59.22	69.40	64.33	0.9300	N/A	N/A	60.0000			90.00	Option 1: VP60 = .93 VP70 = .93
1,2,4-Trimethylbenzene						0.0242	N/A	N/A	120.1900	0.0396	0.0015	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3145	N/A	N/A	78.1100	0.0028	0.0058	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.3598	N/A	N/A	84.1600	0.0008	0.0017	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1259	N/A	N/A	106.1700	0.0280	0.0057	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1380	N/A	N/A	86.1700	0.0036	0.0124	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0600	N/A	N/A	120.2000	0.0001	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0008	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.3770	N/A	N/A	92.1300	0.0910	0.0553	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2225	N/A	N/A	57.3869	0.6657	0.8892	84.72	
Xylenes (mixed isomers)						0.1050	N/A	N/A	106.1700	0.1677	0.0284	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA HVY	Dec	61.76	56.83	66.70	64.33	0.9300	N/A	N/A	60.0000			90.00	Option 1: VP60 = .93 VP70 = .93
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0396	0.0014	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2262	N/A	N/A	78.1100	0.0028	0.0054	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.2705	N/A	N/A	84.1600	0.0008	0.0016	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1154	N/A	N/A	106.1700	0.0280	0.0052	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0030	N/A	N/A	86.1700	0.0036	0.0116	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0546	N/A	N/A	120.2000	0.0001	0.0000	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0008	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.3487	N/A	N/A	92.1300	0.0910	0.0512	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2295	N/A	N/A	57.6027	0.6657	0.8976	84.72	
Xylenes (mixed isomers)						0.0961	N/A	N/A	106.1700	0.1677	0.0260	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

I&C 80211 - Domed External Floating Roof Tank
Wilmington, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	5.7332	5.7332	5.7332	5.7332	5.7332	5.7332	5.7332	5.7332	5.7332	5.7332	5.7332	5.7332
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seal-related Wind Speed Exponent:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Value of Vapor Pressure Function:	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Vapor Molecular Weight (lb/lb-mole):	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	13.3163	13.3163	13.3163	13.3163	13.3163	13.3163	13.3163	13.3163	13.3163	13.3163	13.3163	13.3163
Net Throughput (gal/mo.):	8,566,837.0830	8,566,837.0830	8,566,837.0830	8,566,837.0830	8,566,837.0830	8,566,837.0830	8,566,837.0830	8,566,837.0830	8,566,837.0830	8,566,837.0830	8,566,837.0830	8,566,837.0830
Shell Clingage Factor (bbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000
Tank Diameter (ft):	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000	117.0000
Roof Fitting Losses (lb):	3.6131	3.6131	3.6131	3.6131	3.6131	3.6131	3.6131	3.6131	3.6131	3.6131	3.6131	3.6131
Value of Vapor Pressure Function:	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163	0.0163
Vapor Molecular Weight (lb/lb-mole):	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	44.2400	44.2400	44.2400	44.2400	44.2400	44.2400	44.2400	44.2400	44.2400	44.2400	44.2400	44.2400
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Losses (lb):	22.6625	22.6625	22.6625	22.6625	22.6625	22.6625	22.6625	22.6625	22.6625	22.6625	22.6625	22.6625

		Roof Fitting Loss Factors			
Roof Fitting/Status	Quantity	KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	1.5681
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	2.7441
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1	0.47	0.02	0.97	0.4606
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00	0.6958
Roof Drain (3-in. Diameter)/90% Closed	1	1.80	0.14	1.10	1.7641
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Sock	34	0.49	0.16	0.14	16.3274
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	1	14.00	3.70	0.78	13.7205
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	6.0762

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

I&C 80211 - Domed External Floating Roof Tank
Wilmington, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
TSO FCCU NAPHTHA HVY	68.80	159.80	43.36	0.00	271.95
1,2,4-Trimethylbenzene	0.12	6.33	0.07	0.00	6.52
Benzene	0.43	0.44	0.27	0.00	1.14
Cyclohexane	0.12	0.12	0.08	0.00	0.32
Ethylbenzene	0.42	4.47	0.27	0.00	5.16
Hexane (-n)	0.90	0.57	0.57	0.00	2.04
Isopropyl benzene	0.00	0.02	0.00	0.00	0.02
Naphthalene	0.00	0.14	0.00	0.00	0.14
Toluene	4.08	14.54	2.57	0.00	21.18
Unidentified Components	60.62	106.38	38.20	0.00	205.20
Xylenes (mixed isomers)	2.11	26.79	1.33	0.00	30.23

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	I&C 80215
City:	Wilmington
State:	California
Company:	Tesoro
Type of Tank:	Domed External Floating Roof Tank
Description:	D654

Tank Dimensions

Diameter (ft):	120.00
Volume (gallons):	3,360,000.00
Turnovers:	37.94

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good

Roof Characteristics

Type:	Pontoon
Fitting Category	Detail

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Sock	24
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Sock	19
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

I&C 80215 - Domed External Floating Roof Tank
Wilmington, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TSO FCCU NAPHTHA LGT	Jan	61.79	56.79	66.79	64.33	6.0700	N/A	N/A	60.0000			90.00	Option 1: VP60 = 6.07 VP70 = 6.07
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0241	0.0001	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2270	N/A	N/A	78.1100	0.0159	0.0048	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.2713	N/A	N/A	84.1600	0.0018	0.0006	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1155	N/A	N/A	106.1700	0.0109	0.0003	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Ethylene						775.8551	N/A	N/A	28.0500	0.0001	0.0242	28.05	Option 1: VP60 = 775.8551 VP70 = 775.8551
Hexane (-n)						2.0042	N/A	N/A	86.1700	0.0195	0.0097	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	N/A	N/A	128.1700	0.0007	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	N/A	N/A	42.0800	0.0002	0.0075	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.3490	N/A	N/A	92.1300	0.0535	0.0046	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8140	N/A	N/A	61.5605	0.8065	0.9466	88.31	
Xylenes (mixed isomers)						0.0962	N/A	N/A	106.1700	0.0667	0.0016	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA LGT	Feb	62.78	57.67	67.88	64.33	6.0700	N/A	N/A	60.0000			90.00	Option 1: VP60 = 6.07 VP70 = 6.07
1,2,4-Trimethylbenzene						0.0228	N/A	N/A	120.1900	0.0241	0.0001	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2607	N/A	N/A	78.1100	0.0159	0.0049	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.3054	N/A	N/A	84.1600	0.0018	0.0006	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1195	N/A	N/A	106.1700	0.0109	0.0003	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Ethylene						775.8551	N/A	N/A	28.0500	0.0001	0.0242	28.05	Option 1: VP60 = 775.8551 VP70 = 775.8551
Hexane (-n)						2.0558	N/A	N/A	86.1700	0.0195	0.0099	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	N/A	N/A	128.1700	0.0007	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	N/A	N/A	42.0800	0.0002	0.0075	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.3597	N/A	N/A	92.1300	0.0535	0.0048	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8109	N/A	N/A	61.5488	0.8065	0.9460	88.31	
Xylenes (mixed isomers)						0.0996	N/A	N/A	106.1700	0.0667	0.0016	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA LGT	Mar	63.78	58.57	68.99	64.33	6.0700	N/A	N/A	60.0000			90.00	Option 1: VP60 = 6.07 VP70 = 6.07
1,2,4-Trimethylbenzene						0.0237	N/A	N/A	120.1900	0.0241	0.0001	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2957	N/A	N/A	78.1100	0.0159	0.0051	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.3408	N/A	N/A	84.1600	0.0018	0.0006	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1236	N/A	N/A	106.1700	0.0109	0.0003	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Ethylene						775.8551	N/A	N/A	28.0500	0.0001	0.0242	28.05	Option 1: VP60 = 775.8551 VP70 = 775.8551
Hexane (-n)						2.1093	N/A	N/A	86.1700	0.0195	0.0102	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	N/A	N/A	128.1700	0.0007	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	N/A	N/A	42.0800	0.0002	0.0075	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.3710	N/A	N/A	92.1300	0.0535	0.0049	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8077	N/A	N/A	61.5365	0.8065	0.9454	88.31	
Xylenes (mixed isomers)						0.1031	N/A	N/A	106.1700	0.0667	0.0017	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA LGT	Apr	65.70	59.89	71.51	64.33	6.0700	N/A	N/A	60.0000			90.00	Option 1: VP60 = 6.07 VP70 = 6.07
1,2,4-Trimethylbenzene						0.0256	N/A	N/A	120.1900	0.0241	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3652	N/A	N/A	78.1100	0.0159	0.0054	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.4110	N/A	N/A	84.1600	0.0018	0.0006	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1320	N/A	N/A	106.1700	0.0109	0.0004	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Ethylene						775.8551	N/A	N/A	28.0500	0.0001	0.0242	28.05	Option 1: VP60 = 775.8551 VP70 = 775.8551
Hexane (-n)						2.2152	N/A	N/A	86.1700	0.0195	0.0107	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	N/A	N/A	128.1700	0.0007	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175

Propylene						157.4770	N/A	N/A	42.0800	0.0002	0.0075	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.3934	N/A	N/A	92.1300	0.0535	0.0052	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8013	N/A	N/A	61.5121	0.8065	0.9441	88.31	
Xylenes (mixed isomers)						0.1101	N/A	N/A	106.1700	0.0667	0.0018	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA LGT	May	67.27	61.79	72.76	64.33	6.0700	N/A	N/A	60.0000			90.00	Option 1: VP60 = 6.07 VP70 = 6.07
1,2,4-Trimethylbenzene						0.0272	N/A	N/A	120.1900	0.0241	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4241	N/A	N/A	78.1100	0.0159	0.0056	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.4704	N/A	N/A	84.1600	0.0018	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1392	N/A	N/A	106.1700	0.0109	0.0004	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Ethylene						775.8551	N/A	N/A	28.0500	0.0001	0.0242	28.05	Option 1: VP60 = 775.8551 VP70 = 775.8551
Hexane (-n)						2.3049	N/A	N/A	86.1700	0.0195	0.0111	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	N/A	N/A	128.1700	0.0007	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	N/A	N/A	42.0800	0.0002	0.0075	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.4125	N/A	N/A	92.1300	0.0535	0.0055	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.7958	N/A	N/A	61.4913	0.8065	0.9431	88.31	
Xylenes (mixed isomers)						0.1162	N/A	N/A	106.1700	0.0667	0.0019	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA LGT	Jun	68.98	63.35	74.61	64.33	6.0700	N/A	N/A	60.0000			90.00	Option 1: VP60 = 6.07 VP70 = 6.07
1,2,4-Trimethylbenzene						0.0291	N/A	N/A	120.1900	0.0241	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4904	N/A	N/A	78.1100	0.0159	0.0058	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.5373	N/A	N/A	84.1600	0.0018	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1474	N/A	N/A	106.1700	0.0109	0.0004	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Ethylene						775.8551	N/A	N/A	28.0500	0.0001	0.0242	28.05	Option 1: VP60 = 775.8551 VP70 = 775.8551
Hexane (-n)						2.4054	N/A	N/A	86.1700	0.0195	0.0116	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	N/A	N/A	128.1700	0.0007	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	N/A	N/A	42.0800	0.0002	0.0075	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.4341	N/A	N/A	92.1300	0.0535	0.0057	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.7897	N/A	N/A	61.4678	0.8065	0.9418	88.31	
Xylenes (mixed isomers)						0.1231	N/A	N/A	106.1700	0.0667	0.0020	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA LGT	Jul	71.26	65.04	77.47	64.33	6.0700	N/A	N/A	60.0000			90.00	Option 1: VP70 = 6.07 VP80 = 6.07
1,2,4-Trimethylbenzene						0.0317	N/A	N/A	120.1900	0.0241	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5831	N/A	N/A	78.1100	0.0159	0.0062	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.6306	N/A	N/A	84.1600	0.0018	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1589	N/A	N/A	106.1700	0.0109	0.0004	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Ethylene						775.8551	N/A	N/A	28.0500	0.0001	0.0242	28.05	Option 1: VP70 = 775.8551 VP80 = 775.8551
Hexane (-n)						2.5456	N/A	N/A	86.1700	0.0195	0.0123	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	N/A	N/A	128.1700	0.0007	0.0000	128.17	Option 1: VP70 = .009175 VP80 = .009175
Propylene						157.4770	N/A	N/A	42.0800	0.0002	0.0075	42.08	Option 1: VP70 = 157.477 VP80 = 157.477
Toluene						0.4645	N/A	N/A	92.1300	0.0535	0.0061	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.7812	N/A	N/A	61.4348	0.8065	0.9402	88.31	
Xylenes (mixed isomers)						0.1329	N/A	N/A	106.1700	0.0667	0.0022	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA LGT	Aug	71.60	65.63	77.58	64.33	6.0700	N/A	N/A	60.0000			90.00	Option 1: VP70 = 6.07 VP80 = 6.07
1,2,4-Trimethylbenzene						0.0321	N/A	N/A	120.1900	0.0241	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5975	N/A	N/A	78.1100	0.0159	0.0063	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.6451	N/A	N/A	84.1600	0.0018	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1608	N/A	N/A	106.1700	0.0109	0.0004	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Ethylene						775.8551	N/A	N/A	28.0500	0.0001	0.0242	28.05	Option 1: VP70 = 775.8551 VP80 = 775.8551
Hexane (-n)						2.5674	N/A	N/A	86.1700	0.0195	0.0124	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	N/A	N/A	128.1700	0.0007	0.0000	128.17	Option 1: VP70 = .009175 VP80 = .009175
Propylene						157.4770	N/A	N/A	42.0800	0.0002	0.0075	42.08	Option 1: VP70 = 157.477 VP80 = 157.477
Toluene						0.4693	N/A	N/A	92.1300	0.0535	0.0062	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.7798	N/A	N/A	61.4296	0.8065	0.9399	88.31	
Xylenes (mixed isomers)						0.1344	N/A	N/A	106.1700	0.0667	0.0022	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA LGT	Sep	70.17	64.65	75.68	64.33	6.0700	N/A	N/A	60.0000			90.00	Option 1: VP70 = 6.07 VP80 = 6.07
1,2,4-Trimethylbenzene						0.0304	N/A	N/A	120.1900	0.0241	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5381	N/A	N/A	78.1100	0.0159	0.0060	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.5853	N/A	N/A	84.1600	0.0018	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1533	N/A	N/A	106.1700	0.0109	0.0004	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Ethylene						775.8551	N/A	N/A	28.0500	0.0001	0.0242	28.05	Option 1: VP70 = 775.8551 VP80 = 775.8551
Hexane (-n)						2.4776	N/A	N/A	86.1700	0.0195	0.0120	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	N/A	N/A	128.1700	0.0007	0.0000	128.17	Option 1: VP70 = .009175 VP80 = .009175

Propylene						157.4770	N/A	N/A	42.0800	0.0002	0.0075	42.08	Option 1: VP70 = 157.477 VP80 = 157.477
Toluene						0.4497	N/A	N/A	92.1300	0.0535	0.0060	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.7853	N/A	N/A	61.4508	0.8065	0.9410	88.31	
Xylenes (mixed isomers)						0.1281	N/A	N/A	106.1700	0.0667	0.0021	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA LGT	Oct	67.76	62.48	73.04	64.33	6.0700	N/A	N/A	60.0000			90.00	Option 1: VP60 = 6.07 VP70 = 6.07
1,2,4-Trimethylbenzene						0.0277	N/A	N/A	120.1900	0.0241	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4428	N/A	N/A	78.1100	0.0159	0.0057	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.4893	N/A	N/A	84.1600	0.0018	0.0007	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1415	N/A	N/A	106.1700	0.0109	0.0004	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Ethylene						775.8551	N/A	N/A	28.0500	0.0001	0.0242	28.05	Option 1: VP60 = 775.8551 VP70 = 775.8551
Hexane (-n)						2.3332	N/A	N/A	86.1700	0.0195	0.0113	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	N/A	N/A	128.1700	0.0007	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	N/A	N/A	42.0800	0.0002	0.0075	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.4186	N/A	N/A	92.1300	0.0535	0.0055	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.7941	N/A	N/A	61.4847	0.8065	0.9427	88.31	
Xylenes (mixed isomers)						0.1181	N/A	N/A	106.1700	0.0667	0.0019	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA LGT	Nov	64.31	59.22	69.40	64.33	6.0700	N/A	N/A	60.0000			90.00	Option 1: VP60 = 6.07 VP70 = 6.07
1,2,4-Trimethylbenzene						0.0242	N/A	N/A	120.1900	0.0241	0.0001	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3145	N/A	N/A	78.1100	0.0159	0.0052	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.3598	N/A	N/A	84.1600	0.0018	0.0006	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1259	N/A	N/A	106.1700	0.0109	0.0003	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Ethylene						775.8551	N/A	N/A	28.0500	0.0001	0.0242	28.05	Option 1: VP60 = 775.8551 VP70 = 775.8551
Hexane (-n)						2.1380	N/A	N/A	86.1700	0.0195	0.0103	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	N/A	N/A	128.1700	0.0007	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	N/A	N/A	42.0800	0.0002	0.0075	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.3770	N/A	N/A	92.1300	0.0535	0.0050	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8059	N/A	N/A	61.5299	0.8065	0.9450	88.31	
Xylenes (mixed isomers)						0.1050	N/A	N/A	106.1700	0.0667	0.0017	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA LGT	Dec	61.76	56.83	66.70	64.33	6.0700	N/A	N/A	60.0000			90.00	Option 1: VP60 = 6.07 VP70 = 6.07
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0241	0.0001	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2262	N/A	N/A	78.1100	0.0159	0.0048	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Cyclohexane						1.2705	N/A	N/A	84.1600	0.0018	0.0006	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Ethylbenzene						0.1154	N/A	N/A	106.1700	0.0109	0.0003	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Ethylene						775.8551	N/A	N/A	28.0500	0.0001	0.0242	28.05	Option 1: VP60 = 775.8551 VP70 = 775.8551
Hexane (-n)						2.0030	N/A	N/A	86.1700	0.0195	0.0097	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0092	N/A	N/A	128.1700	0.0007	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Propylene						157.4770	N/A	N/A	42.0800	0.0002	0.0075	42.08	Option 1: VP60 = 157.477 VP70 = 157.477
Toluene						0.3487	N/A	N/A	92.1300	0.0535	0.0046	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						6.8140	N/A	N/A	61.5608	0.8065	0.9466	88.31	
Xylenes (mixed isomers)						0.0961	N/A	N/A	106.1700	0.0667	0.0016	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

I&C 80215 - Domed External Floating Roof Tank
Wilmington, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	47.6403	47.6403	47.6403	47.6403	47.6403	47.6403	47.6403	47.6403	47.6403	47.6403	47.6403	47.6403
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seal-related Wind Speed Exponent:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Value of Vapor Pressure Function:	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	6.0700	6.0700	6.0700	6.0700	6.0700	6.0700	6.0700	6.0700	6.0700	6.0700	6.0700	6.0700
Tank Diameter (ft):	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000
Vapor Molecular Weight (lb/lb-mole):	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	16.0982	16.0982	16.0982	16.0982	16.0982	16.0982	16.0982	16.0982	16.0982	16.0982	16.0982	16.0982
Net Throughput (gal/mo.):	10,622,111.6600	10,622,111.6600	10,622,111.6600	10,622,111.6600	10,622,111.6600	10,622,111.6600	10,622,111.6600	10,622,111.6600	10,622,111.6600	10,622,111.6600	10,622,111.6600	10,622,111.6600
Shell Clingage Factor (bbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000
Tank Diameter (ft):	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000
Roof Fitting Losses (lb):	42.2741	42.2741	42.2741	42.2741	42.2741	42.2741	42.2741	42.2741	42.2741	42.2741	42.2741	42.2741
Value of Vapor Pressure Function:	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323	0.1323
Vapor Molecular Weight (lb/lb-mole):	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	63.8900	63.8900	63.8900	63.8900	63.8900	63.8900	63.8900	63.8900	63.8900	63.8900	63.8900	63.8900
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Losses (lb):	106.0126	106.0126	106.0126	106.0126	106.0126	106.0126	106.0126	106.0126	106.0126	106.0126	106.0126	106.0126

		Roof Fitting Loss Factors			
Roof Fitting/Status	Quantity	KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	12.7041
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	22.2321
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1	0.47	0.02	0.97	3.7318
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00	5.6374
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Sock	24	1.20	0.14	0.65	228.6734
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Sock	19	0.49	0.16	0.14	73.9219
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	1	14.00	3.70	0.78	111.1607
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	49.2283

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

I&C 80215 - Domed External Floating Roof Tank
Wilmington, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
TSO FCCU NAPHTHA LGT	571.68	193.18	507.29	0.00	1,272.15
1,2,4-Trimethylbenzene	0.09	4.66	0.08	0.00	4.83
Benzene	3.13	3.07	2.78	0.00	8.98
Cyclohexane	0.37	0.35	0.32	0.00	1.04
Ethylbenzene	0.21	2.11	0.19	0.00	2.51
Ethylene	13.81	0.02	12.25	0.00	26.09
Hexane (-n)	6.25	3.78	5.54	0.00	15.57
Naphthalene	0.00	0.14	0.00	0.00	0.14
Propylene	4.29	0.04	3.81	0.00	8.14
Toluene	3.06	10.34	2.71	0.00	16.11
Unidentified Components	539.41	155.79	478.65	0.00	1,173.85
Xylenes (mixed isomers)	1.07	12.89	0.95	0.00	14.91

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification	
User Identification:	I&C 80217
City:	Wilmington
State:	California
Company:	Tesoro
Type of Tank:	Domed External Floating Roof Tank
Description:	D656
Tank Dimensions	
Diameter (ft):	120.00
Volume (gallons):	3,360,000.00
Turnovers:	24.67
Paint Characteristics	
Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Characteristics	
Type:	Pontoon
Fitting Category	Detail
Tank Construction and Rim-Seal System	
Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Sock	19
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Sock	24
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

I&C 80217 - Domed External Floating Roof Tank
Wilmington, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
TSO FCCU NAPHTHA MED	Jan	61.79	56.79	66.79	64.33	1.1400	N/A	N/A	60.0000			90.00	Option 1: VP60 = 1.14 VP70 = 1.14
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0050	0.0001	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2270	N/A	N/A	78.1100	0.0065	0.0105	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1155	N/A	N/A	106.1700	0.0093	0.0014	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0042	N/A	N/A	86.1700	0.0257	0.0678	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0546	N/A	N/A	120.2000	0.0014	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.3490	N/A	N/A	92.1300	0.0376	0.0173	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2048	N/A	N/A	57.9274	0.8710	0.8974	89.12	
Xylenes (mixed isomers)						0.0962	N/A	N/A	106.1700	0.0422	0.0053	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA MED	Feb	62.78	57.67	67.88	64.33	1.1400	N/A	N/A	60.0000			90.00	Option 1: VP60 = 1.14 VP70 = 1.14
1,2,4-Trimethylbenzene						0.0228	N/A	N/A	120.1900	0.0050	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2607	N/A	N/A	78.1100	0.0065	0.0108	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1195	N/A	N/A	106.1700	0.0093	0.0015	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0558	N/A	N/A	86.1700	0.0257	0.0695	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0567	N/A	N/A	120.2000	0.0014	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.3597	N/A	N/A	92.1300	0.0376	0.0178	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2023	N/A	N/A	57.8656	0.8710	0.8946	89.12	
Xylenes (mixed isomers)						0.0996	N/A	N/A	106.1700	0.0422	0.0055	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA MED	Mar	63.78	58.57	68.99	64.33	1.1400	N/A	N/A	60.0000			90.00	Option 1: VP60 = 1.14 VP70 = 1.14
1,2,4-Trimethylbenzene						0.0237	N/A	N/A	120.1900	0.0050	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2957	N/A	N/A	78.1100	0.0065	0.0111	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1236	N/A	N/A	106.1700	0.0093	0.0015	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1093	N/A	N/A	86.1700	0.0257	0.0713	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0588	N/A	N/A	120.2000	0.0014	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.3710	N/A	N/A	92.1300	0.0376	0.0183	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.1997	N/A	N/A	57.8010	0.8710	0.8917	89.12	
Xylenes (mixed isomers)						0.1031	N/A	N/A	106.1700	0.0422	0.0057	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA MED	Apr	65.70	59.89	71.51	64.33	1.1400	N/A	N/A	60.0000			90.00	Option 1: VP60 = 1.14 VP70 = 1.14
1,2,4-Trimethylbenzene						0.0256	N/A	N/A	120.1900	0.0050	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3652	N/A	N/A	78.1100	0.0065	0.0117	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1320	N/A	N/A	106.1700	0.0093	0.0016	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.2152	N/A	N/A	86.1700	0.0257	0.0749	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0631	N/A	N/A	120.2000	0.0014	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.3934	N/A	N/A	92.1300	0.0376	0.0195	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.1946	N/A	N/A	57.6720	0.8710	0.8859	89.12	
Xylenes (mixed isomers)						0.1101	N/A	N/A	106.1700	0.0422	0.0061	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA MED	May	67.27	61.79	72.76	64.33	1.1400	N/A	N/A	60.0000			90.00	Option 1: VP60 = 1.14 VP70 = 1.14
1,2,4-Trimethylbenzene						0.0272	N/A	N/A	120.1900	0.0050	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4241	N/A	N/A	78.1100	0.0065	0.0122	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1392	N/A	N/A	106.1700	0.0093	0.0017	106.17	Option 2: A=6.975, B=1424.255, C=213.21

Hexane (-n)						2.3049	N/A	N/A	86.1700	0.0257	0.0779	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0668	N/A	N/A	120.2000	0.0014	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.4125	N/A	N/A	92.1300	0.0376	0.0204	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.1902	N/A	N/A	57.5615	0.8710	0.8810	89.12	
Xylenes (mixed isomers)						0.1162	N/A	N/A	106.1700	0.0422	0.0064	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA MED	Jun	68.98	63.35	74.61	64.33	1.1400	N/A	N/A	60.0000			90.00	Option 1: VP60 = 1.14 VP70 = 1.14
1,2,4-Trimethylbenzene						0.0291	N/A	N/A	120.1900	0.0050	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4904	N/A	N/A	78.1100	0.0065	0.0128	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1474	N/A	N/A	106.1700	0.0093	0.0018	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4054	N/A	N/A	86.1700	0.0257	0.0813	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0710	N/A	N/A	120.2000	0.0014	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.4341	N/A	N/A	92.1300	0.0376	0.0215	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.1853	N/A	N/A	57.4361	0.8710	0.8754	89.12	
Xylenes (mixed isomers)						0.1231	N/A	N/A	106.1700	0.0422	0.0068	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA MED	Jul	71.26	65.04	77.47	64.33	1.1400	N/A	N/A	60.0000			90.00	Option 1: VP70 = 1.14 VP80 = 1.14
1,2,4-Trimethylbenzene						0.0317	N/A	N/A	120.1900	0.0050	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5831	N/A	N/A	78.1100	0.0065	0.0136	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1589	N/A	N/A	106.1700	0.0093	0.0019	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5456	N/A	N/A	86.1700	0.0257	0.0861	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0771	N/A	N/A	120.2000	0.0014	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0014	0.0000	128.17	Option 1: VP70 = .009175 VP80 = .009175
Toluene						0.4645	N/A	N/A	92.1300	0.0376	0.0230	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.1785	N/A	N/A	57.2589	0.8710	0.8677	89.12	
Xylenes (mixed isomers)						0.1329	N/A	N/A	106.1700	0.0422	0.0074	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA MED	Aug	71.60	65.63	77.58	64.33	1.1400	N/A	N/A	60.0000			90.00	Option 1: VP70 = 1.14 VP80 = 1.14
1,2,4-Trimethylbenzene						0.0321	N/A	N/A	120.1900	0.0050	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5975	N/A	N/A	78.1100	0.0065	0.0137	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1608	N/A	N/A	106.1700	0.0093	0.0020	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5674	N/A	N/A	86.1700	0.0257	0.0868	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0780	N/A	N/A	120.2000	0.0014	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0014	0.0000	128.17	Option 1: VP70 = .009175 VP80 = .009175
Toluene						0.4693	N/A	N/A	92.1300	0.0376	0.0232	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.1774	N/A	N/A	57.2311	0.8710	0.8665	89.12	
Xylenes (mixed isomers)						0.1344	N/A	N/A	106.1700	0.0422	0.0075	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA MED	Sep	70.17	64.65	75.68	64.33	1.1400	N/A	N/A	60.0000			90.00	Option 1: VP70 = 1.14 VP80 = 1.14
1,2,4-Trimethylbenzene						0.0304	N/A	N/A	120.1900	0.0050	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5381	N/A	N/A	78.1100	0.0065	0.0132	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1533	N/A	N/A	106.1700	0.0093	0.0019	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4776	N/A	N/A	86.1700	0.0257	0.0838	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0741	N/A	N/A	120.2000	0.0014	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0014	0.0000	128.17	Option 1: VP70 = .009175 VP80 = .009175
Toluene						0.4497	N/A	N/A	92.1300	0.0376	0.0222	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.1818	N/A	N/A	57.3452	0.8710	0.8714	89.12	
Xylenes (mixed isomers)						0.1281	N/A	N/A	106.1700	0.0422	0.0071	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA MED	Oct	67.76	62.48	73.04	64.33	1.1400	N/A	N/A	60.0000			90.00	Option 1: VP60 = 1.14 VP70 = 1.14
1,2,4-Trimethylbenzene						0.0277	N/A	N/A	120.1900	0.0050	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4428	N/A	N/A	78.1100	0.0065	0.0124	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1415	N/A	N/A	106.1700	0.0093	0.0017	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3332	N/A	N/A	86.1700	0.0257	0.0789	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0680	N/A	N/A	120.2000	0.0014	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.4186	N/A	N/A	92.1300	0.0376	0.0207	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.1889	N/A	N/A	57.5263	0.8710	0.8794	89.12	
Xylenes (mixed isomers)						0.1181	N/A	N/A	106.1700	0.0422	0.0066	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA MED	Nov	64.31	59.22	69.40	64.33	1.1400	N/A	N/A	60.0000			90.00	Option 1: VP60 = 1.14 VP70 = 1.14
1,2,4-Trimethylbenzene						0.0242	N/A	N/A	120.1900	0.0050	0.0002	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3145	N/A	N/A	78.1100	0.0065	0.0113	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1259	N/A	N/A	106.1700	0.0093	0.0015	106.17	Option 2: A=6.975, B=1424.255, C=213.21

Hexane (-n)						2.1380	N/A	N/A	86.1700	0.0257	0.0723	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0600	N/A	N/A	120.2000	0.0014	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.3770	N/A	N/A	92.1300	0.0376	0.0186	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.1983	N/A	N/A	57.7662	0.8710	0.8901	89.12	
Xylenes (mixed isomers)						0.1050	N/A	N/A	106.1700	0.0422	0.0058	106.17	Option 2: A=7.009, B=1462.266, C=215.11
TSO FCCU NAPHTHA MED	Dec	61.76	56.83	66.70	64.33	1.1400	N/A	N/A	60.0000			90.00	Option 1: VP60 = 1.14 VP70 = 1.14
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0050	0.0001	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2262	N/A	N/A	78.1100	0.0065	0.0105	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.1154	N/A	N/A	106.1700	0.0093	0.0014	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0030	N/A	N/A	86.1700	0.0257	0.0677	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Isopropyl benzene						0.0546	N/A	N/A	120.2000	0.0014	0.0001	120.20	Option 2: A=6.963, B=1460.793, C=207.78
Naphthalene						0.0092	N/A	N/A	128.1700	0.0014	0.0000	128.17	Option 1: VP60 = .009175 VP70 = .009175
Toluene						0.3487	N/A	N/A	92.1300	0.0376	0.0172	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						1.2049	N/A	N/A	57.9289	0.8710	0.8975	89.12	
Xylenes (mixed isomers)						0.0961	N/A	N/A	106.1700	0.0422	0.0053	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

I&C 80217 - Domed External Floating Roof Tank
Wilmington, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	7.2626	7.2626	7.2626	7.2626	7.2626	7.2626	7.2626	7.2626	7.2626	7.2626	7.2626	7.2626
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seal-related Wind Speed Exponent:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Value of Vapor Pressure Function:	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400
Tank Diameter (ft):	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000
Vapor Molecular Weight (lb/lb-mole):	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Withdrawal Losses (lb):	10.4673	10.4673	10.4673	10.4673	10.4673	10.4673	10.4673	10.4673	10.4673	10.4673	10.4673	10.4673
Net Throughput (gal/mo.):	6,906,659.1660	6,906,659.1660	6,906,659.1660	6,906,659.1660	6,906,659.1660	6,906,659.1660	6,906,659.1660	6,906,659.1660	6,906,659.1660	6,906,659.1660	6,906,659.1660	6,906,659.1660
Shell Clingage Factor (bbl/1000 sqft):	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Average Organic Liquid Density (lb/gal):	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000	5.4000
Tank Diameter (ft):	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000
Roof Fitting Losses (lb):	6.0864	6.0864	6.0864	6.0864	6.0864	6.0864	6.0864	6.0864	6.0864	6.0864	6.0864	6.0864
Value of Vapor Pressure Function:	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202	0.0202
Vapor Molecular Weight (lb/lb-mole):	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000	60.0000
Product Factor:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	60.3400	60.3400	60.3400	60.3400	60.3400	60.3400	60.3400	60.3400	60.3400	60.3400	60.3400	60.3400
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Losses (lb):	23.8163	23.8163	23.8163	23.8163	23.8163	23.8163	23.8163	23.8163	23.8163	23.8163	23.8163	23.8163

		Roof Fitting Loss Factors			
Roof Fitting/Status	Quantity	KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	1.9367
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	3.3892
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1	0.47	0.02	0.97	0.5689
Rim Vent (6-in. Diameter)/Weighted Mech. Actuation, Gask.	1	0.71	0.10	1.00	0.8594
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Sock	19	1.20	0.14	0.65	27.5977
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Sock	24	0.49	0.16	0.14	14.2346
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	1	14.00	3.70	0.78	16.9460
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	7.5046

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

I&C 80217 - Domed External Floating Roof Tank
Wilmington, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
TSO FCCU NAPHTHA MED	87.15	125.61	73.04	0.00	285.80
1,2,4-Trimethylbenzene	0.02	0.63	0.01	0.00	0.66
Benzene	1.04	0.82	0.88	0.00	2.74
Ethylbenzene	0.15	1.17	0.12	0.00	1.44
Hexane (-n)	6.67	3.23	5.59	0.00	15.49
Isopropyl benzene	0.01	0.17	0.01	0.00	0.19
Naphthalene	0.00	0.18	0.00	0.00	0.18
Toluene	1.74	4.72	1.46	0.00	7.92
Unidentified Components	76.97	109.40	64.51	0.00	250.88
Xylenes (mixed isomers)	0.55	5.30	0.46	0.00	6.31

TANKS 4.0.9d
Emissions Report - Detail Format
Total Emissions Summaries - All Tanks in Report

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

Tank Identification				Losses (lbs)
I&C 80044	Tesoro	Vertical Fixed Roof Tank	Wilmington, California	1,257,419.21
I&C 80074	Tesoro	Vertical Fixed Roof Tank	Wilmington, California	5,315.25
I&C 80211	Tesoro	Domed External Floating Roof Tank	Wilmington, California	271.95
I&C 80215	Tesoro	Domed External Floating Roof Tank	Wilmington, California	1,272.15
I&C 80217	Tesoro	Domed External Floating Roof Tank	Wilmington, California	285.80
Total Emissions for all Tanks:				1,264,564.36

ATTACHMENT C: CRITERIA POLLUTANT AIR QUALITY IMPACT ANALYSIS

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CRITERIA POLLUTANT AIR QUALITY IMPACT ANALYSIS

FOR THE

TESORO LOS ANGELES REFINERY INTEGRATION AND COMPLIANCE PROJECT

CARSON AND WILMINGTON, CALIFORNIA

Prepared by:
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~~MARCH 2016~~ FEBRUARY 2017

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LIST OF ATTACHMENTS

[1] Available separately from South Coast AQMD.

PREFACE

In March 2016, Ashworth Leininger Group prepared a criteria pollutant air quality analysis to evaluate the proposed Tesoro Los Angeles Refinery Integration and Compliance Project. The analysis considered criteria pollutant (NO_2, SO_2, CO, PM_{10} and $PM_{2.5}$) emission increases associated with the proposed project. This analysis was used to support the March 2016 draft EIR (DEIR).

The analysis has been revised for the final EIR (FEIR) to include updates and technical corrections identified during review of the document to respond to public comments on the DEIR. Updates and corrections include the following:

- Inclusion of criteria pollutant emissions from onsite truck traffic associated with the project.
- Inclusion of PM emissions from increased coke handling at Wilmington Operations.
- Sulfuric Acid Regeneration Plant (SARP) reactor H_2SO_4 emissions have been included as condensable particulate emissions in the analysis.
- Stack temperatures for SRP Incinerators F704 and F754 and Heater H-101 were updated.

The updates and corrections listed above caused changes to the modeled criteria pollutant concentrations reported in the DEIR. A comparison of the modeling results in the DEIR and the FEIR are shown in the tables below:

Table A. Comparison of Modeled NO_2, SO_2, and CO Concentrations plus Background

Pollutant	Averaging Period	Max concentration (ug/m3) DEIR (model result including background)	Max concentration (ug/m3) FEIR (model result including background)	AAQS
NO_2	1 Hour - State	301.4	304.0	339
	1 Hour - Federal	184.9	187.1	188
	Annual	49.7*	49.6	57
SO_2	1 Hour - State	71.4	71.5	655
	1 Hour - Federal	46.6	46.6	196
	24 Hour	65.5	65.5	105
CO	1 Hour	4,819.4	4,820.2	23,000
	8 Hour	2,980.6	2,982.1	10,000

* There was a copy/paste error in the March 2016 report, and the value listed for NO_2 annual (including background) was 49.7. The correct value is 49.4.

Table B. Comparison of Modeled PM_{10} and $PM_{2.5}$ Concentrations

Pollutant	Averaging Period	Max concentration (ug/m3)	
		DEIR	FEIR[2]
PM_{10}	24 Hour	0.42	0.42
	Annual	0.16	0.52
$PM_{2.5}$	24 Hour	0.42	0.42
	Annual	0.16	0.52

The updates and corrections listed above, resulted in minor changes to the modeled ambient air quality concentrations. The updated modeling results continue to demonstrate compliance with all state and federal ambient air quality standards.

[2] Not all sources experience daily or hourly increases but may experience annual increases. Therefore modeled annual concentrations may be greater than short term concentrations at some receptors.

1.0 EXECUTIVE SUMMARY

In June 2013, the Tesoro Refining & Marketing Company LLC (Tesoro) purchased the BP West Coast Products LLC (BP) Carson Refinery (currently termed the Tesoro Carson Operations). The current project is intended to further integrate the Carson Operations with the adjacent Tesoro Wilmington Operations to form the Tesoro Los Angeles Refinery (Refinery). Criteria pollutant modeling was conducted to support the Environmental Impact Report required by the California Environmental Quality Act (CEQA) for this project. The purpose of the analysis is to determine if project emissions pose a threat to ambient air quality standards.

This analysis demonstrates that project impacts associated with NO_2, SO_2, CO, PM_{10} and $PM_{2.5}$ are expected to be less than significant. The complete criteria pollutant modeling analysis is presented below.

2.0 INTRODUCTION

In June 2013, Tesoro purchased the BP West Coast Products LLC (BP) Carson Refinery (now named the Tesoro Los Angeles Refinery – Carson Operations) which is adjacent to the Tesoro Los Angeles Refinery – Wilmington Operations. The Los Angeles Refinery – Wilmington Operations is located at 2101 East Pacific Coast Highway, Wilmington, CA while the Los Angeles Refinery – Carson Operations is located at 2350 East 223rd Street, Carson, CA; both operations are located in the South Coast Air Basin. As shown in Figure 1, these two facilities are adjacent to each other and therefore are considered a single stationary source for air quality evaluation purposes.

Currently, the Wilmington and Carson Operations function as two separate and distinct facilities with limited operational integration. The proposed project is intended to further integrate the Los Angeles Refinery Wilmington and Carson Operations. As part of the project, the refinery will also be modified in order to comply with the federally mandated Tier 3 gasoline specifications, as well as with state and local regulations mandating emission reductions, including but not limited to, California AB32 Greenhouse Gas (GHG) Cap and Trade requirements and SCAQMD RECLAIM NOx and SOx allocation shaves. This project will include the shutdown of the Wilmington Operation’s Fluid Catalytic Cracking Unit (FCCU) and reconfiguring the combined Refinery complex with flexibility to improve the gasoline to distillate production ratio in order to meet changing market demand. As part of the project, equipment efficiency and heat recovery will be optimized for new or modified units to minimize GHG and other pollutants. All new and modified sources will meet Best Available Control Technology (BACT) requirements (unless otherwise exempt). The proposed project will have a small impact on crude oil and feedstock throughput capacity. The crude oil and feedstock processing capability at the integrated Refinery will increase by approximately 2% or 6,000 BPD as a result of the proposed project. The type of crude oil and feedstocks will not change as part of the proposed project. The proposed modifications include new and modified equipment, shutdown of existing equipment, as well as piping modifications.

The above improvements and/or modifications are described further in Section 2 of the Air Quality Analysis Report to which this criteria pollutant modeling analysis is appended.

This criteria pollutant modeling was conducted to support the Environmental Impact Report for the proposed project as required by the California Environmental Quality Act (CEQA). The purpose of the analysis is to determine if project emissions pose a threat to ambient air quality standards. The approach used in this analysis is described later in this report and is based on written SCAQMD guidance[3], and discussions with SCAQMD staff.

Figure 1. Tesoro Los Angeles Refinery

[3] http://www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/modeling-guidance

2.1 SIGNIFICANCE CRITERIA

The criteria pollutants of concern are:

- Nitrogen Dioxide (NO_2)
- Respirable Particulate Matter (PM_{10})
- Fine Particulate Matter ($PM_{2.5}$)
- Carbon Monoxide (CO)
- Sulfur Dioxide (SO_2)

Table 1 shows the basis upon which the significance of modeled criteria pollutant impacts are judged. If the pollutant is in attainment of ambient air quality standards (AAQS), then the maximum impact is added to a representative maximum background concentration derived from ambient monitoring, and the total concentration is compared to the most stringent AAQS. A total concentration greater than the AAQS is a significant impact. If the pollutant is not in attainment (i.e., PM_{10} and $PM_{2.5}$), then the impact is significant if the modeled impact is greater than the SCAQMD CEQA Significance Threshold.

Table 1. Ambient Air Quality Standards for Criteria Pollutants and SCAQMD Air Quality Significance Thresholds

Pollutant	Averaging Period	SCAQMD Significant Change (μg/m^3)	Most Stringent Ambient Air Quality Standard (μg/m^3)
NO_2	1-hr	--[a]	339 (California) 188 (Federal)
	Annual	--[a]	57
CO	1-hr	--[a]	23,000
	8-hr	--[a]	10,000
SO_2	1-hr	--[a]	655 (California) 196 (Federal)
	3-hr	--[a]	1300 (Federal)
	24-hr	--[a]	105
PM_{10}	24-hr	2.5	50[b]
	Annual	1.0	20[b]
$PM_{2.5}$	24-hr	2.5	35[b]

*[a] SCAQMD is in attainment for these pollutants and averaging periods.
*[b] SCAQMD is not in attainment of these standards.

3.0 MODELING APPROACH

3.1 EMISSIONS ASSESSMENT

The project emission sources relative to criteria pollutants[4] are:

- New Sulfuric Acid Regeneration Plant (SARP).
- New heaters to support the new Sulfuric Acid Regeneration Plant.

[4] There are several modifications associated with this project that do not involve the emissions of NOx, SOx, CO, or PM. Those modifications are not listed here.

- Process vent emissions from the new Sulfuric Acid Regeneration Plant.
- Modifications to increase the permitted equipment description firing rate of the Carson 51 Vacuum Unit Heater as well as Wilmington Heaters H-100, H-300 and H-301.
- Modifications to the Carson Naphtha Hydrotreater Heater to allow the installation of ultra-low NOx burners.
- Increased utilization of the following heaters at the Carson Operations: Hydrocracker R-1, Hydrocracker R-2 and the Light Hydrotreating Unit Heater.
- Increased utilization of the FCCU Regenerator and Pre-Heater at the Carson Operations.
- Increased utilization of Cogeneration Units 1-4 at the Carson Operations.
- Increased utilization of the following heaters at the Wilmington Operations: Delayed Coking Unit H-101, Hydrotreating Unit #3 H-30, Hydrotreating Unit #3 H-21/22, CRU H-510, CRU H-501A, H-501B, H-502 and H-503/504.
- Increased utilization of the following boilers at the Wilmington Operations: Boilers 7, 8, 9 and 10.
- Increased coke handling at the Wilmington Operations.
- Increased utilization of the following boilers at the Sulfur Recovery Plant Operations: Boilers H-1601/1602.
- Increased utilization of the following incinerators at the Sulfur Recovery Plant Operations: Incinerators F-704 and H-754.
- Locomotives associated with increased railcar movement of LPG, in-transit and idling on site and just outside facility fenceline.
- Increased routine onsite truck traffic at the refinery resulting from the proposed project.

The emission sources listed above represent the components of this project that result in emission *increases* of criteria pollutants with AAQSs. There will also be a substantial reduction in criteria pollutant emissions from the shutdown of the Wilmington Operation's Fluid Catalytic Cracking Unit (FCCU) and associated heaters (CO Boiler, H2 Heater, H3 Heater, H4 Heater, H5 Heater and Startup Heater). To simplify the modeling, only the emission increases were considered (i.e., emission decreases associated with the FCCU shutdown were not considered). There are also volatile organic chemical (VOC) emission increases (and decreases) associated with process unit and piping fugitive components and storage tanks, but there are no AAQSs for VOCs and no criteria pollutant modeling is required.

Emissions by source, as input to the dispersion model, are summarized in the Air Quality Analysis Section 2.2.1.

3.2 AIR DISPERSION MODEL AND INPUTS

The AMS/EPA Regulatory Model (AERMOD[5]~~, v15181~~), the air dispersion model currently preferred by U.S. EPA and approved by the SCAQMD, was used for this analysis.

[5] Short term modeling (1-hr, 8-hr, and 24-hr) was performed in November 2016 with AERMOD v15181. Annual modeling was performed in February 2017 with AERMOD v16216r. Based on a

AERMOD simulates the atmospheric transport and dilution of emissions from project sources. This mathematical model estimates dilution of emissions by diffusion and turbulent mixing with ambient air as the emissions travel downwind from a source. AERMOD can predict the resulting concentrations at specified locations of interest (commonly referred to as receptors). The model is capable of predicting impacts from any combination of point, area, and volume sources in terrain ranging from flat to complex.

3.2.1 Emission Inputs

As explained above, for the criteria pollutant modeling, only emission increases associated with the project were modeled. For modified combustion sources[6], emission rates for short-term modeling (1-hr, 8-hr, and 24-hr) were based on the *daily* pre- to post-project increase, and emission rates for long-term modeling (annual) were based on the *annual* pre - to post-project increase. For new and modified combustion sources, startup, shutdown and commissioning emissions were included in the analysis. For ~~combustion~~ sources that won't be modified but may experience an increase in utilization, the emission rates were estimated based on the anticipated increase in operating rate of the unit. Emission rates used in the modeling are shown in Table 2.

Locomotive operations typically occur between the hours of 6:00 AM and 2:00 PM, and locomotives only operate (in transit or idling) for an estimated four of those eight hours. For criteria pollutants with a 1-hr standard (NO_2, SO_2, and CO), the maximum 1-hr emission rate was modeled for the entire 8-hr period during which locomotive operations could occur. While this essentially doubles the total amount of emissions on a daily or annual basis and may be considered conservative, it ensures that the maximum impact during potential locomotive operating hours is captured. The 8-hr CO modeling was also performed using the maximum 1-hr emission rate. For 24-hr and annual averaging periods, the daily emissions were spread evenly over the 6:00 AM to 2:00 PM period. ~~Modeled emission rates for the locomotives are shown in Table 3~~.

Truck operations were assumed to occur 24 hours per day, 7 days per week. Hourly emissions were based on the maximum expected number of trucks in the peak hour, while annual emissions were based on the total number of trucks per year. 1-hr and 8-hr model runs used the maximum hourly emission rates, and 24-hr and annual model runs used the annual emission rates[7].

Modeled emission rates for the locomotives and trucks are shown in Table 3.

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review of the model change bulletin, no differences between the two versions of the model are expected for the types of emission sources and model options in this project.

[6] Combustion sources that will be modified as part of the project include the Wilmington H-100 heater, the Wilmington HCU H-300 and H-301 heaters, the Carson 51 Vacuum Unit heater, and the Carson Naphtha HDS heater.

[7] Truck trips associated with Wilmington Operations Coke Handling will not experience daily or hourly increases but may experience annual increases. Therefore these sources were not included in the 1-hr, 8-hr, and 24-hr modeling.

3.2.2 Source Release Parameters

Project point sources identified in Section 2.1.1 were modeled using the release parameters summarized in Table 4 for stationary sources (heaters and process vents). The stationary source locations are plotted in Figure 2.

Coke handling emissions were modeled as a volume source located at the Wilmington coke barn truck loading area, with a height of 5 feet and lateral dimensions encompassing the loading area and that portion of the coke barn. The release parameters are summarized in Table 5.

Two locomotive engines are used to move railcars carrying LPG. These locomotives were modeled as a string of evenly-spaced volume sources along the segments of track where engines are expected to travel. The engines travel a short distance outside the facility boundaries at times; this was reflected in the modeling. ~~The distribution of locomotive emissions is shown in Figure 2, and the release parameters are summarized in Table 5~~.

Truck operations were also modeled as a string of evenly-spaced volume sources located along routes traveled by the trucks. The distribution of locomotive and truck emissions is shown in Figure 2, and the release parameters are summarized in Table 6.

Table 2. Stationary ~~Point~~ Source Emission Rate Increases[a]

Source Description	Stack ID	Nitrogen Oxides		Particulate Matter [b]		Sulfur Dioxide		Carbon Monoxide	
		(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)
Carson 51 Vacuum Unit heater stack (D63)	51VAC	14.9146	36,072.2	1.8954	17,092.9	0.0749	503.6	9.7437	85,501.1
Carson Cogeneration Unit 1 turbine and duct burner stack (D1226/D1227)	COGEN1	0.2145	1,879.4	0.1026	899.2	0.0261	228.4	0.0469	410.6
Carson Cogeneration Unit 2 turbine and duct burner stack (D1233/D1234)	COGEN2	0.2145	1,879.4	0.1026	899.2	0.0261	228.4	0.0469	410.6
Carson Cogeneration Unit 3 turbine and duct burner stack (D1236/D1237)	COGEN3	0.2145	1,879.4	0.1026	899.2	0.0261	228.4	0.0469	410.6
Carson Cogeneration Unit 4 turbine and duct burner stack (D1239/D1240)	COGEN4	0.2145	1,879.4	0.1026	899.2	0.0261	228.4	0.0469	410.6
Carson FCCU Pre-Heater	FCCUPH_C	0.0	2,785.4	0.0	1,370.1	0.0	688.9	0.0	267.4
Carson FCCU Regenerator	FCCUR_C	0.0	29,164.1	0.0	14,882.6	0.0	41,981.1	0.0	36,484.9
Carson Hydrocracker R1 heater stack (D625)	HCU_R1	0.7500	6,570.0	0.2244	1,965.4	0.1920	1,681.5	0.0433	379.0
Carson Hydrocracker R2 heater stack (D627)	HCU_R2	0.6000	5,256.0	0.2991	2,620.5	0.4089	3,582.3	0.0577	505.4
Carson Light Hydrotreating Unit heater (D425)	LHU_HTR	0.2500	2,190.0	0.0778	681.3	0.0626	548.3	0.0152	133.0
Carson Naphtha HDS heater stack (D1433)	NHDS	0.5030	354.5	0.2317	2,139.5	0.0267	219.4	0.4264	3,725.9
Wilmington - Sulfuric Acid Regen Plant Stk 1 - Process Air & Converter Htr	SA1_W	1.2143	10,637.0	0.1827	1,600.9	0.0146	128.1	0.8528	7,470.7
Wilmington - Sulfuric Acid Regen Plant Stk 2 - Decomp Furnace	SA2_W	2.0400	17,870.1	~~0.3070~~ <u>0.5572</u>	~~2,689.5~~ <u>4,880.7</u>	1.3210	11,572.1	1.4327	12,550.8
Wilmington Boilers 7 & 8 stack	BLR78_W	0.5000	4,380.0	0.0789	691.6	0.1278	1,119.7	0.0154	135.0
Wilmington Boilers 9 & 10 stack	BLR910_W	0.5000	4,380.0	0.0789	691.6	0.1278	1,119.7	0.0154	135.0
Wilmington Coker heater H101	H101	0.7917	6,935.0	0.0347	304.2	0.3160	2,768.2	0.1816	1,591.0
Wilmington CRU2 unit H-501A/B 502 503 504 heaters stack	H501A_ET	0.0531	465.1	0.0246	215.8	0.0173	151.1	0.0396	346.5
Wilmington CRU2 unit H-510 heater stack	H510	0.0200	175.2	0.0062	54.5	0.0101	88.2	0.0249	218.0
Wilmington H100 heater stack	H100	22.0332	12,240	0.0000	1,502.2	Note c	70,752.1	0.0000	7,253.6
Wilmington HCU H-300 and H-301 heaters stack	H300_301	4.2789	0	0.4496	4,295.9	0	0	2.0728	20,047.5
Wilmington HTU3 unit H-21/H-22 heaters stack	H21_22	0.5287	4,631.3	0.0245	215.0	0.0553	484.6	0.1151	1,008.0
Wilmington HTU3 unit H-30 heater stack	H30	0.3280	2,873.3	0.0820	718.3	0.1054	923.5	0.0160	140.2
Wilmington Sulfur Plant combined H-1601/1602 stack	H1601_2	0.0045	39.7	0.0023	20.0	0.0018	16.1	0.0004	3.9
Wilmington Sulfur Plant Incinerator stack 1	F704	0.0101	88.5	0.0005	4.3	0.5276	4,621.6	0.0023	20.1
Wilmington Sulfur Plant Incinerator stack 2	F754	0.0218	191.3	0.0014	12.4	0.5276	4,621.6	0.0014	12.2
<u>Wilmington Coke Handling Emissions</u>	<u>COKE_W</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>145.9</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

[a] Zero emissions denote cases when the project resulted in no emissions increase or an emissions decrease. <u>Additionally, not all sources experience daily or hourly increases but may have annual increases.</u>

[b] All PM emissions were conservatively assumed to be equal to PM_{10} and $PM_{2.5}$.

[c] For maximum 1-hr average modeling, the maximum 1-hr SO_2 emission rate increase of 15.1951 lb/hr was used, based on a maximum 22 lb/hr emission rate from this unit (less baseline). For maximum 24-hr average modeling, a 1-hr SO_2 emission rate increase of 3.6121 lb/hr was used, based on a 24-hr emission rate of 250 lb/day (less baseline).

Table 3. Locomotive Engine and Truck Traffic Emission Rate Increases

~~Locomotive Engine~~ Emission Source	Source IDs	Nitrogen Oxides		Particulate Matter		Sulfur Dioxide		Carbon Monoxide	
		(g/sec)	(lb/hr)	(g/sec)	(lb/hr)	(g/sec)	(lb/hr)	(g/sec)	(lb/hr)
Locomotive - GP9 (Blue Engine)	RRB_0001 through RRB_0098								
Maximum 1-hr and 8-hr Average Modeling		0.152	1.207	0.0033	0.026	9.06E-05	7.19E-04	0.0262	0.208
Maximum 24-hr and Annual Average Modeling		0.076	0.603	0.0016	0.013	4.53E-05	3.60E-04	0.0131	0.104
Locomotive - SW1200 (Green Engine)	RRG_0001 through RRG_0303								
Maximum 1-hr and 8-hr Average Modeling		0.2148	1.705	0.0047	0.037	1.28E-04	1.02E-03	0.0371	0.294
Maximum 24-hr and Annual Average Modeling		0.1074	0.852	0.0023	0.018	6.40E-05	5.08E-04	0.0185	0.147
Truck Traffic - Wilmington Operations	WLM_0001 through WLM_154								
Maximum 1-hr and 8-hr Average Modeling		2.03E-02	1.61E-01	1.14E-04	9.03E-04	1.45E-05	1.15E-04	4.62E-03	3.66E-02
Maximum 24-hr and Annual Average Modeling		8.47E-04	6.72E-03	4.74E-06	3.76E-05	6.04E-07	4.79E-06	1.92E-04	1.53E-03
Truck Traffic - Carson Operations	CAR_0001 through CAR_0417								
Maximum 1-hr and 8-hr Average Modeling		7.03E-02	5.58E-01	3.38E-04	2.68E-03	4.77E-05	3.78E-04	1.84E-02	1.46E-01
Maximum 24-hr and Annual Average Modeling		1.10E-02	8.72E-02	5.27E-05	4.19E-04	7.45E-06	5.91E-05	2.88E-03	2.28E-02
Truck Traffic - Wilmington Coke Handling	COK_0001 through COK_0165								
Maximum 1-hr. 8-hr, and 24-hr Average Modeling		0	0	0	0	0	0	0	0
Annual Average Modeling		2.00E-03	1.59E-02	1.06E-05	8.43E-05	1.40E-06	1.11E-05	4.80E-04	3.81E-03

Note: Within each locomotive engine or truck traffic group (i.e., GP9 and SW1200), the emissions shown are distributed equally among all modeled sources. All PM emissions were conservatively assumed to be equal to PM_{10} and $PM_{2.5}$.

Table 4. Stationary Point Source Release Parameters

Source Description	Stack ID	Stack Height		Stack Gas Exit Temperature		Stack Gas Exit Velocity		Stack Diameter		UTM Coordinates (NAD83) Easting/Northing	
		(ft)	(m)	(ºF)	(K)	(ft/s)	(m/s)	(ft)	(m)	(m)	(m)
Carson 51 Vacuum Unit heater stack (D63)	51VAC	153.8	46.9	344.3	446.6	19.7	6.0	10.3	3.1	385299.8	3741864.8
Carson Cogeneration Unit 1 turbine and duct burner stack (D1226/D1227)	COGEN1	100.0	30.5	332.1	439.9	98.8	30.1	14.8	4.5	384708.0	3742507.4
Carson Cogeneration Unit 2 turbine and duct burner stack (D1233/D1234)	COGEN2	100.0	30.5	332.3	440.0	99.5	30.3	14.8	4.5	384763.4	3742505.6
Carson Cogeneration Unit 3 turbine and duct burner stack (D1236/D1237)	COGEN3	100.0	30.5	352.3	451.1	96.5	29.4	14.8	4.5	384816.3	3742503.6
Carson Cogeneration Unit 4 turbine and duct burner stack (D1239/D1240)	COGEN4	100.0	30.5	333.3	440.5	99.6	30.4	14.8	4.5	384869.4	3742502.6
Carson FCCU Regenerator	FCCUPH_C	178.8	54.5	519.9	544.2	12.0	3.7	6.5	2.0	384977.0	3742816.0
Carson FCCU Pre-Heater	FCCUR_C	171.0	52.1	604.9	591.4	60.9	18.6	11.5	3.5	385025.0	3742758.0
Carson Hydrocracker R1 heater stack (D625)	HCU_R1	125.0	38.1	521.3	545.0	14.2	4.3	3.3	1.0	385009.7	3743159.6
Carson Hydrocracker R2 heater stack (D627)	HCU_R2	110.3	33.6	587.0	581.5	22.3	6.8	3.6	1.1	385003.0	3743159.3
Carson Light Hydrotreating Unit heater (D425)	LHU_HTR	84.0	25.6	618.3	598.9	15.0	4.6	3.0	0.9	384827.5	3742919.6
Carson Naphtha HDS heater stack (D1433)	NHDS	65.1	19.8	600.1	588.8	13.4	4.1	2.4	0.7	385437.9	3741732.8
Wilmington - Sulfuric Acid Regen Plant Stk 1 - process air & converter htr	SA1_W	124.0	37.8	450.0	505.4	17.9	5.5	3.0	0.9	385559.6	3739535.2
Wilmington - Sulfuric Acid Regen Plant Stk 2 - Decomp furnace	SA2_W	194.0	59.1	180.0	355.4	18.2	5.5	3.5	1.1	385602.5	3739519.6
Wilmington Boilers 7 & 8 stack	BLR78_W	65.0	19.8	500.0	533.2	6.8	2.1	7.0	2.1	385564.4	3739451.0
Wilmington Boilers 9 & 10 stack	BLR910_W	65.0	19.8	500.0	533.2	21.6	6.6	7.0	2.1	385579.0	3739442.9
Wilmington Coker heater H101	H101	183.0	55.8	~~1160.6~~ 463.7	~~900.2~~ 513.0	33.2	10.1	9.9	3.0	386023.0	3739978.7
Wilmington CRU2 unit H-501A/B 502 503 504 heaters stack	H501A_ETC	75.0	22.9	300.2	422.2	41.2	12.6	4.5	1.4	385783.0	3740132.0
Wilmington CRU2 unit H-510 heater stack	H510	100.0	30.5	649.4	616.2	4.8	1.5	4.5	1.4	385759.0	3740106.0
Wilmington H100 heater stack	H100	183.0	55.8	665.6	625.2	16.2	4.9	10.0	3.0	386024.8	3739996.0
Wilmington HCU H-300 and H-301 heaters stack	H300_301	185.5	56.5	450.0	505.4	20.0	6.1	5.3	1.6	385652.4	3740058.5
Wilmington HTU3 unit H-21/H-22 heaters stack	H21_22	116.0	35.4	640.4	611.2	1.4	0.4	5.7	1.7	385754.2	3740191.0
Wilmington HTU3 unit H-30 heater stack	H30	88.0	26.8	575.6	575.2	16.9	5.1	4.0	1.2	385754.4	3740180.7
Wilmington Sulfur plant combined H-1601/1602 stack	H1601_2	155.6	47.4	344.3	446.7	21.7	6.6	6.4	2.0	385978.8	3742153.0
Wilmington sulfur plant incinerator stack 1	F704	150.0	45.7	~~1064.4~~ 541.1	~~846.7~~ 556.0	45.4	13.8	6.0	1.8	386010.9	3742144.8

Source Description	Stack ID	Stack Height		Stack Gas Exit Temperature		Stack Gas Exit Velocity		Stack Diameter		UTM Coordinates (NAD83) Easting/Northing	
		(ft)	(m)	(ºF)	(K)	(ft/s)	(m/s)	(ft)	(m)	(m)	(m)
Wilmington sulfur plant incinerator stack 2	F754	107.0	32.6	~~1061.8~~ 602.3	~~845.3~~ 590.0	37.9	11.5	6.3	1.9	386002.9	3742129.3

Table 5. Release Parameters for Coke Handling Volume Source

Source Description	Release Height		Horizontal Dimension (σ_{yo})		Vertical Dimension (σ_{zo})	
	(ft)	(m)	(ft)	(m)	(ft)	(m)
Wilmington Coke Handling Emissions	2.5	0.8	30.5	9.3	2.3	0.7

~~**Table 5. Release Parameters for Volume Sources Representing Locomotives**~~
Table 6. Release Parameters for Volume Sources Representing Locomotives and Trucks Increases

Source Description	Release Height		Spacing Between Sources		Horizontal Dimension (σ_{yo})		Vertical Dimension (σ_{zo})	
	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)
Locomotives	18.4	5.6	24	7.32	11.16	3.4	8.53	2.6
Trucks	3.0	0.9	20	6.1	9.3	2.8	1.4	0.4

Note: Locomotive volume source parameters based on values used for daytime traveling locomotives in Commerce Rail Yard modeling study[8] (Table 41). Source locations are included in Attachment C-1.

[8] Sierra Research, Inc., Toxic Air Contaminant Emissions Inventory and Dispersion Modeling Report for the Commerce Rail Yard, Los Angeles, California, prepared for Union Pacific Railroad Company, January 2007.

~~**Figure 2. Modeled Source Locations**~~

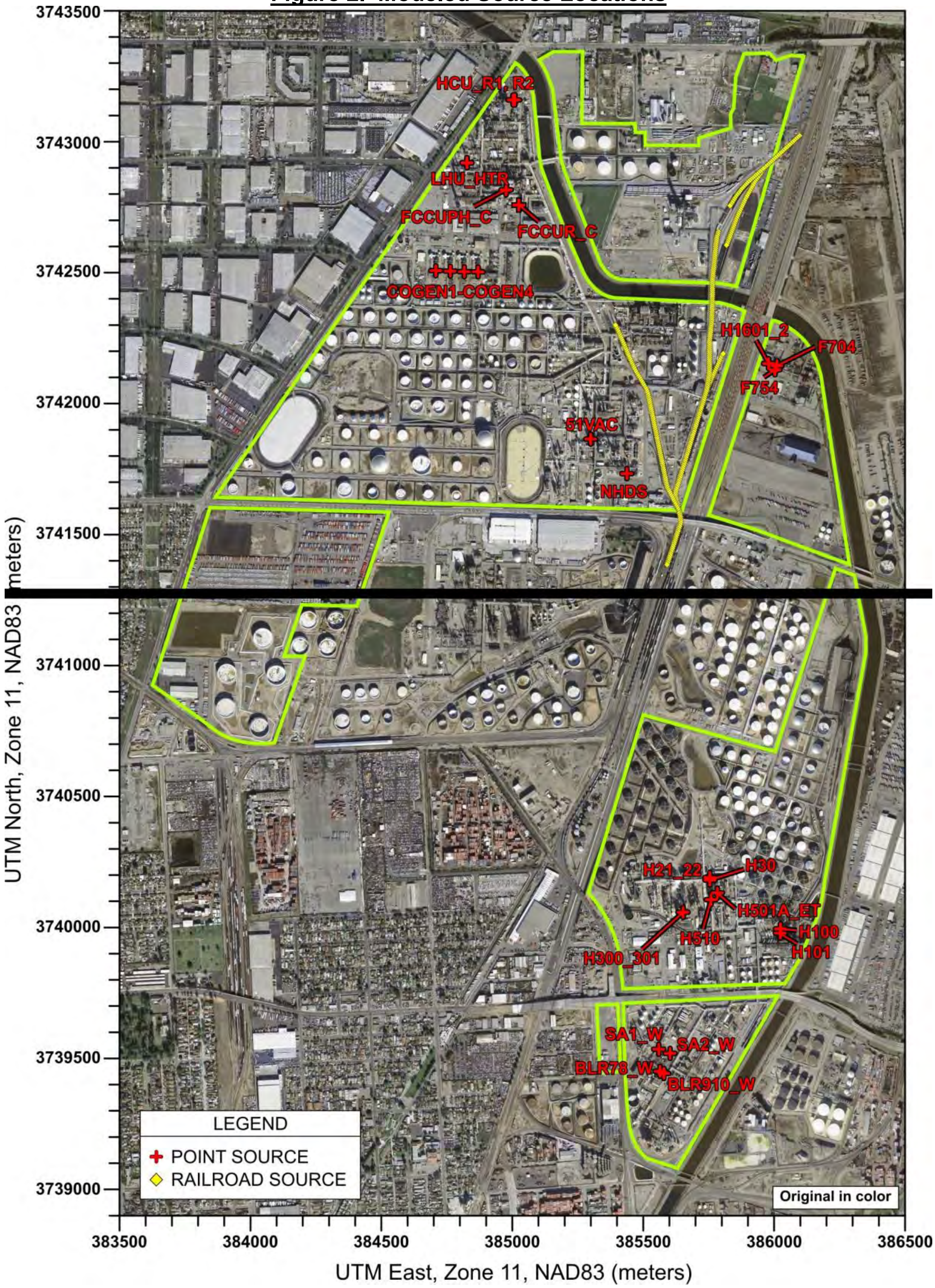
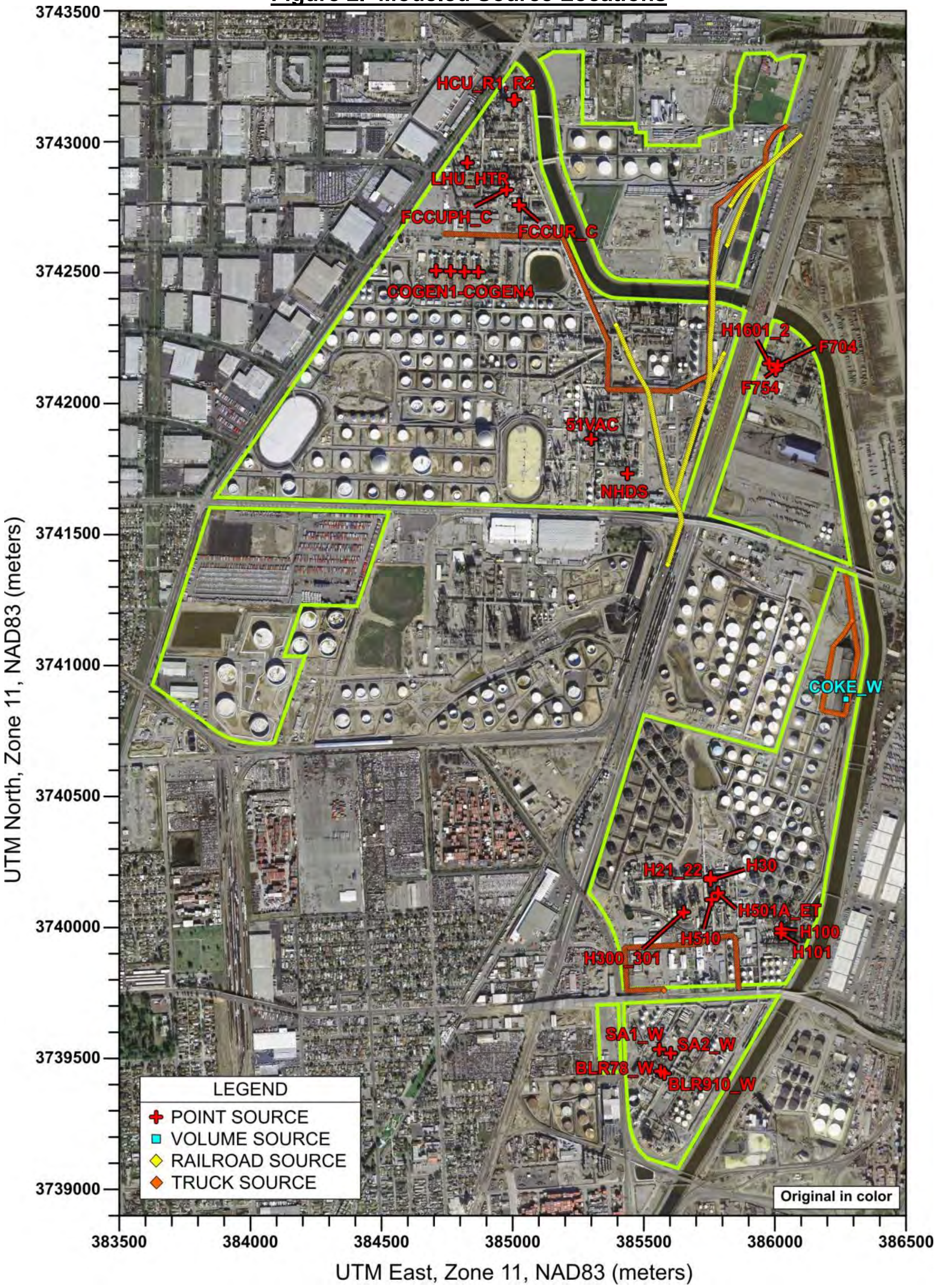


Figure 2. Modeled Source Locations



3.2.3 Terrain Characterization

AERMOD requires that each source in the analysis be categorized as being in either a rural or an urban setting. Consistent with SCAQMD guidance, all sources were designated as Urban.

Although the area is relatively flat, source and receptors were modeled with consideration of terrain elevations. The AERMOD terrain processor (AERMAP) was used to calculate terrain elevations for each source and receptor from the U.S. Geological Survey (USGS) National Elevation Dataset (NED).

3.2.4 Building Downwash

When point sources are located near or on buildings or structures, the dispersion of the plume can be influenced. The wake produced on the lee side of the structure can cause the plume to be pulled toward the ground near the structure resulting in higher concentrations. This is called building downwash. Stack heights that minimize downwash effects are designated good engineering practice (GEP) stack heights.

The effects of building downwash have been examined in this modeling analysis. AERMOD uses the EPA-approved Building Profile Input Program with Plume Rise Model Enhancements (BPIP-PRIME) to provide input for the downwash analysis. This program calculates the GEP formula stack heights and direction-specific building dimensions for input to the dispersion calculations. BPIP-PRIME requires the input of building coordinates and heights, and stack coordinates. The heaters and process vents are project stationary point sources. The building downwash effects for these stacks are based on structures in the vicinity that were judged to have downwash potential.

3.2.5 Meteorological Data

The AERMOD-ready meteorological data sets for years 2006, 2007, 2008, 2009, and 2011 for the Long Beach, CA monitoring station were used for the analysis. These data sets were developed by SCAQMD using AERMET version 14134, the AERMOD meteorological data preprocessor, and provided for use in this analysis. The Long Beach meteorological station is located less than 3 miles east of the refinery. A windrose showing a graphical distribution of wind speed and wind direction for the time period modeled is shown in Attachment C-2.

3.2.6 Receptors

The receptors used to analyze project impacts include:

- 25-m spaced receptors along the outer facility boundary
- 100-m spaced receptors within the facility boundary and out to 1,000+ meters from the facility boundary
- 250-m spaced receptors beyond 1,000 m out to 3,500 m or more from the facility boundary

Receptor spacing was based on SCAQMD modeling guidance[9], which requires a fenceline spacing of 100 meters or less for facility areas greater than or equal to 100 acres. One

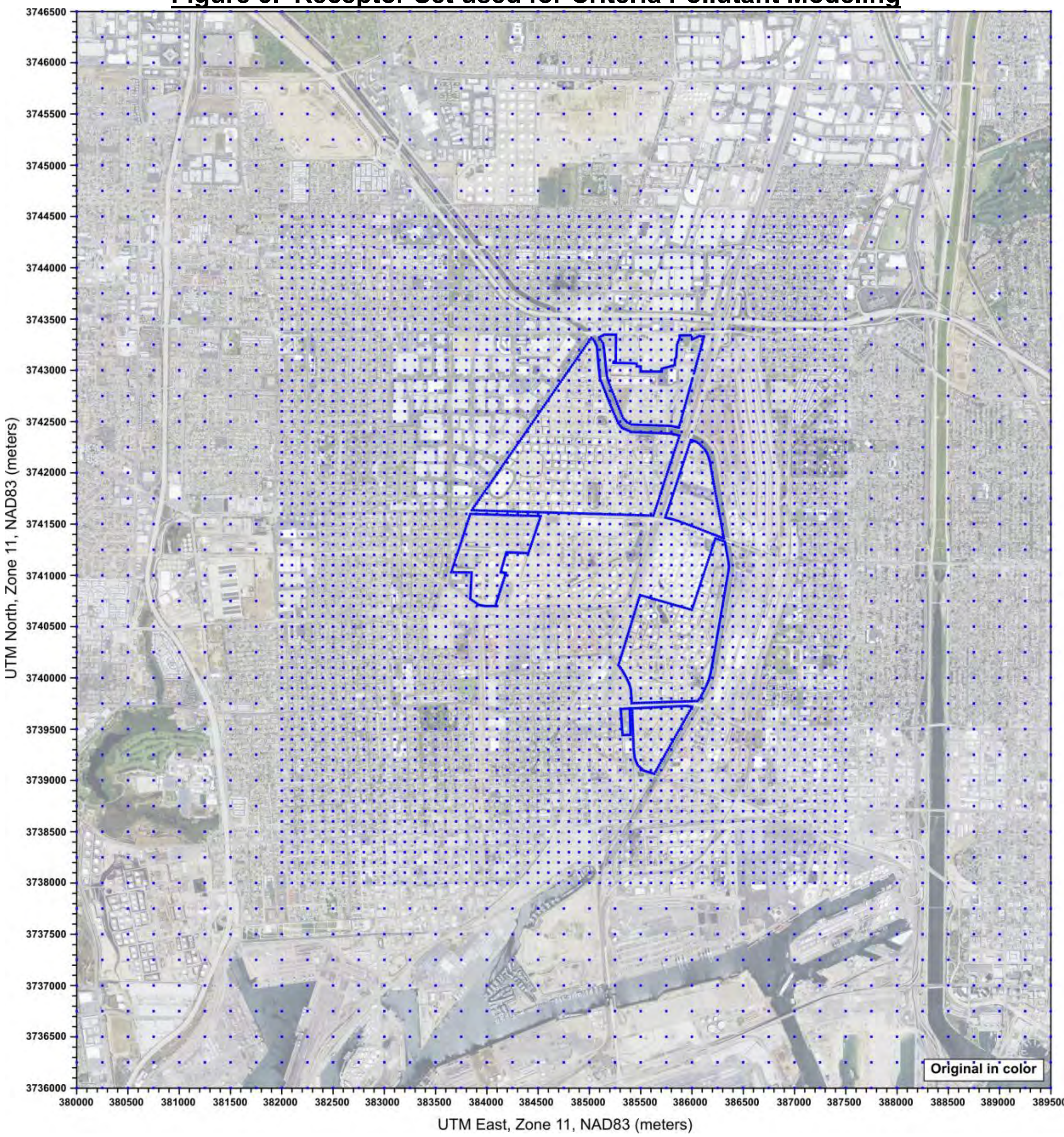
[9] http://www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/modeling-guidance

receptor along the facility boundary fell within the exclusion zone[10] of one of the volume sources representing the locomotive emissions. Per discussions with AQMD staff, this receptor was removed as the pollutant concentrations calculated for this receptor cannot be considered accurate. Since the receptor spacing requirement was 100 meters, and the actual spacing used was 25 meters, the spacing along the boundary where the receptor was removed remained within SCAQMD requirements. Receptor heights above ground were set to 0.0 meters, consistent with SCAQMD modeling guidance. This network is composed of Cartesian (X,Y) receptors with Universal Transverse Mercator (UTM) coordinates. The modeling was conducted using the North American Datum of 1983 (NAD83).

Figure 3 shows a plot of the receptors. A total of 5,738 receptors were included in the analysis. Receptors within facility boundaries were included in the modeling for the purpose of drawing more accurate isopleths in case any isopleth maps were generated. No analyses of modeling results were performed on receptors within facility boundaries. A list of the onsite receptor coordinates is included as Attachment C-3.

[10] Concentrations are not calculated by AERMOD in a source exclusion zone. For volume sources, the exclusion zone is the region [(2.15 x Sigma Y) + 1 meter)] from the center of the volume. See 12/6/2011 Memorandum entitled “Haul Road Workgroup Final Report” from Randy Robinson, EPA Region 5 and Mick Daye, EPA Region 7, to Tyler Fox, Leader, Air Quality Modeling Group and George Bridgers, Clearinghouse Coordinator, Air Quality Modeling Group.

Figure 3. Receptor Set used for Criteria Pollutant Modeling



4.0 MODELING RESULTS

The modeling results for NO_2, SO_2, and CO are summarized in Table ~~6~~7 along with the applicable AAQS. The results for PM_{10} and $PM_{2.5}$ are shown in Table ~~7~~8, along with the SCAQMD's Significant Impact Levels. A table showing results for each year modeled, as applicable, is provided in Attachment C-4.

The project's impact on attainment pollutants (NO_2, SO_2, and CO) is determined by adding the modeled increase to the representative background concentration and comparing the results to the AAQS (see Table 1). The maximum modeled value of the five years modeled was added to the maximum background concentration observed in the three year period 2012 – 2014 and compared to the appropriate AAQS, with the following exceptions:

- The federal 1-hr NO_2 standard is the 3-year average of each year's 98^{th} percentile daily maximum 1-hr average. Therefore, the background concentration for the federal 1-hr NO_2 standard is the 3-year average of each year's 98^{th} percentile daily maximum 1-hr average. The modeled concentration is the average of the 8^{th} highest daily maximum 1-hr averages for each of the five years modeled. The 8^{th} highest daily value is equivalent to the 98^{th} percentile value.
- The federal SO_2 1-hr standard is the 3-year average of the annual 99^{th} percentile daily maximum 1-hr average. As a conservative "first pass" the modeled maximum 1-hr average, rather than the 99th percentile values, was added to background (99^{th} percentile, 3-year average) for comparison.

Regarding NO_2, the emission increases that were modeled are actually NOx, of which a substantial fraction is NO. To convert modeling results from NOx to NO_2, a default 0.8 NOx:NO_2 ratio was used for hourly averages and 0.75 NOx:NO_2 ratio was used for annual averages, based on the Tier 2 approach per EPA guidance[11]. To be conservative, the Ozone Limiting Method was not used.

As shown in Table ~~6~~7, the maximum total concentrations (modeled impacts plus background) are less than the most stringent AAQS for NO_2, SO_2, and CO. Therefore, the modeled increases are not expected to create exceedances of AAQS. Notably, compliance with the state 1-hr SO_2 standard ensures compliance with the federal 3-hr SO_2 standard listed in Table 1. Impacts associated with ambient NO_2, SO_2, and CO concentrations therefore are expected to be less than significant.

In the case of particulate matter impacts, the comparisons made in Table ~~7~~8 demonstrate that modeled PM_{10} and $PM_{2.5}$ impacts are less than the Significant Impact Levels. The PM_{10} and $PM_{2.5}$ impacts therefore are also expected to be less than significant. As a conservative assumption, all calculated PM emissions represent PM, PM_{10} and $PM_{2.5}$.

[11] 9/30/2014 Memorandum from R. Chris Owen and Roger Brode, EPA Air Quality Modeling Group, to Regional Air Division Directors re: *Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO2 National Ambient Air Quality Standard*. See http://www.epa.gov/ttn/scram/guidance/clarification/NO2_Clarification_Memo-20140930.pdf.

The receptors with maximum concentrations as calculated by the model for all pollutants and averaging periods are shown in Figure 4. These receptors are located as follows:

- For 1-hr CO and 1-hr and annual NO_2, the maximum impacted receptors are those nearest to where the railroad tracks cross the facility boundary at the northeast portion of the refinery.
- For 8-hr CO, the receptor is located at the Carson operations fenceline where the locomotives and onsite trucks cross over the Dominguez Channel.
- For annual PM_{10} and $PM_{2.5}$ ~~and 8-hr CO, the receptors are located at the fenceline east of the onsite railroad tracks and Carson 51 Vacuum Unit and Naphtha HDS heaters stacks~~, the receptors are located at the fenceline east of the Wilmington coke barn loading area, immediately west of the Dominguez Channel.
- For 24-hr PM_{10} and $PM_{2.5}$ the receptors are located at the fenceline near the Carson Hydrocracker R1 and R2 heater stacks.
- For SO_2, the receptors are located at or near the fenceline around the southern portion of the refinery in the vicinity of the H100 heater stack and Sulfuric Acid Regeneration Plant combustion sources.

As can be seen, all maximum concentrations occurred at or near fenceline receptors, where people are not typically found. Regarding the disparate locations of the maximally impacted receptors, the NO_2 is impacted more by locomotive emissions and proximity of fenceline receptors to the locomotive sources, the CO and PM are impacted by both stationary ~~combustion~~ sources and locomotive sources, and SO_2 was impacted primarily by the Sulfuric Acid Plant and H-100 heater stack emissions.

The AERMOD input and output files are in Attachment C-5 (available separately).

~~**Table 6. Total Modeled NO_2, SO_2, and CO Concentrations Compared to AAQS**~~
Table 7. Total Modeled NO_2, SO_2, and CO Concentrations Compared to AAQS

Pollutant	Averaging Period	Concentrations (µg/m³)			
		Modeled Impact[a]	Background[b]	Total	AAQS
NO_2	1 Hour - State	~~45.9~~ 48.5	255.5	~~301.4~~ 304.0	339
	1 Hour - Federal[c]	~~38.6~~ 40.8	146.3	~~184.9~~ 187.1	188
	Annual	2.1	47.6	~~49.7~~ 49.6	57
SO_2	1 Hour - State	6.5	64.9	~~71.4~~ 71.5	655
	1 Hour – Federal[d]	6.5	40.0	46.6	196
	24 Hour	0.6	64.9	65.5	105
CO	1 Hour	~~10.4~~ 11.2	4,809.0	~~4,819.4~~ 4,820.2	23,000
	8 Hour	~~3.6~~ 5.1	2,977.0	~~2,980.6~~ 2,982.1	10,000

[a] Maximum concentration at any fenceline or offsite receptor, except for 1-hr federal NO_2 value. Modeled federal NO_2 1-hr value is the average of the 8th highest daily maximum 1-hr average for each of the five years modeled. NO_2 converted from NOx by using default factor of 0.8 for hourly and

0.75 for annual, per 9/30/2014 Memorandum from R. Chris Owen and Roger Brode, EPA Air Quality Modeling Group, to Regional Air Division Directors re: *Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO2 National Ambient Air Quality Standard*. See http://www.epa.gov/ttn/scram/guidance/clarification/NO2_Clarification_Memo-20140930.pdf.

[b] Background values taken from SCAQMD Air Quality Data Tables for 2012-2014 (downloaded 10/1/2015) for Station #033 (West Long Beach). Maximum value of the three years was used, except concentrations used to compare with federal standards were averages. See: http://www.aqmd.gov/home/library/air-quality-data-studies/historical-data-by-year.

Note: SCAQMD tables did not contain maximum 1-hr CO or maximum 24-hr SO_2 values for all three years. Those values were obtained from Jillian Wong of SCAQMD - see 10/8/2015 email from Jillian Wong to Michael Choi of Environmental Audit.

[c] Federal standard is the 98th percentile concentration, averaged over three years.

[d] Federal standard is the 99th percentile concentration, averaged over three years.

~~Table 7. Modeled Particulate Matter Impacts~~

Table 8. Modeled Particulate Matter Impacts

Pollutant	Averaging Period	Modeled Impact [a, b] ($\mu g/m^3$)	Significance Thresholds [~~b~~c] ($\mu g/m^3$)
PM_{10}	24 Hour	0.42	2.5
	Annual	~~0.16~~ 0.52	1
$PM_{2.5}$	24 Hour	0.42	2.5

[a] All PM emissions were conservatively assumed to be equal to PM_{10}, and those emissions were also conservatively assumed to be $PM_{2.5}$.

[b] Not all sources experience daily or hourly increases but do have annual increases. Therefore modeled annual concentrations may be greater than short term concentrations at some receptors.

[~~b~~c] SCAQMD Significant Increase in Concentration per Rule 1303 Table A-2 and SCAQMD Air Quality Significance Thresholds (see http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf).

~~**Figure 4. Location of Maximum Modeled Impacts**~~

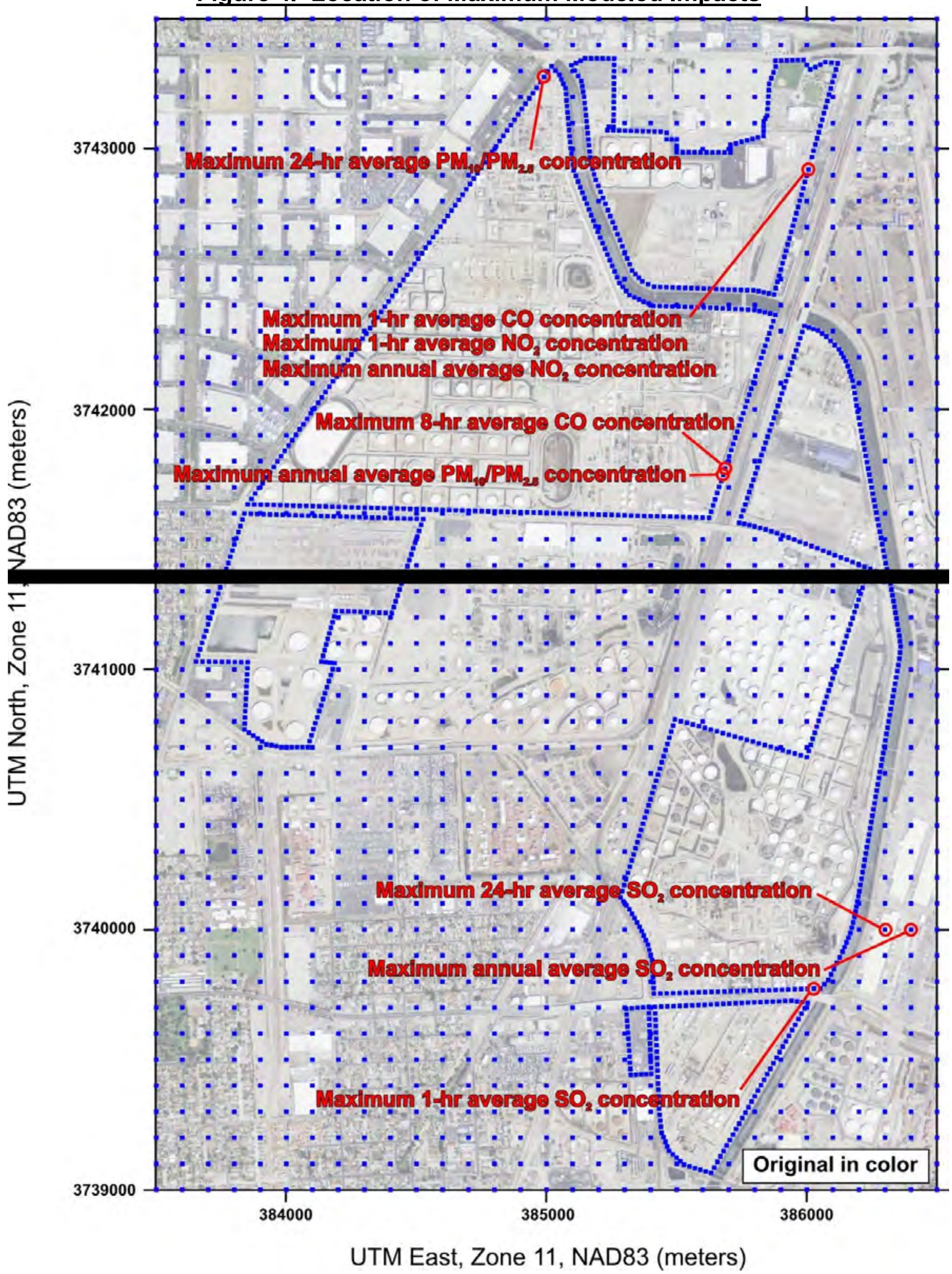
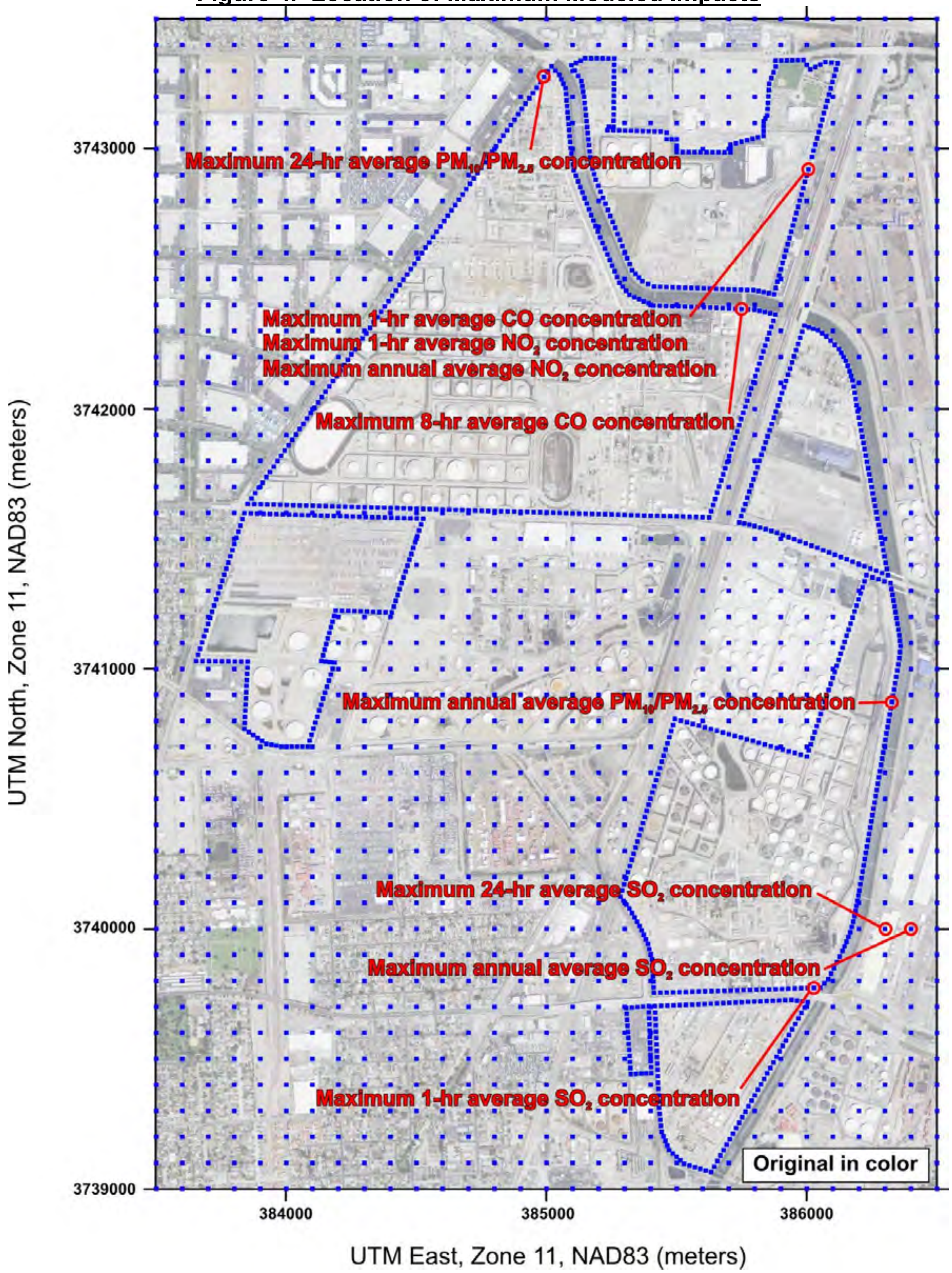


Figure 4. Location of Maximum Modeled Impacts



5.0 CONCLUSIONS

A detailed air dispersion modeling analysis of criteria pollutant impacts was performed using AERMOD. The results demonstrate that the potential increases in concentrations of NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$ are less than the SCAQMD's respective CEQA significance thresholds. Therefore, the impacts of criteria pollutant emissions from the proposed Tesoro Integration & Compliance Project are expected to be less than significant.

ATTACHMENT C-1 LOCOMOTIVE VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
RRB_0001	386097.2	3743023.1
RRB_0002	386091.8	3743018.2
RRB_0003	386086.4	3743013.2
RRB_0004	386081.0	3743008.3
RRB_0005	386075.6	3743003.3
RRB_0006	386070.2	3742998.4
RRB_0007	386064.8	3742993.4
RRB_0008	386059.5	3742988.5
RRB_0009	386054.1	3742983.5
RRB_0010	386048.7	3742978.6
RRB_0011	386043.3	3742973.6
RRB_0012	386037.9	3742968.7
RRB_0013	386032.5	3742963.7
RRB_0014	386027.1	3742958.8
RRB_0015	386021.7	3742953.9
RRB_0016	386016.3	3742948.9
RRB_0017	386010.9	3742944.0
RRB_0018	386005.5	3742939.0
RRB_0019	386000.2	3742934.1
RRB_0020	385994.8	3742929.1
RRB_0021	385989.4	3742924.2
RRB_0022	385984.0	3742919.3
RRB_0023	385978.6	3742914.3
RRB_0024	385973.2	3742909.4
RRB_0025	385967.8	3742904.4
RRB_0026	385962.6	3742899.3
RRB_0027	385958.4	3742893.3
RRB_0028	385954.2	3742887.4
RRB_0029	385949.9	3742881.4
RRB_0030	385945.7	3742875.4
RRB_0031	385941.5	3742869.5
RRB_0032	385937.2	3742863.5
RRB_0033	385933.0	3742857.5
RRB_0034	385928.8	3742851.6
RRB_0035	385924.8	3742845.4
RRB_0036	385921.2	3742839.0
RRB_0037	385917.7	3742832.6
RRB_0038	385914.2	3742826.2
RRB_0039	385910.6	3742819.8
RRB_0040	385907.1	3742813.4
RRB_0041	385903.6	3742807.0
RRB_0042	385900.0	3742800.6
RRB_0043	385896.5	3742794.2
RRB_0044	385893.0	3742787.8
RRB_0045	385889.4	3742781.4
RRB_0046	385886.4	3742774.8
RRB_0047	385883.3	3742768.1
RRB_0048	385880.3	3742761.4

Source ID	UTM (X)	UTM (Y)
RRB_0049	385877.2	3742754.8
RRB_0050	385874.2	3742748.1
RRB_0051	385871.2	3742741.5
RRB_0052	385868.1	3742734.8
RRB_0053	385865.1	3742728.2
RRB_0054	385862.1	3742721.5
RRB_0055	385859.0	3742714.9
RRB_0056	385856.2	3742708.1
RRB_0057	385853.7	3742701.3
RRB_0058	385851.2	3742694.4
RRB_0059	385848.6	3742687.5
RRB_0060	385846.1	3742680.6
RRB_0061	385843.6	3742673.8
RRB_0062	385841.1	3742666.9
RRB_0063	385838.6	3742660.0
RRB_0064	385836.1	3742653.2
RRB_0065	385833.6	3742646.3
RRB_0066	385831.1	3742639.4
RRB_0067	385828.6	3742632.6
RRB_0068	385826.0	3742625.7
RRB_0069	385823.5	3742618.8
RRB_0070	385821.0	3742611.9
RRB_0071	385818.5	3742605.1
RRB_0072	385957.8	3742896.2
RRB_0073	385952.3	3742891.4
RRB_0074	385946.8	3742886.6
RRB_0075	385941.3	3742881.7
RRB_0076	385935.9	3742876.9
RRB_0077	385930.4	3742872.1
RRB_0078	385924.9	3742867.2
RRB_0079	385919.4	3742862.4
RRB_0080	385913.9	3742857.6
RRB_0081	385908.4	3742852.7
RRB_0082	385902.9	3742847.9
RRB_0083	385897.5	3742843.0
RRB_0084	385892.5	3742837.6
RRB_0085	385887.6	3742832.3
RRB_0086	385882.6	3742826.9
RRB_0087	385877.6	3742821.5
RRB_0088	385872.7	3742816.1
RRB_0089	385868.3	3742810.3
RRB_0090	385864.0	3742804.4
RRB_0091	385859.6	3742798.5
RRB_0092	385855.3	3742792.6
RRB_0093	385850.9	3742786.7
RRB_0094	385847.1	3742780.5
RRB_0095	385843.3	3742774.3
RRB_0096	385839.4	3742768.0

ATTACHMENT C-1 LOCOMOTIVE VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
RRB_0097	385835.6	3742761.8
RRB_0098	385831.8	3742755.5
RRG_0001	385746.3	3742060.3
RRG_0002	385749.3	3742066.9
RRG_0003	385752.3	3742073.6
RRG_0004	385755.4	3742080.2
RRG_0005	385758.4	3742086.9
RRG_0006	385761.4	3742093.6
RRG_0007	385764.5	3742100.2
RRG_0008	385767.5	3742106.9
RRG_0009	385770.5	3742113.5
RRG_0010	385773.6	3742120.2
RRG_0011	385776.6	3742126.8
RRG_0012	385779.6	3742133.5
RRG_0013	385782.7	3742140.2
RRG_0014	385785.7	3742146.8
RRG_0015	385788.7	3742153.5
RRG_0016	385791.8	3742160.1
RRG_0017	385794.8	3742166.8
RRG_0018	385797.8	3742173.4
RRG_0019	385800.9	3742180.1
RRG_0020	385803.9	3742186.8
RRG_0021	385805.8	3742190.8
RRG_0022	385786.9	3742656.6
RRG_0023	385785.0	3742649.5
RRG_0024	385783.1	3742642.5
RRG_0025	385781.3	3742635.4
RRG_0026	385779.9	3742628.2
RRG_0027	385779.2	3742620.9
RRG_0028	385778.4	3742613.7
RRG_0029	385777.7	3742606.4
RRG_0030	385777.0	3742599.1
RRG_0031	385776.2	3742591.8
RRG_0032	385775.5	3742584.6
RRG_0033	385774.8	3742577.3
RRG_0034	385774.0	3742570.0
RRG_0035	385773.3	3742562.7
RRG_0036	385772.6	3742555.4
RRG_0037	385771.8	3742548.2
RRG_0038	385771.1	3742540.9
RRG_0039	385770.4	3742533.6
RRG_0040	385769.6	3742526.3
RRG_0041	385768.9	3742519.1
RRG_0042	385768.1	3742511.8
RRG_0043	385767.4	3742504.5
RRG_0044	385766.7	3742497.2
RRG_0045	385765.9	3742489.9
RRG_0046	385765.2	3742482.7

Source ID	UTM (X)	UTM (Y)
RRG_0047	385764.7	3742475.4
RRG_0048	385764.6	3742468.1
RRG_0049	385764.5	3742460.7
RRG_0050	385764.4	3742453.4
RRG_0051	385764.3	3742446.1
RRG_0052	385764.2	3742438.8
RRG_0053	385764.1	3742431.5
RRG_0054	385764.0	3742424.2
RRG_0055	385764.0	3742416.9
RRG_0056	385763.9	3742409.5
RRG_0057	385763.8	3742402.2
RRG_0058	385763.7	3742394.9
RRG_0059	385763.6	3742387.6
RRG_0060	385763.5	3742380.3
RRG_0061	385763.4	3742373.0
RRG_0062	385763.3	3742365.7
RRG_0063	385763.2	3742358.3
RRG_0064	385762.9	3742351.0
RRG_0065	385762.6	3742343.7
RRG_0066	385762.2	3742336.4
RRG_0067	385761.9	3742329.1
RRG_0068	385761.6	3742321.8
RRG_0069	385761.3	3742314.5
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RRG_0072	385759.1	3742292.7
RRG_0073	385758.2	3742285.4
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RRG_0075	385756.7	3742270.8
RRG_0076	385755.9	3742263.6
RRG_0077	385755.2	3742256.3
RRG_0078	385754.4	3742249.0
RRG_0079	385753.7	3742241.7
RRG_0080	385753.6	3742234.4
RRG_0081	385753.5	3742227.1
RRG_0082	385753.5	3742219.8
RRG_0083	385753.4	3742212.5
RRG_0084	385753.4	3742205.2
RRG_0085	385753.4	3742197.9
RRG_0086	385753.3	3742190.5
RRG_0087	385753.3	3742183.2
RRG_0088	385753.2	3742175.9
RRG_0089	385753.2	3742168.6
RRG_0090	385753.1	3742161.3
RRG_0091	385753.1	3742154.0
RRG_0092	385753.1	3742146.7
RRG_0093	385753.0	3742139.3
RRG_0094	385753.0	3742132.0

ATTACHMENT C-1 LOCOMOTIVE VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
RRG_0095	385752.9	3742124.7
RRG_0096	385752.9	3742117.4
RRG_0097	385751.8	3742110.2
RRG_0098	385750.7	3742102.9
RRG_0099	385749.5	3742095.7
RRG_0100	385748.4	3742088.5
RRG_0101	385747.2	3742081.3
RRG_0102	385746.1	3742074.0
RRG_0103	385744.9	3742066.8
RRG_0104	385743.8	3742059.6
RRG_0105	385742.1	3742052.5
RRG_0106	385739.9	3742045.5
RRG_0107	385737.8	3742038.5
RRG_0108	385735.7	3742031.5
RRG_0109	385733.5	3742024.5
RRG_0110	385731.4	3742017.5
RRG_0111	385729.3	3742010.5
RRG_0112	385727.1	3742003.5
RRG_0113	385725.0	3741996.5
RRG_0114	385722.9	3741989.5
RRG_0115	385720.7	3741982.5
RRG_0116	385718.6	3741975.5
RRG_0117	385716.5	3741968.5
RRG_0118	385714.4	3741961.5
RRG_0119	385712.2	3741954.5
RRG_0120	385710.1	3741947.5
RRG_0121	385708.0	3741940.5
RRG_0122	385705.8	3741933.5
RRG_0123	385703.7	3741926.5
RRG_0124	385701.6	3741919.5
RRG_0125	385699.4	3741912.5
RRG_0126	385697.3	3741905.5
RRG_0127	385695.2	3741898.5
RRG_0128	385693.0	3741891.6
RRG_0129	385690.9	3741884.6
RRG_0130	385688.8	3741877.6
RRG_0131	385686.6	3741870.6
RRG_0132	385684.5	3741863.6
RRG_0133	385682.4	3741856.6
RRG_0134	385680.2	3741849.6
RRG_0135	385678.1	3741842.6
RRG_0136	385676.0	3741835.6
RRG_0137	385673.8	3741828.6
RRG_0138	385671.7	3741821.6
RRG_0139	385669.6	3741814.6
RRG_0140	385667.4	3741807.6
RRG_0141	385665.3	3741800.6
RRG_0142	385663.2	3741793.6
RRG_0143	385661.0	3741786.6
RRG_0144	385658.9	3741779.6
RRG_0145	385656.8	3741772.6
RRG_0146	385654.6	3741765.6
RRG_0147	385652.5	3741758.6
RRG_0148	385650.4	3741751.6
RRG_0149	385648.2	3741744.6
RRG_0150	385646.1	3741737.6
RRG_0151	385644.0	3741730.6
RRG_0152	385641.8	3741723.6
RRG_0153	385639.7	3741716.6
RRG_0154	385637.6	3741709.6
RRG_0155	385635.4	3741702.6
RRG_0156	385633.3	3741695.6
RRG_0157	385631.2	3741688.6
RRG_0158	385629.1	3741681.6
RRG_0159	385626.9	3741674.6
RRG_0160	385624.9	3741667.6
RRG_0161	385624.0	3741660.3
RRG_0162	385623.1	3741653.1
RRG_0163	385623.8	3741645.9
RRG_0164	385625.5	3741638.8
RRG_0165	385627.2	3741631.7
RRG_0166	385628.9	3741624.6
RRG_0167	385630.5	3741617.4
RRG_0168	385632.2	3741610.3
RRG_0169	385633.9	3741603.2
RRG_0170	385635.6	3741596.1
RRG_0171	385637.2	3741589.0
RRG_0172	385638.9	3741581.8
RRG_0173	385640.6	3741574.7
RRG_0174	385642.3	3741567.6
RRG_0175	385642.9	3741560.3
RRG_0176	385643.2	3741553.0
RRG_0177	385643.0	3741545.8
RRG_0178	385640.8	3741538.8
RRG_0179	385638.5	3741531.9
RRG_0180	385636.3	3741524.9
RRG_0181	385634.0	3741517.9
RRG_0182	385631.8	3741511.0
RRG_0183	385629.5	3741504.0
RRG_0184	385627.3	3741497.1
RRG_0185	385625.0	3741490.1
RRG_0186	385622.8	3741483.1
RRG_0187	385620.5	3741476.2
RRG_0188	385618.3	3741469.2
RRG_0189	385616.1	3741462.2
RRG_0190	385613.8	3741455.3

ATTACHMENT C-1 LOCOMOTIVE VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
RRG_0191	385611.6	3741448.3
RRG_0192	385609.3	3741441.4
RRG_0193	385607.1	3741434.4
RRG_0194	385604.8	3741427.4
RRG_0195	385602.6	3741420.5
RRG_0196	385600.3	3741413.5
RRG_0197	385598.1	3741406.6
RRG_0198	385595.8	3741399.6
RRG_0199	385593.6	3741392.6
RRG_0200	385591.3	3741385.7
RRG_0201	385632.4	3741598.9
RRG_0202	385629.1	3741605.5
RRG_0203	385625.9	3741612.0
RRG_0204	385622.6	3741618.6
RRG_0205	385619.4	3741625.1
RRG_0206	385616.1	3741631.7
RRG_0207	385612.9	3741638.2
RRG_0208	385609.6	3741644.8
RRG_0209	385606.4	3741651.3
RRG_0210	385603.1	3741657.9
RRG_0211	385599.9	3741664.4
RRG_0212	385596.6	3741671.0
RRG_0213	385593.4	3741677.6
RRG_0214	385591.0	3741684.4
RRG_0215	385589.5	3741691.6
RRG_0216	385588.1	3741698.7
RRG_0217	385586.6	3741705.9
RRG_0218	385585.1	3741713.1
RRG_0219	385583.6	3741720.2
RRG_0220	385582.1	3741727.4
RRG_0221	385580.7	3741734.6
RRG_0222	385579.2	3741741.7
RRG_0223	385577.7	3741748.9
RRG_0224	385576.2	3741756.1
RRG_0225	385574.8	3741763.2
RRG_0226	385573.3	3741770.4
RRG_0227	385571.8	3741777.5
RRG_0228	385570.3	3741784.7
RRG_0229	385568.9	3741791.9
RRG_0230	385567.4	3741799.0
RRG_0231	385565.9	3741806.2
RRG_0232	385564.4	3741813.4
RRG_0233	385563.0	3741820.5
RRG_0234	385561.5	3741827.7
RRG_0235	385560.0	3741834.9
RRG_0236	385558.5	3741842.0
RRG_0237	385557.1	3741849.2
RRG_0238	385555.6	3741856.4

Source ID	UTM (X)	UTM (Y)
RRG_0239	385554.1	3741863.5
RRG_0240	385552.6	3741870.7
RRG_0241	385551.2	3741877.9
RRG_0242	385549.7	3741885.0
RRG_0243	385548.2	3741892.2
RRG_0244	385546.7	3741899.4
RRG_0245	385545.3	3741906.5
RRG_0246	385543.8	3741913.7
RRG_0247	385542.3	3741920.8
RRG_0248	385540.8	3741928.0
RRG_0249	385539.4	3741935.2
RRG_0250	385537.9	3741942.3
RRG_0251	385536.4	3741949.5
RRG_0252	385534.9	3741956.7
RRG_0253	385533.5	3741963.8
RRG_0254	385532.0	3741971.0
RRG_0255	385530.5	3741978.2
RRG_0256	385529.0	3741985.3
RRG_0257	385527.6	3741992.5
RRG_0258	385526.1	3741999.7
RRG_0259	385524.6	3742006.8
RRG_0260	385523.1	3742014.0
RRG_0261	385521.7	3742021.2
RRG_0262	385520.2	3742028.3
RRG_0263	385518.4	3742035.4
RRG_0264	385516.1	3742042.3
RRG_0265	385513.8	3742049.3
RRG_0266	385511.2	3742056.1
RRG_0267	385507.6	3742062.4
RRG_0268	385503.9	3742068.8
RRG_0269	385500.2	3742075.1
RRG_0270	385496.5	3742081.4
RRG_0271	385492.8	3742087.7
RRG_0272	385489.1	3742094.0
RRG_0273	385485.4	3742100.3
RRG_0274	385481.8	3742106.7
RRG_0275	385478.1	3742113.0
RRG_0276	385474.4	3742119.3
RRG_0277	385470.7	3742125.6
RRG_0278	385467.0	3742131.9
RRG_0279	385463.9	3742138.6
RRG_0280	385461.0	3742145.3
RRG_0281	385458.1	3742152.0
RRG_0282	385455.2	3742158.7
RRG_0283	385452.3	3742165.4
RRG_0284	385449.4	3742172.1
RRG_0285	385446.5	3742178.9
RRG_0286	385443.6	3742185.6

ATTACHMENT C-1 LOCOMOTIVE VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
RRG_0287	385440.7	3742192.3
RRG_0288	385437.8	3742199.0
RRG_0289	385434.9	3742205.7
RRG_0290	385432.0	3742212.4
RRG_0291	385429.1	3742219.2
RRG_0292	385426.3	3742225.9
RRG_0293	385423.4	3742232.6
RRG_0294	385420.5	3742239.3
RRG_0295	385417.6	3742246.0
RRG_0296	385414.7	3742252.8
RRG_0297	385411.8	3742259.5
RRG_0298	385408.9	3742266.2
RRG_0299	385406.0	3742272.9
RRG_0300	385403.1	3742279.6
RRG_0301	385400.2	3742286.3
RRG_0302	385397.3	3742293.1
RRG_0303	385394.4	3742299.8

ATTACHMENT C-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)	Source ID	UTM (X)	UTM (Y)
WLM_0001	385861.2	3739771	WLM_0049	385751.2	3739955
WLM_0002	385860.9	3739777	WLM_0050	385745.2	3739953
WLM_0003	385860.5	3739783	WLM_0051	385739.2	3739952
WLM_0004	385860.1	3739789	WLM_0052	385733.2	3739951
WLM_0005	385859.7	3739795	WLM_0053	385728.1	3739949
WLM_0006	385859.3	3739801	WLM_0054	385723.8	3739944
WLM_0007	385859	3739807	WLM_0055	385719.6	3739940
WLM_0008	385858.6	3739813	WLM_0056	385713.8	3739939
WLM_0009	385858.2	3739819	WLM_0057	385707.7	3739938
WLM_0010	385857.8	3739825	WLM_0058	385701.7	3739937
WLM_0011	385857.4	3739831	WLM_0059	385695.6	3739937
WLM_0012	385857.1	3739838	WLM_0060	385689.5	3739936
WLM_0013	385856.7	3739844	WLM_0061	385683.5	3739936
WLM_0014	385856.3	3739850	WLM_0062	385677.4	3739935
WLM_0015	385855.9	3739856	WLM_0063	385671.3	3739935
WLM_0016	385855.5	3739862	WLM_0064	385665.2	3739935
WLM_0017	385855.1	3739868	WLM_0065	385659.1	3739934
WLM_0018	385854.8	3739874	WLM_0066	385653	3739934
WLM_0019	385854.4	3739880	WLM_0067	385646.9	3739934
WLM_0020	385854	3739886	WLM_0068	385640.8	3739933
WLM_0021	385853.6	3739892	WLM_0069	385634.8	3739933
WLM_0022	385853.2	3739898	WLM_0070	385628.7	3739933
WLM_0023	385852.9	3739904	WLM_0071	385622.6	3739932
WLM_0024	385852.5	3739911	WLM_0072	385616.5	3739932
WLM_0025	385852.1	3739917	WLM_0073	385610.4	3739932
WLM_0026	385851.7	3739923	WLM_0074	385604.3	3739931
WLM_0027	385851.3	3739929	WLM_0075	385598.2	3739931
WLM_0028	385850.9	3739935	WLM_0076	385592.1	3739931
WLM_0029	385850.6	3739941	WLM_0077	385586.1	3739930
WLM_0030	385850.2	3739947	WLM_0078	385580	3739930
WLM_0031	385849.8	3739953	WLM_0079	385573.9	3739930
WLM_0032	385848.8	3739959	WLM_0080	385567.8	3739930
WLM_0033	385844.6	3739963	WLM_0081	385561.7	3739929
WLM_0034	385840.4	3739968	WLM_0082	385555.6	3739929
WLM_0035	385835.3	3739969	WLM_0083	385549.5	3739929
WLM_0036	385829.3	3739968	WLM_0084	385543.4	3739928
WLM_0037	385823.2	3739967	WLM_0085	385537.4	3739928
WLM_0038	385817.2	3739966	WLM_0086	385531.3	3739928
WLM_0039	385811.2	3739965	WLM_0087	385525.2	3739927
WLM_0040	385805.2	3739964	WLM_0088	385519.1	3739927
WLM_0041	385799.2	3739963	WLM_0089	385513	3739927
WLM_0042	385793.2	3739962	WLM_0090	385506.9	3739926
WLM_0043	385787.2	3739961	WLM_0091	385500.8	3739926
WLM_0044	385781.2	3739960	WLM_0092	385494.7	3739926
WLM_0045	385775.2	3739959	WLM_0093	385488.7	3739925
WLM_0046	385769.2	3739958	WLM_0094	385482.6	3739925
WLM_0047	385763.2	3739957	WLM_0095	385476.5	3739925
WLM_0048	385757.2	3739956	WLM_0096	385470.4	3739924

ATTACHMENT C-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
WLM_0097	385464.3	3739924
WLM_0098	385458.2	3739924
WLM_0099	385452.1	3739923
WLM_0100	385446	3739923
WLM_0101	385440	3739923
WLM_0102	385433.9	3739922
WLM_0103	385427.8	3739922
WLM_0104	385426.6	3739917
WLM_0105	385427	3739911
WLM_0106	385427.4	3739905
WLM_0107	385427.7	3739899
WLM_0108	385428.1	3739893
WLM_0109	385428.5	3739887
WLM_0110	385428.8	3739881
WLM_0111	385429.2	3739875
WLM_0112	385429.6	3739869
WLM_0113	385429.9	3739863
WLM_0114	385430.3	3739857
WLM_0115	385430.7	3739850
WLM_0116	385431	3739844
WLM_0117	385431.4	3739838
WLM_0118	385431.8	3739832
WLM_0119	385432.1	3739826
WLM_0120	385432.5	3739820
WLM_0121	385432.9	3739814
WLM_0122	385433.2	3739808
WLM_0123	385433.6	3739802
WLM_0124	385434	3739796
WLM_0125	385434.3	3739790
WLM_0126	385434.7	3739783
WLM_0127	385435.1	3739777
WLM_0128	385435.4	3739771
WLM_0129	385435.8	3739765
WLM_0130	385436.2	3739759
WLM_0131	385441.9	3739759
WLM_0132	385448	3739759
WLM_0133	385454.1	3739760
WLM_0134	385460.2	3739760
WLM_0135	385466.3	3739760
WLM_0136	385472.4	3739760
WLM_0137	385478.5	3739761
WLM_0138	385484.6	3739761
WLM_0139	385490.7	3739761
WLM_0140	385496.7	3739761
WLM_0141	385502.8	3739762
WLM_0142	385508.9	3739762
WLM_0143	385515	3739762
WLM_0144	385521.1	3739762

Source ID	UTM (X)	UTM (Y)
WLM_0145	385527.2	3739763
WLM_0146	385533.3	3739763
WLM_0147	385539.4	3739763
WLM_0148	385545.5	3739763
WLM_0149	385551.6	3739764
WLM_0150	385557.7	3739764
WLM_0151	385563.7	3739764
WLM_0152	385569.8	3739765
WLM_0153	385575.9	3739765
WLM_0154	385576.8	3739759
CAR_0001	384739.7	3742649
CAR_0002	384745.8	3742648
CAR_0003	384751.9	3742648
CAR_0004	384758	3742648
CAR_0005	384764	3742648
CAR_0006	384770.1	3742648
CAR_0007	384776.2	3742647
CAR_0008	384782.3	3742647
CAR_0009	384788.4	3742647
CAR_0010	384794.5	3742647
CAR_0011	384800.6	3742647
CAR_0012	384806.7	3742646
CAR_0013	384812.8	3742646
CAR_0014	384818.9	3742646
CAR_0015	384825	3742646
CAR_0016	384831.1	3742646
CAR_0017	384837.2	3742645
CAR_0018	384843.3	3742645
CAR_0019	384849.3	3742645
CAR_0020	384855.4	3742645
CAR_0021	384861.5	3742645
CAR_0022	384867.6	3742644
CAR_0023	384873.7	3742644
CAR_0024	384879.8	3742644
CAR_0025	384885.9	3742644
CAR_0026	384892	3742644
CAR_0027	384898.1	3742643
CAR_0028	384904.2	3742643
CAR_0029	384910.3	3742643
CAR_0030	384916.4	3742643
CAR_0031	384922.5	3742643
CAR_0032	384928.5	3742642
CAR_0033	384934.6	3742642
CAR_0034	384940.7	3742642
CAR_0035	384946.8	3742642
CAR_0036	384952.9	3742642
CAR_0037	384959	3742641
CAR_0038	384965.1	3742641

ATTACHMENT C-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)	Source ID	UTM (X)	UTM (Y)
CAR_0039	384971.2	3742641	CAR_0087	385220.6	3742568
CAR_0040	384977.3	3742641	CAR_0088	385223.1	3742562
CAR_0041	384983.4	3742641	CAR_0089	385225.5	3742557
CAR_0042	384989.5	3742640	CAR_0090	385227.9	3742551
CAR_0043	384995.6	3742640	CAR_0091	385230.4	3742545
CAR_0044	385001.7	3742640	CAR_0092	385232.8	3742540
CAR_0045	385007.8	3742640	CAR_0093	385235.3	3742534
CAR_0046	385013.8	3742640	CAR_0094	385237.7	3742529
CAR_0047	385019.9	3742639	CAR_0095	385240.2	3742523
CAR_0048	385026	3742639	CAR_0096	385242.6	3742518
CAR_0049	385032.1	3742639	CAR_0097	385245.1	3742512
CAR_0050	385038.2	3742639	CAR_0098	385247.5	3742506
CAR_0051	385044.3	3742639	CAR_0099	385249.9	3742501
CAR_0052	385050.4	3742638	CAR_0100	385252.4	3742495
CAR_0053	385056.5	3742638	CAR_0101	385254.8	3742490
CAR_0054	385062.6	3742638	CAR_0102	385257.3	3742484
CAR_0055	385068.7	3742638	CAR_0103	385259.7	3742478
CAR_0056	385074.8	3742638	CAR_0104	385262.2	3742473
CAR_0057	385080.9	3742637	CAR_0105	385264.6	3742467
CAR_0058	385087	3742637	CAR_0106	385267	3742462
CAR_0059	385093	3742637	CAR_0107	385269.5	3742456
CAR_0060	385099.1	3742637	CAR_0108	385271.9	3742451
CAR_0061	385105.2	3742637	CAR_0109	385274.4	3742445
CAR_0062	385111.3	3742636	CAR_0110	385276.8	3742439
CAR_0063	385117.4	3742636	CAR_0111	385279.3	3742434
CAR_0064	385123.5	3742636	CAR_0112	385281.7	3742428
CAR_0065	385129.6	3742636	CAR_0113	385284.1	3742423
CAR_0066	385135.7	3742635	CAR_0114	385286.6	3742417
CAR_0067	385141.8	3742635	CAR_0115	385289	3742411
CAR_0068	385147.9	3742635	CAR_0116	385291.5	3742406
CAR_0069	385154	3742635	CAR_0117	385293.9	3742400
CAR_0070	385160.1	3742635	CAR_0118	385296.4	3742395
CAR_0071	385166.2	3742634	CAR_0119	385298.8	3742389
CAR_0072	385172.3	3742634	CAR_0120	385301.2	3742383
CAR_0073	385178.3	3742634	CAR_0121	385303.7	3742378
CAR_0074	385184.4	3742634	CAR_0122	385306.1	3742372
CAR_0075	385190.5	3742634	CAR_0123	385308.6	3742367
CAR_0076	385193.7	3742629	CAR_0124	385311	3742361
CAR_0077	385196.2	3742624	CAR_0125	385313.5	3742356
CAR_0078	385198.6	3742618	CAR_0126	385315.9	3742350
CAR_0079	385201.1	3742612	CAR_0127	385318.4	3742344
CAR_0080	385203.5	3742607	CAR_0128	385320.8	3742339
CAR_0081	385206	3742601	CAR_0129	385323.2	3742333
CAR_0082	385208.4	3742596	CAR_0130	385325.7	3742328
CAR_0083	385210.8	3742590	CAR_0131	385328.1	3742322
CAR_0084	385213.3	3742585	CAR_0132	385330.6	3742316
CAR_0085	385215.7	3742579	CAR_0133	385333	3742311
CAR_0086	385218.2	3742573	CAR_0134	385335.5	3742305

ATTACHMENT C-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)	Source ID	UTM (X)	UTM (Y)
CAR_0135	385337.9	3742300	CAR_0183	385401.6	3742053
CAR_0136	385340.3	3742294	CAR_0184	385407.7	3742053
CAR_0137	385342.8	3742289	CAR_0185	385413.7	3742052
CAR_0138	385345.2	3742283	CAR_0186	385419.8	3742052
CAR_0139	385347.7	3742277	CAR_0187	385425.9	3742052
CAR_0140	385350.1	3742272	CAR_0188	385432	3742052
CAR_0141	385352.6	3742266	CAR_0189	385438.1	3742052
CAR_0142	385355	3742261	CAR_0190	385444.2	3742052
CAR_0143	385357.4	3742255	CAR_0191	385450.3	3742052
CAR_0144	385359.9	3742249	CAR_0192	385456.4	3742052
CAR_0145	385362.3	3742244	CAR_0193	385462.5	3742052
CAR_0146	385364.8	3742238	CAR_0194	385468.6	3742051
CAR_0147	385366.4	3742233	CAR_0195	385474.7	3742051
CAR_0148	385366.3	3742226	CAR_0196	385480.8	3742051
CAR_0149	385366.1	3742220	CAR_0197	385486.9	3742051
CAR_0150	385365.9	3742214	CAR_0198	385493	3742051
CAR_0151	385365.8	3742208	CAR_0199	385499.1	3742051
CAR_0152	385365.6	3742202	CAR_0200	385505.2	3742051
CAR_0153	385365.4	3742196	CAR_0201	385511.3	3742051
CAR_0154	385365.2	3742190	CAR_0202	385517.4	3742051
CAR_0155	385365.1	3742184	CAR_0203	385523.5	3742050
CAR_0156	385364.9	3742178	CAR_0204	385529.6	3742050
CAR_0157	385364.7	3742172	CAR_0205	385535.6	3742050
CAR_0158	385364.6	3742166	CAR_0206	385541.7	3742050
CAR_0159	385364.4	3742159	CAR_0207	385547.8	3742050
CAR_0160	385364.2	3742153	CAR_0208	385553.9	3742050
CAR_0161	385364	3742147	CAR_0209	385560	3742050
CAR_0162	385363.9	3742141	CAR_0210	385566.1	3742050
CAR_0163	385363.7	3742135	CAR_0211	385572.2	3742050
CAR_0164	385363.5	3742129	CAR_0212	385578.3	3742049
CAR_0165	385363.3	3742123	CAR_0213	385584.4	3742049
CAR_0166	385363.2	3742117	CAR_0214	385590.5	3742049
CAR_0167	385363	3742111	CAR_0215	385596.6	3742049
CAR_0168	385362.8	3742105	CAR_0216	385602.7	3742049
CAR_0169	385362.7	3742098	CAR_0217	385608.8	3742049
CAR_0170	385362.5	3742092	CAR_0218	385614.9	3742049
CAR_0171	385362.3	3742086	CAR_0219	385621	3742049
CAR_0172	385362.1	3742080	CAR_0220	385627.1	3742049
CAR_0173	385362	3742074	CAR_0221	385632.6	3742051
CAR_0174	385361.8	3742068	CAR_0222	385638	3742054
CAR_0175	385361.6	3742062	CAR_0223	385643.4	3742057
CAR_0176	385361.5	3742056	CAR_0224	385648.8	3742060
CAR_0177	385365	3742053	CAR_0225	385654.3	3742062
CAR_0178	385371.1	3742053	CAR_0226	385659.7	3742065
CAR_0179	385377.2	3742053	CAR_0227	385665.1	3742068
CAR_0180	385383.3	3742053	CAR_0228	385670.6	3742071
CAR_0181	385389.4	3742053	CAR_0229	385676	3742073
CAR_0182	385395.5	3742053	CAR_0230	385681.4	3742076

ATTACHMENT C-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
CAR_0231	385686.9	3742079
CAR_0232	385692.3	3742082
CAR_0233	385697.7	3742084
CAR_0234	385703.1	3742087
CAR_0235	385708.6	3742090
CAR_0236	385714	3742093
CAR_0237	385719.4	3742096
CAR_0238	385724.9	3742098
CAR_0239	385730.3	3742101
CAR_0240	385735.7	3742104
CAR_0241	385741.2	3742107
CAR_0242	385746.6	3742109
CAR_0243	385746.9	3742115
CAR_0244	385747.1	3742121
CAR_0245	385747.3	3742128
CAR_0246	385747.5	3742134
CAR_0247	385747.7	3742140
CAR_0248	385747.9	3742146
CAR_0249	385748.1	3742152
CAR_0250	385748.2	3742158
CAR_0251	385748.4	3742164
CAR_0252	385748.6	3742170
CAR_0253	385748.8	3742176
CAR_0254	385749	3742182
CAR_0255	385749.2	3742189
CAR_0256	385749.4	3742195
CAR_0257	385749.6	3742201
CAR_0258	385749.8	3742207
CAR_0259	385750	3742213
CAR_0260	385750.2	3742219
CAR_0261	385750.4	3742225
CAR_0262	385750.6	3742231
CAR_0263	385750.8	3742237
CAR_0264	385751	3742243
CAR_0265	385751.2	3742249
CAR_0266	385751.4	3742256
CAR_0267	385751.6	3742262
CAR_0268	385751.8	3742268
CAR_0269	385752	3742274
CAR_0270	385752.2	3742280
CAR_0271	385752.5	3742286
CAR_0272	385752.7	3742292
CAR_0273	385753	3742298
CAR_0274	385753.2	3742304
CAR_0275	385753.5	3742310
CAR_0276	385753.7	3742316
CAR_0277	385754	3742323
CAR_0278	385754.2	3742329

Source ID	UTM (X)	UTM (Y)
CAR_0279	385754.5	3742335
CAR_0280	385754.7	3742341
CAR_0281	385755	3742347
CAR_0282	385755.2	3742353
CAR_0283	385755.5	3742359
CAR_0284	385755.7	3742365
CAR_0285	385756	3742371
CAR_0286	385756.2	3742377
CAR_0287	385756.5	3742383
CAR_0288	385756.7	3742390
CAR_0289	385756.9	3742396
CAR_0290	385757.2	3742402
CAR_0291	385757.4	3742408
CAR_0292	385757.7	3742414
CAR_0293	385757.9	3742420
CAR_0294	385758.2	3742426
CAR_0295	385758.4	3742432
CAR_0296	385758.7	3742438
CAR_0297	385758.9	3742444
CAR_0298	385759.2	3742450
CAR_0299	385759.4	3742457
CAR_0300	385759.7	3742463
CAR_0301	385759.9	3742469
CAR_0302	385760.2	3742475
CAR_0303	385760.4	3742481
CAR_0304	385760.7	3742487
CAR_0305	385760.9	3742493
CAR_0306	385761.2	3742499
CAR_0307	385761.4	3742505
CAR_0308	385761.7	3742511
CAR_0309	385761.9	3742517
CAR_0310	385762.2	3742524
CAR_0311	385762.4	3742530
CAR_0312	385762.6	3742536
CAR_0313	385762.9	3742542
CAR_0314	385763.1	3742548
CAR_0315	385763.4	3742554
CAR_0316	385763.6	3742560
CAR_0317	385763.9	3742566
CAR_0318	385764.1	3742572
CAR_0319	385764.4	3742578
CAR_0320	385764.6	3742584
CAR_0321	385764.9	3742591
CAR_0322	385765.1	3742597
CAR_0323	385765.4	3742603
CAR_0324	385765.6	3742609
CAR_0325	385765.9	3742615
CAR_0326	385766.1	3742621

ATTACHMENT C-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)	Source ID	UTM (X)	UTM (Y)
CAR_0327	385766.4	3742627	CAR_0375	385899.2	3742863
CAR_0328	385766.6	3742633	CAR_0376	385904	3742866
CAR_0329	385766.9	3742639	CAR_0377	385908.8	3742870
CAR_0330	385767.1	3742645	CAR_0378	385913.6	3742874
CAR_0331	385767.4	3742651	CAR_0379	385918.3	3742878
CAR_0332	385767.6	3742658	CAR_0380	385923.1	3742882
CAR_0333	385767.9	3742664	CAR_0381	385927.9	3742885
CAR_0334	385768.4	3742670	CAR_0382	385932.7	3742889
CAR_0335	385768.9	3742676	CAR_0383	385937.5	3742893
CAR_0336	385769.4	3742682	CAR_0384	385942.2	3742897
CAR_0337	385769.9	3742688	CAR_0385	385947	3742900
CAR_0338	385770.4	3742694	CAR_0386	385951.8	3742904
CAR_0339	385770.9	3742700	CAR_0387	385956.6	3742908
CAR_0340	385771.4	3742706	CAR_0388	385961.3	3742912
CAR_0341	385771.9	3742712	CAR_0389	385963.4	3742917
CAR_0342	385772.4	3742718	CAR_0390	385963.8	3742923
CAR_0343	385772.9	3742724	CAR_0391	385964.2	3742929
CAR_0344	385773.4	3742730	CAR_0392	385964.6	3742935
CAR_0345	385773.9	3742737	CAR_0393	385965	3742941
CAR_0346	385774.4	3742743	CAR_0394	385965.4	3742947
CAR_0347	385774.9	3742749	CAR_0395	385965.8	3742953
CAR_0348	385775.5	3742755	CAR_0396	385966.2	3742960
CAR_0349	385780.4	3742758	CAR_0397	385966.6	3742966
CAR_0350	385785.4	3742762	CAR_0398	385967.9	3742972
CAR_0351	385790.4	3742765	CAR_0399	385970.1	3742977
CAR_0352	385795.3	3742769	CAR_0400	385972.3	3742983
CAR_0353	385800.3	3742772	CAR_0401	385974.6	3742989
CAR_0354	385805.2	3742776	CAR_0402	385976.8	3742994
CAR_0355	385810.2	3742780	CAR_0403	385980.1	3742999
CAR_0356	385814.6	3742784	CAR_0404	385983.5	3743004
CAR_0357	385818.9	3742788	CAR_0405	385986.8	3743010
CAR_0358	385823.2	3742792	CAR_0406	385990.2	3743015
CAR_0359	385827.5	3742797	CAR_0407	385993.5	3743020
CAR_0360	385831.8	3742801	CAR_0408	385996.9	3743025
CAR_0361	385836.1	3742805	CAR_0409	386000.3	3743030
CAR_0362	385840.4	3742810	CAR_0410	386003.6	3743035
CAR_0363	385844.7	3742814	CAR_0411	386008	3743039
CAR_0364	385849.1	3742818	CAR_0412	386013.4	3743042
CAR_0365	385853.4	3742823	CAR_0413	386018.7	3743045
CAR_0366	385857.7	3742827	CAR_0414	386024	3743048
CAR_0367	385862	3742831	CAR_0415	386029.3	3743051
CAR_0368	385866.3	3742835	CAR_0416	386034.6	3743054
CAR_0369	385870.6	3742840	CAR_0417	386039.9	3743057
CAR_0370	385875.3	3742844	COK_1	386272.2	3741342
CAR_0371	385880.1	3742847	COK_2	386273.1	3741336
CAR_0372	385884.9	3742851	COK_3	386274	3741330
CAR_0373	385889.7	3742855	COK_4	386274.9	3741324
CAR_0374	385894.4	3742859	COK_5	386275.8	3741318

ATTACHMENT C-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)	Source ID	UTM (X)	UTM (Y)
COK_6	386276.7	3741312	COK_54	386312.3	3741022
COK_7	386277.6	3741306	COK_55	386311.1	3741016
COK_8	386278.5	3741300	COK_56	386309.8	3741010
COK_9	386279.4	3741294	COK_57	386308.6	3741004
COK_10	386280.3	3741287	COK_58	386307.4	3740999
COK_11	386281.2	3741281	COK_59	386306.1	3740993
COK_12	386282.1	3741275	COK_60	386304.9	3740987
COK_13	386283	3741269	COK_61	386303.6	3740981
COK_14	386283.9	3741263	COK_62	386302.4	3740975
COK_15	386284.8	3741257	COK_63	386301.2	3740969
COK_16	386285.7	3741251	COK_64	386299.9	3740963
COK_17	386286.6	3741245	COK_65	386298.7	3740957
COK_18	386287.5	3741239	COK_66	386297.4	3740951
COK_19	386288.4	3741233	COK_67	386296.2	3740945
COK_20	386289.3	3741227	COK_68	386295	3740939
COK_21	386290.2	3741221	COK_69	386293.7	3740933
COK_22	386291.1	3741215	COK_70	386292.5	3740927
COK_23	386292	3741209	COK_71	386291.2	3740921
COK_24	386292.9	3741203	COK_72	386290	3740915
COK_25	386293.8	3741197	COK_73	386288.8	3740909
COK_26	386294.7	3741191	COK_74	386287.5	3740903
COK_27	386295.6	3741185	COK_75	386286.3	3740897
COK_28	386296.5	3741179	COK_76	386285.1	3740891
COK_29	386297.4	3741173	COK_77	386283.8	3740885
COK_30	386298.3	3741167	COK_78	386282.6	3740879
COK_31	386299.2	3741161	COK_79	386281.3	3740873
COK_32	386300.1	3741155	COK_80	386280.1	3740867
COK_33	386301	3741149	COK_81	386278.9	3740861
COK_34	386301.9	3741143	COK_82	386277.6	3740855
COK_35	386302.8	3741137	COK_83	386276.4	3740849
COK_36	386303.7	3741131	COK_84	386275.1	3740843
COK_37	386304.6	3741125	COK_85	386273.9	3740837
COK_38	386305.5	3741119	COK_86	386272.7	3740831
COK_39	386306.4	3741113	COK_87	386271.4	3740825
COK_40	386307.3	3741107	COK_88	386270.2	3740819
COK_41	386308.2	3741101	COK_89	386269	3740813
COK_42	386309.1	3741095	COK_90	386265.6	3740811
COK_43	386310	3741089	COK_91	386259.7	3740812
COK_44	386310.9	3741082	COK_92	386253.7	3740813
COK_45	386311.8	3741076	COK_93	386247.8	3740815
COK_46	386312.7	3741070	COK_94	386241.8	3740816
COK_47	386313.6	3741064	COK_95	386235.9	3740817
COK_48	386314.5	3741058	COK_96	386229.9	3740818
COK_49	386315.4	3741052	COK_97	386223.9	3740820
COK_50	386316.3	3741046	COK_98	386218	3740821
COK_51	386316	3741040	COK_99	386212	3740822
COK_52	386314.8	3741034	COK_100	386206.1	3740824
COK_53	386313.5	3741028	COK_101	386200.1	3740825

ATTACHMENT C-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

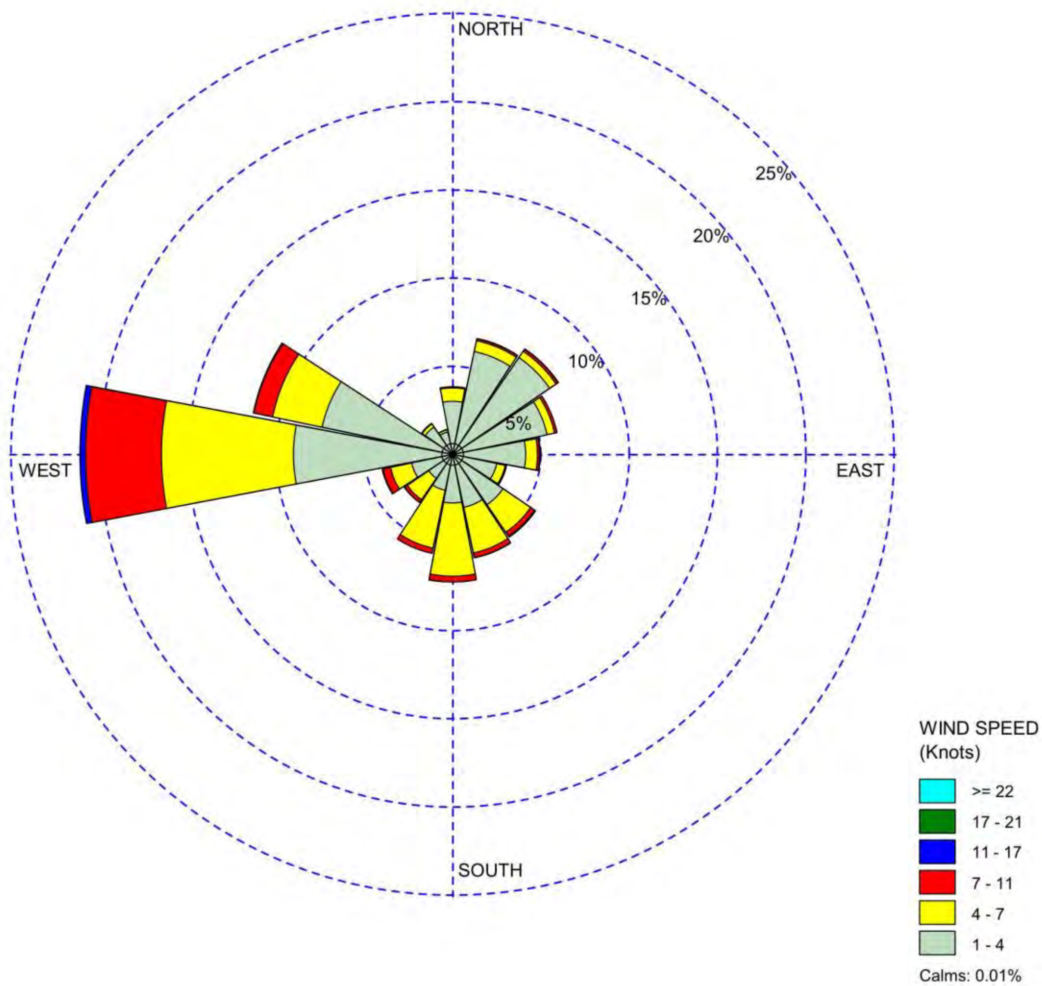
Source ID	UTM (X)	UTM (Y)
COK_102	386194.2	3740826
COK_103	386188.2	3740828
COK_104	386182.3	3740829
COK_105	386179.9	3740833
COK_106	386181	3740839
COK_107	386182.1	3740845
COK_108	386183.2	3740851
COK_109	386184.3	3740857
COK_110	386185.4	3740863
COK_111	386186.5	3740869
COK_112	386187.6	3740875
COK_113	386188.7	3740881
COK_114	386189.8	3740887
COK_115	386190.9	3740893
COK_116	386192	3740899
COK_117	386193.1	3740904
COK_118	386194.2	3740910
COK_119	386195.3	3740916
COK_120	386196.4	3740922
COK_121	386197.5	3740928
COK_122	386198.6	3740934
COK_123	386199.7	3740940
COK_124	386200.8	3740946
COK_125	386201.9	3740952
COK_126	386203	3740958
COK_127	386204.1	3740964
COK_128	386205.2	3740970
COK_129	386206.3	3740976
COK_130	386207.4	3740982
COK_131	386208.5	3740988
COK_132	386209.6	3740994
COK_133	386210.7	3741000
COK_134	386211.8	3741006
COK_135	386212.9	3741012
COK_136	386214	3741018
COK_137	386215.1	3741024
COK_138	386216.2	3741030
COK_139	386217.3	3741036
COK_140	386218.4	3741042
COK_141	386219.5	3741048
COK_142	386220.6	3741054
COK_143	386221.7	3741060
COK_144	386222.8	3741066
COK_145	386223.9	3741072
COK_146	386226.9	3741077
COK_147	386230.9	3741082
COK_148	386234.9	3741087
COK_149	386238.9	3741091

Source ID	UTM (X)	UTM (Y)
COK_150	386242.9	3741096
COK_151	386246.9	3741100
COK_152	386250.9	3741105
COK_153	386254.9	3741110
COK_154	386258.9	3741114
COK_155	386262.9	3741119
COK_156	386266.6	3741124
COK_157	386269.8	3741129
COK_158	386272.9	3741134
COK_159	386276	3741139
COK_160	386279.1	3741145
COK_161	386282.2	3741150
COK_162	386285.4	3741155
COK_163	386288.5	3741160
COK_164	386291.6	3741166
COK_165	386294.7	3741171

ATTACHMENT ~~C-2~~ C-3 **WINDROSE**

WIND ROSE PLOT:
Long Beach, CA

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS: Met years: 2006, 2007, 2008, 2009, 2011	DATA PERIOD: **Start Date: 1/1/2006 - 00:00** **End Date: 12/31/2011 - 23:00**	COMPANY NAME:
		MODELER:
	CALM WINDS: **0.01%**	TOTAL COUNT: **43378 hrs.**
	AVG. WIND SPEED: **3.66 Knots**	DATE: **5/19/2014**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

ATTACHMENT ~~C-3~~ C-4 LIST OF ONSITE RECEPTORS

UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)
385600	3739100	3.8	385600	3740100	3.8	386100	3740600	13.0
385500	3739200	3.6	385700	3740100	4.2	386200	3740600	14.4
385600	3739200	3.8	385800	3740100	4.9	385500	3740700	10.7
385700	3739200	3.0	385900	3740100	5.3	385600	3740700	9.0
385500	3739300	3.5	386000	3740100	6.7	385700	3740700	8.5
385600	3739300	3.2	386100	3740100	6.7	385800	3740700	9.0
385700	3739300	3.5	385400	3740200	10.2	386100	3740700	11.0
385500	3739400	3.7	385500	3740200	4.3	386200	3740700	13.5
385600	3739400	3.5	385600	3740200	4.6	383900	3740800	13.0
385700	3739400	3.5	385700	3740200	6.0	384000	3740800	13.0
385800	3739400	3.2	385800	3740200	6.6	384100	3740800	13.0
385500	3739500	7.5	385900	3740200	6.7	385500	3740800	11.5
385600	3739500	5.1	386000	3740200	7.9	386100	3740800	9.5
385700	3739500	3.6	386100	3740200	9.3	386200	3740800	11.8
385800	3739500	3.3	386200	3740200	5.6	386300	3740800	10.7
385500	3739600	8.7	385400	3740300	10.9	383900	3740900	13.0
385600	3739600	7.7	385500	3740300	9.9	384000	3740900	13.0
385700	3739600	3.5	385600	3740300	8.6	384100	3740900	13.0
385800	3739600	3.5	385700	3740300	6.6	386100	3740900	9.4
385900	3739600	3.3	385800	3740300	7.2	386200	3740900	11.4
385500	3739700	9.9	385900	3740300	7.3	386300	3740900	12.8
385600	3739700	8.4	386000	3740300	8.8	383900	3741000	13.0
385700	3739700	8.5	386100	3740300	11.1	384000	3741000	12.8
385800	3739700	6.9	386200	3740300	9.0	384100	3741000	13.0
385900	3739700	4.6	385400	3740400	11.8	386200	3741000	8.9
385500	3739800	10.8	385500	3740400	10.3	386300	3741000	11.3
385600	3739800	10.2	385600	3740400	9.0	383700	3741100	13.7
385700	3739800	10.2	385700	3740400	6.9	383800	3741100	13.0
385800	3739800	9.9	385800	3740400	8.1	383900	3741100	13.0
385900	3739800	8.0	385900	3740400	8.6	384000	3741100	12.9
386000	3739800	7.6	386000	3740400	10.3	384100	3741100	12.7
385500	3739900	11.4	386100	3740400	11.9	386200	3741100	9.8
385600	3739900	10.8	386200	3740400	14.2	386300	3741100	13.0
385700	3739900	11.0	385400	3740500	12.3	383800	3741200	13.1
385800	3739900	9.3	385500	3740500	10.8	383900	3741200	12.5
385900	3739900	6.8	385600	3740500	9.4	384000	3741200	12.3
386000	3739900	7.2	385700	3740500	7.1	384100	3741200	12.7
386100	3739900	5.4	385800	3740500	8.4	386200	3741200	10.5
385400	3740000	11.7	385900	3740500	9.3	386300	3741200	13.7
385500	3740000	10.9	386000	3740500	11.2	383800	3741300	12.2
385600	3740000	9.7	386100	3740500	13.3	383900	3741300	11.9
385700	3740000	3.3	386200	3740500	14.3	384000	3741300	12.3
385800	3740000	4.7	385500	3740600	10.8	384100	3741300	12.3
385900	3740000	6.0	385600	3740600	9.0	384200	3741300	12.4
386000	3740000	6.2	385700	3740600	8.1	384300	3741300	12.1
386100	3740000	5.6	385800	3740600	8.7	384400	3741300	11.5
385400	3740100	11.5	385900	3740600	9.7	386300	3741300	13.1
385500	3740100	9.0	386000	3740600	11.0	383800	3741400	11.7

ATTACHMENT ~~C-3~~ C-4 LIST OF ONSITE RECEPTORS

UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)
383900	3741400	11.8	386200	3741700	5.3	384700	3742000	10.8
384000	3741400	12.4	384000	3741800	11.2	384800	3742000	8.4
384100	3741400	12.4	384100	3741800	11.7	384900	3742000	7.2
384200	3741400	12.3	384200	3741800	12.1	385000	3742000	6.9
384300	3741400	12.1	384300	3741800	11.5	385100	3742000	8.7
384400	3741400	11.3	384400	3741800	10.9	385200	3742000	9.1
386300	3741400	5.7	384500	3741800	11.1	385300	3742000	9.0
383900	3741500	11.7	384600	3741800	11.1	385400	3742000	9.0
384000	3741500	11.8	384700	3741800	9.9	385500	3742000	8.7
384100	3741500	12.1	384800	3741800	10.2	385600	3742000	6.0
384200	3741500	12.3	384900	3741800	8.4	385700	3742000	6.6
384300	3741500	12.1	385000	3741800	8.7	385900	3742000	6.6
384400	3741500	11.2	385100	3741800	9.7	386000	3742000	6.6
386000	3741500	6.0	385200	3741800	9.9	386100	3742000	6.9
386100	3741500	5.4	385300	3741800	9.5	384200	3742100	11.6
386200	3741500	8.2	385400	3741800	9.0	384300	3742100	11.2
385100	3741600	9.6	385500	3741800	8.4	384400	3742100	10.6
385200	3741600	9.5	385600	3741800	6.9	384500	3742100	11.1
385300	3741600	8.7	385900	3741800	6.5	384600	3742100	10.8
385400	3741600	8.7	386000	3741800	6.3	384700	3742100	10.8
385500	3741600	9.0	386100	3741800	6.0	384800	3742100	8.1
385600	3741600	9.0	386200	3741800	6.3	384900	3742100	8.2
385800	3741600	6.6	384100	3741900	11.6	385000	3742100	7.2
385900	3741600	6.3	384200	3741900	11.8	385100	3742100	7.2
386000	3741600	6.0	384300	3741900	11.5	385200	3742100	6.8
386100	3741600	5.7	384400	3741900	10.7	385300	3742100	6.7
386200	3741600	5.3	384500	3741900	11.1	385400	3742100	6.5
384000	3741700	11.4	384600	3741900	11.1	385500	3742100	6.7
384100	3741700	11.7	384700	3741900	10.8	385600	3742100	6.9
384200	3741700	11.8	384800	3741900	8.6	385700	3742100	6.9
384300	3741700	11.5	384900	3741900	7.9	386000	3742100	6.6
384400	3741700	11.0	385000	3741900	7.2	386100	3742100	6.9
384500	3741700	11.4	385100	3741900	9.6	384300	3742200	10.9
384600	3741700	11.6	385200	3741900	9.6	384400	3742200	10.6
384700	3741700	11.4	385300	3741900	9.3	384500	3742200	10.8
384800	3741700	9.6	385400	3741900	9.0	384600	3742200	10.5
384900	3741700	10.1	385500	3741900	8.7	384700	3742200	10.8
385000	3741700	10.2	385600	3741900	6.6	384800	3742200	8.9
385100	3741700	10.0	385700	3741900	6.9	384900	3742200	8.1
385200	3741700	9.9	385900	3741900	6.6	385000	3742200	7.8
385300	3741700	9.6	386000	3741900	6.3	385100	3742200	7.5
385400	3741700	9.0	386100	3741900	6.3	385200	3742200	6.9
385500	3741700	8.7	386200	3741900	6.6	385300	3742200	6.2
385600	3741700	7.3	384200	3742000	11.8	385400	3742200	5.7
385800	3741700	6.6	384300	3742000	11.2	385500	3742200	6.2
385900	3741700	6.3	384400	3742000	10.6	385600	3742200	7.3
386000	3741700	6.0	384500	3742000	10.8	385700	3742200	7.1
386100	3741700	5.7	384600	3742000	10.8	385800	3742200	6.9

ATTACHMENT ~~C-3~~ C-4 LIST OF ONSITE RECEPTORS

UTM (X)	UTM (Y)	Elev. (m)
386000	3742200	6.9
386100	3742200	6.9
384400	3742300	10.3
384500	3742300	10.8
384600	3742300	10.6
384700	3742300	10.6
384800	3742300	8.4
384900	3742300	8.6
385000	3742300	8.1
385100	3742300	7.5
385200	3742300	7.6
385300	3742300	6.6
385400	3742300	6.6
385500	3742300	7.2
385600	3742300	7.2
385700	3742300	7.0
385800	3742300	7.2
386000	3742300	6.7
384400	3742400	10.3
384500	3742400	10.5
384600	3742400	10.5
384700	3742400	9.9
384800	3742400	8.5
384900	3742400	9.3
385000	3742400	8.4
385100	3742400	8.4
385200	3742400	9.9
385300	3742400	8.2
384500	3742500	10.5
384600	3742500	9.9
384700	3742500	9.8
384800	3742500	9.0
384900	3742500	9.3
385000	3742500	9.0
385100	3742500	9.0
385200	3742500	8.7
385400	3742500	7.2
385500	3742500	7.2
385600	3742500	7.2
385700	3742500	7.0
385800	3742500	7.1
384600	3742600	9.8
384700	3742600	9.6
384800	3742600	9.6
384900	3742600	9.6
385000	3742600	9.3
385100	3742600	10.0
385200	3742600	8.7
385400	3742600	7.5
385500	3742600	7.2
385600	3742600	7.5
385700	3742600	7.1
385800	3742600	6.9
385900	3742600	6.9
384600	3742700	9.9
384700	3742700	10.2
384800	3742700	9.6
384900	3742700	9.9
385000	3742700	9.6
385100	3742700	10.2
385300	3742700	8.1
385400	3742700	7.8
385500	3742700	7.4
385600	3742700	7.2
385700	3742700	6.9
385800	3742700	6.9
385900	3742700	7.2
384700	3742800	9.3
384800	3742800	8.4
384900	3742800	9.4
385000	3742800	9.9
385100	3742800	9.9
385300	3742800	8.1
385400	3742800	7.8
385500	3742800	7.6
385600	3742800	7.2
385700	3742800	7.1
385800	3742800	7.0
385900	3742800	7.5
384800	3742900	7.4
384900	3742900	9.0
385000	3742900	9.3
385100	3742900	8.0
385200	3742900	8.4
385300	3742900	8.1
385400	3742900	7.6
385500	3742900	7.2
385600	3742900	7.2
385700	3742900	6.9
385800	3742900	6.9
385900	3742900	7.5
384900	3743000	8.4
385000	3743000	8.7
385200	3743000	8.1
385300	3743000	7.8
385400	3743000	7.5
385800	3743000	6.9
385900	3743000	7.2
386000	3743000	8.0
384900	3743100	7.2
385000	3743100	8.4
385200	3743100	7.8
385900	3743100	7.2
386000	3743100	7.8
385000	3743200	8.4
385200	3743200	7.5
385900	3743200	7.4
386000	3743200	7.8
385200	3743300	6.9
385900	3743300	7.2
386000	3743300	7.5
386100	3743300	8.1

ATTACHMENT ~~C-4~~ C-5 MODELING RESULTS BY YEAR

Maximum Modeling Results by Year

Pollutant	Averaging Period	Modeled Maximum Fenceline/Offsite Concentration (μg/m^3)					
		2006	2007	2008	2009	2011	5-yr Max
NO_2 [a]	1 Hour - State	~~45.92~~ 48.50	~~45.06~~ 47.62	~~45.66~~ 48.22	~~44.68~~ 47.25	~~45.04~~ 47.60	~~45.92~~ 48.50
	1 Hour - Federal[c]	~~44.67~~ 47.25	~~35.37~~ 37.49	~~35.44~~ 37.57	~~35.42~~ 37.53	~~41.86~~ 44.17	~~38.55~~ 40.80
	Annual	~~2.13~~ 2.06	~~2.07~~ 2.01	~~2.06~~ 2.00	~~2.03~~ 1.96	~~1.92~~ 1.86	~~2.13~~ 2.06
SO_2	1 Hour	~~6.53~~ 6.55	~~6.41~~ 6.10	~~6.45~~ 5.20	~~6.20~~ 5.36	~~6.49~~ 5.77	~~6.53~~ 6.55
	24 Hour	~~0.58~~ 0.59	0.55	~~0.49~~ 0.48	~~0.50~~ 0.45	~~0.51~~ 0.40	~~0.58~~ 0.59
CO	1 Hour	~~10.38~~ 11.22	~~10.14~~ 10.97	~~10.34~~ 11.17	~~9.79~~ 10.63	~~10.11~~ 10.95	~~10.38~~ 11.22
	8 Hour	~~3.48~~ 5.13	~~3.37~~ 4.79	~~3.33~~ 4.51	~~3.60~~ 5.06	~~3.54~~ 4.57	~~3.60~~ 5.13
PM_{10} [b]	24 Hour	0.42	~~0.41~~ 0.31	~~0.37~~ 0.28	~~0.39~~ 0.35	~~0.41~~ 0.29	0.42
	Annual	~~0.16~~ 0.52	~~0.16~~ 0.51	~~0.16~~ 0.52	~~0.16~~ 0.51	~~0.16~~ 0.49	~~0.16~~ 0.52
$PM_{2.5}$ [b]	24 Hour	0.42	~~0.41~~ 0.31	~~0.37~~ 0.28	~~0.39~~ 0.35	~~0.41~~ 0.29	0.42
	Annual	~~0.16~~ 0.52	~~0.16~~ 0.51	~~0.16~~ 0.52	~~0.16~~ 0.51	~~0.16~~ 0.49	~~0.16~~ 0.52

[a] To convert modeling results from NOx to NO_2, a default 0.8 NOx:NO_2 ratio was used for hourly averages and 0.75 NOx:NO_2 ratio was used for annual averages. See 9/30/2014 Memorandum from R. Chris Owen and Roger Brode, EPA Air Quality Modeling Group, to Regional Air Division Directors re*: Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 National Ambient Air Quality Standard*. Available at http://www.epa.gov/ttn/scram/guidance/clarification/NO2_Clarification_Memo-20140930.pdf.

[b] PM_{10} and $PM_{2.5}$ conservatively assumed equal to total PM.

[c] The yearly values for the 1-hr federal standard are the 8th highest daily maximum 1-hr NO_2 averages, and the value in the last column is the average of the five yearly values.

ATTACHMENT ~~C-5~~ C-6 AIR DISPERSION MODELING FILES

The AERMOD input and output files are available upon request from the SCAQMD.

APPENDIX B-4

HEALTH RISK ASSESSMENT

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HEALTH RISK ASSESSMENT

FOR THE

TESORO LOS ANGELES REFINERY INTEGRATION AND COMPLIANCE PROJECT

CARSON AND WILMINGTON, CALIFORNIA

Prepared by:
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(805) 764-6010

~~MARCH 2016~~ MAY 2017

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LIST OF ATTACHMENTS

[1] Available separately from South Coast AQMD.

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PREFACE

In March 2016, Ashworth Leininger Group prepared a Health Risk Assessment (HRA) to evaluate the proposed Tesoro Los Angeles Refinery Integration and Compliance Project. The HRA considered toxic chemical emission increases associated with the proposed project. This HRA was used to support the March 2016 draft EIR (DEIR).

The HRA has been revised for the final EIR (FEIR) to include updates and technical corrections identified during review of the document to respond to public comments on the DEIR. Updates and corrections include the following:

- Inclusion of diesel particulate matter emissions from onsite truck traffic associated with the project.
- Inclusion of toxics resulting from increased coke handling at the Wilmington Operations.
- Sulfuric acid mist emissions from refinery fuel gas and natural gas process heaters have been updated to reflect methodologies published in the Oil & Gas Journal.
- Sulfuric Acid Regeneration Plant (SARP) emissions of H_2SO_4 have been reduced based on updated information from a SARP and emissions control equipment vendor.
- Hydrogen cyanide (HCN) emissions at the Carson Operations Fluid Catalytic Cracking Unit have been added.
- Four residential receptors not included in the original modeling were included in the FEIR.
- Stack temperatures for SRP Incinerators F704 and F754 and Heater H-101 were updated.
- Tables showing the health risk by source and also by chemical, at the maximally exposed receptors were added to the report.

The updates and corrections listed above caused changes to the health risk values reported in the DEIR. A comparison of the predicted health risks in the DEIR and the FEIR are shown in Table A, below:

Table A. Comparison of Predicted Health Risks (DEIR vs FEIR)

	DEIR			FEIR		
		UTM Coordinates (NAD83)			UTM Coordinates (NAD83)	
Maximally Exposed Individual	**Result**	**Easting (m)**	**Northing (m)**	**Result**	**Easting (m)**	**Northing (m)**
Residential						
Cancer Risk (Increase Cases in-one-million)	3.6	383700	3741400	3.7	383700	3741400
Chronic Risk (Hazard Index)	0.049	387500	3739600	0.030	385251	3739503
8-Hr Chronic Risk (Hazard Index)	0.006	383700	3741400	0.006	383700	3741400
Acute Risk (Hazard Index)	0.052	385305	3742454	0.052	385305	3742454
Offsite Workplace						
Cancer Risk (Increase Cases in-one-million)	9.2	386006	3742921	9.3	386006	3742921
Chronic Risk (Hazard Index)	0.127	386000	3739500	0.106	386153	3741128
8-Hr Chronic Risk (Hazard Index)	0.108	386153	3741128	0.108	386153	3741128
Acute Risk (Hazard Index)	0.052	385305	3742454	0.052	385305	3742454
Sensitive Receptor						
Cancer Risk (Increase Cases in-one-million)	2.1	386721	3739987	2.1	386721	3739987
Chronic Risk (Hazard Index)	0.054	387304	3739447	0.025	387304	3739447
8-Hr Chronic Risk (Hazard Index)	0.005	386721	3739987	0.005	386721	3739987
Acute Risk (Hazard Index)	0.010	386721	3739987	0.010	386721	3739987

The updates and corrections listed above, resulted in minor changes to the modeled health risk results. The updated modeling continues to demonstrate a project cancer risk increase below 10 in one million and chronic and acute hazard indices below 1.

1.0 EXECUTIVE SUMMARY

In June 2013, the Tesoro Refining & Marketing Company LLC (Tesoro) purchased the BP West Coast Products LLC (BP) Carson Refinery (currently termed the Tesoro Carson Operations). The current project is intended to further integrate the Carson Operations with the adjacent Tesoro Wilmington Operations ~~to form~~ that comprise the Tesoro Los Angeles Refinery (Refinery). A health risk assessment was conducted to support the Environmental Impact Report required by the California Environmental Quality Act (CEQA) for this proposed project. The purpose of the analysis is to evaluate the health risks associated with toxic emissions from all sources of the proposed project to determine ~~if it has~~ the ~~potential to produce significant~~ significance of health risks under CEQA. This health risk assessment presents the results and documents the methodology that support the significance determination presented in Section 4.2.2.5 of the Environmental Impact Report.

The health risk assessment was performed following the most recent Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Risk Assessment Guidelines and the SCAQMD Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics “Hot Spots” Information and Assessment Act. The modeling performed for this proposed project includes stationary sources including 25 point sources (i.e., heater, furnace, and incinerator stacks), 32 volume sources (i.e., fugitive emission sources), 1 line source (i.e., interconnecting pipeline bundle), 26 circular area sources (i.e., storage tanks), and mobile sources consisting of two additional line sources (i.e., onsite locomotives and trucks). The emission decreases associated with the shutdown of the Wilmington Operations FCCU and associated heaters were not considered in the health risk assessment. A total of 75 toxic air contaminants were included in the health risk assessment.

The model included a total of 5,742 receptors (i.e., locations that could potentially be impacted) throughout the surrounding community of the Refinery. The receptor grid (area modeled) extended to 3,500 meters from the Refinery boundary and included residential areas, sensitive receptors (i.e., schools, hospitals, medical facilities nursing homes), commercial facilities, and industrial facilities.

The highest cancer risk at a residential receptor is a cancer risk value of 3.7 in one million. The highest cancer risk at a worker receptor is a cancer risk value of 9.3 in one million. The maximum chronic hazard index (worker or residential) is 0.106 and the maximum 8-hr chronic hazard index (worker or residential) is 0.108. The maximum acute hazard index value is 0.052. The cancer burden is calculated to be 0.47. The cancer risk results are below 10 in one million and the chronic and acute hazard indices are below 1.

2.0 INTRODUCTION

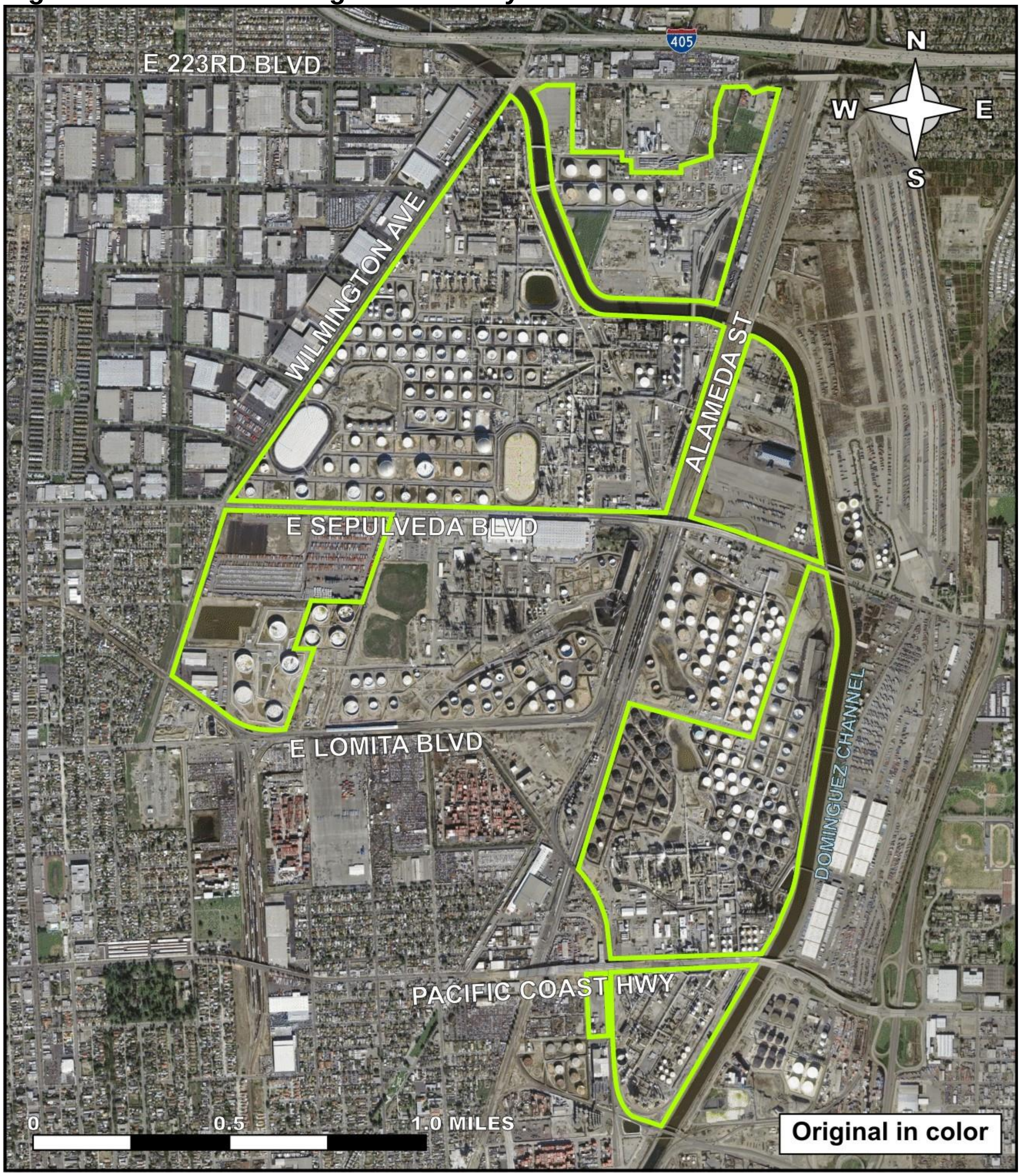
In June 2013, Tesoro purchased the BP West Coast Products LLC (BP) Carson Refinery (now named the Tesoro Los Angeles Refinery – Carson Operations) which is adjacent to the Tesoro Los Angeles Refinery – Wilmington Operations. The Los Angeles Refinery – Wilmington Operations is located at 2101 East Pacific Coast Highway, Wilmington, CA while the Los Angeles Refinery – Carson Operations is located at 2350 East 223rd Street, Carson, CA; both operations are located in the South Coast Air Basin. As these two facilities are adjacent to each other (see Figure 1), they are considered a single stationary source for air quality evaluation purposes.

Currently, the Wilmington and Carson Operations function as two separate and distinct facilities with limited operational integration. The proposed project is intended to further integrate the Los Angeles Refinery Wilmington and Carson Operations. As part of the project, the refinery will also be modified in order to comply with the federally mandated Tier 3 gasoline specifications, as well as with state and local regulations mandating emission reductions, including but not limited to, California AB32 Greenhouse Gas (GHG) Cap and Trade requirements and SCAQMD RECLAIM NOx and SOx allocation shaves. This project will include the shutdown of the Wilmington Operation's Fluid Catalytic Cracking Unit (FCCU) and reconfiguring the combined Refinery complex with flexibility to improve the gasoline to distillate production ratio in order to meet changing market demand. As part of the project, equipment efficiency and heat recovery will be optimized for new or modified units to minimize GHG and other pollutants. All new and modified sources will meet Best Available Control Technology (BACT) requirements (unless otherwise exempt). The proposed project will have a small impact on crude oil and feedstock throughput capacity. The crude oil and feedstock processing capability at the integrated Refinery will increase by approximately 2% or 6,000 BPD as a result of the proposed project. The type of crude oil and feedstocks will not change as part of the proposed project. The proposed modifications include new and modified equipment, shutdown of existing equipment, as well as piping modifications.

The above improvements and/or modifications are described further in Section 2 of the Air Quality Analysis Report.

This HRA is being conducted to support the Environmental Impact Report (EIR) for the proposed project as required by the California Environmental Quality Act (CEQA). The assessment evaluates the risk associated with toxic emissions from all sources of the proposed project to determine if it has the potential to produce significant risks. The approach used in this assessment is described later in this report and is based on written South Coast Air Quality Management District (SCAQMD) guidelines and discussions with SCAQMD staff.

Figure 1. Tesoro Los Angeles Refinery



3.0 BACKGROUND

3.1 HEALTH EFFECTS

3.1.1 Cancer Risk

Cancer risk is defined as the lifetime probability (chance) of developing cancer from exposure to a carcinogen, typically expressed as chances per million. Exposure to cancer-causing substances can be through direct inhalation or indirectly through non-inhalation pathways.

Non-inhalation pathways include exposure through soil ingestion or absorption of the pollutant from soil adhered to the skin, ingestion of crops grown in soil potentially affected by deposited air pollutants, and transmittal of a dose to an infant by breast milk due to the mother's cumulative exposure. The cancer risk associated with inhalation of a carcinogen is estimated by multiplying the inhalation dose in units of milligram per kilogram-day (mg/kg-day) by an inhalation cancer potency factor [$(mg/kg/day)^{-1}$]. Non-inhalation cancer risk is calculated from cancer toxicity factors and exposure assumptions.

Cancer risks are calculated for all carcinogenic air toxics and the results are summed to estimate an overall cancer risk. This calculation procedure assumes that cancer risk is proportional to concentration at any level of exposure; that is, there is no dose that would result in a zero probability of contracting cancer. This is generally considered to be a conservative assumption at low doses, as some theories on carcinogenesis assume that certain chemicals may require a threshold level or interaction with other agents, while others say that cancer can form at any exposure level. The zero-threshold approach is consistent with the current OEHHA regulatory approach. Although the assumption of additivity of cancer risk from exposure to multiple carcinogens ignores possible antagonistic or synergistic interactions, this approach has been accepted by regulatory agencies as generally conservative.

3.1.2 Non-Cancer Risk

Non-cancer health risk refers to both acute (short-term) and chronic (long-term) adverse health effects other than cancer that may be associated with exposure to air toxics. The commonly employed regulatory metric for assessing non-cancer effects is the hazard index (HI), the ratio of the estimated exposure level of an air toxic compound to a scientifically derived reference exposure level (REL) for the same compound. RELs generally represent the highest exposure level where no adverse effect has been observed or the lowest exposure level where the onset of an adverse effect has been observed, with the inclusion of a safety factor ranging from 10 to 1000, depending on the source and quality of the scientific data. ~~Non-cancer RELs are discussed further in Section 3.3.~~

If the reported concentration or dose of a given chemical is less than its REL, then the hazard index will be less than 1.0. When more than one chemical is considered, it is assumed that the effects are additive provided the associated chemicals are expected to have an adverse impact on the same target organ system (respiratory system, liver, etc). Thus, chemical-specific hazard indices are summed to arrive at a hazard index for each target organ. For any organ system, a total hazard index exceeding 1.0 indicates a potential health effect. Again, although the assumption of additivity of exposure to multiple chemicals ignores possible antagonistic or synergistic interactions, this approach has been accepted by regulatory agencies as generally conservative.

3.2 SIGNIFICANCE CRITERIA

Risks for the entire project that are less than the following regulatory thresholds are not considered to be significant and, therefore, acceptable:

- Cancer risk equal to or less than 10 in one million
- Chronic hazard index equal to or less than 1

- 8-hr chronic hazard index equal to or less than 1
- Acute hazard index equal to or less than 1
- Cancer burden equal to or less than 0.5

The cancer risk and hazard index metrics are generally applied to the maximally exposed individual (MEI). There are separate MEIs for residential exposure (i.e., residential areas) and for worker exposure (i.e., offsite work places).

4.0 RISK ASSESSMENT APPROACH

This health risk assessment was performed following the Office of Environmental Health Hazard Assessment (OEHHA), *Air Toxics Hot Spots Program Risk Assessment Guidelines*[2]. As recommended by this guideline, the California Air Resources Board (CARB) Hotspots Analysis and Reporting Program Version 2 (HARP2)[3] was used to perform a refined health risk assessment for the project's emission sources.

Consistent with SCAQMD modeling guidelines, the AMS/EPA Regulatory Model (AERMOD~~, v 15181~~)[4] was used as the air dispersion model for this analysis. HARP2 includes AERMOD but also allows model runs to be performed with AERMOD outside of HARP2. For this project, AERMOD~~ v 15181~~ was run outside of HARP2, and the results were imported into HARP2 to complete the risk analysis. This HRA evaluates risk following SCAQMD guidelines[5]. Further discussion of AERMOD is contained in Section 4.2.1.

In general, risk assessment involves four steps:

1. Hazard identification
2. Exposure assessment
3. Dose-response assessment
4. Risk characterization

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[2] California Office of Environmental Health Hazard Assessment (OEHHA) 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments, February 2015.
[3] HARP2 (Hotspots Analysis and Reporting Program) Air Dispersion Modeling & Risk Tool, dated ~~16057~~ 16217 was used for acute risk analysis performed in November 2016. HARP2 (Hotspots Analysis and Reporting Program) Air Dispersion & Risk Tool, dated 17023 was used for cancer and chronic risk analysis performed in February 2017. Based on a review of the version history, no differences between the two versions of the model are expected for the toxic chemicals and model options used for this project.
[4] Acute modeling was performed in November 2016 with AERMOD v15181. Chronic modeling was performed in February 2017 with AERMOD v16216r. Based on a review of the model change bulletin, no differences in results between the two versions of the model are expected for the types of emission sources and model options in this project. The latest version of the AERMOD modeling system and documentation and user's guide is available at http://www.epa.gov/scram001/dispersion_prefrec.htm.
[5] South Coast Air Quality Management District, Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act, June 5, 2015.

Hazard identification involves identifying the toxic pollutants and whether the pollutant is a carcinogen or is associated with other types of adverse health effects. Toxic emissions from project sources are then quantified. Exposure assessment includes air dispersion modeling, identification of exposure routes, and estimation of exposure levels (dose). Dose-response requires identifying the relationship between exposure to a pollutant and the incidence of an adverse health effect in exposed populations. Finally, risk characterization combines the hazard identification, exposure assessment, dose-response assessment to estimate total cancer and non-cancer risk. The details of these four steps are presented below.

4.1 HAZARD IDENTIFICATION/ EMISSIONS ASSESSMENT

4.1.1 Project Emission Sources

The following sources from the proposed project have been identified as having toxic emissions that should be included in this HRA:

- New Sulfuric Acid Regeneration Plant (SARP)
- New heaters to support the new Sulfuric Acid Regeneration Plant.
- New Propane Storage and Treatment Unit and Wet Jet Treater.
- New internal floating roof storage tanks and modifications to existing fixed and floating roof storage tanks.
- Increased utilization of several fixed and floating roof storage tanks at both Carson and Wilmington Operations.
- Modification of a Railcar LPG Loading/Unloading Rack.
- Installation of interconnect piping between the two operations.
- Modifications to existing process units and equipment resulting in the addition of equipment components and associated fugitive VOC leaks.
- Modifications to increase the permitted equipment description firing rate of the Carson 51 Vacuum Unit Heater as well as Wilmington Heaters H-100, H-300 and H-301.
- Modifications to the Carson Naphtha Hydrotreater Heater to allow the installation of ultra-low NOx burners.
- Increased utilization of the following heaters at the Carson Operations: Hydrocracker R-1, Hydrocracker R-2 and the Light Hydrotreating Unit Heater.
- Increased utilization of the FCCU Regenerator and Pre-Heater at the Carson Operations.
- Increased utilization of the Cogeneration Units 1-4 at the Carson Operations.
- Increased utilization of the following heaters at the Wilmington Operations: Delayed Coking Unit H-101, Hydrotreating Unit #3 H-30, Hydrotreating Unit #3 H-21/22, CRU H-510, CRU H-501A, H-501B, H-502 and H-503/504.
- Increased utilization of the following boilers at the Wilmington Operations: Boilers 7, 8, 9 and 10.
- Increased handing of coke products at Wilmington Operations.
- Increased utilization of the following boilers at the Sulfur Recovery Plant Operations: Boilers H-1601/1602.
- Increased utilization of the following boilers at the Sulfur Recovery Plant Operations: Incinerators F-704 and H-754.

- Locomotives associated with increased railcar movement of LPG, in-transit and idling on site and just outside facility fenceline.
- Increased routine onsite truck traffic at the refinery resulting from the proposed project.

As a conservative approach, emission *decreases* associated with the shutdown of the Wilmington Operation's Fluid Catalytic Cracking Unit (FCCU) and associated heaters (CO Boiler, H2 Heater, H3 Heater, H4 Heater, H5 Heater and Startup Heater) were not considered in this health risk assessment.

The TACs emitted by the project, and included in the analysis[6], are:

Chemical	CAS #	Chemical	CAS #
1,2,4-Trimethylbenzene	95-63-6	Hexane	110-54-3
1,3-Butadiene	106-99-0	Hydrochloric acid	7647-01-0
2,2,4-Trimethylpentane	540-84-1	Hydrogen cyanide	74-90-8
2-Methylnaphthalene	91-57-6	Hydrogen sulfide	7783–06–4
3-Methylchloranthrene	56-49-5	Indeno(1,2,3-cd)pyrene	193-39-5
Acenaphthene	83-32-9	Isoprene	78-79-5
Acenaphthylene	208-96-8	Lead	7439-92-1
Acetaldehyde	75-07-0	Manganese	7439-96-5
Acrolein	107-02-8	Mercury	7439-97-6
Ammonia	7664-41-7	Methanol	67-56-1
Anthracene	120-12-7	Molybdenum Trioxide	1313-27-5
Antimony	7440-36-0	Naphthalene	91-20-3
Arsenic	7440-38-2	Nickel	7440-02-0
Barium	7440-39-3	PAHs, total reported	1150
Benzene	71-43-2	Perylene	198-55-0
Benzo(a)anthracene	56-55-3	Phenanthrene	85-01-8
Benzo(a)pyrene	50-32-8	Phenol	108-95-2
Benzo(b)fluoranthene	205-99-2	Phosphorus	7723-14-0
Benzo(g,h,i)perylene	191-24-2	Propylene	115-07-1
Benzo(k)fluoranthene	207-08-9	Pyrene	129-00-0
Benzo[e]pyrene	192-97-2	Selenium	7782-49-2
Beryllium	7440-41-7	Silver	7440-22-4
Cadmium	7440-43-9	Sulfuric Acid	7664-93-9
Biphenyl	92-52-4	Thallium	7440-28-0
Carbon Disulfide	75-15-0	Toluene	108-88-3
Carbonyl sulfide	463-58-1	Trimethylbenzene (mixed isomers)	25551-13-7
Chromium	7440-47-3	Vanadium	7440-62-2
Chromium (hexavalent)	18540-29-9	Xylenes (mixed)	1330-20-7
Chrysene	218-01-9	Zinc	7440-66-6

[6] TACs that were emitted but did not have any OEHHA/ARB approved cancer, chronic, or acute risk assessment health values are not included in this list.

Chemical	CAS #	Chemical	CAS #
Copper	7440-50-8	Cyanide compounds	57-12-5
Cresols (mixtures of) {cresylic acid}	1319-77-3	Cyclohexane	110-82-7
Cumene	98-82-8	Dibenz(a,h)anthracene	53-70-3
Ethylene	74-85-1	Dioxin and dioxin-like compounds	N150
Fluoranthene	206-44-0	Ethylbenzene	100-41-4
Fluorene	86-73-7	Diesel exhaust particulate matter	--
Formaldehyde	50-00-0		
Chlorine	7782-50-5		

4.1.2 Emission Calculation Approach

The purpose of the Health Risk Assessment was to evaluate the risk associated with changes in emissions resulting from the integration of the Wilmington and Carson operations. Emission changes are summarized below:

New Sulfuric Acid Regeneration Plant	Emissions rates were estimated based on vendor data and the estimated sulfuric acid regeneration rate.
Modified combustion sources	Hourly emission rates were based on the 2012/2013 *daily* pre- to post-project emissions increase; annual emission rates were based on the 2012/2013 *annual* pre- to post-project emissions increase.
Non-modified combustion sources[7]	Emission rates were estimated based on the anticipated increase in operating rate of the unit.
Storage tanks	Pre-project storage tank emissions were based on 2012/2013 actual emissions; post-project storage tank emissions were based on estimated maximum emissions upon completion of the project.
Process unit pipeline component fugitives	Emission rates were estimated based on the number and type of pipeline components to be installed.
Locomotive DPM	Emissions increase in diesel particulate matter (DPM) was based on the estimated increase in locomotive activity associated with increased railcar movement of LPG, in-transit and idling on site, and just outside facility fenceline.
Truck Traffic DPM	Emissions increase in DPM was based on the estimated annual increase in onsite truck traffic following the proposed project.

[7] Combustion sources that won't be modified but may experience an increase in utilization.

Coke Handling	Emission rates were estimated based on the anticipated annual increase in operation of the unit and emission factors based on US EPA AP-42 Chapter 13.2.

Details of the emission calculations for stationary sources, onsite truck traffic, and locomotive-related emissions are presented in the Air Quality/Global Climate Change Analysis Report.

4.2 EXPOSURE ASSESSMENT

The exposure assessment includes air dispersion modeling, identification of exposure routes, and estimation of exposure levels. In a typical exposure assessment, the air dispersion modeling is used to estimate normalized ground level concentrations based on an emission rate of one gram per second (χ/Q or Chi over Q). Since ambient concentration is directly related to emission rate, the χ/Q is then multiplied by the emission rate for each substance to obtain a ground level concentration (GLC) resulting from each substance. Potential pathways of exposure to potential offsite receptors by each substance are identified (e.g., inhalation, dermal) and the appropriate algorithms are then used together with the χ/Q to estimate the concentration in air, soil, water, vegetation, and animals. The potential exposure levels to receptors are then estimated for each substance.

4.2.1 Air Dispersion

The air dispersion model currently required by U.S. EPA and the SCAQMD, AMS/EPA Regulatory Model (AERMOD~~, v 15181~~), was used for this analysis. AERMOD simulates the atmospheric transport and dilution of emissions from project sources. This mathematical model estimates dilution of emissions by diffusion and turbulent mixing with ambient air as the emissions travel downwind from a source. AERMOD can predict the resulting cumulative concentrations from many point, area, and volume sources at numerous specified locations of interest (commonly referred to as receptors). The model is capable of predicting impacts in terrain ranging from flat to complex.

4.2.1.1 Using AERMOD with HARP2

The AERMOD program is embedded within HARP2, but the program also allows AERMOD to be run independently and the results can be imported. This approach was chosen for two reasons:

- The software used to run AERMOD allows model runs to be split up among computer processing cores, greatly reducing model run time. This is not possible when running AERMOD within HARP2.
- Running AERMOD outside of HARP2 ensures that the latest version or AERMOD is used. The latest version of HARP2 does not necessarily include the latest version of AERMOD.

When AERMOD is run outside of HARP2, the modeling results must be imported into HARP2. The general approach is as follows:

1. Create an AERMOD input file with all necessary source release parameters, receptors, and building downwash data. Each emission source is given an emission rate of 1.0 grams per second.
2. Run AERMOD using the AERMOD input file and an AERMOD-ready meteorological data file; the output files required by HARP2 are individual .GRF files that provide the impact at each receptor. Two .GRF files are created for each source – one for the maximum 1-hr average concentrations and one for the annual average concentrations.
3. Generate a comma-delimited .CSV text file containing the hourly and annual emission rates of each chemical for each emission source in the format specified by HARP2.
4. Import the files into HARP2 and run the risk analyses.

The steps above are performed for both the pre-project emissions and for the post-project emissions. Additionally, separate model runs were performed for DPM. Project total cancer risks are calculated within a spreadsheet by adding the stationary source cancer risks (post-project minus pre-project) to the mobile source cancer risks on a receptor by receptor basis. This is done separately for residential and workplace exposures.

4.2.1.2 Project Sources

The project stationary point sources identified in Section 4.1.1 were modeled using the parameters summarized in Table 1, below. Stationary combustion sources (heaters and process vents) were modeled using representative release parameters. Process unit piping component fugitive emissions were modeled as volume sources with a release height equal to 10 feet and lateral dimensions appropriate to the physical extents of the unit. For process units that were oblong in shape, the unit was divided into two or three volume sources of equal dimensions (as appropriate), and emissions were divided evenly among the sources. Coke handling emissions were conservatively modeled as a volume source located at the Wilmington coke barn truck loading area, with a height of 5 feet and lateral dimensions encompassing the loading area and that portion of the coke barn. Piping component fugitive emissions associated with the interconnect piping were also modeled as volume sources, with the exception described below. Interconnect piping sources were modeled with a release height of 3 feet. Source parameters for the volume sources are shown in Table 2.

The interconnect piping fugitive emission source ID IC_C2 was modeled as a line source. It was modeled as a line source as this represents the most appropriate method for a long, narrow, straight fugitive emissions source near ground level. Source parameters for the line source are shown in Table 3, below.

Storage tanks were modeled as circular area ("AREACIRC") sources with the diameter equal to the diameter of the tank and the release height equal to the height of the tank. One exception was Tank 502, which is actually a reservoir with a fixed roof. Tank 502 was modeled as an "AREAPOLY" source. The storage tanks either have fixed roofs, fixed roofs with internal floating roofs, or are fixed roof tanks connected to vapor recovery. For purposes of simplification and because these emissions are relatively small, emissions from tanks connected to vapor recovery were treated the same as the floating roof tanks (modeled as an AREACIRC source). Source parameters for the AREACIRC sources are shown in Table 4, below.

At the facility, two locomotive engines are used to move railcars carrying LPG. These locomotives were modeled as a string of evenly-spaced volume sources along the segments of track where engines are expected to travel. The engines travel a short distance outside the facility boundaries at times; this was reflected in the modeling. The locomotive source release parameters are summarized in Table 5.

Emissions from onsite truck traffic were also modeled as a string of evenly-spaced volume sources along the refinery roads where trucks are expected to travel. The truck traffic source release parameters are summarized in Table 5.

Figure 2 shows the model representation of the point, volume, and area sources representing stationary, ~~and~~ locomotive, and truck traffic sources. The TAC emissions as input to the HARP model are included in Attachment ~~D-4~~H-5.

4.2.1.3 Terrain Characterization

AERMOD requires that each source in the analysis be categorized as being in either a rural or an urban setting. Consistent with SCAQMD guidance, all sources were designated as Urban.

Although the area is relatively flat, source and receptors were modeled with consideration of terrain elevations. The AERMOD terrain processor (AERMAP) was used to calculate terrain elevations for each source and receptor from the U.S. Geological Survey (USGS) National Elevation Dataset (NED).

Table 1. Point Source Parameters for Project Stationary Sources

Source Description	Stack ID	Stack Height		Stack Gas Exit Temperature		Stack Gas Exit Velocity		Stack Diameter		UTM Coordinates (NAD83) Easting/Northing	
		(ft)	(m)	(ºF)	(K)	(ft/s)	(m/s)	(ft)	(m)	(m)	(m)
Carson 51 Vacuum Unit Heater stack (D63)	51VAC	153.8	46.9	344.3	446.6	19.7	6.0	10.3	3.1	385299.8	3741864.8
Carson Cogeneration Unit 1 turbine and duct burner stack (D1226/D1227)	COGEN1	100.0	30.5	332.1	439.9	98.8	30.1	14.8	4.5	384708.0	3742507.4
Carson Cogeneration Unit 2 turbine and duct burner stack (D1233/D1234)	COGEN2	100.0	30.5	332.3	440.0	99.5	30.3	14.8	4.5	384763.4	3742505.6
Carson Cogeneration Unit 3 turbine and duct burner stack (D1236/D1237)	COGEN3	100.0	30.5	352.3	451.1	96.5	29.4	14.8	4.5	384816.3	3742503.6
Carson Cogeneration Unit 4 turbine and duct burner stack (D1239/D1240)	COGEN4	100.0	30.5	333.3	440.5	99.6	30.4	14.8	4.5	384869.4	3742502.6
Carson FCCU Regenerator	FCCUPH_C	178.8	54.5	519.9	544.2	12.0	3.7	6.5	2.0	384977.0	3742816.0
Carson FCCU Pre-Heater	FCCUR_C	171.0	52.1	604.9	591.4	60.9	18.6	11.5	3.5	385025.0	3742758.0
Carson Hydrocracker R1 Heater stack (D625)	HCU_R1	125.0	38.1	521.3	545.0	14.2	4.3	3.3	1.0	385009.7	3743159.6
Carson Hydrocracker R2 Heater stack (D627)	HCU_R2	110.3	33.6	587.0	581.5	22.3	6.8	3.6	1.1	385003.0	3743159.3
Carson Light Hydrotreating Unit Heater (D425)	LHU_HTR	84.0	25.6	618.3	598.9	15.0	4.6	3.0	0.9	384827.5	3742919.6
Carson Naphtha HDS Heater stack (D1433)	NHDS	65.1	19.8	600.1	588.8	13.4	4.1	2.4	0.7	385437.9	3741732.8
Wilmington - Sulfuric Acid Regen Plant Stk 1 - Process Air & Converter Htr	SA1_W	124.0	37.8	450.0	505.4	17.9	5.5	3.0	0.9	385559.6	3739535.2
Wilmington - Sulfuric Acid Regen Plant Stk 2 - Decomp Furnace	SA2_W	194.0	59.1	180.0	355.4	18.2	5.5	3.5	1.1	385602.5	3739519.6
Wilmington Boilers 7 & 8 Stack	BLR78_W	65.0	19.8	500.0	533.2	6.8	2.1	7.0	2.1	385564.4	3739451.0

Source Description	Stack ID	Stack Height		Stack Gas Exit Temperature		Stack Gas Exit Velocity		Stack Diameter		UTM Coordinates (NAD83) Easting/Northing	
		(ft)	(m)	(ºF)	(K)	(ft/s)	(m/s)	(ft)	(m)	(m)	(m)
Wilmington Boilers 9 & 10 Stack	BLR910_W	65.0	19.8	500.0	533.2	21.6	6.6	7.0	2.1	385579.0	3739442.9
Wilmington Coker Heater H101	H101	183.0	55.8	~~1160.6~~ 463.7	~~900.2~~ 513.0	33.2	10.1	9.9	3.0	386023.0	3739978.7
Wilmington CRU2 Unit H-501A/B 502 503 504 Heaters Stack	H501A_ET	75.0	22.9	300.2	422.2	41.2	12.6	4.5	1.4	385783.0	3740132.0
Wilmington CRU2 Unit H-510 Heater Stack	H510	100.0	30.5	649.4	616.2	4.8	1.5	4.5	1.4	385759.0	3740106.0
Wilmington H100 Heater Stack	H100	183.0	55.8	665.6	625.2	16.2	4.9	10.0	3.0	386024.8	3739996.0
Wilmington HCU H-300 and H-301 Heaters Stack	H300_301	185.5	56.5	450.0	505.4	20.0	6.1	5.3	1.6	385652.4	3740058.5
Wilmington HTU3 Unit H-21/H-22 Heaters Stack	H21_22	116.0	35.4	640.4	611.2	1.4	0.4	5.7	1.7	385754.2	3740191.0
Wilmington HTU3 Unit H-30 Heater Stack	H30	88.0	26.8	575.6	575.2	16.9	5.1	4.0	1.2	385754.4	3740180.7
Wilmington Sulfur plant combined H-1601/1602 Stack	H1601_2	155.6	47.4	344.3	446.7	21.7	6.6	6.4	2.0	385978.8	3742153.0
Wilmington Sulfur Plant Incinerator Stack 1	F704	150.0	45.7	~~1064.4~~ 541.1	~~846.7~~ 556.0	45.4	13.8	6.0	1.8	386010.9	3742144.8
Wilmington Sulfur Plant Incinerator Stack 2	F754	107.0	32.6	~~1061.8~~ 602.3	~~845.3~~ 590.0	37.9	11.5	6.3	1.9	386002.9	3742129.3

Table 2. ~~Piping Component Process Fugitive Volume Source Parameters~~ Volume Source Parameters for Piping Component Process Fugitive and Coke Handling Emissions

Source Description	Model ID	Release Height Above Ground		Initial Horizontal Dimension (σ_{yo})		Initial Vertical Dimension (σ_{zo})		UTM Coordinates[a] Easting/ Northing	
		(ft)	(m)	(ft)	(m)	(ft)	(m)	(m)	(m)
Carson Alkylation Unit	ALKY_C	10.0	3.0	42.0	12.8	9.3	2.8	385461.7	3741952.6
Carson FCCU	FCCU_C	10.0	3.0	57.2	17.4	9.3	2.8	385017.2	3742833.4
Carson HCU	HCU_C	10.0	3.0	28.2	8.6	9.3	2.8	385014.0	3743133.4
Carson Interconnect Piping - Pig Station	PIGST_C	3.0	0.9	19.1	5.8	2.8	0.9	385539.8	3741732.6
Carson Interconnect Piping - OSBL	IC_C1	3.0	0.9	11.6	3.5	2.8	0.9	385185.1	3741677.2
Carson Light Hydro Unit (1 of 2)	LHU_C1	10.0	3.0	35.1	10.7	9.3	2.8	384842.3	3742895.3
Carson Light Hydro Unit (2 of 2)	LHU_C2	10.0	3.0	35.1	10.7	9.3	2.8	384865.1	3742895.8
Carson LPG Rail Car Loading/Unloading	LPG_C	10.0	3.0	11.5	3.5	9.3	2.8	385819.4	3742730.7
Carson Mid Barrel Distillate Treater (1 of 2)	MID_C1	10.0	3.0	35.1	10.7	9.3	2.8	384842.3	3742895.3
Carson Mid Barrel Distillate Treater (2 of 2)	MID_C2	10.0	3.0	35.1	10.7	9.3	2.8	384865.1	3742895.8
Carson Naphtha HDS	NAPHDS_C	10.0	3.0	11.5	3.5	9.3	2.8	385478.6	3741892.9
Carson Naphtha Isom Unit (1 of 2)	NISOM_C1	10.0	3.0	91.5	27.9	9.3	2.8	385390.8	3741751.8
Carson Naphtha Isom Unit (2 of 2)	NISOM_C2	10.0	3.0	91.5	27.9	9.3	2.8	385449.1	3741750.8
Carson No. 51 Vacuum Unit	51VAC_C	10.0	3.0	76.3	23.3	9.3	2.8	385264.1	3741831.4
Carson Wet Jet Treater (New)	WETJET_C	10.0	3.0	15.3	4.7	9.3	2.8	385168.8	3741885.9
Crude Tank Farm - Pipeline Component Fugitives	CCT_FUG	3.0	0.9	164.8	50.2	2.8	0.9	384291.4	3741414.0
Wilmington - New Piping for Tanks 300035-300036	NWPIPE_W	3.0	0.9	6.0	1.8	2.8	0.9	385510.8	3740479.0
Wilmington CRU (1 of 2)	CRU_W1	10.0	3.0	61.0	18.6	9.3	2.8	385695.0	3740150.0
Wilmington CRU (2 of 2)	CRU_W2	10.0	3.0	61.0	18.6	9.3	2.8	385696.4	3740106.0
Wilmington Hydrocracker Unit (1 of 3)	HCU_W1	10.0	3.0	65.6	20.0	9.3	2.8	385645.9	3740144.1
Wilmington Hydrocracker Unit (2 of 3)	HCU_W2	10.0	3.0	65.6	20.0	9.3	2.8	385647.7	3740107.6

Source Description	Model ID	Release Height Above Ground		Initial Horizontal Dimension (σ_{yo})		Initial Vertical Dimension (σ_{zo})		UTM Coordinates[a] Easting/ Northing	
		(ft)	(m)	(ft)	(m)	(ft)	(m)	(m)	(m)
Wilmington Hydrocracker Unit (3 of 3)	HCU_W3	10.0	3.0	65.6	20.0	9.3	2.8	385650.3	3740072.8
Wilmington Hydrotreater Unit No. 1	HTU1_W	10.0	3.0	22.9	7.0	9.3	2.8	385814.4	3740039.1
Wilmington Hydrotreater Unit No. 2	HTU2_W	10.0	3.0	64.9	19.8	9.3	2.8	385789.8	3740149.7
Wilmington Hydrotreater Unit No. 4	HTU4_W	10.0	3.0	53.4	16.3	9.3	2.8	385463.3	3740135.8
Wilmington side Pig Station - Piping Interconnect (1 of 2)	PIGST_W1	3.0	0.9	19.5	5.9	2.8	0.9	386187.1	3741129.1
Wilmington side Pig Station - Piping Interconnect (2 of 2)	PIGST_W2	3.0	0.9	19.5	5.9	2.8	0.9	386182.9	3741116.5
Wilmington Interconnect Piping (Location 1 of 3) - OSBL	IC_W1	3.0	0.9	34.9	10.6	2.8	0.9	385839.8	3740251.6
Wilmington Interconnect Piping (Location 2 of 3) - OSBL	IC_W2	3.0	0.9	93.0	28.4	2.8	0.9	385544.7	3739633.8
Wilmington Interconnect Piping (Location 3 of 3) - PSTU	IC_W3	3.0	0.9	81.4	24.8	2.8	0.9	385535.2	3739865.7
Wilmington Propane Sales Treating Unit	PSTU_W	10.0	3.0	13.0	4.0	9.3	2.8	385505.5	3740163.2
Wilmington Coke Handling Emissions	COKE_W	2.5	0.8	30.5	9.3	2.3	0.7	386271.2	3740871.7

[a] Center of volume source

Table 3. Project Line Source Parameters

Source ID	Source Description	Start UTM Coordinates Easting/ Northing		End UTM Coordinates Easting/ Northing		Line Width		Vertical Dimension (σ_{zo})	
		(m)	(m)	(m)	(m)	(ft)	(m)	(ft)	(m)
IC_C2	Carson Interconnect Piping - OSBL	384435.89	3742374.48	384660.62	3742369.67	32.8	10.0	2.79	0.85

Table 4. Project Circular Area Source Parameters

Source Description	Model ID	Release Height Above Ground		Radius of Circle		UTM Coordinates[a] Easting/ Northing	
		(ft)	(m)	(ft)	(m)	(m)	(m)
Carson new 500 MBBL Crude Tank (1 of 6)	CRDTK1_C	56.0	17.1	120.0	36.6	384266.0	3741526.0
Carson new 500 MBBL Crude Tank (2 of 6)	CRDTK2_C	56.0	17.1	120.0	36.6	384373.0	3741526.0
Carson new 500 MBBL Crude Tank (3 of 6)	CRDTK3_C	56.0	17.1	120.0	36.6	384238.0	3741414.0
Carson new 500 MBBL Crude Tank (4 of 6)	CRDTK4_C	56.0	17.1	120.0	36.6	384344.0	3741414.0
Carson new 500 MBBL Crude Tank (5 of 6)	CRDTK5_C	56.0	17.1	120.0	36.6	384209.0	3741303.0
Carson new 500 MBBL Crude Tank (6 of 6)	CRDTK6_C	56.0	17.1	120.0	36.6	384314.0	3741303.0
Carson Tank 14	TK14	64.0	19.5	100.0	30.5	384497.0	3741772.1
Carson Tank 31	TK31	42.0	12.8	58.5	17.8	384911.9	3742071.6
Carson Tank 502	TK502	0.0	0.0	-- [b]	-- [b]	384042.4	3741877.9
Carson Tank 62	TK62	42.0	12.4	58.5	20.7	385139.2	3742309.5
Carson Tank 63	TK63	42.0	12.4	58.5	20.7	385058.5	3742311.1
Carson Tank 64	TK64	41.0	12.4	58.5	20.5	384977.2	3742314.3
Carson Tank 959	TK959	41.0	15.8	58.5	22.9	385249.7	3742903.0
Wilmington Tank 300035 (replaces 80035)	300035	72.0	21.9	90.0	27.4	385495.1	3740432.7
Wilmington Tank 300036 (replaces 80036)	300036	72.0	21.9	90.0	27.4	385527.4	3740529.9
Wilmington Tank 80035	80035	41.0	12.5	58.5	17.8	385495.1	3740432.7
Wilmington Tank 80036	80036	41.0	12.5	58.5	17.8	385527.4	3740529.9
Wilmington Tank 80038	80038	42.0	12.8	58.5	17.8	385442.3	3740498.3
Wilmington Tank 80044	80044	42.0	12.8	58.5	17.8	385928.8	3740567.9
Wilmington Tank 80060	80060	42.0	12.8	58.5	17.8	386044.2	3740333.8
Wilmington Tank 80067	80067	41.0	12.5	58.5	17.8	385969.0	3740298.0
Wilmington Tank 80074	80074	42.0	12.8	58.5	17.8	385498.1	3740685.5
Wilmington Tank 80079	80079	42.0	12.8	58.5	17.8	386092.7	3740128.4

Source Description	Model ID	Release Height Above Ground		Radius of Circle		UTM Coordinates[a] Easting/ Northing	
		(ft)	(m)	(ft)	(m)	(m)	(m)
Wilmington Tank 80211	80211	42.0	12.8	58.5	17.8	386017.5	3740558.8
Wilmington Tank 80215	80215	40.0	12.2	60.0	18.3	386111.5	3740528.6
Wilmington Tank 80217	80217	40.0	12.2	60.0	18.3	386162.3	3740684.2

[a] Center of source

[b] Tank 502 modeled as an AREAPOLY source due to its oval shape. Area of source is 34,639 m^2.

Table 5. Release Parameters for Volume Sources Representing Locomotives and Trucks

Source Description	Release Height		Spacing Between Sources		Horizontal Dimension (σ_{yo})		Vertical Dimension (σ_{zo})	
	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)
Locomotives	18.4	5.6	24	7.32	11.16	3.4	8.53	2.6
Trucks	3.0	0.9	20	6.1	9.3	2.8	1.4	0.4

Note: Locomotive volume source parameters based on values used for daytime traveling locomotives in Commerce Rail Yard modeling study[8] (Table 41). Source locations are included in Attachment ~~D~~H-1.

[8] Sierra Research, Inc., Toxic Air Contaminant Emissions Inventory and Dispersion Modeling Report for the Commerce Rail Yard, Los Angeles, California, prepared for Union Pacific Railroad Company, January 2007.

~~**Figure 2. Modeled Point, Volume, and Area Source Locations**~~

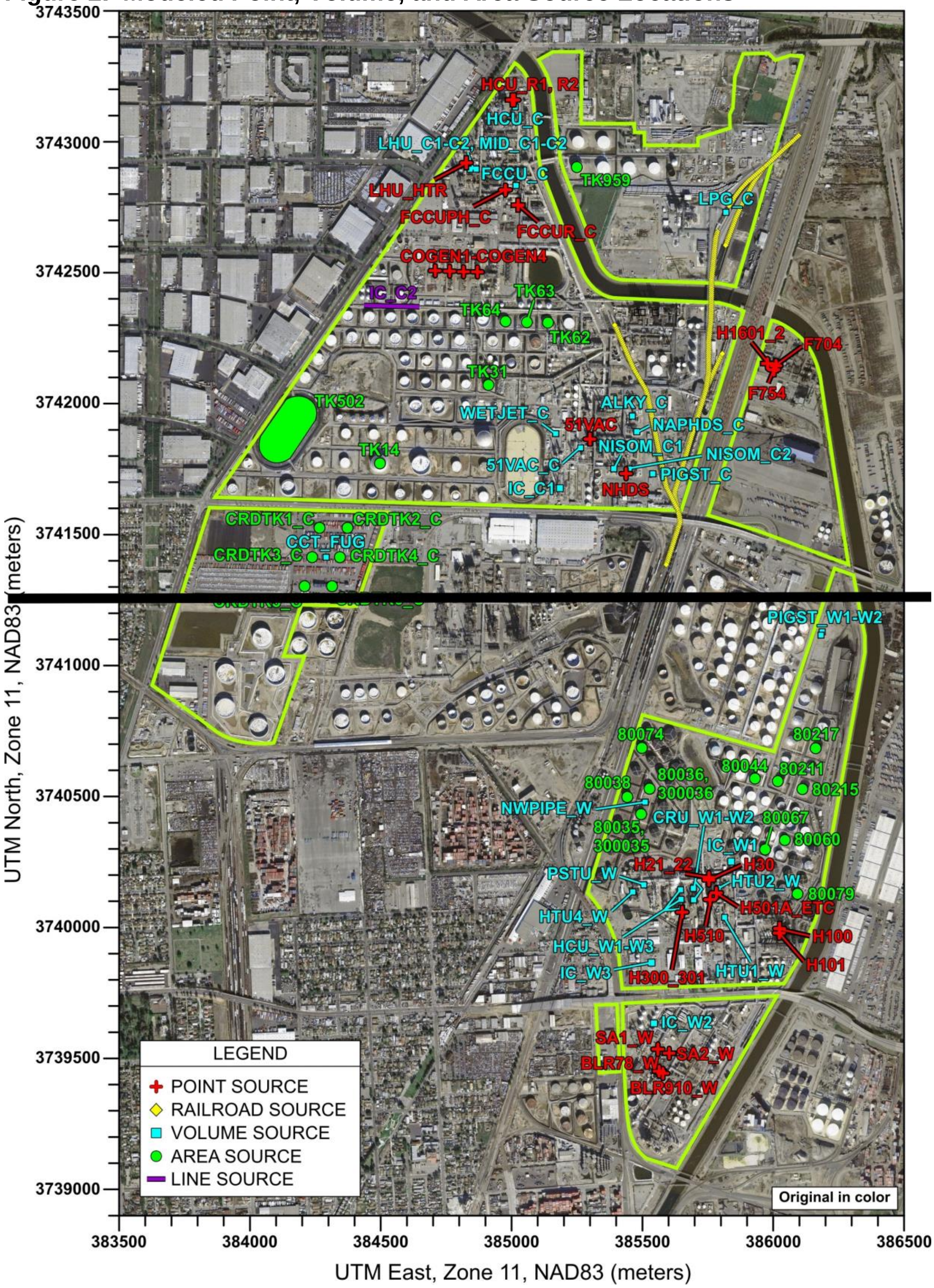
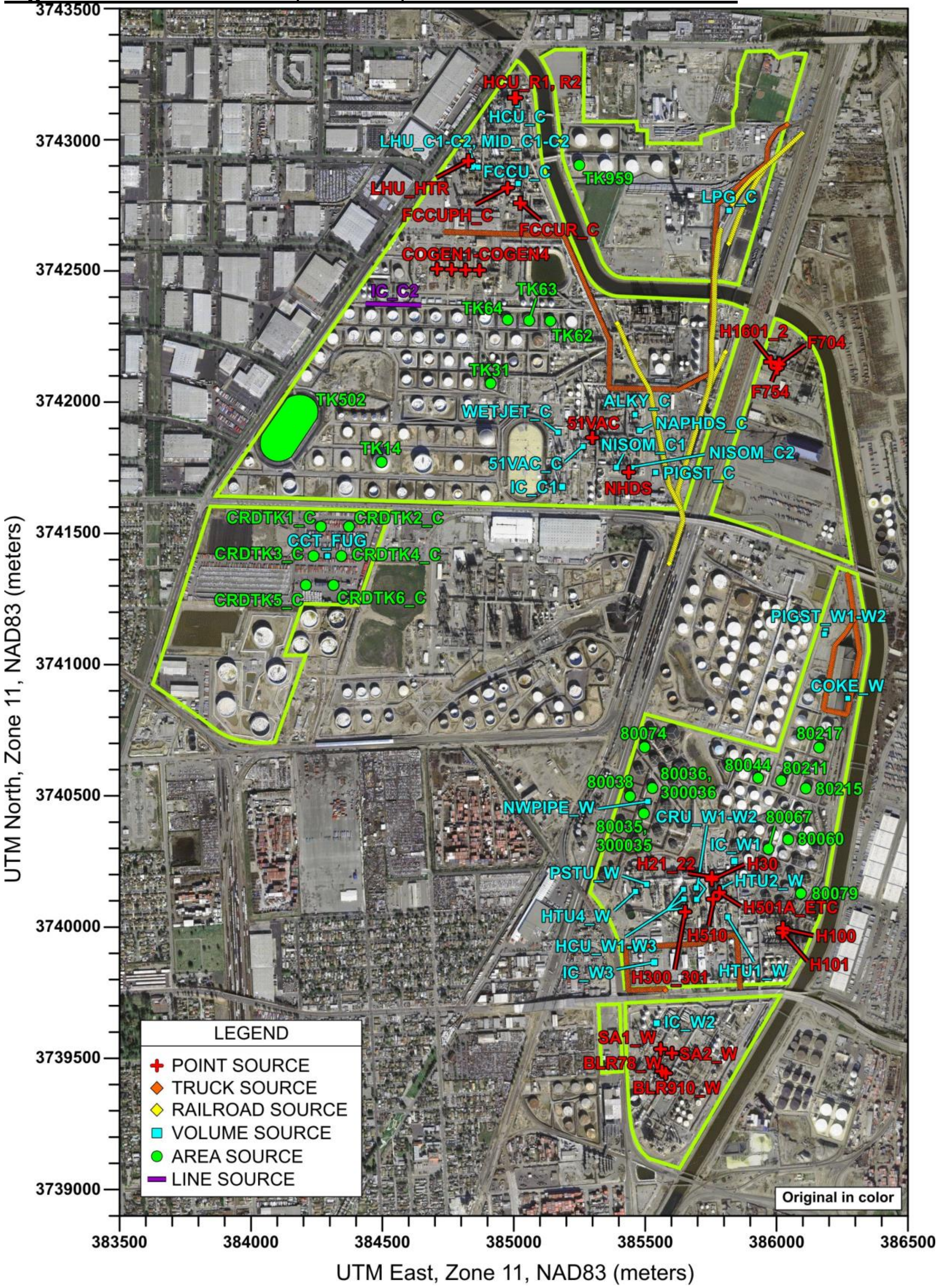


Figure 2. Modeled Point, Volume, and Area Source Locations



4.2.1.4 Building Downwash

When point sources are located near or on buildings or structures, the dispersion of the plume can be influenced. The wake produced on the lee side of the structure can cause the plume to be pulled toward the ground near the structure resulting in higher concentrations. This is called building downwash. Stack heights that minimize downwash effects are designated good engineering practice (GEP) stack heights.

The effects of building downwash have been examined in this modeling analysis. AERMOD uses the EPA-approved Building Profile Input Program with Plume Rise Model Enhancements (BPIP-PRIME) to provide input for the downwash analysis. This program calculates the GEP formula stack heights and direction-specific building dimensions for input to the dispersion calculations. BPIP-PRIME requires the input of building coordinates and heights, and stack coordinates. The heaters and process vents are project stationary point sources. The building downwash effects for these stacks are based on structures in the vicinity that were judged to have downwash potential.

4.2.1.5 Meteorological Data

The AERMOD-ready meteorological data sets for years 2006, 2007, 2008, 2009, and 2011 for the Long Beach, CA monitoring station were used for the analysis. These data sets were developed by SCAQMD using AERMET version 14134, the AERMOD meteorological data preprocessor, and provided for use in this analysis. The Long Beach meteorological station is located less than 3 miles east of the refinery. A windrose showing a graphical distribution of wind speed and wind direction for the time period modeled is shown in Attachment ~~D-2~~ H-3.

4.2.1.6 Receptors

Health effect indices such as cancer risk, chronic hazard index, and acute hazard index were calculated for a variety of receptor locations. Receptors of primary interest are those at residential locations, at sensitive population locations, and at offsite worker locations. However, in order to get a more complete picture of the patterns of exposure, concentrations and risk are also calculated at regularly spaced grid points throughout the modeling domain.

The receptors used to analyze project impacts include:

- 25-m spaced receptors along the outer facility boundary
- 100-m spaced receptors within the facility boundary and out to 1,000+ meters from the facility boundary
- 250-m spaced receptors beyond 1,000 m out to 3,500 m or more from the facility boundary
- Sensitive receptors within a radius of approximately 6 kilometers of a central refinery location
- Four (4) additional receptors located at residences in an otherwise commercial/industrial area immediately west of the southern portion of the facility

Receptor spacing was based on SCAQMD modeling guidance[9], which requires a fenceline spacing of 100 meters or less for facility areas greater than or equal to 100 acres. One receptor along the facility boundary fell within the exclusion zone[10] of one of the volume sources representing the locomotive emissions. Per discussions with AQMD staff, this receptor was removed as the pollutant concentrations calculated for this receptor cannot be considered accurate. Since the receptor spacing requirement was 100 meters, and the actual spacing used was 25 meters, the spacing along the boundary where the receptor was removed remained within SCAQMD requirements. Receptor heights above ground were set to 0.0 meters, consistent with SCAQMD modeling guidance. This network is composed of Cartesian (X,Y) receptors with Universal Transverse Mercator (UTM) coordinates. The modeling was conducted using the North American Datum of 1983 (NAD83).

Sensitive receptor locations (schools, day care facilities, hospitals, and convalescent homes) were obtained via an internet search and the Google Maps database. The sensitive receptors used in the project analysis are listed in Table 6.

Figure 3 shows the model representation of grid and fenceline receptors, and Figure 4 plots the sensitive receptor locations. A total of ~~5,738~~ 5,742 fenceline and grid receptors were included in the analysis, plus an additional 76 sensitive receptors. Since some of the sensitive receptors were located beyond the extents of the grid, the sensitive receptors were modeled separately in AERMOD and HARP2. Fenceline, grid, and sensitive receptors are included in Attachment ~~D-4~~ H-5. Onsite receptors (receptors within facility boundaries) are used solely for creating risk contours (see Section 5) and are not considered when assessing off-site impacts. Onsite receptors are listed in Attachment ~~D-3~~ H-4.

4.2.2 Exposure Pathways

A receptor can be hypothetically exposed to a substance through several different pathways. Typically, the primary environmental exposure pathway in a health risk assessment is direct inhalation of gaseous and particulate air pollutants. However, there is the potential for exposure via non-inhalation pathways due to the deposition of particulate pollutants in the environment. In general, potential non-inhalation exposure pathways include:

- Dermal (skin) absorption
- Soil ingestion
- Mother's milk
- Fish ingestion
- Home grown produce ingestion
- Pasture ingestion (including beef and dairy)
- Drinking water ingestion

[9] South Coast Air Quality Management District, Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act, June 5, 2015, Table 9.
[10] Concentrations are not calculated by AERMOD in a source exclusion zone. For volume sources, the exclusion zone is the region [(2.15 x Sigma Y) + 1 meter)] from the center of the volume. See 12/6/2011 Memorandum entitled "Haul Road Workgroup Final Report" from Randy Robinson, EPA Region 5 and Mick Daye, EPA Region 7, to Tyler Fox, Leader, Air Quality Modeling Group and George Bridgers, Clearinghouse Coordinator, Air Quality Modeling Group.

- Pigs, chickens, and/or eggs ingestion

For this analysis, per SCAQMD guidance[11] only the dermal absorption, soil ingestion, mother's milk, and home grown produce ingestion pathways were considered to be viable non-inhalation exposure pathways for the area of impact. Exposure to DPM is evaluated for the inhalation pathway only, consistent with OEHHA guidelines. Moreover, acute impacts of DPM are not calculated as there is no acute inhalation risk assessment health value for DPM.

[11] South Coast Air Quality Management District, Supplemental Guidelines for Preparing Risk Assessment for the Air Toxics "Hot Spots" Information and Assessment Act, June 5, 2015, Table 11.

Table 6. Description and Coordinates of Sensitive Receptors

Description	UTM Coordinates (NAD83) Easting/Northing	
	(m)	(m)
Andrew Carnegie Middle School	383558	3744007
Annalee Elementary School	384218	3746693
Avalon High School	383044	3739793
Banning Elementary School	382774	3737978
Banning High School	383286	3740026
Banning-Marine Avenue Adult Center	382948	3739923
Bethune Mary School	386721	3739987
Bonita Street Elementary School	383370	3743858
Broad Avenue Elementary School	383158	3740800
Broadacres Elementary School	385396	3746688
Cabrillo High School	387473	3739922
Carson Elementary School	382022	3744352
Carson High School	382047	3743274
Carson Montessori Academy	383307	3744170
Catskill Elementary School	382435	3742047
Cesar Chavez Elementary School	388750	3737361
Child Time Learning Center	388951	3737098
Curtiss Middle School	384293	3746322
Del Amo Elementary School	385247	3744738
Edison Elementary School	388774	3737826
Elizabeth Hudson Elementary School	387091	3740595
First Baptist Church	383243	3739694
Fries Avenue Elementary School	382836	3739449
Garfield Head Start Elementary School	387692	3740405
Golden Wings Academy Inc	383115	3745483
Gulf Avenue Elementary School	382164	3739057
Harbor-UCLA Medical Center	380471	3744060
Hawaiian Avenue Children’s Center	381811	3737926
Hawaiian Avenue Elementary	381812	3737989
Hillcrest Care Center	389343	3742818
Holy Family Grammar School	384401	3739366
John Muir Elementary School	387914	3742030
Jonathan Jaques Children's Center Hospital	390345	3741550
Kaiser Permanente South Bay	381895	3741791
Li’l Cowpoke Pre-School	383104	3737974
Long Beach Brethren Elementary School	390143	3743190
Long Beach Day Nursery	389275	3739143
Long Beach Head Start School	391125	3741695
Long Beach Japanese School	387304	3739447

Description	UTM Coordinates (NAD83) Easting/Northing	
	(m)	(m)
Long Beach Job Corp Dynamic Educational	387472	3739724
Long Beach School for Adult	389368	3739487
Long Beach Child Development	387287	3740345
Mary Bethune School	389232	3738849
Memorial Heart Institute Hospital	390121	3741522
Miller Children's Hospital	390121	3741522
Normont Elementary School	380300	3740328
Oakwood Academy School	389995	3743777
Old King Cole Day Care	388848	3742528
Pacific Harbor Elementary School	381903	3740040
Pacific Hospital of Long Beach	389587	3741419
Phineas Banning Senior High School	383288	3740032
Rancho Dominguez Preparatory School	387538	3744360
Regency High School	389116	3738789
Robinson (Jackie) School	389694	3741418
Royal Care Skilled Nursing Care Center	389480	3741357
Santa Fe Convalescent Hospital	387542	3742485
St Philomena School	382031	3743958
St. Lucy’s School	387437	3740571
Sts. Peter & Paul School	382456	3738335
The Palmcrest Grand Care Center, Inc	389279	3742980
Thomas A. Edison State Pre-School	388900	3737881
Vermont Christian School	381588	3738582
Volunteers of America - Head Start Preschool	379911	3739748
Washington Middle School	389361	3738974
Webster Elementary School	387380	3742512
West Child Development Center	387474	3740168
White Middle School	381089	3743544
Will J. Reid High School	387037	3740324
William Logan Stephens Junior High	387367	3741657
Wilmington Boys and Girls Club	381354	3740025
Wilmington Christian School	383005	3740658
Wilmington Junior High School	382039	3740361
Wilmington Park Children’s Center	384655	3739221
Wilmington Park Elementary School	384618	3739222
Wilmington YMCA	383050	3739071
Wyo Tech National Institute of Tech	387041	3739640

Figure 3. Fenceline and Grid Receptor Locations

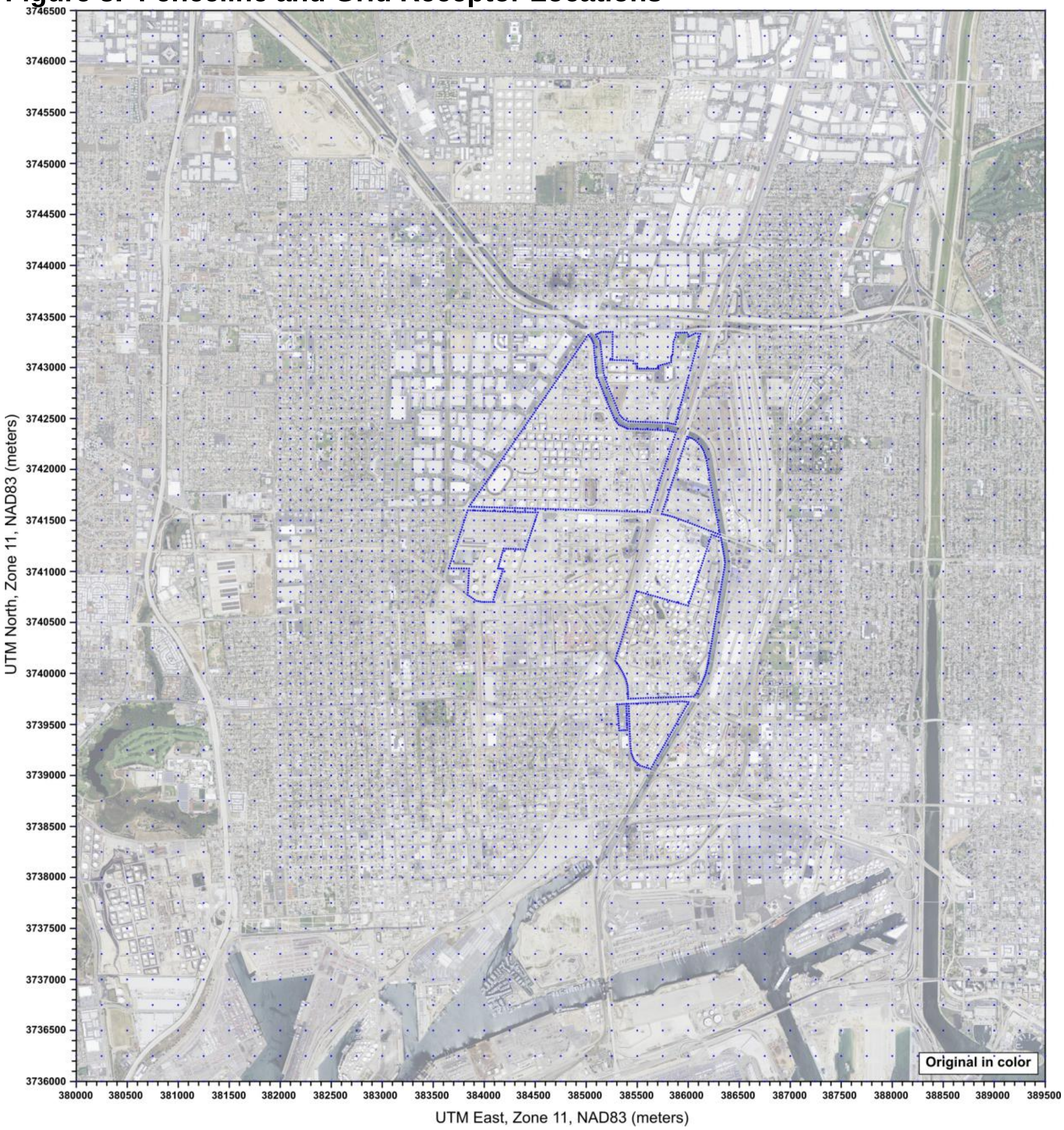
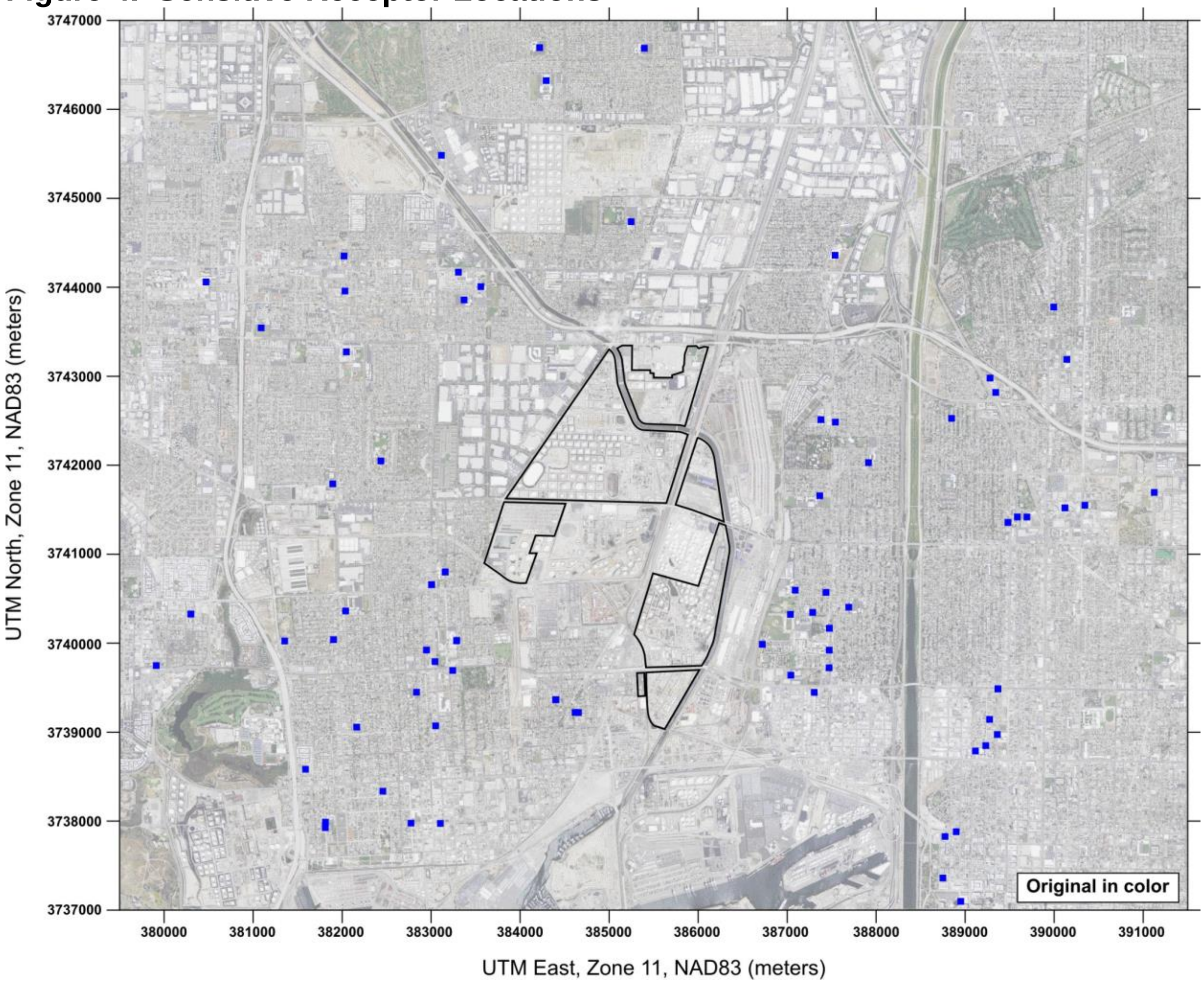


Figure 4. Sensitive Receptor Locations



4.3 EXPOSURE DOSE

Based on the estimated concentrations in the air, soil, and plants, the HARP2 software program calculated potential exposure levels to people through the various applicable pathways. The program used the algorithms identified in the OEHHA risk assessment guidelines[12].

4.4 DOSE-RESPONSE

As described in the OEHHA risk assessment guidelines, the dose-response assessment describes the quantitative relationship between the amount of exposure of a person to a substance (the dose) and the incidence or occurrence of an adverse health impact (the response). For carcinogens, this information is quantified as a cancer potency slope. For non-carcinogens, dose-response information is characterized as a reference exposure level.

4.4.1 Carcinogens

OEHHA has developed cancer potency factors for inhalation and non-inhalation pathways. The cancer potency factors represent an upper bound probability of developing cancer based on a continuous lifetime exposure to one milligram per kilogram of body weight of a substance. The cancer potency factor does not represent a threshold under which a person would not develop cancer but instead is used to estimate the probability of developing cancer. OEHHA regularly updates cancer potency factors as new information becomes available. This assessment is based on the latest health tables made available by OEHHA.

4.4.2 Non-carcinogens

OEHHA has developed RELs for acute and chronic non-carcinogenic impacts. Unlike cancer potency factors, these RELs represent concentration thresholds at which no adverse non-cancer health effects are anticipated. Since a substance may affect multiple organs or endpoints, each substance may have multiple RELs to represent each toxicological endpoint. However, the REL for the most sensitive endpoint is used to ensure the REL considers the most adverse potential impacts. The chronic RELs are based on a long term exposure of 8 years while the acute RELs are typically based on a one hour exposure. Chronic RELs have been developed for inhalation and non-inhalation pathways while 8-hr chronic and acute RELs have been developed only for the inhalation pathway. OEHHA regularly updates the RELs and this health risk assessment is based on the latest HARP health tables made available by OEHHA.

5.0 RISK CHARACTERIZATION

By combining the results from the exposure assessment and dose response assessment, the HARP2 software program estimated potential cancer risk and non-cancer risks. More specifically, the calculated doses and exposure pathway information are used with the RELs and cancer potency factors to quantify cancer and non-cancer health impacts.

[12] California Office of Environmental Health Hazard Assessment (OEHHA) 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. February 2015.

5.1 CARCINOGENS

The cancer health impacts are characterized as a cancer risk that represents the chances per million people of developing cancer. The cancer risk from each substance is added together to arrive at a total cancer risk. The exposure durations modeled in HARP2 followed OEHHA and SCAQMD guidance and are shown in Table 7 below.

Table 7. Exposure Durations Used in Risk Modeling

Risk type	Exposure Duration
Residential and sensitive receptor cancer risk[13]	24 hr/day, 350 day/yr, 30 years
Cancer burden	24 hr/day, 350 day/yr, 70 years
Worker cancer risk	8 hr/day, 250 day/yr, 25 years

5.2 NON-CARCINOGENS

The non-cancer health impacts are characterized through a hazard index (HI). The HI for each toxicological endpoint or target organ system is calculated for each applicable substance. The total HI for each target organ system is equal to the sum of the HI from each substance. As a conservative measure, pre-project impacts were not subtracted from post-project impacts in the non-carcinogen risk calculations. An HI of one or less indicates that adverse non-cancer health impacts are not anticipated.

5.2.1 Chronic HI

The chronic HI calculations are based on annual average concentrations and the chronic REL. Separate HARP2 analyses were run for DPM and for all other toxic chemicals. The results from the two HARP2 runs were then summed together to determine the total HI.

5.2.2 8-Hr Chronic HI

8-hr chronic calculations were made in HARP2 based on the annual average concentrations and 8-hr chronic RELs. Since no 8-hr chronic RELs exist for DPM, the 8-hr chronic calculations were based only on the stationary source modeling. As these sources emit continuously, no adjustment factors were applied.

HARP2 contains an option to calculate the 8-hr chronic HI based on hour-by-hour model results for a specific 8-hr period (e.g., 8:00 AM to 4:00 PM to represent typical worker schedule). As this option requires long model times and can generate extremely large computer files, ARB guidance[14] suggests a screening calculation prior to performing this refined analysis. An extremely conservative screening calculation was made by multiplying

[13] Sensitive receptors were modeled as residential receptors in HARP2 (risk analysis calculations are performed in the same manner).
[14] California Office of Environmental Health Hazard Assessment (OEHHA) 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. February 2015, p. 4-46.
California Air Resources Board, User Manual for the Hotspots Analysis and Reporting Program Air Dispersion Modeling and Risk Assessment Tool Version 2. March 17, 2015, p. 46.

the maximum chronic HI values by three. Multiplying by three provides the absolute worst-case value, as this assumes that all exposure occurs in the same 8-hr period each day. This approach also assumes that the 8-hr chronic REL is equal to the chronic REL, which is not the case for most chemicals[15]. Using this conservative screening approach, neither the maximum residential, worker, nor sensitive receptor chronic HI multiplied by three exceeded one.

5.2.3 Acute HI

The acute HI calculations are based on maximum 1-hr average concentrations and the acute REL. Since no acute RELs exist for DPM, the acute calculations were based only on the stationary source modeling.

5.3 HARP2 ANALYSIS METHOD

The HARP2 analysis methods followed SCAQMD guidance[16] and are shown in Table 8 below. These options affect the way the cancer risk and chronic HI are calculated at each receptor.

Table 8. Analysis Methods Used in Risk Modeling

Risk	Method
Residential cancer risk	RMP Using the Derived Method
Worker cancer risk	OEHHA Derived Method
Residential chronic and 8-hr chronic risk	OEHHA Derived Method
Worker chronic and 8-hr chronic risk	OEHHA Derived Method
Acute risk	Default/NA

6.0 HEALTH RISK RESULTS

6.1 CANCER RISK

The predicted increase in health risks at maximally exposed offsite receptors are summarized by category in Table 10. As shown, the highest calculated cancer risks at residential, sensitive, and worker receptors are below 10 in one million.

The highest cancer risk at a residential receptor is a cancer risk value of ~~3.6~~ 3.7 in one million. The receptor is located just west of the western boundary of the refinery nearest to the proposed new crude tanks – see Figure 5. Contours showing the aerial distribution of calculated cancer risks for worst-case residential exposure are shown on Figure 6. The highest calculated cancer risk at a sensitive receptor was 2.1 in one million, at Bethune Mary School located about 500 meters east of the eastern boundary of the Wilmington

[15] 8-hr chronic RELs are either equal to or greater than the chronic REL for the respective chemical. Notably, there are many chemicals for which an 8-hr chronic REL does not exist, including DPM.
[16] HARP2: South Coast Air Quality Management District, Supplemental Guidelines for Preparing Risk Assessment for the Air Toxics "Hot Spots" Information and Assessment Act, June 5, 2015, Table 11.

Operations area. Table 11 provides a list of the highest sensitive receptors in terms of cancer risk.

The receptor with the highest calculated worker exposure cancer risk was located near the railroad tracks at the northeastern boundary of the refinery – see Figure 5. The receptor is in the immediate vicinity of the location where a locomotive engine enters and exits the facility boundary when moving LPG railcars. The worst case worker cancer risk at this receptor is ~~9.2~~ 9.3 in one million. This receptor is located along the fenceline[17] where long-term (multi-decade) 40 hour/week exposure is highly unlikely to occur. Contours showing the areal distribution of calculated cancer risks for worst-case worker exposure are shown on Figure 7.

Tables 12 and 14 provide~~s~~ the contributions of DPM and other toxics to the total cancer risks shown in Table 10. DPM is the primary source of cancer risk for the maximum offsite worker receptor, but only a small contributor to cancer risk for the maximum residential and sensitive receptors. Tables 13 and 15 identify the contribution to total cancer risk by source.

6.2 CHRONIC AND ACUTE RISK

~~The maximum chronic hazard index (worker or residential) of 0.127 was predicted at a receptor just east of the southern portion of the facility. The maximum 8-hr chronic hazard index (worker or residential) of 0.108 was predicted at a receptor just west of the Wilmington operations refinery interconnect system~~. The maximum chronic hazard index (worker or residential) of 0.106 was predicted at a receptor just west of the Wilmington operations refinery interconnect system. The maximum 8-hr chronic hazard index (worker or residential) of 0.108 was predicted at the same receptor. The maximum increase in the acute hazard index value was predicted to be 0.052 at a fenceline receptor[18] along the Dominguez Channel. The maximum chronic HI and acute HI receptors are shown in Figure 5. All maximum chronic and acute HI receptors were in close proximity to or along facility boundaries~~ with the exception of the maximum residential chronic HI receptor, which was approximately 3 km east of the southern portion of the facility. This was due primarily to the risk associated with the Wilmington Sulfuric Acid Decomposition Furnace stack (SA2_W) – a very tall stack (194 feet) with significant sulfuric acid emissions~~.

Tables 16 through 19 identify the contribution to total acute and chronic risk by pollutant and by source.

[17] Per discussions with AQMD staff, fenceline receptors in the vicinity of the rail-line could be included as worker receptors as a conservative measure.
[18] As a conservative assumption, all fenceline receptors were considered when determining the maximum acute HI.

6.3 CANCER BURDEN

Rule 1401 Risk Assessment Procedures[19] require that cancer burden (increase in cancer cases in the population) be calculated whenever the maximum individual cancer risk (MICR) exceeds one in a million. Since both the maximum residential receptor and maximum worker receptor exceeded one in a million, a calculation was performed to determine if cancer burden could exceed 0.5. A conservative approach was used as a screening calculation. Using the default population density of 4,000 persons per square kilometer, the cumulative area (in square kilometers) of all residential areas within the one in a million isopleth line, and the highest calculated cancer risk between the residential and worker receptors, cancer burden is estimated as shown in Table 9 below:

Table 9. Cancer Burden Calculation

Parameter	**Value**
Residential area within 1 in million cancer risk isopleth line (km2)	~~12.5~~ 12.8
Population density (persons/km2)	4,000
Cancer risk	~~9.2~~ 9.3E-06
Cancer burden (total cancer cases)	~~0.46~~ 0.47

Since the cancer burden is less than 0.5, no further analysis is necessary.

[19] South Coast Air Quality Management District, Risk Assessment Procedures for Rules 1401, 1401.1 and 212, Version 8.0, June 5, 2015.

Table 10. Summary of Maximum Project Offsite Cancer and Non-cancer Risks

Location[a]	Cancer Risk			Chronic Risk			8-Hr Chronic Risk			Acute Risk[d]		
	Increase Cases in-one-million	UTM Coordinates (NAD83)		Hazard Index	UTM Coordinates (NAD83)		Hazard Index	UTM Coordinates (NAD83)		Hazard Index	UTM Coordinates (NAD83)	
		Easting (m)	Northing (m)		Easting (m)	Northing (m)		Easting (m)	Northing (m)		Easting (m)	Northing (m)
Residential receptor [b]	~~3.6~~ 3.7	383700	3741400	~~0.049~~ 0.030	~~387500~~ 385251	~~3739600~~ 3739503	0.006	383700	3741400	0.052	385305	3742454
Offsite workplace receptor	~~9.2~~ 9.3	386006	3742921	~~0.127~~ 0.106	~~386000~~ 386153	~~3739500~~ 3741128	0.108	386153	3741128	0.052	385305	3742454
Sensitive Receptor [b]	2.1	386721	3739987	~~0.054~~ 0.025	387304	3739447	0.005	386721	3739987	0.010	386721	3739987

[a] Excluding onsite grid receptors
[b] Worst-case residential exposure
[c] Maximum sensitive receptors:
Cancer Risk: Bethune Mary School
Chronic Risk: Long Beach Japanese School
8-Hr Chronic Risk: Bethune Mary School
Acute Risk: Bethune Mary School
[d] Fenceline receptors were conservatively included as potential residential and worker receptors for determination of maximum acute risk.

~~Figure 5. Location of Maximum Calculated Health Risks~~

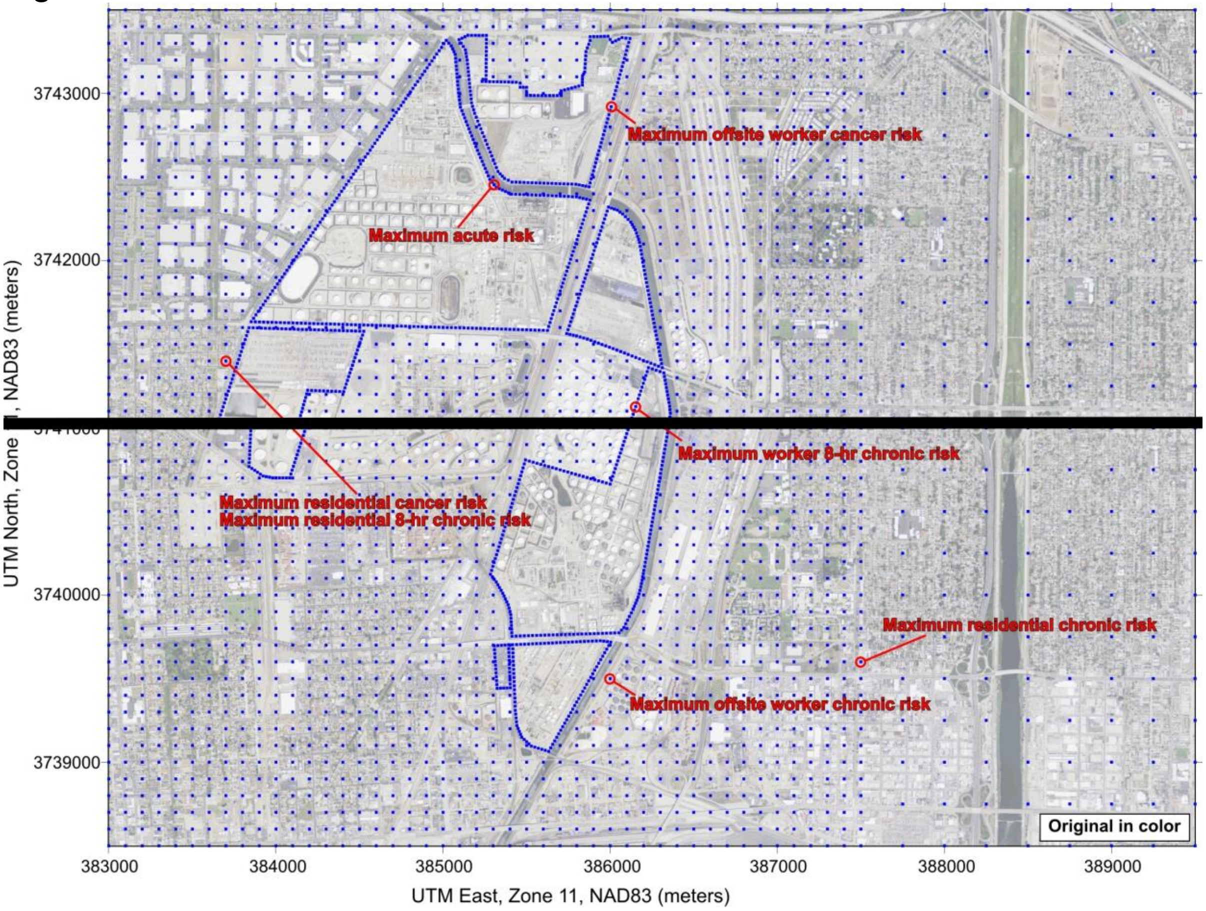
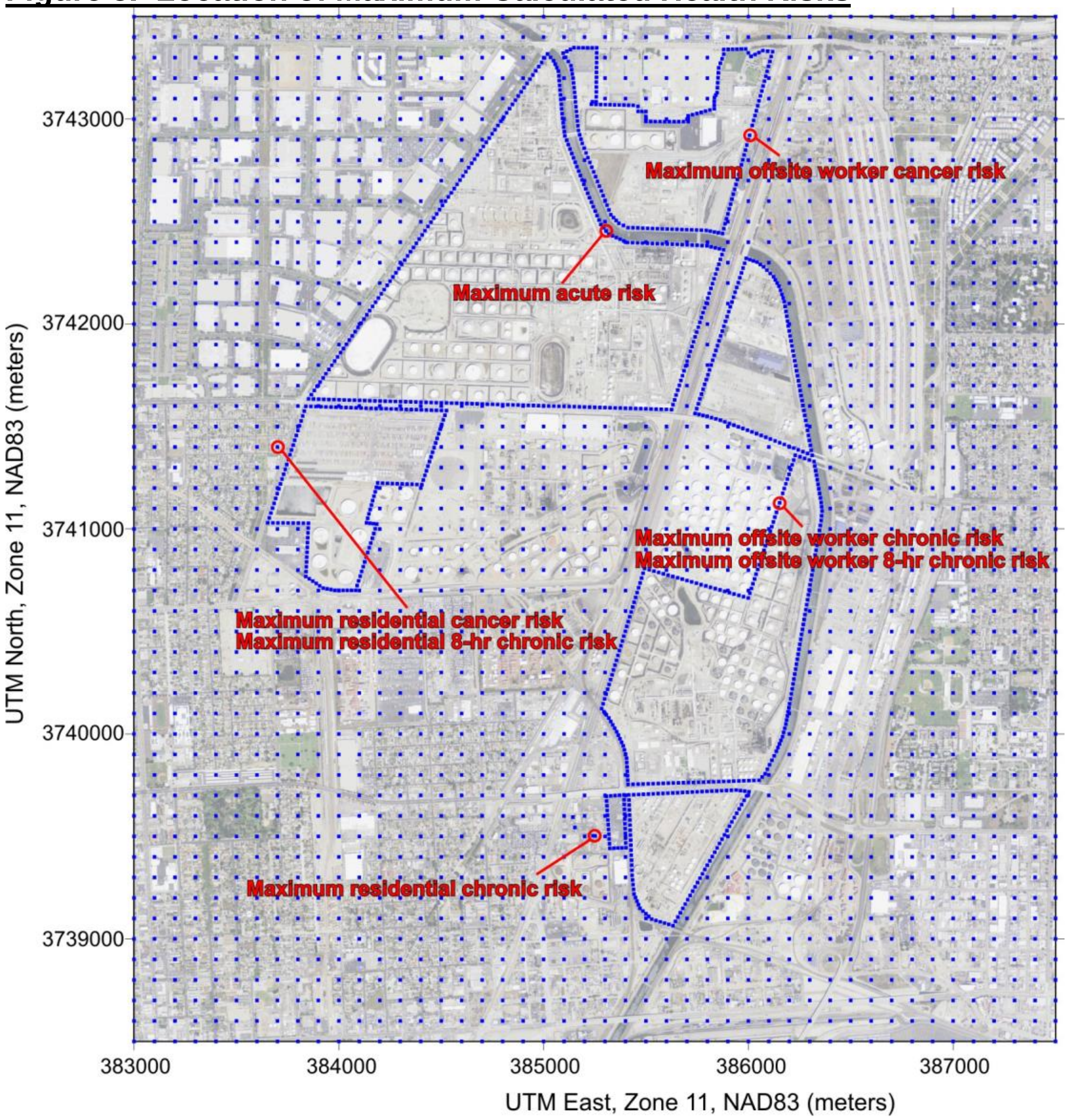
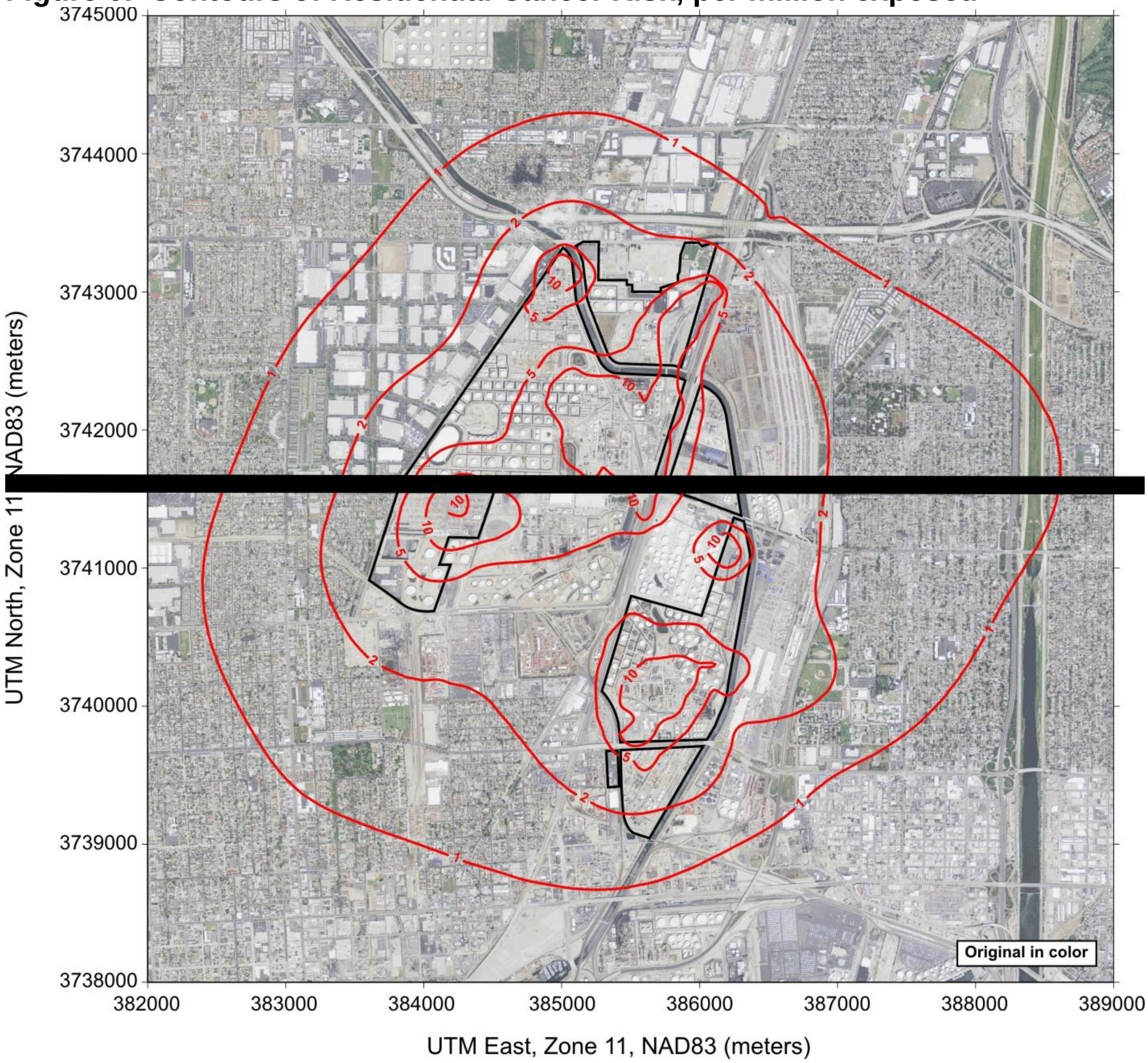


Figure 5. Location of Maximum Calculated Health Risks

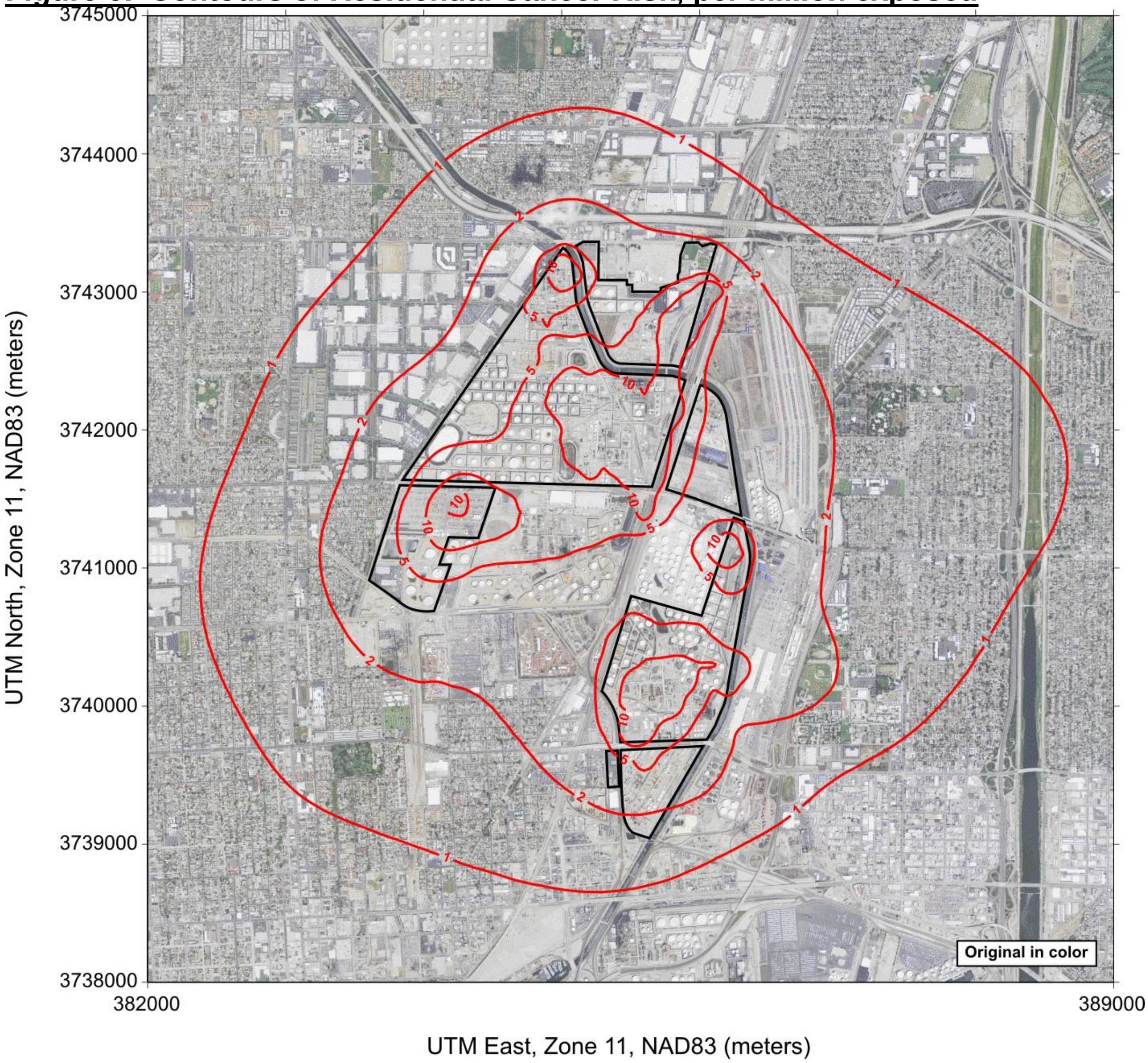


~~Figure 6. Contours of Residential Cancer Risk, per million exposed~~



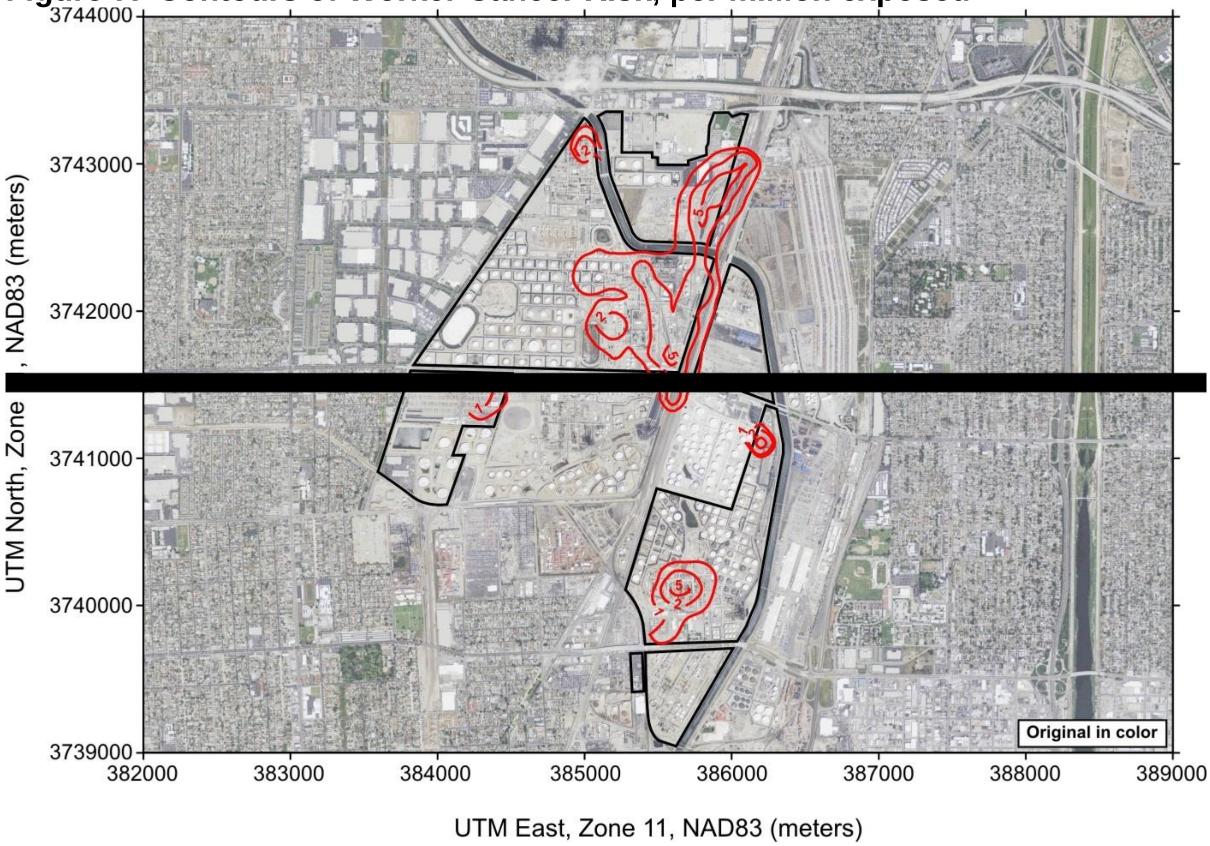
~~Note: The contours shown above represent worst-case hypothetical residential exposure.~~

Figure 6. Contours of Residential Cancer Risk, per million exposed



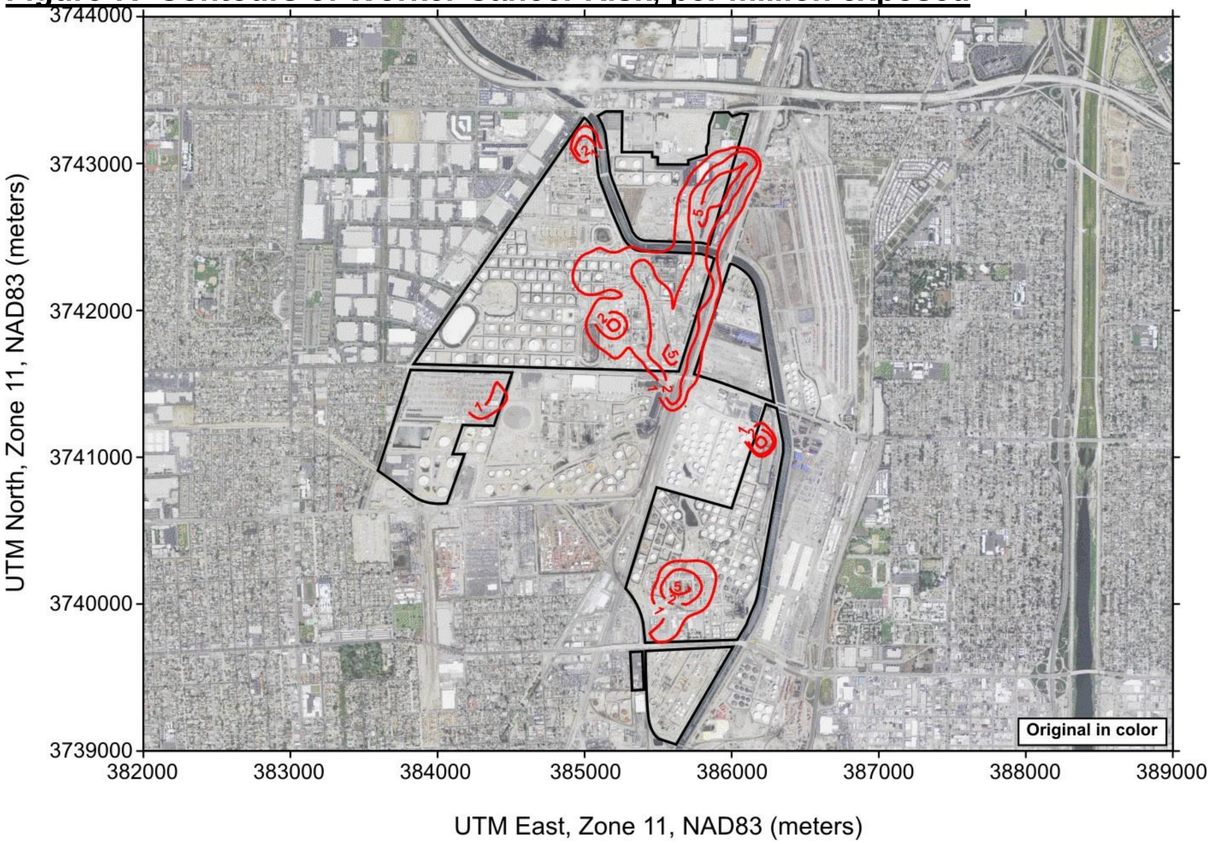
Note: The contours shown above represent worst-case hypothetical residential exposure.

~~Figure 7. Contours of Worker Cancer Risk, per million exposed~~



~~Note: The contours shown above represent worst-case hypothetical worker exposure.~~

Figure 7. Contours of Worker Cancer Risk, per million exposed



Note: The contours shown above represent worst-case hypothetical worker exposure.

Table 11. Summary of Project Cancer Risks at the Most Exposed Sensitive Receptors

Sensitive Receptor Name	UTM Coordinates (NAD83)		Increased Cancer Cases (in-one-million)
	Easting (m)	Northing (m)	
Bethune Mary School	386721	3739987	~~2.09~~ 2.13
Will J. Reid High School	387037	3740324	~~1.91~~ 1.94
Elizabeth Hudson Elementary School	387091	3740595	~~1.74~~ 1.77
Broad Avenue Elementary School	383158	3740800	~~1.73~~ 1.75
William Logan Stephens Junior High	387367	3741657	~~1.58~~ 1.61
Long Beach Child Development	387287	3740345	~~1.55~~ 1.58
Wilmington Christian School	383005	3740658	~~1.47~~ 1.49
Phineas Banning Senior High School	383288	3740032	~~1.42~~ 1.43
Banning High School	387437	3740571	~~1.41~~ 1.43
St. Lucy's School	383286	3740026	~~1.40~~ 1.43
~~Wilmington Park Children's Center~~	~~384655~~	~~3739221~~	~~1.38~~
~~Webster Elementary School~~	~~387380~~	~~3742512~~	~~1.38~~

Webster Elementary School	387380	3742512	1.41
Wilmington Park Children's Center	384655	3739221	1.40
Holy Family Grammar School	384401	3739366	~~1.37~~ 1.38
Wilmington Park Elementary School	384618	3739222	~~1.36~~ 1.38
Santa Fe Convalescent Hospital	387542	3742485	~~1.30~~ 1.33
West Child Development Center	387474	3740168	~~1.29~~ 1.32
John Muir Elementary School	387914	3742030	~~1.25~~ 1.27
First Baptist Church	387692	3740405	~~1.20~~ 1.21
Garfield Head Start Elementary School	383243	3739694	~~1.19~~ 1.21
Avalon High School	383044	3739793	~~1.14~~ 1.15
Banning-Marine Avenue Adult Center	382948	3739923	~~1.14~~ 1.15
Cabrillo High School	387473	3739922	~~1.12~~ 1.14
Wyo Tech National Institute of Tech	387041	3739640	~~1.10~~ 1.12

~~Table 12. Contribution of Diesel Particulate Matter to Calculated Cancer Risks~~

~~Chemical~~	~~Contribution (Increase Cases in-one-million)~~		
	~~Residential Receptor~~	~~Offsite Workplace Receptor~~	~~Sensitive Receptor~~
~~DPM~~	~~0.11~~	~~9.05~~	~~0.08~~
~~Other TACs [a]~~	~~3.53~~	~~0.15~~	~~2.02~~
~~Total~~	~~3.64~~	~~9.19~~	~~2.09~~

~~[a] The TACs primarily responsible for cancer risk are chrysene, benzo(a)pyrene, benzene, and naphthalene.~~

Table 12. Cancer Risk by Pollutant at MEIR

Pollutant[20]	CAS Number	Total risk[21]	Fraction
Benzene	71-43-2	1.2E-06	33.2%
Benzo[a]pyrene	50-32-8	8.7E-07	23.8%
Benzo[b]fluoranthene	205-99-2	4.4E-07	11.9%
Naphthalene	91-20-3	3.4E-07	9.2%
Dioxin and dioxin-like compounds	N150	2.2E-07	6.0%
Benz[a]anthracene	56-55-3	1.9E-07	5.3%
Diesel exhaust particulate matter	--	1.3E-07	3.7%
Dibenz[a,h]anthracene	53-70-3	1.0E-07	2.8%
1,3-Butadiene	106-99-0	8.7E-08	2.4%
Arsenic	7440-38-2	5.6E-08	1.5%
Chromium, hexavalent (& compounds)	18540-29-9	5.3E-08	1.5%

[20] Pollutants that did not contribute any risk were not included in the "risk by pollutant" tables.
[21] Decreases in toxic emissions, e.g. from proposed conversion from refinery fuel gas to natural gas, proposed application of more stringent permit conditions, etc., resulted in negative risk for some chemicals and for some sources in the "risk by pollutant" and "risk by source" tables.

Ethyl benzene	100-41-4	4.7E-08	1.3%
Chrysene	218-01-9	4.0E-08	1.1%
Formaldehyde	50-00-0	3.6E-09	0.1%
Nickel	7440-02-0	2.2E-09	0.1%
Acetaldehyde	75-07-0	1.1E-09	0.0%
Beryllium	7440-41-7	7.3E-10	0.0%
Lead	7439-92-1	5.0E-10	0.0%
Indeno[1,2,3-cd]pyrene	193-39-5	1.3E-10	0.0%
Benzo[k]fluoranthene	207-08-9	3.4E-11	0.0%
3-Methylcholanthrene	56-49-5	-6.2E-09	-0.2%
Cadmium	7440-43-9	-1.4E-07	-3.8%
Total		3.7E-06	100.0%

Table 13. Cancer Risk by Source at MEIR

Source Description	Source ID	Total risk	Fraction
Carson new 500 MBBL Crude Tanks	CRDTK1_C to CRDTK6_C	1.4E-06	38.8%
Crude Tank Farm - Pipeline Component Fugitives	CCT_FUG	1.1E-06	29.4%
Carson FCCU Pre-Heater	FCCUR_C	2.0E-07	5.6%
Carson tank 63	TK63	1.5E-07	4.1%
Carson tank 62	TK62	1.4E-07	3.9%
Carson Wet Jet Treater (New)	WETJET_C	1.1E-07	3.1%
Locomotives	RRB_0001 to RRB_0098, RRG_0001 to RRG_0303	1.1E-07	3.1%
Wilmington Hydrocracker Unit	HCU_W1 to HCU_W3	1.0E-07	2.8%
Carson side Pig Station - Piping Interconnect	PIGST_C	5.7E-08	1.6%
Carson HCU	HCU_C	4.6E-08	1.2%
Wilmington Interconnect Piping - PSTU	IC_W3	3.5E-08	1.0%
Wilmington side Pig Station - Piping Interconnect	PIGST_W1 to PIGST_W2	3.1E-08	0.9%
Wilmington tank 300035 (replaces 80035)	300035	2.4E-08	0.6%
Wilmington Tank 300036 (replaces 80036)	300036	2.4E-08	0.6%
Onsite Trucks	CAR_0001 to CAR_0417, WLM_0001 to WLM_0154, COK_0001 to COK_0165	2.2E-08	0.6%
Wilmington HTU3 unit H-21/H-22 heaters stack	H21_22	1.9E-08	0.5%
Carson LPG Rail Car Loading/Unloading	LPG_C	1.5E-08	0.4%
Carson 51 Vacuum Unit heater stack (D63)	51VAC	1.4E-08	0.4%
Wilmington Boilers 7 & 8 stack	BLR78_W	1.3E-08	0.4%
Wilmington - Sulfuric Acid Regen Plant Stk 2 - Decomp furnace	SA2_W	1.3E-08	0.4%
Carson Naphtha HDS heater stack (D1433)	NHDS	1.3E-08	0.3%
Carson Hydrocracker R1 heater stack (D625)	HCU_R1	1.2E-08	0.3%
Wilmington tank 80060	80060	1.2E-08	0.3%
Wilmington - New Piping for Tanks 300035-300036	NWPIPE_W	1.1E-08	0.3%
Carson Hydrocracker R2 heater stack (D627)	HCU_R2	1.1E-08	0.3%
Wilmington - Sulfuric Acid Regen Plant Stk 1 - process air & converter htr	SA1_W	1.1E-08	0.3%
Carson Interconnect Piping - OSBL	IC_C1 to IC_C2	1.0E-08	0.3%
Wilmington Interconnect Piping - OSBL	IC_W1 to IC_W2	9.5E-09	0.3%
Wilmington tank 80067	80067	7.7E-09	0.2%
Wilmington tank 80079	80079	6.7E-09	0.2%

Source Description	Source ID	Total risk	Fraction
Wilmington Hydrotreater Unit No. 2	HTU2_W	6.7E-09	0.2%
Carson Mid Barrel Distillate Treater	MID_C1 to MID_C2	5.7E-09	0.2%
Wilmington HTU3 unit H-30 heater stack	H30	5.3E-09	0.1%
Wilmington Boilers 9 & 10 stack	BLR910_W	5.2E-09	0.1%
Wilmington H100 heater stack	H100	5.0E-09	0.1%
Carson Cogeneration Unit 4 turbine and duct burner stack (D1239/D1240)	COGEN4	4.8E-09	0.1%
Carson Cogeneration Unit 1 turbine and duct burner stack (D1226/D1227)	COGEN1	4.8E-09	0.1%
Carson Cogeneration Unit 2 turbine and duct burner stack (D1233/D1234)	COGEN2	4.8E-09	0.1%
Carson Cogeneration Unit 3 turbine and duct burner stack (D1236/D1237)	COGEN3	4.7E-09	0.1%
Carson tank 31	TK31	3.5E-09	0.1%
Wilmington Hydrotreater Unit No. 1	HTU1_W	3.3E-09	0.1%
Carson Naphtha HDS	NAPHDS_C	3.1E-09	0.1%
Carson Light Hydro Unit	LHU_C1 to LHU_C2	2.9E-09	0.1%
Carson No. 51 Vacuum Unit	51VAC_C	2.1E-09	0.1%
Wilmington coker heater H101	H101	1.9E-09	0.1%
Carson Naphtha Isom Unit	NISOM_C1 to NISOM_C2	1.4E-09	0.0%
Wilmington tank 80044	80044	1.0E-09	0.0%
Wilmington CRU2 unit H-510 heater stack	H510	8.6E-10	0.0%
Wilmington Coke Handling Emissions	COKE_W	8.4E-10	0.0%
Carson Alkylation Unit	ALKY_C	7.2E-10	0.0%
Wilmington Hydrotreater Unit No. 4	HTU4_W	6.9E-10	0.0%
Wilmington tank 80217	80217	6.1E-10	0.0%
Carson FCCU	FCCU_C	4.5E-10	0.0%
Wilmington CRU	CRU_W1 to CRU_W2	3.9E-10	0.0%
Wilmington CRU2 unit H-501A/B 502 503 504 heaters stack	H501A_ET	3.2E-10	0.0%
Carson Light Hydrotreating Unit heater (D425)	LHU_HTR	2.9E-10	0.0%
Wilmington Sulfur plant combined H-1601/1602 stack	H1601_2	1.8E-10	0.0%
Carson FCCU Regenerator	FCCUPH_C	1.3E-10	0.0%
Wilmington tank 80074	80074	8.4E-11	0.0%
Wilmington tank 80211	80211	7.8E-11	0.0%
Carson tank 64	TK64	2.0E-11	0.0%
Wilmington Propane Sales Treating Unit	PSTU_W	9.9E-12	0.0%
Wilmington sulfur plant incinerator stack 2	F754	5.9E-12	0.0%
Wilmington sulfur plant incinerator stack 1	F704	5.0E-12	0.0%

Source Description	Source ID	Total risk	Fraction
Carson tank 14	TK14	0.0E+00	0.0%
Carson tank 959	TK959	0.0E+00	0.0%
Carson Tank 502	TK502	0.0E+00	0.0%
Wilmington tank 80035	80035	-1.7E-12	0.0%
Wilmington tank 80036	80036	-3.4E-12	0.0%
Wilmington tank 80215	80215	-5.1E-11	0.0%
Wilmington tank 80038	80038	-9.2E-11	0.0%
Wilmington HCU H-300 and H-301 heaters stack	H300_301	-1.5E-07	-4.1%
Total		3.7E-06	100.0%

Table 14. Cancer Risk by Pollutant at MEIW

Pollutant	CAS Number	Total risk	Fraction
Diesel exhaust particulate matter	--	9.1E-06	98.4%
1,3-Butadiene	106-99-0	6.6E-08	0.7%
Benzene	71-43-2	3.4E-08	0.4%
Naphthalene	91-20-3	3.3E-08	0.4%
Dioxin and dioxin-like compounds	N150	1.2E-08	0.1%
Chromium, hexavalent (& compounds)	18540-29-9	3.4E-09	0.0%
Arsenic	7440-38-2	2.2E-09	0.0%
Benzo(a)pyrene	50-32-8	1.9E-09	0.0%
Ethyl benzene	100-41-4	1.5E-09	0.0%
Benzo(b)fluoranthene	205-99-2	9.7E-10	0.0%
Benz(a)anthracene	56-55-3	4.4E-10	0.0%
Formaldehyde	50-00-0	2.5E-10	0.0%
Dibenz(a,h)anthracene	53-70-3	2.0E-10	0.0%
Nickel	7440-02-0	1.7E-10	0.0%
Chrysene	218-01-9	8.9E-11	0.0%
Acetaldehyde	75-07-0	8.9E-11	0.0%
Beryllium	7440-41-7	6.7E-11	0.0%
Lead	7439-92-1	2.4E-11	0.0%
Indeno(1,2,3-cd)pyrene	193-39-5	3.7E-12	0.0%
Benzo(k)fluoranthene	207-08-9	8.1E-13	0.0%
3-Methylcholanthrene	56-49-5	-1.7E-10	0.0%
Cadmium	7440-43-9	-1.2E-08	-0.1%
Total		9.3E-06	100.0%

Table 15. Cancer Risk by Source at MEIW

Source Description	Source ID	Total risk	Fraction
Locomotives	RRB_0001 to RRB_0098, RRG_0001 to RRG_0303	9.0E-06	97.7%
Onsite Trucks	CAR_0001 to CAR_0417, WLM_0001 to WLM_0154, COK_0001 to COK_0165	6.9E-08	0.7%
Carson LPG Rail Car Loading/Unloading	LPG_C	5.8E-08	0.6%
Carson HCU	HCU_C	1.4E-08	0.2%
Carson Wet Jet Treater (New)	WETJET_C	1.2E-08	0.1%
Carson FCCU Pre-Heater	FCCUR_C	1.2E-08	0.1%
Carson side Pig Station - Piping Interconnect	PIGST_C	9.1E-09	0.1%
Carson tank 62	TK62	8.3E-09	0.1%
Carson tank 63	TK63	8.0E-09	0.1%
Wilmington Hydrocracker Unit	HCU_W1 to HCU_W3	6.6E-09	0.1%
Crude Tank Farm - Pipeline Component Fugitives	CCT_FUG	4.7E-09	0.1%
Wilmington side Pig Station - Piping Interconnect	PIGST_W1 to PIGST_W2	4.5E-09	0.0%
Carson new 500 MBBL Crude Tanks	CRDTK1_C	3.1E-09	0.0%
Wilmington Interconnect Piping - PSTU	IC_W3	2.0E-09	0.0%
Carson Mid Barrel Distillate Treater	MID_C1 to MID_C2	1.1E-09	0.0%
Carson Hydrocracker R1 heater stack (D625)	HCU_R1	1.1E-09	0.0%
Carson Hydrocracker R2 heater stack (D627)	HCU_R2	1.0E-09	0.0%
Carson 51 Vacuum Unit heater stack (D63)	51VAC	9.3E-10	0.0%
Wilmington HTU3 unit H-21/H-22 heaters stack	H21_22	7.6E-10	0.0%
Wilmington Tank 300036 (replaces 80036)	300036	7.5E-10	0.0%
Wilmington tank 300035 (replaces 80035)	300035	7.0E-10	0.0%
Wilmington Interconnect Piping - OSBL	IC_W1 to IC_W2	6.1E-10	0.0%
Carson Light Hydro Unit	LHU_C1 to LHU_C2	5.8E-10	0.0%
Wilmington tank 80060	80060	5.7E-10	0.0%
Carson Naphtha HDS	NAPHDS_C	5.7E-10	0.0%
Wilmington - Sulfuric Acid Regen Plant Stk 2 - Decomp furnace	SA2_W	4.9E-10	0.0%
Carson Naphtha HDS heater stack (D1433)	NHDS	4.9E-10	0.0%
Wilmington Hydrotreater Unit No. 2	HTU2_W	4.8E-10	0.0%
Carson Interconnect Piping - OSBL	IC_C1 to IC_C2	4.7E-10	0.0%
Wilmington Boilers 7 & 8 stack	BLR78_W	4.3E-10	0.0%

Source Description	Source ID	Total risk	Fraction
Wilmington tank 80067	80067	3.7E-10	0.0%
Wilmington - Sulfuric Acid Regen Plant Stk 1 - process air & converter htr	SA1_W	3.7E-10	0.0%
Wilmington - New Piping for Tanks 300035-300036	NWPIPE_W	3.5E-10	0.0%
Wilmington H100 heater stack	H100	3.2E-10	0.0%
Wilmington tank 80079	80079	2.6E-10	0.0%
Wilmington HTU3 unit H-30 heater stack	H30	2.5E-10	0.0%
Carson No. 51 Vacuum Unit	51VAC_C	2.4E-10	0.0%
Wilmington Hydrotreater Unit No. 1	HTU1_W	2.4E-10	0.0%
Wilmington Boilers 9 & 10 stack	BLR910_W	2.1E-10	0.0%
Carson Naphtha Isom Unit	NISOM_C1 to NISOM_C2	2.0E-10	0.0%
Carson Cogeneration Unit 1 turbine and duct burner stack (D1226/D1227)	COGEN1	1.5E-10	0.0%
Carson Cogeneration Unit 2 turbine and duct burner stack (D1233/D1234)	COGEN2	1.5E-10	0.0%
Carson Cogeneration Unit 4 turbine and duct burner stack (D1239/D1240)	COGEN4	1.5E-10	0.0%
Carson Cogeneration Unit 3 turbine and duct burner stack (D1236/D1237)	COGEN3	1.5E-10	0.0%
Carson Alkylation Unit	ALKY_C	1.4E-10	0.0%
Wilmington coker heater H101	FCCU_C	1.3E-10	0.0%
Carson FCCU	H101	1.2E-10	0.0%
Carson tank 31	TK31	8.3E-11	0.0%
Wilmington tank 80044	80044	7.8E-11	0.0%
Wilmington Coke Handling Emissions	COKE_W	7.7E-11	0.0%
Wilmington tank 80217	80217	5.7E-11	0.0%
Wilmington Hydrotreater Unit No. 4	HTU4_W	3.7E-11	0.0%
Wilmington CRU2 unit H-510 heater stack	H510	3.7E-11	0.0%
Carson Light Hydrotreating Unit heater (D425)	LHU_HTR	3.0E-11	0.0%
Wilmington CRU	CRU_W1 to CRU_W2	2.6E-11	0.0%
Wilmington Sulfur plant combined H-1601/1602 stack	H1601_2	2.5E-11	0.0%
Wilmington CRU2 unit H-501A/B 502 503 504 heaters stack	H501A_ET	1.4E-11	0.0%
Carson FCCU Regenerator	FCCUPH_C	1.4E-11	0.0%
Wilmington tank 80211	80211	6.2E-12	0.0%
Wilmington tank 80074	80074	4.1E-12	0.0%
Wilmington sulfur plant incinerator stack 2	F754	1.5E-12	0.0%
Wilmington sulfur plant incinerator stack 1	F704	1.3E-12	0.0%
Carson tank 64	TK64	9.6E-13	0.0%
Wilmington Propane Sales Treating Unit	PSTU_W	5.8E-13	0.0%
Carson tank 14	TK14	0.0E+00	0.0%

Source Description	Source ID	Total risk	Fraction
Carson tank 959	TK959	0.0E+00	0.0%
Carson Tank 502	TK502	0.0E+00	0.0%
Wilmington tank 80035	80035	-7.6E-14	0.0%
Wilmington tank 80036	80036	-1.6E-13	0.0%
Wilmington tank 80038	80038	-3.9E-12	0.0%
Wilmington tank 80215	80215	-4.3E-12	0.0%
Wilmington HCU H-300 and H-301 heaters stack	H300_301	-1.3E-08	-0.1%
Total	-	9.3E-06	100.0%

Table 16. Chronic Risk by Pollutant at Maximum Exposed Individual[22]

Pollutant	CAS Number	Total risk	Fraction
Benzene	71-43-2	1.1E-01	102.4%
Nickel	7440-02-0	1.4E-03	1.3%
Dioxin and dioxin-like compounds	N150	4.4E-04	0.4%
DPM	--	1.5E-04	0.1%
Chromium, hexavalent (& compounds)	18540-29-9	2.7E-06	0.0%
Propylene	115-07-1	-4.8E-07	0.0%
Acetaldehyde	75-07-0	-5.5E-07	0.0%
Naphthalene	91-20-3	-1.4E-06	0.0%
Xylenes (mixed)	1330-20-7	-2.0E-06	0.0%
Formaldehyde	50-00-0	-6.8E-06	0.0%
Toluene	108-88-3	-1.0E-05	0.0%
Hydrochloric acid	7647-01-0	-2.2E-05	0.0%
Ammonia	7664-41-7	-3.8E-05	0.0%
Sulfuric acid	7664-93-9	-6.4E-05	-0.1%
Beryllium	7440-41-7	-7.2E-05	-0.1%
Hydrogen sulfide	7783–06–4	-8.8E-05	-0.1%
Acrolein	107-02-8	-3.2E-04	-0.3%
Cadmium	7440-43-9	-1.4E-03	-1.4%
Arsenic	7440-38-2	-2.5E-03	-2.4%
Total	-	1.1E-01	100.0%

[22] To calculate maximum chronic risk, HARP2 determines risk from all chemicals for all pathways, and the pathway with the highest total is considered the maximum. If a chemical contributes risk to one or more pathways but does affect the pathway with the highest risk, it is not listed in this table. For this project, the pathway with the highest chronic risk at the MEI was respiratory system for the baseline emissions and (hematologic system) blood for the post-project emissions.

Table 17. Chronic Risk by Source at Maximum Exposed Individual

Source Description	Source ID	Total risk	Fraction
Wilmington side Pig Station - Piping Interconnect	PIGST_W1 to PIGST_W2	1.0E-01	98.1%
Carson new 500 MBBL Crude Tanks	CRDTK1_C	1.3E-03	1.2%
Wilmington Coke Handling Emissions	COKE_W	1.1E-03	1.0%
Wilmington Hydrocracker Unit	HCU_W1 to HCU_W3	5.7E-04	0.5%
Carson FCCU Pre-Heater	FCCUR_C	4.0E-04	0.4%
Carson side Pig Station - Piping Interconnect	PIGST_C	3.8E-04	0.4%
Carson tank 63	TK63	2.8E-04	0.3%
Carson tank 62	TK62	2.7E-04	0.3%
Wilmington tank 80044	80044	2.5E-04	0.2%
Onsite Trucks	CAR_0001 to CAR_0417, WLM_0001 to WLM_0154, COK_0001 to COK_0165	2.4E-04	0.2%
Crude Tank Farm - Pipeline Component Fugitives	CCT_FUG	2.1E-04	0.2%
Wilmington Interconnect Piping - PSTU	IC_W3	1.6E-04	0.1%
Wilmington tank 80060	80060	1.5E-04	0.1%
Wilmington HTU3 unit H-21/H-22 heaters stack	H21_22	1.5E-04	0.1%
Wilmington Hydrotreater Unit No. 2	HTU2_W	1.4E-04	0.1%
Wilmington Tank 300036 (replaces 80036)	300036	1.2E-04	0.1%
Wilmington tank 300035 (replaces 80035)	300035	9.8E-05	0.1%
Wilmington tank 80067	80067	9.6E-05	0.1%
Wilmington tank 80079	80079	8.3E-05	0.1%
Wilmington tank 80215	80215	7.9E-05	0.1%
Wilmington Interconnect Piping - OSBL	IC_W1 to IC_W2	6.4E-05	0.1%
Wilmington - New Piping for Tanks 300035-300036	NWPIPE_W	5.4E-05	0.1%
Wilmington Boilers 7 & 8 stack	BLR78_W	5.3E-05	0.0%
Wilmington tank 80217	80217	4.4E-05	0.0%
Carson Naphtha HDS	NAPHDS_C	3.9E-05	0.0%
Wilmington HTU3 unit H-30 heater stack	H30	3.9E-05	0.0%
Wilmington coker heater H101	H101	3.0E-05	0.0%
Carson tank 31	TK31	2.7E-05	0.0%
Wilmington Boilers 9 & 10 stack	BLR910_W	2.6E-05	0.0%
Locomotives	RRB_0001 to RRB_0098, RRG_0001 to RRG_0303	2.5E-05	0.0%
Carson Mid Barrel Distillate Treater	MID_C1 to MID_C2	2.0E-05	0.0%

Source Description	Source ID	Total risk	Fraction
Carson Interconnect Piping - OSBL	IC_C1 to IC_C2	1.3E-05	0.0%
Carson Light Hydro Unit	LHU_C1 to LHU_C2	1.1E-05	0.0%
Carson Cogeneration Unit 1 turbine and duct burner stack (D1226/D1227)	COGEN1	1.0E-05	0.0%
Carson Cogeneration Unit 2 turbine and duct burner stack (D1233/D1234)	COGEN2	1.0E-05	0.0%
Carson Cogeneration Unit 3 turbine and duct burner stack (D1236/D1237)	COGEN3	1.0E-05	0.0%
Carson Cogeneration Unit 4 turbine and duct burner stack (D1239/D1240)	COGEN4	9.8E-06	0.0%
Wilmington - Sulfuric Acid Regen Plant Stk 2 - Decomp furnace	SA2_W	8.0E-06	0.0%
Wilmington tank 80211	80211	7.8E-06	0.0%
Wilmington CRU2 unit H-510 heater stack	H510	6.5E-06	0.0%
Wilmington - Sulfuric Acid Regen Plant Stk 1 - process air & converter htr	SA1_W	6.3E-06	0.0%
Carson Hydrocracker R1 heater stack (D625)	HCU_R1	2.3E-06	0.0%
Carson Hydrocracker R2 heater stack (D627)	HCU_R2	2.1E-06	0.0%
Carson LPG Rail Car Loading/Unloading	LPG_C	1.5E-06	0.0%
Wilmington CRU2 unit H-501A/B 502 503 504 heaters stack	H501A_ET	1.3E-06	0.0%
Wilmington Sulfur plant combined H-1601/1602 stack	H1601_2	5.5E-07	0.0%
Carson No. 51 Vacuum Unit	51VAC_C	2.1E-07	0.0%
Wilmington Hydrotreater Unit No. 4	HTU4_W	1.0E-07	0.0%
Carson Alkylation Unit	ALKY_C	8.0E-08	0.0%
Carson FCCU	FCCU_C	2.2E-08	0.0%
Carson Light Hydrotreating Unit heater (D425)	LHU_HTR	1.2E-08	0.0%
Carson FCCU Regenerator	FCCUPH_C	7.5E-09	0.0%
Wilmington sulfur plant incinerator stack 2	F754	4.1E-09	0.0%
Wilmington sulfur plant incinerator stack 1	F704	3.5E-09	0.0%
Carson HCU	HCU_C	0.0E+00	0.0%
Carson Wet Jet Treater (New)	WETJET_C	0.0E+00	0.0%
Wilmington Hydrotreater Unit No. 1	HTU1_W	0.0E+00	0.0%
Wilmington CRU	CRU_W1	0.0E+00	0.0%
Wilmington Propane Sales Treating Unit	PSTU_W	0.0E+00	0.0%
Carson Naphtha Isom Unit	NISOM_C1	0.0E+00	0.0%
Wilmington tank 80074	80074	0.0E+00	0.0%
Carson tank 14	TK14	0.0E+00	0.0%
Carson tank 959	TK959	0.0E+00	0.0%
Carson Tank 502	TK502	0.0E+00	0.0%
Carson tank 64	TK64	-3.2E-09	0.0%
Wilmington tank 80035	80035	-8.1E-09	0.0%

Source Description	Source ID	Total risk	Fraction
Wilmington tank 80036	80036	-1.7E-08	0.0%
Wilmington tank 80038	80038	-6.4E-07	0.0%
Carson Naphtha HDS heater stack (D1433)	NHDS	-1.9E-04	-0.2%
Carson 51 Vacuum Unit heater stack (D63)	51VAC	-1.1E-03	-1.0%
Wilmington H100 heater stack	H100	-1.3E-03	-1.2%
Wilmington HCU H-300 and H-301 heaters stack	H300_301	-2.0E-03	-1.9%
Total		1.1E-01	100.0%

Table 18. Acute Risk by Pollutant at Maximum Exposed Individual[23]

Pollutant	CAS Number	Total risk	Fraction
Benzene	71-43-2	5.2E-02	98.7%
Nickel	7440-02-0	7.0E-04	1.3%
Total		5.2E-02	100.0%

Table 19. Acute Risk by Source at Maximum Exposed Individual

Source Description	Source ID	Total risk	Fraction
Carson tank 62	TK62	2.7E-02	51.6%
Carson tank 63	TK63	1.9E-02	36.3%
Carson new 500 MBBL Crude Tanks	CRDTK1_C to CRDTK6_C	2.4E-03	4.6%
Carson tank 31	TK31	4.2E-04	0.8%
Wilmington Tank 300036 (replaces 80036)	300036	3.9E-04	0.7%
Wilmington tank 300035 (replaces 80035)	300035	3.6E-04	0.7%
Wilmington tank 80044	80044	3.2E-04	0.6%
Carson side Pig Station - Piping Interconnect	PIGST_C	3.2E-04	0.6%
Wilmington HTU3 unit H-21/H-22 heaters stack	H21_22	2.2E-04	0.4%
Wilmington tank 80060	80060	2.1E-04	0.4%
Crude Tank Farm - Pipeline Component Fugitives	CCT_FUG	1.8E-04	0.4%
Wilmington tank 80067	80067	1.6E-04	0.3%
Wilmington tank 80079	80079	1.5E-04	0.3%
Carson 51 Vacuum Unit heater stack (D63)	51VAC	1.3E-04	0.2%
Wilmington Boilers 7 & 8 stack	BLR78_W	1.2E-04	0.2%
Carson Interconnect Piping - OSBL	IC_C1 to IC_C2	1.1E-04	0.2%
Wilmington Hydrocracker Unit	HCU_W1 to HCU_W3	9.5E-05	0.2%

[23] To calculate maximum acute risk, HARP2 determines risk from all chemicals for all pathways, and the pathway with the highest total is considered the maximum. If a chemical contributes risk to one or more pathways but does affect the pathway with the highest risk, it is not listed in this table. For this project, the pathway with the highest acute risk at the MEI was the immune system.

Source Description	Source ID	Total risk	Fraction
Carson Mid Barrel Distillate Treater	MID_C1 to MID_C2	8.2E-05	0.2%
Wilmington tank 80215	80215	7.5E-05	0.1%
Wilmington H100 heater stack	H100	7.0E-05	0.1%
Wilmington HTU3 unit H-30 heater stack	H30	6.1E-05	0.1%
Wilmington side Pig Station - Piping Interconnect	PIGST_W1 to PIGST_W2	5.9E-05	0.1%
Carson Naphtha HDS	NAPHDS_C	5.3E-05	0.1%
Carson Light Hydro Unit	LHU_C1 to LHU_C2	4.3E-05	0.1%
Wilmington Boilers 9 & 10 stack	BLR910_W	3.6E-05	0.1%
Wilmington Interconnect Piping - PSTU	IC_W3	3.4E-05	0.1%
Wilmington tank 80217	80217	2.5E-05	0.0%
Wilmington Hydrotreater Unit No. 2	HTU2_W	2.2E-05	0.0%
Carson Naphtha HDS heater stack (D1433)	NHDS	1.9E-05	0.0%
Wilmington - Sulfuric Acid Regen Plant Stk 2 - Decomp furnace	SA2_W	1.9E-05	0.0%
Wilmington HCU H-300 and H-301 heaters stack	H300_301	1.9E-05	0.0%
Wilmington coker heater H101	SA1_W	1.5E-05	0.0%
Wilmington - Sulfuric Acid Regen Plant Stk 1 - process air & converter htr	H101	1.4E-05	0.0%
Wilmington CRU2 unit H-510 heater stack	H510	1.2E-05	0.0%
Wilmington Interconnect Piping - OSBL	IC_W1	1.2E-05	0.0%
Carson Hydrocracker R2 heater stack (D627)	HCU_R2	1.0E-05	0.0%
Wilmington tank 80211	80211	1.0E-05	0.0%
Carson Hydrocracker R1 heater stack (D625)	HCU_R1	8.6E-06	0.0%
Wilmington - New Piping for Tanks 300035-300036	NWPIPE_W	8.3E-06	0.0%
Carson LPG Rail Car Loading/Unloading	LPG_C	6.6E-06	0.0%
Carson FCCU Pre-Heater	FCCUR_C	5.5E-06	0.0%
Wilmington Sulfur plant combined H-1601/1602 stack	H1601_2	2.2E-06	0.0%
Wilmington CRU2 unit H-501A/B 502 503 504 heaters stack	H501A_ET	1.5E-06	0.0%
Carson No. 51 Vacuum Unit	51VAC_C	3.1E-07	0.0%
Carson FCCU	FCCU_C	1.6E-07	0.0%
Carson Alkylation Unit	ALKY_C	1.4E-07	0.0%
Carson FCCU Regenerator	FCCUPH_C	8.7E-08	0.0%
Carson Light Hydrotreating Unit heater (D425)	LHU_HTR	5.9E-08	0.0%
Wilmington sulfur plant incinerator stack 2	F754	1.6E-08	0.0%
Wilmington Hydrotreater Unit No. 4	HTU4_W	1.5E-08	0.0%
Wilmington sulfur plant incinerator stack 1	F704	1.2E-08	0.0%
Carson Cogeneration Unit 1 turbine and duct burner stack (D1226/D1227)	COGEN1	0.0E+00	0.0%
Carson Cogeneration Unit 2 turbine and duct burner	COGEN2	0.0E+00	0.0%

Source Description	Source ID	Total risk	Fraction
stack (D1233/D1234)			
Carson Cogeneration Unit 3 turbine and duct burner stack (D1236/D1237)	COGEN3	0.0E+00	0.0%
Carson Cogeneration Unit 4 turbine and duct burner stack (D1239/D1240)	COGEN4	0.0E+00	0.0%
Carson HCU	HCU_C	0.0E+00	0.0%
Carson Naphtha Isom Unit	NISOM_C1 to NISOM_C2	0.0E+00	0.0%
Carson tank 14	TK14	0.0E+00	0.0%
Carson Tank 502	TK502	0.0E+00	0.0%
Carson tank 64	TK64	0.0E+00	0.0%
Carson tank 959	TK959	0.0E+00	0.0%
Carson Wet Jet Treater (New)	WETJET_C	0.0E+00	0.0%
Locomotives	RRB_0001 to RRB_0098, RRG_0001 to RRG_0303	0.0E+00	0.0%
Onsite Trucks	CAR_0001 to CAR_0417, WLM_0001 to WLM_0154	0.0E+00	0.0%
Wilmington CRU	CRU_W1 to CRU_W2	0.0E+00	0.0%
Wilmington Hydrotreater Unit No. 1	HTU1_W	0.0E+00	0.0%
Wilmington Propane Sales Treating Unit	PSTU_W	0.0E+00	0.0%
Wilmington tank 80035	80035	0.0E+00	0.0%
Wilmington tank 80036	80036	0.0E+00	0.0%
Wilmington tank 80038	80038	0.0E+00	0.0%
Wilmington tank 80074	80074	0.0E+00	0.0%
Total	-	5.2E-02	100.0%

Attachment ~~D-4~~ H-5 contains the AERMOD input and output files. The attachment also has the HARP Risk module outputs with the calculated stationary source risks at each receptor, and the spreadsheet outputs of calculated mobile DPM risks and total (stationary plus mobile) risks for each receptor.

ATTACHMENT ~~D-1~~H-1 LOCOMOTIVE VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
RRB_0001	386097.2	3743023.1
RRB_0002	386091.8	3743018.2
RRB_0003	386086.4	3743013.2
RRB_0004	386081.0	3743008.3
RRB_0005	386075.6	3743003.3
RRB_0006	386070.2	3742998.4
RRB_0007	386064.8	3742993.4
RRB_0008	386059.5	3742988.5
RRB_0009	386054.1	3742983.5
RRB_0010	386048.7	3742978.6
RRB_0011	386043.3	3742973.6
RRB_0012	386037.9	3742968.7
RRB_0013	386032.5	3742963.7
RRB_0014	386027.1	3742958.8
RRB_0015	386021.7	3742953.9
RRB_0016	386016.3	3742948.9
RRB_0017	386010.9	3742944.0
RRB_0018	386005.5	3742939.0
RRB_0019	386000.2	3742934.1
RRB_0020	385994.8	3742929.1
RRB_0021	385989.4	3742924.2
RRB_0022	385984.0	3742919.3
RRB_0023	385978.6	3742914.3
RRB_0024	385973.2	3742909.4
RRB_0025	385967.8	3742904.4
RRB_0026	385962.6	3742899.3
RRB_0027	385958.4	3742893.3
RRB_0028	385954.2	3742887.4
RRB_0029	385949.9	3742881.4
RRB_0030	385945.7	3742875.4
RRB_0031	385941.5	3742869.5
RRB_0032	385937.2	3742863.5
RRB_0033	385933.0	3742857.5
RRB_0034	385928.8	3742851.6
RRB_0035	385924.8	3742845.4
RRB_0036	385921.2	3742839.0
RRB_0037	385917.7	3742832.6
RRB_0038	385914.2	3742826.2
RRB_0039	385910.6	3742819.8
RRB_0040	385907.1	3742813.4
RRB_0041	385903.6	3742807.0
RRB_0042	385900.0	3742800.6
RRB_0043	385896.5	3742794.2
RRB_0044	385893.0	3742787.8
RRB_0045	385889.4	3742781.4
RRB_0046	385886.4	3742774.8
RRB_0047	385883.3	3742768.1
RRB_0049	385877.2	3742754.8
RRB_0050	385874.2	3742748.1
RRB_0051	385871.2	3742741.5
RRB_0052	385868.1	3742734.8
RRB_0053	385865.1	3742728.2
RRB_0054	385862.1	3742721.5
RRB_0055	385859.0	3742714.9
RRB_0056	385856.2	3742708.1
RRB_0057	385853.7	3742701.3
RRB_0058	385851.2	3742694.4
RRB_0059	385848.6	3742687.5
RRB_0060	385846.1	3742680.6
RRB_0061	385843.6	3742673.8
RRB_0062	385841.1	3742666.9
RRB_0063	385838.6	3742660.0
RRB_0064	385836.1	3742653.2
RRB_0065	385833.6	3742646.3
RRB_0066	385831.1	3742639.4
RRB_0067	385828.6	3742632.6
RRB_0068	385826.0	3742625.7
RRB_0069	385823.5	3742618.8
RRB_0070	385821.0	3742611.9
RRB_0071	385818.5	3742605.1
RRB_0072	385957.8	3742896.2
RRB_0073	385952.3	3742891.4
RRB_0074	385946.8	3742886.6
RRB_0075	385941.3	3742881.7
RRB_0076	385935.9	3742876.9
RRB_0077	385930.4	3742872.1
RRB_0078	385924.9	3742867.2
RRB_0079	385919.4	3742862.4
RRB_0080	385913.9	3742857.6
RRB_0081	385908.4	3742852.7
RRB_0082	385902.9	3742847.9
RRB_0083	385897.5	3742843.0
RRB_0084	385892.5	3742837.6
RRB_0085	385887.6	3742832.3
RRB_0086	385882.6	3742826.9
RRB_0087	385877.6	3742821.5
RRB_0088	385872.7	3742816.1
RRB_0089	385868.3	3742810.3
RRB_0090	385864.0	3742804.4
RRB_0091	385859.6	3742798.5
RRB_0092	385855.3	3742792.6
RRB_0093	385850.9	3742786.7
RRB_0094	385847.1	3742780.5
RRB_0095	385843.3	3742774.3

ATTACHMENT ~~D-1~~H-1 LOCOMOTIVE VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
RRB_0048	385880.3	3742761.4
RRB_0097	385835.6	3742761.8
RRB_0098	385831.8	3742755.5
RRG_0001	385746.3	3742060.3
RRG_0002	385749.3	3742066.9
RRG_0003	385752.3	3742073.6
RRG_0004	385755.4	3742080.2
RRG_0005	385758.4	3742086.9
RRG_0006	385761.4	3742093.6
RRG_0007	385764.5	3742100.2
RRG_0008	385767.5	3742106.9
RRG_0009	385770.5	3742113.5
RRG_0010	385773.6	3742120.2
RRG_0011	385776.6	3742126.8
RRG_0012	385779.6	3742133.5
RRG_0013	385782.7	3742140.2
RRG_0014	385785.7	3742146.8
RRG_0015	385788.7	3742153.5
RRG_0016	385791.8	3742160.1
RRG_0017	385794.8	3742166.8
RRG_0018	385797.8	3742173.4
RRG_0019	385800.9	3742180.1
RRG_0020	385803.9	3742186.8
RRG_0021	385805.8	3742190.8
RRG_0022	385786.9	3742656.6
RRG_0023	385785.0	3742649.5
RRG_0024	385783.1	3742642.5
RRG_0025	385781.3	3742635.4
RRG_0026	385779.9	3742628.2
RRG_0027	385779.2	3742620.9
RRG_0028	385778.4	3742613.7
RRG_0029	385777.7	3742606.4
RRG_0030	385777.0	3742599.1
RRG_0031	385776.2	3742591.8
RRG_0032	385775.5	3742584.6
RRG_0033	385774.8	3742577.3
RRG_0034	385774.0	3742570.0
RRG_0035	385773.3	3742562.7
RRG_0036	385772.6	3742555.4
RRG_0037	385771.8	3742548.2
RRG_0038	385771.1	3742540.9
RRG_0039	385770.4	3742533.6
RRG_0040	385769.6	3742526.3
RRG_0041	385768.9	3742519.1
RRG_0042	385768.1	3742511.8
RRG_0043	385767.4	3742504.5
RRG_0044	385766.7	3742497.2
RRB_0096	385839.4	3742768.0
RRG_0047	385764.7	3742475.4
RRG_0048	385764.6	3742468.1
RRG_0049	385764.5	3742460.7
RRG_0050	385764.4	3742453.4
RRG_0051	385764.3	3742446.1
RRG_0052	385764.2	3742438.8
RRG_0053	385764.1	3742431.5
RRG_0054	385764.0	3742424.2
RRG_0055	385764.0	3742416.9
RRG_0056	385763.9	3742409.5
RRG_0057	385763.8	3742402.2
RRG_0058	385763.7	3742394.9
RRG_0059	385763.6	3742387.6
RRG_0060	385763.5	3742380.3
RRG_0061	385763.4	3742373.0
RRG_0062	385763.3	3742365.7
RRG_0063	385763.2	3742358.3
RRG_0064	385762.9	3742351.0
RRG_0065	385762.6	3742343.7
RRG_0066	385762.2	3742336.4
RRG_0067	385761.9	3742329.1
RRG_0068	385761.6	3742321.8
RRG_0069	385761.3	3742314.5
RRG_0070	385760.8	3742307.2
RRG_0071	385759.9	3742299.9
RRG_0072	385759.1	3742292.7
RRG_0073	385758.2	3742285.4
RRG_0074	385757.4	3742278.1
RRG_0075	385756.7	3742270.8
RRG_0076	385755.9	3742263.6
RRG_0077	385755.2	3742256.3
RRG_0078	385754.4	3742249.0
RRG_0079	385753.7	3742241.7
RRG_0080	385753.6	3742234.4
RRG_0081	385753.5	3742227.1
RRG_0082	385753.5	3742219.8
RRG_0083	385753.4	3742212.5
RRG_0084	385753.4	3742205.2
RRG_0085	385753.4	3742197.9
RRG_0086	385753.3	3742190.5
RRG_0087	385753.3	3742183.2
RRG_0088	385753.2	3742175.9
RRG_0089	385753.2	3742168.6
RRG_0090	385753.1	3742161.3
RRG_0091	385753.1	3742154.0
RRG_0092	385753.1	3742146.7

ATTACHMENT ~~D-1~~H-1 LOCOMOTIVE VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
RRG_0045	385765.9	3742489.9
RRG_0046	385765.2	3742482.7
RRG_0095	385752.9	3742124.7
RRG_0096	385752.9	3742117.4
RRG_0097	385751.8	3742110.2
RRG_0098	385750.7	3742102.9
RRG_0099	385749.5	3742095.7
RRG_0100	385748.4	3742088.5
RRG_0101	385747.2	3742081.3
RRG_0102	385746.1	3742074.0
RRG_0103	385744.9	3742066.8
RRG_0104	385743.8	3742059.6
RRG_0105	385742.1	3742052.5
RRG_0106	385739.9	3742045.5
RRG_0107	385737.8	3742038.5
RRG_0108	385735.7	3742031.5
RRG_0109	385733.5	3742024.5
RRG_0110	385731.4	3742017.5
RRG_0111	385729.3	3742010.5
RRG_0112	385727.1	3742003.5
RRG_0113	385725.0	3741996.5
RRG_0114	385722.9	3741989.5
RRG_0115	385720.7	3741982.5
RRG_0116	385718.6	3741975.5
RRG_0117	385716.5	3741968.5
RRG_0118	385714.4	3741961.5
RRG_0119	385712.2	3741954.5
RRG_0120	385710.1	3741947.5
RRG_0121	385708.0	3741940.5
RRG_0122	385705.8	3741933.5
RRG_0123	385703.7	3741926.5
RRG_0124	385701.6	3741919.5
RRG_0125	385699.4	3741912.5
RRG_0126	385697.3	3741905.5
RRG_0127	385695.2	3741898.5
RRG_0128	385693.0	3741891.6
RRG_0129	385690.9	3741884.6
RRG_0130	385688.8	3741877.6
RRG_0131	385686.6	3741870.6
RRG_0132	385684.5	3741863.6
RRG_0133	385682.4	3741856.6
RRG_0134	385680.2	3741849.6
RRG_0135	385678.1	3741842.6
RRG_0136	385676.0	3741835.6
RRG_0137	385673.8	3741828.6
RRG_0138	385671.7	3741821.6
RRG_0139	385669.6	3741814.6

Source ID	UTM (X)	UTM (Y)
RRG_0093	385753.0	3742139.3
RRG_0094	385753.0	3742132.0
RRG_0143	385661.0	3741786.6
RRG_0144	385658.9	3741779.6
RRG_0145	385656.8	3741772.6
RRG_0146	385654.6	3741765.6
RRG_0147	385652.5	3741758.6
RRG_0148	385650.4	3741751.6
RRG_0149	385648.2	3741744.6
RRG_0150	385646.1	3741737.6
RRG_0151	385644.0	3741730.6
RRG_0152	385641.8	3741723.6
RRG_0153	385639.7	3741716.6
RRG_0154	385637.6	3741709.6
RRG_0155	385635.4	3741702.6
RRG_0156	385633.3	3741695.6
RRG_0157	385631.2	3741688.6
RRG_0158	385629.1	3741681.6
RRG_0159	385626.9	3741674.6
RRG_0160	385624.9	3741667.6
RRG_0161	385624.0	3741660.3
RRG_0162	385623.1	3741653.1
RRG_0163	385623.8	3741645.9
RRG_0164	385625.5	3741638.8
RRG_0165	385627.2	3741631.7
RRG_0166	385628.9	3741624.6
RRG_0167	385630.5	3741617.4
RRG_0168	385632.2	3741610.3
RRG_0169	385633.9	3741603.2
RRG_0170	385635.6	3741596.1
RRG_0171	385637.2	3741589.0
RRG_0172	385638.9	3741581.8
RRG_0173	385640.6	3741574.7
RRG_0174	385642.3	3741567.6
RRG_0175	385642.9	3741560.3
RRG_0176	385643.2	3741553.0
RRG_0177	385643.0	3741545.8
RRG_0178	385640.8	3741538.8
RRG_0179	385638.5	3741531.9
RRG_0180	385636.3	3741524.9
RRG_0181	385634.0	3741517.9
RRG_0182	385631.8	3741511.0
RRG_0183	385629.5	3741504.0
RRG_0184	385627.3	3741497.1
RRG_0185	385625.0	3741490.1
RRG_0186	385622.8	3741483.1
RRG_0187	385620.5	3741476.2

ATTACHMENT ~~D-1~~H-1 LOCOMOTIVE VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
RRG_0140	385667.4	3741807.6
RRG_0141	385665.3	3741800.6
RRG_0142	385663.2	3741793.6
RRG_0191	385611.6	3741448.3
RRG_0192	385609.3	3741441.4
RRG_0193	385607.1	3741434.4
RRG_0194	385604.8	3741427.4
RRG_0195	385602.6	3741420.5
RRG_0196	385600.3	3741413.5
RRG_0197	385598.1	3741406.6
RRG_0198	385595.8	3741399.6
RRG_0199	385593.6	3741392.6
RRG_0200	385591.3	3741385.7
RRG_0201	385632.4	3741598.9
RRG_0202	385629.1	3741605.5
RRG_0203	385625.9	3741612.0
RRG_0204	385622.6	3741618.6
RRG_0205	385619.4	3741625.1
RRG_0206	385616.1	3741631.7
RRG_0207	385612.9	3741638.2
RRG_0208	385609.6	3741644.8
RRG_0209	385606.4	3741651.3
RRG_0210	385603.1	3741657.9
RRG_0211	385599.9	3741664.4
RRG_0212	385596.6	3741671.0
RRG_0213	385593.4	3741677.6
RRG_0214	385591.0	3741684.4
RRG_0215	385589.5	3741691.6
RRG_0216	385588.1	3741698.7
RRG_0217	385586.6	3741705.9
RRG_0218	385585.1	3741713.1
RRG_0219	385583.6	3741720.2
RRG_0220	385582.1	3741727.4
RRG_0221	385580.7	3741734.6
RRG_0222	385579.2	3741741.7
RRG_0223	385577.7	3741748.9
RRG_0224	385576.2	3741756.1
RRG_0225	385574.8	3741763.2
RRG_0226	385573.3	3741770.4
RRG_0227	385571.8	3741777.5
RRG_0228	385570.3	3741784.7
RRG_0229	385568.9	3741791.9
RRG_0230	385567.4	3741799.0
RRG_0231	385565.9	3741806.2
RRG_0232	385564.4	3741813.4
RRG_0233	385563.0	3741820.5
RRG_0234	385561.5	3741827.7

Source ID	UTM (X)	UTM (Y)
RRG_0188	385618.3	3741469.2
RRG_0189	385616.1	3741462.2
RRG_0190	385613.8	3741455.3
RRG_0239	385554.1	3741863.5
RRG_0240	385552.6	3741870.7
RRG_0241	385551.2	3741877.9
RRG_0242	385549.7	3741885.0
RRG_0243	385548.2	3741892.2
RRG_0244	385546.7	3741899.4
RRG_0245	385545.3	3741906.5
RRG_0246	385543.8	3741913.7
RRG_0247	385542.3	3741920.8
RRG_0248	385540.8	3741928.0
RRG_0249	385539.4	3741935.2
RRG_0250	385537.9	3741942.3
RRG_0251	385536.4	3741949.5
RRG_0252	385534.9	3741956.7
RRG_0253	385533.5	3741963.8
RRG_0254	385532.0	3741971.0
RRG_0255	385530.5	3741978.2
RRG_0256	385529.0	3741985.3
RRG_0257	385527.6	3741992.5
RRG_0258	385526.1	3741999.7
RRG_0259	385524.6	3742006.8
RRG_0260	385523.1	3742014.0
RRG_0261	385521.7	3742021.2
RRG_0262	385520.2	3742028.3
RRG_0263	385518.4	3742035.4
RRG_0264	385516.1	3742042.3
RRG_0265	385513.8	3742049.3
RRG_0266	385511.2	3742056.1
RRG_0267	385507.6	3742062.4
RRG_0268	385503.9	3742068.8
RRG_0269	385500.2	3742075.1
RRG_0270	385496.5	3742081.4
RRG_0271	385492.8	3742087.7
RRG_0272	385489.1	3742094.0
RRG_0273	385485.4	3742100.3
RRG_0274	385481.8	3742106.7
RRG_0275	385478.1	3742113.0
RRG_0276	385474.4	3742119.3
RRG_0277	385470.7	3742125.6
RRG_0278	385467.0	3742131.9
RRG_0279	385463.9	3742138.6
RRG_0280	385461.0	3742145.3
RRG_0281	385458.1	3742152.0
RRG_0282	385455.2	3742158.7

ATTACHMENT ~~D-1~~H-1 LOCOMOTIVE VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
RRG_0235	385560.0	3741834.9
RRG_0236	385558.5	3741842.0
RRG_0237	385557.1	3741849.2
RRG_0238	385555.6	3741856.4
RRG_0287	385440.7	3742192.3
RRG_0288	385437.8	3742199.0
RRG_0289	385434.9	3742205.7
RRG_0290	385432.0	3742212.4
RRG_0291	385429.1	3742219.2
RRG_0292	385426.3	3742225.9
RRG_0293	385423.4	3742232.6
RRG_0294	385420.5	3742239.3
RRG_0295	385417.6	3742246.0
RRG_0296	385414.7	3742252.8
RRG_0297	385411.8	3742259.5
RRG_0298	385408.9	3742266.2
RRG_0299	385406.0	3742272.9
RRG_0300	385403.1	3742279.6
RRG_0301	385400.2	3742286.3
RRG_0302	385397.3	3742293.1
RRG_0303	385394.4	3742299.8
RRG_0283	385452.3	3742165.4
RRG_0284	385449.4	3742172.1
RRG_0285	385446.5	3742178.9
RRG_0286	385443.6	3742185.6

ATTACHMENT ~~D-2~~H-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)	Source ID	UTM (X)	UTM (Y)
WLM_0001	385861.2	3739771	WLM_0049	385751.2	3739955
WLM_0002	385860.9	3739777	WLM_0050	385745.2	3739953
WLM_0003	385860.5	3739783	WLM_0051	385739.2	3739952
WLM_0004	385860.1	3739789	WLM_0052	385733.2	3739951
WLM_0005	385859.7	3739795	WLM_0053	385728.1	3739949
WLM_0006	385859.3	3739801	WLM_0054	385723.8	3739944
WLM_0007	385859	3739807	WLM_0055	385719.6	3739940
WLM_0008	385858.6	3739813	WLM_0056	385713.8	3739939
WLM_0009	385858.2	3739819	WLM_0057	385707.7	3739938
WLM_0010	385857.8	3739825	WLM_0058	385701.7	3739937
WLM_0011	385857.4	3739831	WLM_0059	385695.6	3739937
WLM_0012	385857.1	3739838	WLM_0060	385689.5	3739936
WLM_0013	385856.7	3739844	WLM_0061	385683.5	3739936
WLM_0014	385856.3	3739850	WLM_0062	385677.4	3739935
WLM_0015	385855.9	3739856	WLM_0063	385671.3	3739935
WLM_0016	385855.5	3739862	WLM_0064	385665.2	3739935
WLM_0017	385855.1	3739868	WLM_0065	385659.1	3739934
WLM_0018	385854.8	3739874	WLM_0066	385653	3739934
WLM_0019	385854.4	3739880	WLM_0067	385646.9	3739934
WLM_0020	385854	3739886	WLM_0068	385640.8	3739933
WLM_0021	385853.6	3739892	WLM_0069	385634.8	3739933
WLM_0022	385853.2	3739898	WLM_0070	385628.7	3739933
WLM_0023	385852.9	3739904	WLM_0071	385622.6	3739932
WLM_0024	385852.5	3739911	WLM_0072	385616.5	3739932
WLM_0025	385852.1	3739917	WLM_0073	385610.4	3739932
WLM_0026	385851.7	3739923	WLM_0074	385604.3	3739931
WLM_0027	385851.3	3739929	WLM_0075	385598.2	3739931
WLM_0028	385850.9	3739935	WLM_0076	385592.1	3739931
WLM_0029	385850.6	3739941	WLM_0077	385586.1	3739930
WLM_0030	385850.2	3739947	WLM_0078	385580	3739930
WLM_0031	385849.8	3739953	WLM_0079	385573.9	3739930
WLM_0032	385848.8	3739959	WLM_0080	385567.8	3739930
WLM_0033	385844.6	3739963	WLM_0081	385561.7	3739929
WLM_0034	385840.4	3739968	WLM_0082	385555.6	3739929
WLM_0035	385835.3	3739969	WLM_0083	385549.5	3739929
WLM_0036	385829.3	3739968	WLM_0084	385543.4	3739928
WLM_0037	385823.2	3739967	WLM_0085	385537.4	3739928
WLM_0038	385817.2	3739966	WLM_0086	385531.3	3739928
WLM_0039	385811.2	3739965	WLM_0087	385525.2	3739927
WLM_0040	385805.2	3739964	WLM_0088	385519.1	3739927
WLM_0041	385799.2	3739963	WLM_0089	385513	3739927
WLM_0042	385793.2	3739962	WLM_0090	385506.9	3739926
WLM_0043	385787.2	3739961	WLM_0091	385500.8	3739926
WLM_0044	385781.2	3739960	WLM_0092	385494.7	3739926
WLM_0045	385775.2	3739959	WLM_0093	385488.7	3739925
WLM_0046	385769.2	3739958	WLM_0094	385482.6	3739925
WLM_0047	385763.2	3739957	WLM_0095	385476.5	3739925
WLM_0048	385757.2	3739956	WLM_0096	385470.4	3739924

ATTACHMENT ~~D-2~~H-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
WLM_0097	385464.3	3739924
WLM_0098	385458.2	3739924
WLM_0099	385452.1	3739923
WLM_0100	385446	3739923
WLM_0101	385440	3739923
WLM_0102	385433.9	3739922
WLM_0103	385427.8	3739922
WLM_0104	385426.6	3739917
WLM_0105	385427	3739911
WLM_0106	385427.4	3739905
WLM_0107	385427.7	3739899
WLM_0108	385428.1	3739893
WLM_0109	385428.5	3739887
WLM_0110	385428.8	3739881
WLM_0111	385429.2	3739875
WLM_0112	385429.6	3739869
WLM_0113	385429.9	3739863
WLM_0114	385430.3	3739857
WLM_0115	385430.7	3739850
WLM_0116	385431	3739844
WLM_0117	385431.4	3739838
WLM_0118	385431.8	3739832
WLM_0119	385432.1	3739826
WLM_0120	385432.5	3739820
WLM_0121	385432.9	3739814
WLM_0122	385433.2	3739808
WLM_0123	385433.6	3739802
WLM_0124	385434	3739796
WLM_0125	385434.3	3739790
WLM_0126	385434.7	3739783
WLM_0127	385435.1	3739777
WLM_0128	385435.4	3739771
WLM_0129	385435.8	3739765
WLM_0130	385436.2	3739759
WLM_0131	385441.9	3739759
WLM_0132	385448	3739759
WLM_0133	385454.1	3739760
WLM_0134	385460.2	3739760
WLM_0135	385466.3	3739760
WLM_0136	385472.4	3739760
WLM_0137	385478.5	3739761
WLM_0138	385484.6	3739761
WLM_0139	385490.7	3739761
WLM_0140	385496.7	3739761
WLM_0141	385502.8	3739762
WLM_0142	385508.9	3739762
WLM_0143	385515	3739762
WLM_0144	385521.1	3739762
WLM_0145	385527.2	3739763
WLM_0146	385533.3	3739763
WLM_0147	385539.4	3739763
WLM_0148	385545.5	3739763
WLM_0149	385551.6	3739764
WLM_0150	385557.7	3739764
WLM_0151	385563.7	3739764
WLM_0152	385569.8	3739765
WLM_0153	385575.9	3739765
WLM_0154	385576.8	3739759
CAR_0001	384739.7	3742649
CAR_0002	384745.8	3742648
CAR_0003	384751.9	3742648
CAR_0004	384758	3742648
CAR_0005	384764	3742648
CAR_0006	384770.1	3742648
CAR_0007	384776.2	3742647
CAR_0008	384782.3	3742647
CAR_0009	384788.4	3742647
CAR_0010	384794.5	3742647
CAR_0011	384800.6	3742647
CAR_0012	384806.7	3742646
CAR_0013	384812.8	3742646
CAR_0014	384818.9	3742646
CAR_0015	384825	3742646
CAR_0016	384831.1	3742646
CAR_0017	384837.2	3742645
CAR_0018	384843.3	3742645
CAR_0019	384849.3	3742645
CAR_0020	384855.4	3742645
CAR_0021	384861.5	3742645
CAR_0022	384867.6	3742644
CAR_0023	384873.7	3742644
CAR_0024	384879.8	3742644
CAR_0025	384885.9	3742644
CAR_0026	384892	3742644
CAR_0027	384898.1	3742643
CAR_0028	384904.2	3742643
CAR_0029	384910.3	3742643
CAR_0030	384916.4	3742643
CAR_0031	384922.5	3742643
CAR_0032	384928.5	3742642
CAR_0033	384934.6	3742642
CAR_0034	384940.7	3742642
CAR_0035	384946.8	3742642
CAR_0036	384952.9	3742642
CAR_0037	384959	3742641
CAR_0038	384965.1	3742641

ATTACHMENT ~~D-2~~H-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)	Source ID	UTM (X)	UTM (Y)
CAR_0039	384971.2	3742641	CAR_0087	385220.6	3742568
CAR_0040	384977.3	3742641	CAR_0088	385223.1	3742562
CAR_0041	384983.4	3742641	CAR_0089	385225.5	3742557
CAR_0042	384989.5	3742640	CAR_0090	385227.9	3742551
CAR_0043	384995.6	3742640	CAR_0091	385230.4	3742545
CAR_0044	385001.7	3742640	CAR_0092	385232.8	3742540
CAR_0045	385007.8	3742640	CAR_0093	385235.3	3742534
CAR_0046	385013.8	3742640	CAR_0094	385237.7	3742529
CAR_0047	385019.9	3742639	CAR_0095	385240.2	3742523
CAR_0048	385026	3742639	CAR_0096	385242.6	3742518
CAR_0049	385032.1	3742639	CAR_0097	385245.1	3742512
CAR_0050	385038.2	3742639	CAR_0098	385247.5	3742506
CAR_0051	385044.3	3742639	CAR_0099	385249.9	3742501
CAR_0052	385050.4	3742638	CAR_0100	385252.4	3742495
CAR_0053	385056.5	3742638	CAR_0101	385254.8	3742490
CAR_0054	385062.6	3742638	CAR_0102	385257.3	3742484
CAR_0055	385068.7	3742638	CAR_0103	385259.7	3742478
CAR_0056	385074.8	3742638	CAR_0104	385262.2	3742473
CAR_0057	385080.9	3742637	CAR_0105	385264.6	3742467
CAR_0058	385087	3742637	CAR_0106	385267	3742462
CAR_0059	385093	3742637	CAR_0107	385269.5	3742456
CAR_0060	385099.1	3742637	CAR_0108	385271.9	3742451
CAR_0061	385105.2	3742637	CAR_0109	385274.4	3742445
CAR_0062	385111.3	3742636	CAR_0110	385276.8	3742439
CAR_0063	385117.4	3742636	CAR_0111	385279.3	3742434
CAR_0064	385123.5	3742636	CAR_0112	385281.7	3742428
CAR_0065	385129.6	3742636	CAR_0113	385284.1	3742423
CAR_0066	385135.7	3742635	CAR_0114	385286.6	3742417
CAR_0067	385141.8	3742635	CAR_0115	385289	3742411
CAR_0068	385147.9	3742635	CAR_0116	385291.5	3742406
CAR_0069	385154	3742635	CAR_0117	385293.9	3742400
CAR_0070	385160.1	3742635	CAR_0118	385296.4	3742395
CAR_0071	385166.2	3742634	CAR_0119	385298.8	3742389
CAR_0072	385172.3	3742634	CAR_0120	385301.2	3742383
CAR_0073	385178.3	3742634	CAR_0121	385303.7	3742378
CAR_0074	385184.4	3742634	CAR_0122	385306.1	3742372
CAR_0075	385190.5	3742634	CAR_0123	385308.6	3742367
CAR_0076	385193.7	3742629	CAR_0124	385311	3742361
CAR_0077	385196.2	3742624	CAR_0125	385313.5	3742356
CAR_0078	385198.6	3742618	CAR_0126	385315.9	3742350
CAR_0079	385201.1	3742612	CAR_0127	385318.4	3742344
CAR_0080	385203.5	3742607	CAR_0128	385320.8	3742339
CAR_0081	385206	3742601	CAR_0129	385323.2	3742333
CAR_0082	385208.4	3742596	CAR_0130	385325.7	3742328
CAR_0083	385210.8	3742590	CAR_0131	385328.1	3742322
CAR_0084	385213.3	3742585	CAR_0132	385330.6	3742316
CAR_0085	385215.7	3742579	CAR_0133	385333	3742311
CAR_0086	385218.2	3742573	CAR_0134	385335.5	3742305

ATTACHMENT ~~D-2~~H-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)	Source ID	UTM (X)	UTM (Y)
CAR_0135	385337.9	3742300	CAR_0183	385401.6	3742053
CAR_0136	385340.3	3742294	CAR_0184	385407.7	3742053
CAR_0137	385342.8	3742289	CAR_0185	385413.7	3742052
CAR_0138	385345.2	3742283	CAR_0186	385419.8	3742052
CAR_0139	385347.7	3742277	CAR_0187	385425.9	3742052
CAR_0140	385350.1	3742272	CAR_0188	385432	3742052
CAR_0141	385352.6	3742266	CAR_0189	385438.1	3742052
CAR_0142	385355	3742261	CAR_0190	385444.2	3742052
CAR_0143	385357.4	3742255	CAR_0191	385450.3	3742052
CAR_0144	385359.9	3742249	CAR_0192	385456.4	3742052
CAR_0145	385362.3	3742244	CAR_0193	385462.5	3742052
CAR_0146	385364.8	3742238	CAR_0194	385468.6	3742051
CAR_0147	385366.4	3742233	CAR_0195	385474.7	3742051
CAR_0148	385366.3	3742226	CAR_0196	385480.8	3742051
CAR_0149	385366.1	3742220	CAR_0197	385486.9	3742051
CAR_0150	385365.9	3742214	CAR_0198	385493	3742051
CAR_0151	385365.8	3742208	CAR_0199	385499.1	3742051
CAR_0152	385365.6	3742202	CAR_0200	385505.2	3742051
CAR_0153	385365.4	3742196	CAR_0201	385511.3	3742051
CAR_0154	385365.2	3742190	CAR_0202	385517.4	3742051
CAR_0155	385365.1	3742184	CAR_0203	385523.5	3742050
CAR_0156	385364.9	3742178	CAR_0204	385529.6	3742050
CAR_0157	385364.7	3742172	CAR_0205	385535.6	3742050
CAR_0158	385364.6	3742166	CAR_0206	385541.7	3742050
CAR_0159	385364.4	3742159	CAR_0207	385547.8	3742050
CAR_0160	385364.2	3742153	CAR_0208	385553.9	3742050
CAR_0161	385364	3742147	CAR_0209	385560	3742050
CAR_0162	385363.9	3742141	CAR_0210	385566.1	3742050
CAR_0163	385363.7	3742135	CAR_0211	385572.2	3742050
CAR_0164	385363.5	3742129	CAR_0212	385578.3	3742049
CAR_0165	385363.3	3742123	CAR_0213	385584.4	3742049
CAR_0166	385363.2	3742117	CAR_0214	385590.5	3742049
CAR_0167	385363	3742111	CAR_0215	385596.6	3742049
CAR_0168	385362.8	3742105	CAR_0216	385602.7	3742049
CAR_0169	385362.7	3742098	CAR_0217	385608.8	3742049
CAR_0170	385362.5	3742092	CAR_0218	385614.9	3742049
CAR_0171	385362.3	3742086	CAR_0219	385621	3742049
CAR_0172	385362.1	3742080	CAR_0220	385627.1	3742049
CAR_0173	385362	3742074	CAR_0221	385632.6	3742051
CAR_0174	385361.8	3742068	CAR_0222	385638	3742054
CAR_0175	385361.6	3742062	CAR_0223	385643.4	3742057
CAR_0176	385361.5	3742056	CAR_0224	385648.8	3742060
CAR_0177	385365	3742053	CAR_0225	385654.3	3742062
CAR_0178	385371.1	3742053	CAR_0226	385659.7	3742065
CAR_0179	385377.2	3742053	CAR_0227	385665.1	3742068
CAR_0180	385383.3	3742053	CAR_0228	385670.6	3742071
CAR_0181	385389.4	3742053	CAR_0229	385676	3742073
CAR_0182	385395.5	3742053	CAR_0230	385681.4	3742076

ATTACHMENT ~~D-2~~H-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
CAR_0231	385686.9	3742079
CAR_0232	385692.3	3742082
CAR_0233	385697.7	3742084
CAR_0234	385703.1	3742087
CAR_0235	385708.6	3742090
CAR_0236	385714	3742093
CAR_0237	385719.4	3742096
CAR_0238	385724.9	3742098
CAR_0239	385730.3	3742101
CAR_0240	385735.7	3742104
CAR_0241	385741.2	3742107
CAR_0242	385746.6	3742109
CAR_0243	385746.9	3742115
CAR_0244	385747.1	3742121
CAR_0245	385747.3	3742128
CAR_0246	385747.5	3742134
CAR_0247	385747.7	3742140
CAR_0248	385747.9	3742146
CAR_0249	385748.1	3742152
CAR_0250	385748.2	3742158
CAR_0251	385748.4	3742164
CAR_0252	385748.6	3742170
CAR_0253	385748.8	3742176
CAR_0254	385749	3742182
CAR_0255	385749.2	3742189
CAR_0256	385749.4	3742195
CAR_0257	385749.6	3742201
CAR_0258	385749.8	3742207
CAR_0259	385750	3742213
CAR_0260	385750.2	3742219
CAR_0261	385750.4	3742225
CAR_0262	385750.6	3742231
CAR_0263	385750.8	3742237
CAR_0264	385751	3742243
CAR_0265	385751.2	3742249
CAR_0266	385751.4	3742256
CAR_0267	385751.6	3742262
CAR_0268	385751.8	3742268
CAR_0269	385752	3742274
CAR_0270	385752.2	3742280
CAR_0271	385752.5	3742286
CAR_0272	385752.7	3742292
CAR_0273	385753	3742298
CAR_0274	385753.2	3742304
CAR_0275	385753.5	3742310
CAR_0276	385753.7	3742316
CAR_0277	385754	3742323
CAR_0278	385754.2	3742329
CAR_0279	385754.5	3742335
CAR_0280	385754.7	3742341
CAR_0281	385755	3742347
CAR_0282	385755.2	3742353
CAR_0283	385755.5	3742359
CAR_0284	385755.7	3742365
CAR_0285	385756	3742371
CAR_0286	385756.2	3742377
CAR_0287	385756.5	3742383
CAR_0288	385756.7	3742390
CAR_0289	385756.9	3742396
CAR_0290	385757.2	3742402
CAR_0291	385757.4	3742408
CAR_0292	385757.7	3742414
CAR_0293	385757.9	3742420
CAR_0294	385758.2	3742426
CAR_0295	385758.4	3742432
CAR_0296	385758.7	3742438
CAR_0297	385758.9	3742444
CAR_0298	385759.2	3742450
CAR_0299	385759.4	3742457
CAR_0300	385759.7	3742463
CAR_0301	385759.9	3742469
CAR_0302	385760.2	3742475
CAR_0303	385760.4	3742481
CAR_0304	385760.7	3742487
CAR_0305	385760.9	3742493
CAR_0306	385761.2	3742499
CAR_0307	385761.4	3742505
CAR_0308	385761.7	3742511
CAR_0309	385761.9	3742517
CAR_0310	385762.2	3742524
CAR_0311	385762.4	3742530
CAR_0312	385762.6	3742536
CAR_0313	385762.9	3742542
CAR_0314	385763.1	3742548
CAR_0315	385763.4	3742554
CAR_0316	385763.6	3742560
CAR_0317	385763.9	3742566
CAR_0318	385764.1	3742572
CAR_0319	385764.4	3742578
CAR_0320	385764.6	3742584
CAR_0321	385764.9	3742591
CAR_0322	385765.1	3742597
CAR_0323	385765.4	3742603
CAR_0324	385765.6	3742609
CAR_0325	385765.9	3742615
CAR_0326	385766.1	3742621

ATTACHMENT ~~D-2~~H-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)	Source ID	UTM (X)	UTM (Y)
CAR_0327	385766.4	3742627	CAR_0375	385899.2	3742863
CAR_0328	385766.6	3742633	CAR_0376	385904	3742866
CAR_0329	385766.9	3742639	CAR_0377	385908.8	3742870
CAR_0330	385767.1	3742645	CAR_0378	385913.6	3742874
CAR_0331	385767.4	3742651	CAR_0379	385918.3	3742878
CAR_0332	385767.6	3742658	CAR_0380	385923.1	3742882
CAR_0333	385767.9	3742664	CAR_0381	385927.9	3742885
CAR_0334	385768.4	3742670	CAR_0382	385932.7	3742889
CAR_0335	385768.9	3742676	CAR_0383	385937.5	3742893
CAR_0336	385769.4	3742682	CAR_0384	385942.2	3742897
CAR_0337	385769.9	3742688	CAR_0385	385947	3742900
CAR_0338	385770.4	3742694	CAR_0386	385951.8	3742904
CAR_0339	385770.9	3742700	CAR_0387	385956.6	3742908
CAR_0340	385771.4	3742706	CAR_0388	385961.3	3742912
CAR_0341	385771.9	3742712	CAR_0389	385963.4	3742917
CAR_0342	385772.4	3742718	CAR_0390	385963.8	3742923
CAR_0343	385772.9	3742724	CAR_0391	385964.2	3742929
CAR_0344	385773.4	3742730	CAR_0392	385964.6	3742935
CAR_0345	385773.9	3742737	CAR_0393	385965	3742941
CAR_0346	385774.4	3742743	CAR_0394	385965.4	3742947
CAR_0347	385774.9	3742749	CAR_0395	385965.8	3742953
CAR_0348	385775.5	3742755	CAR_0396	385966.2	3742960
CAR_0349	385780.4	3742758	CAR_0397	385966.6	3742966
CAR_0350	385785.4	3742762	CAR_0398	385967.9	3742972
CAR_0351	385790.4	3742765	CAR_0399	385970.1	3742977
CAR_0352	385795.3	3742769	CAR_0400	385972.3	3742983
CAR_0353	385800.3	3742772	CAR_0401	385974.6	3742989
CAR_0354	385805.2	3742776	CAR_0402	385976.8	3742994
CAR_0355	385810.2	3742780	CAR_0403	385980.1	3742999
CAR_0356	385814.6	3742784	CAR_0404	385983.5	3743004
CAR_0357	385818.9	3742788	CAR_0405	385986.8	3743010
CAR_0358	385823.2	3742792	CAR_0406	385990.2	3743015
CAR_0359	385827.5	3742797	CAR_0407	385993.5	3743020
CAR_0360	385831.8	3742801	CAR_0408	385996.9	3743025
CAR_0361	385836.1	3742805	CAR_0409	386000.3	3743030
CAR_0362	385840.4	3742810	CAR_0410	386003.6	3743035
CAR_0363	385844.7	3742814	CAR_0411	386008	3743039
CAR_0364	385849.1	3742818	CAR_0412	386013.4	3743042
CAR_0365	385853.4	3742823	CAR_0413	386018.7	3743045
CAR_0366	385857.7	3742827	CAR_0414	386024	3743048
CAR_0367	385862	3742831	CAR_0415	386029.3	3743051
CAR_0368	385866.3	3742835	CAR_0416	386034.6	3743054
CAR_0369	385870.6	3742840	CAR_0417	386039.9	3743057
CAR_0370	385875.3	3742844	COK_1	386272.2	3741342
CAR_0371	385880.1	3742847	COK_2	386273.1	3741336
CAR_0372	385884.9	3742851	COK_3	386274	3741330
CAR_0373	385889.7	3742855	COK_4	386274.9	3741324
CAR_0374	385894.4	3742859	COK_5	386275.8	3741318

ATTACHMENT ~~D-2~~H-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)	Source ID	UTM (X)	UTM (Y)
COK_6	386276.7	3741312	COK_54	386312.3	3741022
COK_7	386277.6	3741306	COK_55	386311.1	3741016
COK_8	386278.5	3741300	COK_56	386309.8	3741010
COK_9	386279.4	3741294	COK_57	386308.6	3741004
COK_10	386280.3	3741287	COK_58	386307.4	3740999
COK_11	386281.2	3741281	COK_59	386306.1	3740993
COK_12	386282.1	3741275	COK_60	386304.9	3740987
COK_13	386283	3741269	COK_61	386303.6	3740981
COK_14	386283.9	3741263	COK_62	386302.4	3740975
COK_15	386284.8	3741257	COK_63	386301.2	3740969
COK_16	386285.7	3741251	COK_64	386299.9	3740963
COK_17	386286.6	3741245	COK_65	386298.7	3740957
COK_18	386287.5	3741239	COK_66	386297.4	3740951
COK_19	386288.4	3741233	COK_67	386296.2	3740945
COK_20	386289.3	3741227	COK_68	386295	3740939
COK_21	386290.2	3741221	COK_69	386293.7	3740933
COK_22	386291.1	3741215	COK_70	386292.5	3740927
COK_23	386292	3741209	COK_71	386291.2	3740921
COK_24	386292.9	3741203	COK_72	386290	3740915
COK_25	386293.8	3741197	COK_73	386288.8	3740909
COK_26	386294.7	3741191	COK_74	386287.5	3740903
COK_27	386295.6	3741185	COK_75	386286.3	3740897
COK_28	386296.5	3741179	COK_76	386285.1	3740891
COK_29	386297.4	3741173	COK_77	386283.8	3740885
COK_30	386298.3	3741167	COK_78	386282.6	3740879
COK_31	386299.2	3741161	COK_79	386281.3	3740873
COK_32	386300.1	3741155	COK_80	386280.1	3740867
COK_33	386301	3741149	COK_81	386278.9	3740861
COK_34	386301.9	3741143	COK_82	386277.6	3740855
COK_35	386302.8	3741137	COK_83	386276.4	3740849
COK_36	386303.7	3741131	COK_84	386275.1	3740843
COK_37	386304.6	3741125	COK_85	386273.9	3740837
COK_38	386305.5	3741119	COK_86	386272.7	3740831
COK_39	386306.4	3741113	COK_87	386271.4	3740825
COK_40	386307.3	3741107	COK_88	386270.2	3740819
COK_41	386308.2	3741101	COK_89	386269	3740813
COK_42	386309.1	3741095	COK_90	386265.6	3740811
COK_43	386310	3741089	COK_91	386259.7	3740812
COK_44	386310.9	3741082	COK_92	386253.7	3740813
COK_45	386311.8	3741076	COK_93	386247.8	3740815
COK_46	386312.7	3741070	COK_94	386241.8	3740816
COK_47	386313.6	3741064	COK_95	386235.9	3740817
COK_48	386314.5	3741058	COK_96	386229.9	3740818
COK_49	386315.4	3741052	COK_97	386223.9	3740820
COK_50	386316.3	3741046	COK_98	386218	3740821
COK_51	386316	3741040	COK_99	386212	3740822
COK_52	386314.8	3741034	COK_100	386206.1	3740824
COK_53	386313.5	3741028	COK_101	386200.1	3740825

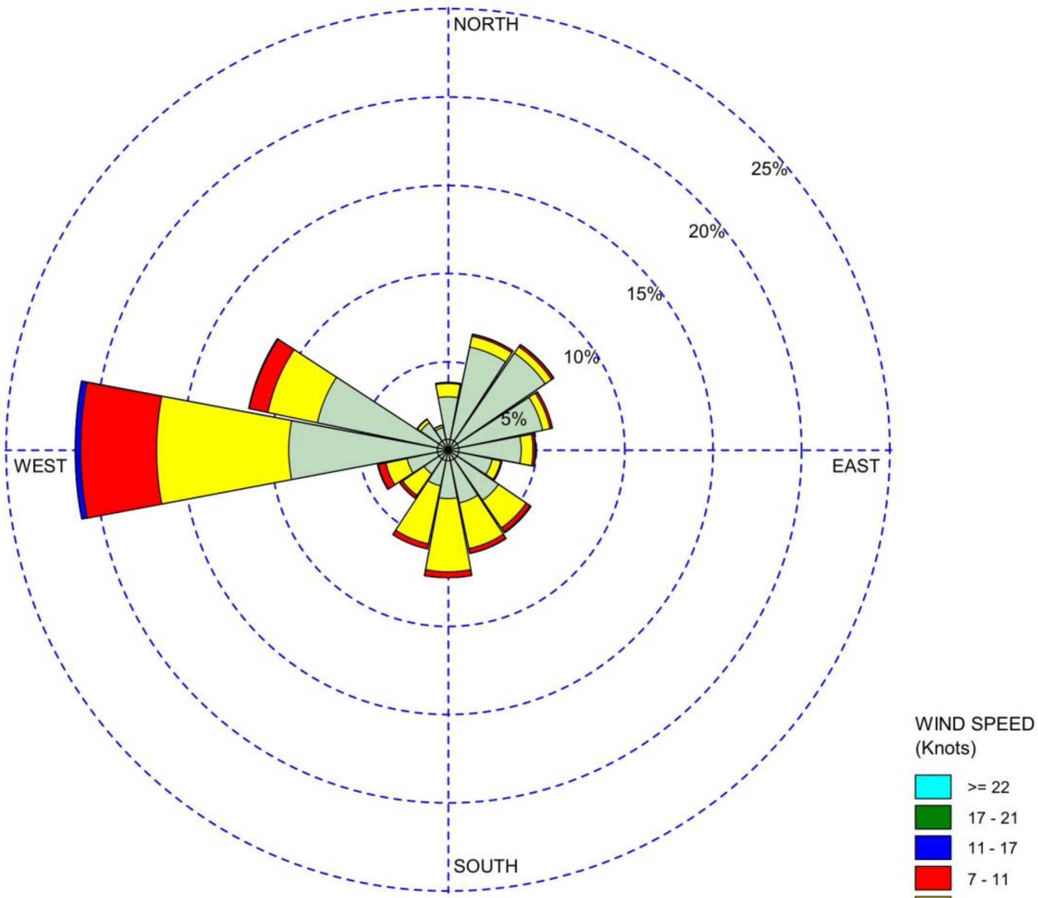
ATTACHMENT ~~D-2~~H-2 ONSITE TRUCK VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
COK_102	386194.2	3740826
COK_103	386188.2	3740828
COK_104	386182.3	3740829
COK_105	386179.9	3740833
COK_106	386181	3740839
COK_107	386182.1	3740845
COK_108	386183.2	3740851
COK_109	386184.3	3740857
COK_110	386185.4	3740863
COK_111	386186.5	3740869
COK_112	386187.6	3740875
COK_113	386188.7	3740881
COK_114	386189.8	3740887
COK_115	386190.9	3740893
COK_116	386192	3740899
COK_117	386193.1	3740904
COK_118	386194.2	3740910
COK_119	386195.3	3740916
COK_120	386196.4	3740922
COK_121	386197.5	3740928
COK_122	386198.6	3740934
COK_123	386199.7	3740940
COK_124	386200.8	3740946
COK_125	386201.9	3740952
COK_126	386203	3740958
COK_127	386204.1	3740964
COK_128	386205.2	3740970
COK_129	386206.3	3740976
COK_130	386207.4	3740982
COK_131	386208.5	3740988
COK_132	386209.6	3740994
COK_133	386210.7	3741000
COK_134	386211.8	3741006
COK_135	386212.9	3741012
COK_136	386214	3741018
COK_137	386215.1	3741024
COK_138	386216.2	3741030
COK_139	386217.3	3741036
COK_140	386218.4	3741042
COK_141	386219.5	3741048
COK_142	386220.6	3741054
COK_143	386221.7	3741060
COK_144	386222.8	3741066
COK_145	386223.9	3741072
COK_146	386226.9	3741077
COK_147	386230.9	3741082
COK_148	386234.9	3741087
COK_149	386238.9	3741091
COK_150	386242.9	3741096
COK_151	386246.9	3741100
COK_152	386250.9	3741105
COK_153	386254.9	3741110
COK_154	386258.9	3741114
COK_155	386262.9	3741119
COK_156	386266.6	3741124
COK_157	386269.8	3741129
COK_158	386272.9	3741134
COK_159	386276	3741139
COK_160	386279.1	3741145
COK_161	386282.2	3741150
COK_162	386285.4	3741155
COK_163	386288.5	3741160
COK_164	386291.6	3741166
COK_165	386294.7	3741171

ATTACHMENT ~~D-2~~ H-3 WINDROSE

WIND ROSE PLOT:
Long Beach, CA

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS: Met years: 2006, 2007, 2008, 2009, 2011	DATA PERIOD: **Start Date: 1/1/2006 - 00:00** **End Date: 12/31/2011 - 23:00**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.01%**	TOTAL COUNT: **43378 hrs.**	
	AVG. WIND SPEED: **3.66 Knots**	DATE: **5/19/2014**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

ATTACHMENT ~~D-3~~ H-4 LIST OF ONSITE RECEPTORS

UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)
385600	3739100	3.8	385600	3740100	3.8	386100	3740600	13.0
385500	3739200	3.6	385700	3740100	4.2	386200	3740600	14.4
385600	3739200	3.8	385800	3740100	4.9	385500	3740700	10.7
385700	3739200	3.0	385900	3740100	5.3	385600	3740700	9.0
385500	3739300	3.5	386000	3740100	6.7	385700	3740700	8.5
385600	3739300	3.2	386100	3740100	6.7	385800	3740700	9.0
385700	3739300	3.5	385400	3740200	10.2	386100	3740700	11.0
385500	3739400	3.7	385500	3740200	4.3	386200	3740700	13.5
385600	3739400	3.5	385600	3740200	4.6	383900	3740800	13.0
385700	3739400	3.5	385700	3740200	6.0	384000	3740800	13.0
385800	3739400	3.2	385800	3740200	6.6	384100	3740800	13.0
385500	3739500	7.5	385900	3740200	6.7	385500	3740800	11.5
385600	3739500	5.1	386000	3740200	7.9	386100	3740800	9.5
385700	3739500	3.6	386100	3740200	9.3	386200	3740800	11.8
385800	3739500	3.3	386200	3740200	5.6	386300	3740800	10.7
385500	3739600	8.7	385400	3740300	10.9	383900	3740900	13.0
385600	3739600	7.7	385500	3740300	9.9	384000	3740900	13.0
385700	3739600	3.5	385600	3740300	8.6	384100	3740900	13.0
385800	3739600	3.5	385700	3740300	6.6	386100	3740900	9.4
385900	3739600	3.3	385800	3740300	7.2	386200	3740900	11.4
385500	3739700	9.9	385900	3740300	7.3	386300	3740900	12.8
385600	3739700	8.4	386000	3740300	8.8	383900	3741000	13.0
385700	3739700	8.5	386100	3740300	11.1	384000	3741000	12.8
385800	3739700	6.9	386200	3740300	9.0	384100	3741000	13.0
385900	3739700	4.6	385400	3740400	11.8	386200	3741000	8.9
385500	3739800	10.8	385500	3740400	10.3	386300	3741000	11.3
385600	3739800	10.2	385600	3740400	9.0	383700	3741100	13.7
385700	3739800	10.2	385700	3740400	6.9	383800	3741100	13.0
385800	3739800	9.9	385800	3740400	8.1	383900	3741100	13.0
385900	3739800	8.0	385900	3740400	8.6	384000	3741100	12.9
386000	3739800	7.6	386000	3740400	10.3	384100	3741100	12.7
385500	3739900	11.4	386100	3740400	11.9	386200	3741100	9.8
385600	3739900	10.8	386200	3740400	14.2	386300	3741100	13.0
385700	3739900	11.0	385400	3740500	12.3	383800	3741200	13.1
385800	3739900	9.3	385500	3740500	10.8	383900	3741200	12.5
385900	3739900	6.8	385600	3740500	9.4	384000	3741200	12.3
386000	3739900	7.2	385700	3740500	7.1	384100	3741200	12.7
386100	3739900	5.4	385800	3740500	8.4	386200	3741200	10.5
385400	3740000	11.7	385900	3740500	9.3	386300	3741200	13.7
385500	3740000	10.9	386000	3740500	11.2	383800	3741300	12.2
385600	3740000	9.7	386100	3740500	13.3	383900	3741300	11.9
385700	3740000	3.3	386200	3740500	14.3	384000	3741300	12.3
385800	3740000	4.7	385500	3740600	10.8	384100	3741300	12.3
385900	3740000	6.0	385600	3740600	9.0	384200	3741300	12.4
386000	3740000	6.2	385700	3740600	8.1	384300	3741300	12.1
386100	3740000	5.6	385800	3740600	8.7	384400	3741300	11.5
385400	3740100	11.5	385900	3740600	9.7	386300	3741300	13.1
385500	3740100	9.0	386000	3740600	11.0	383800	3741400	11.7

ATTACHMENT ~~D-3~~ H-4 LIST OF ONSITE RECEPTORS

UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)
383900	3741400	11.8	386200	3741700	5.3	384700	3742000	10.8
384000	3741400	12.4	384000	3741800	11.2	384800	3742000	8.4
384100	3741400	12.4	384100	3741800	11.7	384900	3742000	7.2
384200	3741400	12.3	384200	3741800	12.1	385000	3742000	6.9
384300	3741400	12.1	384300	3741800	11.5	385100	3742000	8.7
384400	3741400	11.3	384400	3741800	10.9	385200	3742000	9.1
386300	3741400	5.7	384500	3741800	11.1	385300	3742000	9.0
383900	3741500	11.7	384600	3741800	11.1	385400	3742000	9.0
384000	3741500	11.8	384700	3741800	9.9	385500	3742000	8.7
384100	3741500	12.1	384800	3741800	10.2	385600	3742000	6.0
384200	3741500	12.3	384900	3741800	8.4	385700	3742000	6.6
384300	3741500	12.1	385000	3741800	8.7	385900	3742000	6.6
384400	3741500	11.2	385100	3741800	9.7	386000	3742000	6.6
386000	3741500	6.0	385200	3741800	9.9	386100	3742000	6.9
386100	3741500	5.4	385300	3741800	9.5	384200	3742100	11.6
386200	3741500	8.2	385400	3741800	9.0	384300	3742100	11.2
385100	3741600	9.6	385500	3741800	8.4	384400	3742100	10.6
385200	3741600	9.5	385600	3741800	6.9	384500	3742100	11.1
385300	3741600	8.7	385900	3741800	6.5	384600	3742100	10.8
385400	3741600	8.7	386000	3741800	6.3	384700	3742100	10.8
385500	3741600	9.0	386100	3741800	6.0	384800	3742100	8.1
385600	3741600	9.0	386200	3741800	6.3	384900	3742100	8.2
385800	3741600	6.6	384100	3741900	11.6	385000	3742100	7.2
385900	3741600	6.3	384200	3741900	11.8	385100	3742100	7.2
386000	3741600	6.0	384300	3741900	11.5	385200	3742100	6.8
386100	3741600	5.7	384400	3741900	10.7	385300	3742100	6.7
386200	3741600	5.3	384500	3741900	11.1	385400	3742100	6.5
384000	3741700	11.4	384600	3741900	11.1	385500	3742100	6.7
384100	3741700	11.7	384700	3741900	10.8	385600	3742100	6.9
384200	3741700	11.8	384800	3741900	8.6	385700	3742100	6.9
384300	3741700	11.5	384900	3741900	7.9	386000	3742100	6.6
384400	3741700	11.0	385000	3741900	7.2	386100	3742100	6.9
384500	3741700	11.4	385100	3741900	9.6	384300	3742200	10.9
384600	3741700	11.6	385200	3741900	9.6	384400	3742200	10.6
384700	3741700	11.4	385300	3741900	9.3	384500	3742200	10.8
384800	3741700	9.6	385400	3741900	9.0	384600	3742200	10.5
384900	3741700	10.1	385500	3741900	8.7	384700	3742200	10.8
385000	3741700	10.2	385600	3741900	6.6	384800	3742200	8.9
385100	3741700	10.0	385700	3741900	6.9	384900	3742200	8.1
385200	3741700	9.9	385900	3741900	6.6	385000	3742200	7.8
385300	3741700	9.6	386000	3741900	6.3	385100	3742200	7.5
385400	3741700	9.0	386100	3741900	6.3	385200	3742200	6.9
385500	3741700	8.7	386200	3741900	6.6	385300	3742200	6.2
385600	3741700	7.3	384200	3742000	11.8	385400	3742200	5.7
385800	3741700	6.6	384300	3742000	11.2	385500	3742200	6.2
385900	3741700	6.3	384400	3742000	10.6	385600	3742200	7.3
386000	3741700	6.0	384500	3742000	10.8	385700	3742200	7.1
386100	3741700	5.7	384600	3742000	10.8	385800	3742200	6.9

ATTACHMENT ~~D-3~~ H-4 LIST OF ONSITE RECEPTORS

UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)
386000	3742200	6.9	385400	3742600	7.5	385800	3743000	6.9
386100	3742200	6.9	385500	3742600	7.2	385900	3743000	7.2
384400	3742300	10.3	385600	3742600	7.5	386000	3743000	8.0
384500	3742300	10.8	385700	3742600	7.1	384900	3743100	7.2
384600	3742300	10.6	385800	3742600	6.9	385000	3743100	8.4
384700	3742300	10.6	385900	3742600	6.9	385200	3743100	7.8
384800	3742300	8.4	384600	3742700	9.9	385900	3743100	7.2
384900	3742300	8.6	384700	3742700	10.2	386000	3743100	7.8
385000	3742300	8.1	384800	3742700	9.6	385000	3743200	8.4
385100	3742300	7.5	384900	3742700	9.9	385200	3743200	7.5
385200	3742300	7.6	385000	3742700	9.6	385900	3743200	7.4
385300	3742300	6.6	385100	3742700	10.2	386000	3743200	7.8
385400	3742300	6.6	385300	3742700	8.1	385200	3743300	6.9
385500	3742300	7.2	385400	3742700	7.8	385900	3743300	7.2
385600	3742300	7.2	385500	3742700	7.4	386000	3743300	7.5
385700	3742300	7.0	385600	3742700	7.2	386100	3743300	8.1
385800	3742300	7.2	385700	3742700	6.9			
386000	3742300	6.7	385800	3742700	6.9			
384400	3742400	10.3	385900	3742700	7.2			
384500	3742400	10.5	384700	3742800	9.3			
384600	3742400	10.5	384800	3742800	8.4			
384700	3742400	9.9	384900	3742800	9.4			
384800	3742400	8.5	385000	3742800	9.9			
384900	3742400	9.3	385100	3742800	9.9			
385000	3742400	8.4	385300	3742800	8.1			
385100	3742400	8.4	385400	3742800	7.8			
385200	3742400	9.9	385500	3742800	7.6			
385300	3742400	8.2	385600	3742800	7.2			
384500	3742500	10.5	385700	3742800	7.1			
384600	3742500	9.9	385800	3742800	7.0			
384700	3742500	9.8	385900	3742800	7.5			
384800	3742500	9.0	384800	3742900	7.4			
384900	3742500	9.3	384900	3742900	9.0			
385000	3742500	9.0	385000	3742900	9.3			
385100	3742500	9.0	385100	3742900	8.0			
385200	3742500	8.7	385200	3742900	8.4			
385400	3742500	7.2	385300	3742900	8.1			
385500	3742500	7.2	385400	3742900	7.6			
385600	3742500	7.2	385500	3742900	7.2			
385700	3742500	7.0	385600	3742900	7.2			
385800	3742500	7.1	385700	3742900	6.9			
384600	3742600	9.8	385800	3742900	6.9			
384700	3742600	9.6	385900	3742900	7.5			
384800	3742600	9.6	384900	3743000	8.4			
384900	3742600	9.6	385000	3743000	8.7			
385000	3742600	9.3	385200	3743000	8.1			
385100	3742600	10.0	385300	3743000	7.8			
385200	3742600	8.7	385400	3743000	7.5			

ATTACHMENT ~~D-4~~ H-5 **AIR DISPERSION MODELING FILES**

The AERMOD and HARP2 input and output files are available upon request from the SCAQMD.

APPENDIX B-5

TRANSPORTATION EMISSION CALCULATIONS

~~Appendix B-5~~
~~Tesoro Integration and Compliance Project~~
~~Operational Transportation Emissions~~
~~Emissions Summary~~

~~Peak Daily Emissions Inside SCAQMD (lb/day)~~

~~Scenario~~	~~VOC~~	~~CO~~	~~NOx~~	~~SOx~~	~~PM10~~	~~PM2.5~~	~~CO2e~~
~~Onroad Truck Emissions~~	~~0.0~~	~~0.2~~	~~0.7~~	~~0.0~~	~~0.2~~	~~0.1~~	~~179.3~~
~~Idling Truck Emissions~~	~~0.0~~	~~0.1~~	~~0.4~~	~~0.0~~	~~0.0~~	~~0.0~~	~~35.9~~
~~Rail Emissions~~	~~1.2~~	~~7.6~~	~~25.8~~	~~0.0~~	~~0.7~~	~~0.6~~	~~2081.5~~
~~Total~~	~~1.2~~	~~7.9~~	~~27.0~~	~~0.0~~	~~0.9~~	~~0.7~~	~~2296.7~~

~~Annual Emissions Inside SCAQMD (lb/yr)~~

~~Scenario~~	~~VOC~~	~~CO~~	~~NOx~~	~~SOx~~	~~PM10~~	~~PM2.5~~	~~CO2e (MT)~~
~~Truck Emissions~~	~~8.7~~	~~61.2~~	~~219.4~~	~~0.5~~	~~62.1~~	~~16.1~~	~~24.3~~
~~Idling Truck Emissions~~	~~9.0~~	~~28.8~~	~~227.1~~	~~0.2~~	~~0.2~~	~~0.2~~	~~9.2~~
~~Rail Emissions~~	~~438.8~~	~~2783.1~~	~~9431.9~~	~~7.0~~	~~248.6~~	~~228.7~~	~~260.2~~
~~Total~~	~~456.5~~	~~2873.1~~	~~9878.4~~	~~7.7~~	~~310.9~~	~~245.1~~	~~293.7~~

~~Peak Daily Emissions Outside SCAQMD (lb/day)~~

~~Scenario~~	~~VOC~~	~~CO~~	~~NOx~~	~~SOx~~	~~PM10~~	~~PM2.5~~	~~CO2e~~
~~Truck Emissions~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~
~~Idling Truck Emissions~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~
~~Rail Emissions~~	~~4.2~~	~~26.5~~	~~89.7~~	~~0.1~~	~~2.4~~	~~2.2~~	~~6258.5~~
~~Total~~	~~4.2~~	~~26.5~~	~~89.7~~	~~0.1~~	~~2.4~~	~~2.2~~	~~6258.5~~

~~Annual Emissions Outside SCAQMD (lb/yr)~~

~~Scenario~~	~~VOC~~	~~CO~~	~~NOx~~	~~SOx~~	~~PM10~~	~~PM2.5~~	~~CO2e (MT)~~
~~Truck Emissions~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~
~~Idling Truck Emissions~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~
~~Rail Emissions~~	~~1523.6~~	~~9662.2~~	~~32745.6~~	~~24.4~~	~~863.1~~	~~794.0~~	~~1026.3~~
~~Total~~	~~1523.6~~	~~9662.2~~	~~32745.6~~	~~24.4~~	~~863.1~~	~~794.0~~	~~1026.3~~

Appendix B-5
Tesoro Integration and Compliance Project
Operational Transportation Emissions
Emissions Summary

Peak Daily Emissions Inside SCAQMD (lb/day)

Scenario	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e
Onroad Truck Emissions	0.0	0.2	0.7	0.0	0.0	0.2	179.3
Idling Truck Emissions	0.0	0.1	0.4	0.0	0.0	0.0	35.9
Rail Emissions	1.2	7.6	25.8	0.0	0.7	0.6	2081.5
Total	1.2	7.9	27.0	0.0	0.7	0.8	2296.7

Annual Emissions Inside SCAQMD (lb/yr)

Scenario	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Truck Emissions	17.7	124.0	444.7	1.0	13.6	112.3	49.2
Idling Truck Emissions	11.1	35.6	280.5	0.2	0.6	0.6	11.4
Rail Emissions	438.8	2783.1	9431.9	7.0	248.6	228.7	260.2
Total	467.6	2942.8	10157.2	8.3	262.8	341.6	320.8

Peak Daily Emissions Outside SCAQMD (lb/day)

Scenario	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e
Truck Emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idling Truck Emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rail Emissions	4.2	26.5	89.7	0.1	2.4	2.2	6258.5
Total	4.2	26.5	89.7	0.1	2.4	2.2	6258.5

Annual Emissions Outside SCAQMD (lb/yr)

Scenario	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Truck Emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idling Truck Emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rail Emissions	1523.6	9662.2	32745.6	24.4	863.1	794.0	1026.3
Total	1523.6	9662.2	32745.6	24.4	863.1	794.0	1026.3

~~Appendix B-5~~
~~Tesoro Integration and Compliance Project~~
~~Operational Onroad Emissions~~
~~Onroad Summary~~

~~Parameters~~

	~~Baseline~~		~~Project~~		~~Incremental Change~~		
~~Scenario~~	~~Miles/Trip~~	~~Trucks/day~~	~~Miles/Trip~~	~~Trucks/day~~	~~Miles/Trip~~	~~Trucks/day~~	~~Miles/day~~
~~SARP~~	~~5.4~~	~~6.0~~	~~1.9~~	~~8.0~~	~~-3.5~~	~~2.0~~	~~-17.4~~
~~Spent Caustic~~	~~0.0~~	~~0.0~~	~~5.0~~	~~3.0~~	~~5.0~~	~~3.0~~	~~15.0~~
~~Fresh Caustic~~	~~0.0~~	~~0.0~~	~~10.0~~	~~3.0~~	~~10.0~~	~~3.0~~	~~30.0~~
~~Misc~~	~~0.0~~	~~0.0~~	~~20.0~~	~~1.0~~	~~20.0~~	~~1.0~~	~~20.0~~
~~Total~~							~~47.6~~

~~Emission Factors (lb/mi)~~ ~~(1)(2)(3)~~

~~Vehicle Category~~	~~VOC~~	~~CO~~	~~NOx~~	~~SOx~~	~~PM10 Exhaust~~	~~PM10 Fugitive~~	~~PM10 Total~~	~~PM2.5~~	~~CO2e~~
~~T7 Trucks~~	~~6.13E-04~~	~~4.30E-03~~	~~1.54E-02~~	~~3.59E-05~~	~~4.73E-04~~	~~3.90E-03~~	~~4.37E-03~~	~~1.14E-03~~	~~3.77E+00~~

~~Peak Daily Emissions (lb/day)~~

~~Scenario~~	~~VOC~~	~~CO~~	~~NOx~~	~~SOx~~	~~PM10 Exhaust~~	~~PM10 Fugitive~~	~~PM10 Total~~	~~PM2.5~~	~~CO2e~~
~~SARP~~	~~-0.01~~	~~-0.07~~	~~-0.27~~	~~0.00~~	~~-0.01~~	~~-0.07~~	~~-0.08~~	~~-0.02~~	~~-65.64~~
~~Spent Caustic~~	~~0.01~~	~~0.06~~	~~0.23~~	~~0.00~~	~~0.01~~	~~0.06~~	~~0.07~~	~~0.02~~	~~56.52~~
~~Fresh Caustic~~	~~0.02~~	~~0.13~~	~~0.46~~	~~0.00~~	~~0.01~~	~~0.12~~	~~0.13~~	~~0.03~~	~~113.03~~
~~Misc~~	~~0.01~~	~~0.09~~	~~0.31~~	~~0.00~~	~~0.01~~	~~0.08~~	~~0.09~~	~~0.02~~	~~75.36~~
~~Total~~	~~0.03~~	~~0.20~~	~~0.73~~	~~0.00~~	~~0.02~~	~~0.19~~	~~0.21~~	~~0.05~~	~~179.26~~

~~Annual Emissions (lb/yr)~~

~~Scenario~~	~~VOC~~	~~CO~~	~~NOx~~	~~SOx~~	~~PM10 Exhaust~~	~~PM10 Fugitive~~	~~PM10 Total~~	~~PM2.5~~	~~CO2e (MT/yr)~~
~~SARP~~	~~-3.90~~	~~-27.37~~	~~-98.14~~	~~-0.23~~	~~-3.01~~	~~-24.78~~	~~-27.79~~	~~-7.22~~	~~-10.87~~
~~Spent Caustic~~	~~3.36~~	~~23.57~~	~~84.49~~	~~0.20~~	~~2.59~~	~~21.33~~	~~23.92~~	~~6.21~~	~~9.36~~
~~Fresh Caustic~~	~~4.78~~	~~33.58~~	~~120.38~~	~~0.28~~	~~3.69~~	~~30.39~~	~~34.08~~	~~8.85~~	~~13.33~~
~~Misc~~	~~4.48~~	~~31.42~~	~~112.66~~	~~0.26~~	~~3.45~~	~~28.45~~	~~31.90~~	~~8.29~~	~~12.48~~
~~Total~~	~~8.72~~	~~61.20~~	~~219.39~~	~~0.51~~	~~6.72~~	~~55.40~~	~~62.12~~	~~16.14~~	~~24.30~~

~~(1) Emfac2011 emission factors for the South Coast Air District.~~

~~(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011~~

~~$E = k(sL)^{0.91} \times (W)^{1.02}$~~

~~Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)~~

~~(0.03 for major/collector roads), W = weight of vehicles is 40 tons~~

~~(3) Carbon Dioxide Equivalence (CO_e) = CO_2 + CH_4 * 21 + N2O*310~~

~~where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.~~

~~where light vehicle are gasoline light duty trucks.~~

~~where medium/heavy duty vehicle are diesel heavy duty trucks.~~

~~Chemical~~	~~2015~~
~~CO2 (lb/mi)~~	~~3.7642~~
~~CH4 (g/mi)~~	~~0.0051~~
~~N2O (g/mi)~~	~~0.0048~~
~~CO2e (lb/mi)~~	~~3.768~~

Appendix B-5
Tesoro Integration and Compliance Project
Operational Onroad Emissions
Onroad Summary

Parameters

	Baseline		Project		Incremental Change		
Scenario	**Miles/Trip**	**Trucks/day**	**Miles/Trip**	**Trucks/day**	**Miles/Trip**	**Trucks/day**	**Miles/day**
SARP	5.4	6.0	1.9	8.0	-3.5	2.0	-17.4
Spent Caustic	0.0	0.0	5.0	3.0	5.0	3.0	15.0
Fresh Caustic	0.0	0.0	10.0	3.0	10.0	3.0	30.0
Coke Trucks[1]	0.0	0.0	10.0	4.0	10.0	4.0	40.0
Misc	0.0	0.0	20.0	1.0	20.0	1.0	20.0
Total							87.6

Emission Factors (lb/mi) [2][3][4]

Vehicle Category	VOC	CO	NOx	SOx	PM10 Exhaust	PM10 Fugitive	PM10 Total	PM2.5	CO2e
T7 Trucks	6.13E-04	4.30E-03	1.54E-02	3.59E-05	4.73E-04	3.90E-03	4.37E-03	1.14E-03	3.77E+00

Peak Daily Emissions (lb/day)

Scenario	VOC	CO	NOx	SOx	PM10 Exhaust	PM10 Fugitive	PM10 Total	PM2.5	CO2e
SARP	-0.01	-0.07	-0.27	0.00	-0.01	-0.07	-0.08	-0.02	-65.64
Spent Caustic	0.01	0.06	0.23	0.00	0.01	0.06	0.07	0.02	56.52
Fresh Caustic	0.02	0.13	0.46	0.00	0.01	0.12	0.13	0.03	113.03
Coke Trucks[1]	0.02	0.17	0.62	0.00	0.02	0.16	0.17	0.05	150.71
Misc	0.01	0.09	0.31	0.00	0.01	0.08	0.09	0.02	75.36
Total[1]	0.03	0.20	0.73	0.00	0.02	0.19	0.21	0.05	179.26

Annual Emissions (lb/yr)

Scenario	VOC	CO	NOx	SOx	PM10 Exhaust	PM10 Fugitive	PM10 Total	PM2.5	CO2e (MT/yr)
SARP	-3.90	-27.37	-98.14	-0.23	-3.01	-24.78	-27.79	-7.22	-10.87
Spent Caustic	3.36	23.57	84.49	0.20	2.59	21.33	23.92	6.21	9.36
Fresh Caustic	4.78	33.58	120.38	0.28	3.69	30.39	34.08	8.85	13.33
Coke Trucks[1]	8.95	62.85	225.32	0.52	6.90	56.89	63.79	16.57	24.95
Misc	4.48	31.42	112.66	0.26	3.45	28.45	31.90	8.29	12.48
Total	17.67	124.04	444.71	1.04	13.62	112.29	125.91	32.71	49.25

(1) Coke trucks do not change peak day. Annual average of 4 trucks per day.

(2) Emfac2011 emission factors for the South Coast Air District.

(3) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where: k = 0.0022 lb/VMT for PM10, sL = road silt loading (gms/m2)

(0.03 for major/collector roads), W = weight of vehicles is 40 tons

(4) Carbon Dioxide Equivalence (CO_E) = $CO_2 + CH_4 * 21 + N2O*310$

where CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct Emissions from Mobile Combustion Sources, EPA 2008.

where light vehicle are gasoline light duty trucks.

where medium/heavy duty vehicle are diesel heavy duty trucks.

Chemical	2015
CO2 (lb/mi)	3.7642
CH4 (g/mi)	0.0051
N2O (g/mi)	0.0048
CO2e (lb/mi)	3.768

Appendix B-5
Tesoro Integration and Compliance Project
Onroad Facility T7 Trucks
Idling Emissions Summary

Total Idling Emissions - lb/day

Scenario	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e
Carson	0.0	0.0	0.3	0.0	0.0	0.0	29.4
Wilmington	0.0	0.0	0.1	0.0	0.0	0.0	6.5
Total Idling Emissions	0.0	0.1	0.4	0.0	0.0	0.0	35.9

Total Idling Emissions - lb/yr

Scenario	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Carson	7.9	25.5	200.4	0.2	0.0	0.0	8.1
Wilmington	1.1	3.4	26.7	0.0	0.2	0.2	1.1
Coke Trucks	2.1	6.8	53.4	0.0	0.4	0.4	2.2
Total Idling Emissions	11.1	35.6	280.5	0.2	0.6	0.6	11.4

Appendix B-5
Tesoro Integration and Compliance Project
Onroad Facility T7 Trucks
Carson Operations Idling Emissions

Assumptions

Includes 8 SARP, 6 caustic, and 1 misc. Truck.

Idling Time	15	min/trip
Route Distance	1.75	miles/trip
Existing Trucks	0	per day
Project Trucks	15	per day
Total Trucks	15	per day
Total Trucks	5475	per year

Idling Emissions

Pollutant	Emission Factor (lb/hr)	lb/hr	lb/day	lb/yr
VOC	5.78E-03	5.78E-03	1.30E-02	7.91E+00
CO	1.86E-02	1.86E-02	4.18E-02	2.55E+01
NOx	1.46E-01	1.46E-01	3.29E-01	2.00E+02
SOx	1.19E-04	1.19E-04	2.67E-04	1.63E-01
PM	1.15E-03	1.15E-03	2.59E-03	1.57E+00
CO2	1.31E+01	1.31E+01	2.94E+01	1.79E+04

Assumes 4 truck in the peak hour.

Appendix B-5
Tesoro Integration and Compliance Project
Onroad Facility T7 Trucks
Wilmington Operations Idling Emissions

Assumptions

Includes caustic trucks.		
Idling Time	15	min/trip
Route Distance	0.75	miles/trip
Existing Trucks	6	per day
Project Trucks	8	per day
Total Trucks	2	per day
Total Trucks	730	per year

Idling Emissions

Pollutant	Emission Factor (lb/hr)	lb/hr	lb/day	lb/yr
VOC	5.78E-03	2.89E-03	2.89E-03	1.05E+00
CO	1.86E-02	9.30E-03	9.30E-03	3.39E+00
NOx	1.46E-01	7.32E-02	7.32E-02	2.67E+01
SOx	1.19E-04	5.94E-05	5.94E-05	2.17E-02
PM10/PM2.5	1.15E-03	5.75E-04	5.75E-04	2.10E-01
CO2	1.31E+01	6.53E+00	6.53E+00	2.38E+03

Assumes 2 truck in the peak hour.

Tesoro Integration and Compliance Project
Onsite Facility T7 Trucks
Coke Truck Emissions

Assumptions

Includes an incremental increase of 1460 trucks per year.

Idling Time	15	min/trip
Route Distance	1	miles/trip
Trucks per Year	1460	

Idling Emissions

Pollutant	Emission Factor (lb/hr)	lb/hr	lb/yr
VOC	5.78E-03	5.78E-03	2.11E+00
CO	1.86E-02	1.86E-02	6.79E+00
NOx	1.46E-01	1.46E-01	5.34E+01
SOx	1.19E-04	1.19E-04	4.33E-02
PM	1.15E-03	1.15E-03	4.20E-01
CO2	1.31E+01	1.31E+01	4.77E+03

Assumes 4 truck in the peak hour.

Travel Emissions

Pollutant	Emission Factor (lb/mi)	lb/hr	lb/yr
VOC	5.35E-03	2.14E-02	7.81E+00
CO	1.82E-02	7.29E-02	2.66E+01
NOx	5.88E-02	2.35E-01	8.59E+01
SOx	3.71E-05	1.48E-04	5.41E-02
PM	2.18E-04	8.74E-04	3.19E-01
CO2	1.32E+01	5.27E+01	1.92E+04

Assumes 4 truck in the peak hour.

Appendix B-5

Idling Emission Factors

EMFAC2014 (v1.0.7) Emission Rates
Region Type: Air District
Region: South Coast AQMD
Calendar Year: 2016
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, g/mile for RUNEX, PMBW and PMTW

Region	CalYr	VehClass	MdlYr	Speed	Fuel	Population	VMT	ROG_IDLEX	CO_IDLEX	NOx_IDLEX	SOx_IDLEX	PM10_IDLE	CO2_IDLEX
South Coast AQMD	2016	HHDT	2007	Aggregated	DSL	3343.880868	347399	2.622160473	8.435864	66.39857	0.053854	0.521504	5926.219

Appendix B-5
Tesoro Integration and Compliance Project
Operational Locomotive Emissions
Emission Summary

	Peak Daily Criteria Pollutant Emissions (lb/day)					
Scenario	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
SCAQMD (1)	1.20	7.62	25.84	0.02	0.68	0.63
BAAQMD (2)	0.47	2.95	10.01	0.01	0.26	0.24
SJVAPCD (2)	1.78	11.27	38.20	0.03	1.01	0.93
EKAPCD (2)	0.49	3.12	10.56	0.01	0.28	0.26
MDAQMD (3)	0.82	5.21	17.65	0.01	0.47	0.43
ICAPCD (1)	0.62	3.92	13.30	0.01	0.35	0.32

(1) Assumes 10 LPG railcars from Arizona border and 4 caustic railcars.

(2) Assumes 10 LPG railcars from Martinez.

(3) Assumes 10 LPG railcars from Nevada border.

	Annual Criteria Pollutant Emissions (ton/yr)					
Scenario	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
SCAQMD (1)	0.22	1.39	4.72	0.00	0.12	0.11
BAAQMD (2)	0.08	0.54	1.83	0.00	0.05	0.04
SJVAPCD (2)	0.32	2.06	6.97	0.01	0.18	0.17
EKAPCD (2)	0.09	0.57	1.93	0.00	0.05	0.05
MDAQMD (3)	0.15	0.95	3.22	0.00	0.08	0.08
ICAPCD (1)	0.11	0.72	2.43	0.00	0.06	0.06

(1) Assumes 10 LPG railcars per day for 365 days and 4 caustic railcars per week for 52 weeks from the Arizona border.

(2) Assumes 10 LPG railcars per day for 365 days from Martinez.

(3) Assumes 10 LPG railcars per day for 365 days from Nevada border.

	GHG Emissions (MT/yr)			
Scenario	**CO2**	**CH4**	**N2O**	**CO2e**
SCAQMD (1)	255.83	0.03	0.01	260.19
BAAQMD (2)	131.21	0.01	0.01	133.44
SJVAPCD (2)	500.85	0.05	0.02	509.39
EKAPCD (2)	138.53	0.01	0.01	140.89
MDAQMD (3)	198.41	0.02	0.01	235.39
ICAPCD (1)	7.10	0.00	0.00	7.22
In California (4)	1180.11	0.13	0.06	1200.22

(1) Assumes 10 LPG railcars per day for 365 days and 4 caustic railcars per week for 52 weeks from the Arizona border.

(2) Assumes 10 LPG railcars per day for 365 days from Martinez.

(3) Assumes 10 LPG railcars per day for 365 days from Nevada border.

(4) Assumes 10 LPG railcars per day for 365 days from Martinez and 4 caustic railcars per week for 52 weeks from the Arizona Boarder.

Appendix B-5
Tesoro Integration and Compliance Project
Operational Locomotive Emissions
Locomotive Distance and Time

TRAVEL FROM MARTINEZ[1]

Rail Segment	Distance (one-way miles)	Average Speed (mph)	Travel time (hours)
BAAQMD	53.8	27	1.97
SJVAPCD	277.7	37	7.52
EKAPCD	54.2	26	2.08
MDAQMD to Daggett	33	20	1.67
Daggett to SCAQMD Border	58.9	45	1.31
SCAQMD Border to Redondo	98.4	52	1.89
Redondo to Dolores	14.4	39	0.37
Dolores to Refinery	15	25	0.60
Total Travel Time			**17.41**
Total Travel Time In SCAQMD			2.86
Total Travel Time In California [2]			14.55

TRAVEL FROM NEVADA BORDER[1]

Rail Segment	Distance (one-way miles)	Average Speed (mph)	Travel time (hours)
NV Border to Yermo	126.8	61	2.09
Yermo to SCAQMD Border	62	45	1.39
SCAQMD Border to Redondo	98.4	52	1.89
Redondo to Dolores	14.4	39	0.37
Dolores to Refinery	15	25	0.60
Total Travel Time			6.33
Total Travel Time In SCAQMD			2.86
Total Travel Time In California(MDAQMD) [2]			3.48

TRAVEL FROM ARIZONA BORDER[1]

Rail Segment	Distance (one-way miles)	Average Speed (mph)	Travel time (hours)
Arizona Boarder to SCAQMD Border	112.3	60	1.87
SCAQMD Border to Rancho	81.6	48	1.71
Rancho to Redondo	54.1	56	0.96
Redondo to Dolores	14.4	39	0.37
Dolores to Refinery	15	25	0.60
Total Travel Time			5.50
Total Travel Time In SCAQMD			**3.63**
Total Travel Time In California (ICAPCD) [2]			1.87

(1) Travel distance based milepost markers from Union Pacific or review of maps.

(2) Travel inside California but outside SCAQMD.

Appendix B-5
Tesoro Integration and Compliance Project
Operational Locomotive Emissions
Travel from the Arizona Border

Parameters

Locomotive	GE Dash 9	
Engine Size	4400	bhp
Number of Engines	4	
Engine Tier	T2	
Average Load Factor (See Below)	27.4%	
Railcar Utilization [1]	7.7%	
Operating Hours Inside SCAQMD	3.63	hour/day
Operating Hours Inside ICPCD	1.87	hour/day
Daily Work in SCAQMD	1350.0	bhp-hr/day
Daily Work in ICAPCD	694.7	bhp-hr/day
Brake Specific Fuel Consumption [2]	20.8	bhp-hr/gal
Fuel Usage in SCAQMD	64.9	gal/day
Fuel Usage in ICAPCD	33.4	gal/day

(1) Assumes 10 LPG tanker cars in a 130 unit line-haul train on a peak day. Port of Long Beach (POLB), 2013 Air Emissions Inventory, 2014.

(2) EPA, Emission Factors for Locomotives, 2009.

Typical Power Distribution by Notch [3]

Notch	Idle[3]	DB [3]	1	2	3	4	5	6	7	8
Percent of Rated Power	0.6%	2.7%	4.5%	11.5%	23.5%	35.0%	48.5%	64.0%	85.0%	100.0%
Average Percentage of Time in Notch	38.0%	12.5%	6.5%	6.5%	5.2%	4.4%	3.8%	3.9%	3.0%	16.2%
Average Load Factor										27.4%

(3) Notch distribution and power rating from EPA, Locomotive Emissions Standard Regulatory Support Document, April 1998.

Criteria Pollutant Emissions [4]

	HC	VOC [5]	CO	NOx	SOx [6]	PM10	PM2.5 [7]
Emission Factors (g/bhp-hr)	0.27	0.29	1.83	6.20	0.00	0.16	0.15
Emission Factors (g/gal)	5.70	6.00	38.06	129.00	0.10	3.40	3.13
Emission Factors (lb/gal)	0.01	0.01	0.08	0.28	0.00	0.01	0.01
Daily Emissions in SCAQMD (lb/day)	0.82	0.86	5.45	18.46	0.01	0.49	0.45
Daily Emissions in ICAPCD (lb/day)	0.42	0.44	2.80	9.50	0.01	0.25	0.23
Annual Emissions in SCAQMD (tons/yr) [8]	0.15	0.16	0.99	3.37	0.00	0.09	0.08
Annual Emissions in ICAPCD (tons/yr) [8]	0.08	0.08	0.51	1.73	0.00	0.05	0.04

(4) Emisson factors from the EPA Emission Factors for Locomotive Document, 2009.

(5) VOC emissions scaled from HC emission factors. EPA, Emission Factors for Locomotives, 2009.

(6) Based on 15 ppm S.

(7) PM2.5 emissions scaled from PM10 emissions. POLB, 2013 Air Emissions Inventory, 2014.

(8) Based on 365 days of operations.

GHG Emissions [9]

	CO2	CH4	N2O	CO2e [10]
Emission Factors (g/bhp-hr)	491	0.05	0.02	499.57
Emission Factors (g/gal)	10217	1.10	0.49	10391.09
Emission Factors (lb/gal)	22.52	0.00	0.00	22.91
Daily Emissions in SCAQMD (lb/day)	1461.89	0.16	0.07	1486.80
Daily Emissions in ICAPCD (lb/day)	752.27	0.08	0.04	765.08
Annual Emissions in SCAQMD (lb/yr) [8]	533589.25	57.25	25.45	542681.34
Annual Emissions in ICAPCD (lb/yr) [8]	274576.75	29.46	13.10	279255.40
Annual Emissions in SCAQMD (MT/yr) [8]	242.03	0.03	0.01	246.16
Annual Emissions in ICAPCD (MT/yr) [8]	124.55	0.01	0.01	126.67

(9) CO2 emission factor from Emission Factors for Locomotives, 2009. CH4 and N2O emissions scaled up from HC and NOx emissions in the POLB 2013 Air Emissions Inventory, 2014.

(10) Based on State global warming potentials.

Appendix B-5
Tesoro Integration and Compliance Project
Operational Locomotive Emissions
Travel from the Nevada Border

Parameters

Locomotive	GE Dash 9	
Engine Size	4400	bhp
Number of Engines	4	
Engine Tier	T2	
Average Load Factor (See Below)	27.4%	
Railcar Utilization [1]	7.7%	
Operating Hours Inside SCAQMD	2.86	hour/day
Operating Hours Inside MDAQMD	3.48	hour/day
Daily Work in SCAQMD	1061.0	bhp-hr/day
Daily Work in MDAQMD	1290.9	bhp-hr/day
Brake Specific Fuel Consumption [2]	20.8	bhp-hr/gal
Fuel Usage in SCAQMD	51.0	gal/day
Fuel Usage in MDAQMD	62.1	gal/day

(1) Assumes 10 LPG tanker cars in a 130 unit line-haul train on a peak day. Port of Long Beach (POLB), 2013 Air Emissions Inventory, 2014.

(2) EPA, Emission Factors for Locomotives, 2009.

Typical Power Distribution by Notch [3]

Notch	Idle[3]	DB [3]	1	2	3	4	5	6	7	8
Percent of Rated Power	0.6%	2.7%	4.5%	11.5%	23.5%	35.0%	48.5%	64.0%	85.0%	100.0%
Average Percentage of Time in Notch	38.0%	12.5%	6.5%	6.5%	5.2%	4.4%	3.8%	3.9%	3.0%	16.2%
Average Load Factor										27.4%

(3) Notch distribution and power rating from EPA, Locomotive Emissions Standard Regulatory Support Document, April 1998.

Criteria Pollutant Emissions [4]

	HC	VOC [5]	CO	NOx	SOx [6]	PM10	PM2.5 [7]
Emission Factors (g/bhp-hr)	0.27	0.29	1.83	6.20	0.00	0.16	0.15
Emission Factors (g/gal)	5.70	6.00	38.06	129.00	0.10	3.40	3.13
Emission Factors (lb/gal)	0.01	0.01	0.08	0.28	0.00	0.01	0.01
Daily Emissions in SCAQMD (lb/day)	0.64	0.67	4.28	14.51	0.01	0.38	0.35
Daily Emissions in MDAQMD (lb/day)	0.78	0.82	5.21	17.65	0.01	0.47	0.43
Annual Emissions in SCAQMD (tons/yr) [8]	0.12	0.12	0.78	2.65	0.00	0.07	0.06
Annual Emissions in MDAQMD (tons/yr) (8)	0.14	0.15	0.95	3.22	0.00	0.08	0.08

(4) Emisson factors from the EPA Emission Factors for Locomotive Document, 2009.

(5) VOC emissions scaled from HC emission factors. EPA, Emission Factors for Locomotives, 2009.

(6) Based on 15 ppm S.

(7) PM2.5 emissions scaled from PM10 emissions. POLB, 2013 Air Emissions Inventory, 2014.

(8) Based on 365 days of operations.

GHG Emissions [9]

	CO2	CH4	N2O	CO2e [10]
Emission Factors (g/bhp-hr)	491	0.05	0.02	499.57
Emission Factors (g/gal)	10217	1.10	0.49	10391.09
Emission Factors (lb/gal)	22.52	0.00	0.00	22.91
Daily Emissions in SCAQMD (lb/day)	1148.91	0.12	0.05	1168.49
Daily Emissions in MDAQMD (lb/day)	1397.93	0.15	0.07	1421.75
Annual Emissions in SCAQMD (lb/yr) [8]	419353.58	44.99	20.00	426499.15
Annual Emissions in MDAQMD (lb/yr) (8)	510242.88	54.74	24.34	518937.17
Annual Emissions in SCAQMD (MT/yr) [8]	190.22	0.02	0.01	193.46
Annual Emissions in MDAQMD (MT/yr) (8)	231.44	0.02	0.01	235.39

(9) CO2 emission factor from Emission Factors for Locomotives, 2009. CH4 and N2O emissions scaled up from HC and NOx emissions in the POLB 2013 Air Emissions Inventory, 2014.

(10) Based on State global warming potentials.

Appendix B-5
Tesoro Integration and Compliance Project
Operational Locomotive Emissions
Travel from Martinez, California

Parameters

Locomotive	GE Dash 9	
Engine Size	4400	bhp
Number of Engines	4	
Engine Tier	T2	
Average Load Factor (See Below)	27.4%	
Railcar Utilization [(1)]	7.7%	
Operating Hours Inside SCAQMD	2.86	hour/day
Operating Hours Inside BAAQMD	1.97	
Operating Hours Inside SJVAPCD	7.52	
Operating Hours Inside EKAPCD	2.08	
Operating Hours Inside MDAQMD	2.98	hour/day
Daily Work in SCAQMD	1061.0	bhp-hr/day
Daily Work in BAAQMD	731.8	
Daily Work in SJVAPCD	2793.6	
Daily Work in EKAQPCD	772.7	
Daily Work in MDAQMD	1106.7	bhp-hr/day
Brake Specific Fuel Consumption [(2)]	20.8	bhp-hr/gal
Fuel Usage in SCAQMD	51.0	gal/day
Fuel Usage in BAAQMD	35.2	
Fuel Usage in SJVAPCD	134.3	
Fuel Usage in EKAPCD	37.1	
Fuel Usage in MDAQMD	53.2	gal/day

(1) Assumes 10 LPG tanker cars in a 130 unit line-haul train on a peak day. Port of Long Beach (POLB), 2013 Air Emissions Inventory, 2014.

(2) EPA, Emission Factors for Locomotives, 2009.

Typical Power Distribution by Notch [(3)]

Notch	Idle[(3)]	DB [(3)]	1	2	3	4	5	6	7	8
Percent of Rated Power	0.6%	2.7%	4.5%	11.5%	23.5%	35.0%	48.5%	64.0%	85.0%	100.0%
Average Percentage of Time in Notch	38.0%	12.5%	6.5%	6.5%	5.2%	4.4%	3.8%	3.9%	3.0%	16.2%
Average Load Factor										27.4%

(3) Notch distribution and power rating from EPA, Locomotive Emissions Standard Regulatory Support Document, April 1998.

Criteria Pollutant Emissions [(4)]

	HC	VOC [(5)]	CO	NOx	SOx [(6)]	PM10	PM2.5 [(7)]
Emission Factors (g/bhp-hr)	0.27	0.29	1.83	6.20	0.00	0.16	0.15
Emission Factors (g/gal)	5.70	6.00	38.06	129.00	0.10	3.40	3.13
Emission Factors (lb/gal)	0.01	0.01	0.08	0.28	0.00	0.01	0.01
Daily Emissions in SCAQMD (lb/day)	0.64	0.67	4.28	14.51	0.01	0.38	0.35
Daily Emissions in BAAQMD (lb/day)	0.44	0.47	2.95	10.01	0.01	0.26	0.24
Daily Emissions in SJVAPCD (lb/day)	1.69	1.78	11.27	38.20	0.03	1.01	0.93
Daily Emissions in EKAQPCD (lb/day)	0.47	0.49	3.12	10.56	0.01	0.28	0.26
Daily Emissions in MDAQMD (lb/day)	0.67	0.70	4.46	15.13	0.01	0.40	0.37
Annual Emissions in SCAQMD (tons/yr) [(8)]	0.12	0.12	0.78	2.65	0.00	0.07	0.06
Annual Emissions in BAAQMD (tons/yr) [(8)]	0.08	0.08	0.54	1.83	0.00	0.05	0.04
Annual Emissions in SJVAPCD (tons/yr) [(8)]	0.31	0.32	2.06	6.97	0.01	0.18	0.17
Annual Emissions in EKAPCD (tons/yr) [(8)]	0.09	0.09	0.57	1.93	0.00	0.05	0.05
Annual Emissions in MDAQMD (tons/yr) [(8)]	0.12	0.13	0.81	2.76	0.00	0.07	0.07

(4) Emisson factors from the EPA Emission Factors for Locomotive Document, 2009.

(5) VOC emissions scaled from HC emission factors. EPA, Emission Factors for Locomotives, 2009.

(6) Based on 15 ppm S.

(7) PM2.5 emissions scaled from PM10 emissions. POLB, 2013 Air Emissions Inventory, 2014.

(8) Based on 365 days of operations.

GHG Emissions [(9)]

	CO2	CH4	N2O	CO2e [(10)]
Emission Factors (g/bhp-hr)	491	0.05	0.02	499.57
Emission Factors (g/gal)	10217	1.10	0.49	10391.09
Emission Factors (lb/gal)	22.52	0.00	0.00	22.91
Daily Emissions in SCAQMD (lb/day)	1148.91	0.12	0.05	1168.49
Daily Emissions in BAAQMD (lb/day)	792.49	0.09	0.04	806.00
Daily Emissions in SJVAPCD (lb/day)	3025.15	0.32	0.14	3076.70
Daily Emissions in EKAPCD (lb/day)	836.74	0.09	0.04	851.00
Daily Emissions in MDAQMD (lb/day)	1198.39	0.13	0.06	1218.81
Annual Emissions in SCAQMD (lb/yr) [(8)]	419353.58	44.99	20.00	426499.15
Annual Emissions in BAAQMD (lb/yr) [(8)]	289260.00	31.03	13.80	294188.84
Annual Emissions in SJVAPCD (lb/yr) [(8)]	########	118.46	52.67	########
Annual Emissions in EKAPCD (lb/yr) [(8)]	305411.57	32.77	14.57	310615.63
Annual Emissions in MDAQMD (lb/yr) [(8)]	437413.97	46.93	20.86	444867.29
Annual Emissions in SCAQMD (MT/yr) [(8)]	190.22	0.02	0.01	193.46
Annual Emissions in BAAQMD (MT/yr) [(8)]	131.21	0.01	0.01	133.44
Annual Emissions in SJVAPCD (MT/yr) [(8)]	500.85	0.05	0.02	509.39
Annual Emissions in EKAPCD (MT/yr) [(8)]	138.53	0.01	0.01	140.89
Annual Emissions in MDAQMD (MT/yr) [(8)]	198.41	0.02	0.01	201.79

(9) CO2 emission factor from Emission Factors for Locomotives, 2009. CH4 and N2O emissions scaled up from HC and NOx emissions in the POLB 2013 Air Emissions Inventory, 2014.

(10) Based on State global warming potentials.

Appendix B-5
Tesoro Integration and Compliance Project
Operational Locomotive Emissions
Travel of Spent Caustic (via Arizona Border)

Parameters

Locomotive	GE Dash 9	
Engine Size	4400	bhp
Number of Engines	4	
Engine Tier	T2	
Average Load Factor (See Below)	27.4%	
Railcar Utilization [1]	3.1%	
Operating Hours Inside SCAQMD	3.63	hour/day
Operating Hours Inside ICPCD	1.87	hour/day
Daily Work in SCAQMD	540.0	bhp-hr/day
Daily Work in ICAPCD	277.9	bhp-hr/day
Brake Specific Fuel Consumption [2]	20.8	bhp-hr/gal
Fuel Usage in SCAQMD	26.0	gal/day
Fuel Usage in ICAPCD	13.4	gal/day

(1) Assumes 4 spent caustic tanker cars in a 130 unit line-haul train on a peak day. Port of Long Beach (POLB), 2013 Air Emissions Inventory, 2014.

(2) EPA, Emission Factors for Locomotives, 2009.

Typical Power Distribution by Notch [3]

Notch	Idle[3]	DB [3]	1	2	3	4	5	6	7	8
Percent of Rated Power	0.6%	2.7%	4.5%	11.5%	23.5%	35.0%	48.5%	64.0%	85.0%	100.0%
Average Percentage of Time in Notch	38.0%	12.5%	6.5%	6.5%	5.2%	4.4%	3.8%	3.9%	3.0%	16.2%
Average Load Factor										27.4%

(3) Notch distribution and power rating from EPA, Locomotive Emissions Standard Regulatory Support Document, April 1998.

Criteria Pollutant Emissions [4]

	HC	VOC [5]	CO	NOx	SOx [6]	PM10	PM2.5 [7]
Emission Factors (g/bhp-hr)	0.27	0.29	1.83	6.20	0.00	0.16	0.15
Emission Factors (g/gal)	5.70	6.00	38.06	129.00	0.10	3.40	3.13
Emission Factors (lb/gal)	0.01	0.01	0.08	0.28	0.00	0.01	0.01
Daily Emissions in SCAQMD (lb/day)	0.33	0.34	2.18	7.38	0.01	0.19	0.18
Daily Emissions in ICAPCD (lb/day)	0.17	0.18	1.12	3.80	0.00	0.10	0.09
Annual Emissions in SCAQMD (tons/yr) [8]	0.06	0.06	0.40	1.35	0.00	0.04	0.03
Annual Emissions in ICAPCD (tons/yr) [8]	0.03	0.03	0.20	0.69	0.00	0.02	0.02

(4) Emisson factors from the EPA Emission Factors for Locomotive Document, 2009.

(5) VOC emissions scaled from HC emission factors. EPA, Emission Factors for Locomotives, 2009.

(6) Based on 15 ppm S.

(7) PM2.5 emissions scaled from PM10 emissions. POLB, 2013 Air Emissions Inventory, 2014.

(8) Based on 4 railcars per week and 52 weeks of operations.

GHG Emissions [9]

	CO2	CH4	N2O	CO2e [10]
Emission Factors (g/bhp-hr)	491	0.05	0.02	499.57
Emission Factors (g/gal)	10217	1.10	0.49	10391.09
Emission Factors (lb/gal)	22.52	0.00	0.00	22.91
Daily Emissions in SCAQMD (lb/day)	584.76	0.06	0.03	594.72
Daily Emissions in ICAPCD (lb/day)	300.91	0.03	0.01	306.03
Annual Emissions in SCAQMD (lb/yr) [8]	30407.28	3.26	1.45	30925.40
Annual Emissions in ICAPCD (lb/yr) [8]	15647.11	1.68	0.75	15913.73
Annual Emissions in SCAQMD (MT/yr) [8]	13.79	0.00	0.00	14.03
Annual Emissions in ICAPCD (MT/yr) [8]	7.10	0.00	0.00	7.22

(9) CO2 emission factor from Emission Factors for Locomotives, 2009. CH4 and N2O emissions scaled up from HC and NOx emissions in the POLB 2013 Air Emissions Inventory, 2014.

(10) Based on State global warming potentials.

Appendix B-5
Tesoro Integration and Compliance Project
Operational Marine Vessel Emissions
Emissions Summary

Emission per Barrel (lb/1000 bbl delivered) - Panamax

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Project Unload Rate	0.9	2.1	23.8	0.8	0.11	0.09	0.5
Existing Unloade Rate	1.0	2.4	27.1	1.3	0.15	0.12	0.9
Delta	(0.1)	(0.3)	(3.3)	(0.5)	(0.03)	(0.03)	(0.3)

Emission per Barrel (lb/1000 bbl delivered) - Aframax

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Project Unload Rate	0.6	1.5	16.7	0.7	0.09	0.07	0.5
Existing Unloade Rate	0.7	1.8	19.9	1.2	0.12	0.10	0.8
Delta	(0.1)	(0.2)	(3.2)	(0.6)	(0.04)	(0.03)	(0.4)

Emission per Barrel (lb/yr-1000 bbl delivered) - Panamax

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Project	9.6	23.1	260.8	8.5	1.2	1.0	6.0
Existing	13.2	31.8	356.1	16.5	1.9	1.6	11.4
Delta	(3.6)	(8.6)	(95.3)	(8.0)	(0.7)	(0.6)	(5.4)

Emission per Barrel (lb/yr-1000 bbl delivered) - Aframax

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Project	6.9	16.9	182.3	7.1	1.0	0.8	5.1
Existing	9.8	23.3	261.0	16.1	1.6	1.3	11.1
Delta	(2.9)	(6.5)	(78.6)	(9.0)	(0.7)	(0.6)	(6.0)

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Appendix B-5
Tesoro Integration and Compliance Project
Operational Marine Vessel Emissions
Panamax Parameters

OGV Main Engine Usage per One-Way Transit

Activity	Propulsion Max kW (1)	Speed (Kts) (1)	Load Factor (2)	Distance (nm/trip) (3)	Duration (hr/trip)	Energy Consumed (kW-hr/trip)
California to AQMD Overwater Boundary (4)	11,390	14.8	1.00	110.0	7.43	84,655
Fairway: AQMD Overwater Boundary to 20-Mile (5)	11,390	12.0	0.53	22.9	1.90	11,561
Fairway: 20-Mile to Precautionary Zone (5)	11,390	12.0	0.53	20.0	1.67	10,119
Precautionary Zone (6,7)	11,390	9.0	0.22	8.1	0.90	2,305
Harbor Transit Inbound (8)	11,390	5.0	0.04	3.5	0.70	307
Harbor Transit Outbound (8)	11,390	8.0	0.16	3.5	0.44	787
Turning (8)	11,390	n/a	0.02	n/a	0.25	57
Docking (8)	11,390	n/a	0.02	n/a	0.25	57
Existing - Hoteling (9)	11,390	n/a	-	n/a	62.15	-
Project - Hoteling (10)	11,390	n/a	-	n/a	21.33	-

Notes: (1) Port of Long Beach Air Emissions Inventory - 2013 - Table A.3 (Starcrest 2014)

(2) Load factor = $(\text{speed}/\text{max speed})^3$. Load factor of 0.02 represents minimum load factor for propulsion engines.

(3) Distances from Starcrest (2010), except for California to AQMD and harbor, which were measured from a map. Assumes northern route.

Average One-Way Transit Distances	nmiles
California to AQMD Boundary	110.0
Fairway 1-way nm	42.9
20nm 1-way Distance within Fairway	20.0
PZ to Breakwater 1-way nm	8.1

(4) Assume no Vessel Speed Reduction (VSR).
(5) Assume VSR to 12 knots.
(6) Portion of transit that occurs from PZ boundary to the breakwater.
(7) Average speeds in the precautionary zone are from POLB Air Emissions Inventory 2013 - Table 2.4 (Starcrest 2014)
(8) In harbor transit times and load factors from POLB Air Emissions Inventory 2005 - pg.67 (Starcrest 2007)
(9) Assumes 320,000 barrels unloaded at 5,149 barrels per hour. Unload rate based on average unload rate in 2012.
(10) Assumes 320,000 barrels unloaded at 15,000 barrels per hour.

OGV Auxiliary Generator Usage per One-Way Transit

Activity	Auxiliary kW per Vessel (1)	Hours/ Transit	kW-Hrs/ Transit
Point Conception to AQMD Overwater Boundary	630	7.43	4,682
Fairway: AQMD Overwater Boundary to 20-Mile	630	1.90	1,200
Fairway: 20-Mile to Precautionary Zone	630	1.67	1,050
Precautionary Zone	630	0.90	567
Harbor Transit Inbound	867	0.70	607
Harbor Transit Outbound	867	0.44	379
Turning	867	0.25	217
Docking	867	0.25	217
Existing - Hoteling	683	62.1	42,447
Project - Hoteling	683	21.3	14,571

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.12 (Starcrest 2012)

OGV Auxiliary Boiler Usage per One-Way Transit

Activity	Boiler kW per Vessel (1)	Hours/ Transit	kW-Hrs/ Transit
Point Conception to AQMD Overwater Boundary	-	7.43	-
Fairway: AQMD Overwater Boundary to 20-Mile	-	1.90	-
Fairway: 20-Mile to Precautionary Zone	-	1.67	-
Precautionary Zone	-	0.90	-
Harbor Transit Inbound	371	0.70	259.700
Harbor Transit Outbound	371	0.44	162.313
Turning	371	0.25	92.750
Docking	371	0.25	92.750
Existing - Hoteling	3,000	62.1	186,443.970
Project - Hoteling	3,000	21.3	64,000.000

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.16 (Starcrest 2012)

Tugboat Usage during Assists

Engine Type	Tugboat Max Hp (1)	Load Factor (2)	Hours/ Assist (3)	Tugboats per Assist	kW-Hrs/ Assist
Main Engine	6,770	0.31	3.28	2	10,255
Auxiliary Generator	850	0.43	3.28	2	1,786

Notes: (1) Based on 2 engines per vessel. Port of Long Beach Air Emissions Inventory - 2011 - Table 3.1, 3.2 (Starcrest 2012)
(2) Port of Long Beach Air Emissions Inventory - 2011 - Table 3.4 (Starcrest 2012)
(3) Time spent operating per vessel trip. Assumed to be equal to vessel "Harbor" transit times 2 to account for tug movement and assist time.

Appendix B-5
Tesoro Integration and Compliance Project
Operational Marine Vessel Emissions
Aframax Parameters

OGV Main Engine Usage per One-Way Transit

Activity	Propulsion Max kW (1)	Speed (Kts) (1)	Load Factor (2)	Distance (nm/trip) (3)	Duration (hr/trip)	Energy Consumed (kW-hr/trip)
California to AQMD Overwater Boundary (4)	13,589	15.2	1.00	110.0	7.24	98,341
Fairway: AQMD Overwater Boundary to 20-Mile (5)	13,589	12.0	0.49	22.9	1.90	12,732
Fairway: 20-Mile to Precautionary Zone (5)	13,589	12.0	0.49	20.0	1.67	11,144
Precautionary Zone (6,7)	13,589	9.0	0.21	8.1	0.90	2,539
Harbor Transit Inbound (8)	13,589	5.0	0.04	3.5	0.70	339
Harbor Transit Outbound (8)	13,589	8.0	0.15	3.5	0.44	867
Turning (8)	13,589	n/a	0.02	n/a	0.25	68
Docking (8)	13,589	n/a	0.02	n/a	0.25	68
Existing - Hoteling (9)	13,589	n/a	-	n/a	139.83	-
Project - Hoteling (10)	13,589	n/a	-	n/a	48.00	-

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table A.3 (Starcrest 2012)

(2) Load factor = (speed/max speed)^{3}. Load factor of 0.02 represents minimum load factor for propulsion engines.

(3) Distances from Starcrest (2010), except for California to AQMD and harbor, which were measured from a map. Assumes northern route.

Average One-Way Transit Distances	nmiles
California to AQMD Boundary	110.0
Fairway 1-way nm	42.9
20nm 1-way Distance within Fairway	20.0
PZ to Breakwater 1-way nm	8.1

(4) Assume no Vessel Speed Reduction (VSR).

(5) Assume VSR to 12 knots.

(6) Portion of transit that occurs from PZ boundary to the breakwater.

(7) Average speeds in the precautionary zone are from POLB Air Emissions Inventory 2011 - Table 2.4 (Starcrest 2012)

(8) In harbor transit times and load factors from POLB Air Emissions Inventory 2005 - pg.67 (Starcrest 2007)

(9) Assumes 720,000 barrels unloaded at 5,149 barrels per hour. Unload rate based on average unload rate in 2012.

(10) Assumes 720,000 barrels unloaded at 15,000 barrels per hour.

OGV Auxiliary Generator Usage per One-Way Transit

Activity	Auxiliary kW per Vessel (1)	Hours/ Transit	kW-Hrs/ Transit
Point Conception to AQMD Overwater Boundary	584	7.24	4,226
Fairway: AQMD Overwater Boundary to 20-Mile	584	1.90	1,112
Fairway: 20-Mile to Precautionary Zone	584	1.67	973
Precautionary Zone	584	0.90	526
Harbor Transit Inbound	803	0.70	562
Harbor Transit Outbound	803	0.44	351
Turning	803	0.25	201
Docking	803	0.25	201
Existing - Hoteling	632	139.8	88,374
Project - Hoteling	632	48.0	30,336

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.12 (Starcrest 2012)

OGV Auxiliary Boiler Usage per One-Way Transit

Activity	Boiler kW per Vessel (1)	Hours/ Transit	kW-Hrs/ Transit
Point Conception to AQMD Overwater Boundary	-	7.24	-
Fairway: AQMD Overwater Boundary to 20-Mile	-	1.90	-
Fairway: 20-Mile to Precautionary Zone	-	1.67	-
Precautionary Zone	-	0.90	-
Harbor Transit Inbound	371	0.70	259.700
Harbor Transit Outbound	371	0.44	162.313
Turning	371	0.25	92.750
Docking	371	0.25	92.750
Existing - Hoteling	3,000	139.8	419,498.932
Project - Hoteling	3,000	48.0	144,000.000

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.16 (Starcrest 2012)

Tugboat Usage during Assists

Engine Type	Tugboat Max Hp (1)	Load Factor (2)	Hours/ Assist (3)	Tugboats per Assist	kW-Hrs/ Assist
Main Engine	6,770	0.31	3.28	2	10,255
Auxiliary Generator	850	0.43	3.28	2	1,786

Notes: (1) Based on 2 engines per vessel. Port of Long Beach Air Emissions Inventory - 2011 - Table 3.1, 3.2 (Starcrest 2012)

(2) Port of Long Beach Air Emissions Inventory - 2011 - Table 3.4 (Starcrest 2012)

(3) Time spent operating per vessel trip. Assumed to be equal to vessel "Harbor" transit times 2 to account for tug movement and assist time.

Appendix B-5
Tesoro Integration and Compliance Project
Operational Marine Vessel Emissions
Marine Vessel Emission Factors

Emission Factors for OGV

Engine Type	Assumed Fuel Type	Assumed Fuel Use Application	VOC	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	Source
Main Propulsion Engine (g/kW-hr)												
OGV Main Engines	MGO (0.1% S)	All (current in-use fuel)	0.60	1.40	17.01	0.40	0.07	0.05	589	0.0120	0.02914	(1,2)
Tugboat Main Engines	CARB (500 ppm S)	2006	0.68	1.97	7.31	0.18	0.36	0.29	683	0.0040	0.03100	(3)
(Medium Speed Diesel)	CARB (15 ppm S)	2007+Tier 4	0.49	1.97	5.80	0.01	0.11	0.09	683	0.0029	0.02939	(3,4)
Auxiliary Engine (g/kW-hr)												
OGV Auxiliary Engines	MGO (0.1% S)	All (current in-use fuel)	0.40	1.10	12.97	0.47	0.07	0.05	683	0.0080	0.02914	(2,5)
Tugboat Auxiliary Engines	CARB (500 ppm S)	2006	0.81	3.73	5.10	0.18	0.15	0.12	722	0.0100	0.03100	(3)
(High Speed Diesel)	CARB (15 ppm S)	2007+Tier 4	0.58	3.73	5.60	0.01	0.11	0.09	722	0.0072	0.02939	(3,4)
Auxiliary Boiler (g/kW-hr)												
OGV Auxiliary Boilers	MGO (0.1% S)	All (current in-use fuel)	0.10	0.20	1.88	0.60	0.04	0.03	876	0.002	0.0705	(2,6)

Notes: (1) Port of Long Beach Air Emissions Inventory - 2013 - Table 2.5, 2.6. (Starcrest 2014)
(2) Fuel emission factors were adjusted in accordance with lower sulfur fuels. Port of Long Beach Air Emissions Inventory - 2013 - Table 2.17. (Starcrest 2014)
(3) Emission Estimation Methodology for Commericial Harbor Craft Operating in California. (CARB 2007)
(4) Port of Long Beach Air Emissions Inventory - 2013 - Table 3.7. (Starcrest 2014)
(5) Port of Long Beach Air Emissions Inventory - 2013 - Table 2.10, 2.11. (Starcrest 2014)
(6) Port of Long Beach Air Emissions Inventory - 2013 - Table 2.14, 2.15.. (Starcrest 2014)

Load Emission Factor Adjustments for OGV Main Propulsion Engines

Activity	Load Factor	VOC	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Point Conception to AQMD Overwater Boundary	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fairway: AQMD Overwater Boundary to 20-Mile	0.49	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fairway: 20-Mile to Precautionary Zone	0.49	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Precautionary Zone	0.21	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Harbor Transit Inbound	0.04	9.12	5.46	2.46	1.00	3.53	3.53	1.00	9.12	2.46
Harbor Transit Outbound	0.15	1.40	1.36	1.07	1.00	1.12	1.12	1.00	1.40	1.07
Turning	0.02	21.18	9.70	4.63	1.00	7.29	7.29	1.00	21.18	4.63
Docking	0.02	21.18	9.70	4.63	1.00	7.29	7.29	1.00	21.18	4.63
Exsiting - Hoteling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Project - Hoteling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: (1) Port of Long Beach Air Emissions Inventory - 2013 - Table 2.7. (Starcrest 2014)

Low-Load Emission Factor Regression Factors for OGV Main Propulsion Engines

Variable	VOC	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Exponent	1.5	1	1.5	0	1.5	1.5	0	1.5	1.5
Intercept	0.3859	0.1458	10.4496	0	0.2551	0.2551	0	0.3859	10.4496
Coefficient	0.0667	0.8378	0.1255	1	0.0059	0.0059	1	0.0667	0.1255
Ref. EF @ 20% Load	1.132	4.335	11.853	1	0.321	0.321	1	1.132	11.853

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Appendix B-5
Tesoro Integration and Compliance Project
Operational Marine Vessel Emissions
Panamax Emissions

Total Emissions per Delivery (lb/visit) - Existing

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Marine Vessels - Point Conception to AQMD x 2	232.2	545.3	6,618.5	158.9	26.5	21.2	107.8
Marine Vessels - AQMD to 20 mile x 2	32.7	77.2	935.9	22.9	3.8	3.0	15.5
Marine Vessels - 20 mile to PZ x 2	28.6	67.6	819.1	20.0	3.3	2.6	13.6
Marine Vessels - PZ x 2	7.1	17.0	205.4	5.2	0.9	0.7	3.5
Marine Vessels - Harbor Transit Inbound	4.3	6.8	46.8	1.2	0.3	0.2	0.8
Marine Vessels - Harbor Transit Outbound	1.8	4.3	43.2	1.3	0.2	0.2	0.9
Marine Vessels - Turning	1.8	2.3	16.5	0.4	0.1	0.1	0.3
Marine Vessels - Docking	1.8	2.3	16.5	0.4	0.1	0.1	0.3
Marine Vessels - Hoteling	78.5	185.1	1,986.6	290.3	21.0	18.0	196.8
Tugboats	13.4	59.2	153.2	0.1	2.9	2.3	8.4
Total	**402.28**	**966.96**	**10,841.52**	**500.80**	**58.97**	**48.39**	**347.81**

Total Emissions per Delivery (lb/visit) - Project

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Marine Vessels - Point Conception to AQMD x 2	232.2	545.3	6,618.5	158.9	26.5	21.2	107.8
Marine Vessels - AQMD to 20 mile x 2	32.7	77.2	935.9	22.9	3.8	3.0	15.5
Marine Vessels - 20 mile to PZ x 2	28.6	67.6	819.1	20.0	3.3	2.6	13.6
Marine Vessels - PZ x 4	7.1	17.0	205.4	5.2	0.9	0.7	3.5
Marine Vessels - Harbor Transit Inbound x 2	4.3	6.8	46.8	1.2	0.3	0.2	0.8
Marine Vessels - Harbor Transit Outbound x 2	1.8	4.3	43.2	1.3	0.2	0.2	0.9
Marine Vessels - Turning x 2	1.8	2.3	16.5	0.4	0.1	0.1	0.3
Marine Vessels - Docking x 2	1.8	2.3	16.5	0.4	0.1	0.1	0.3
Marine Vessels - Hoteling	27.0	63.6	681.9	99.6	7.2	6.2	67.5
Tugboats x 2	13.4	59.2	153.2	0.1	2.9	2.3	8.4
Total	**350.70**	**845.37**	**9,536.83**	**310.16**	**45.20**	**36.58**	**218.59**

Emission per Barrel (lb/1000 bbl delivered)

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Project	0.9	2.1	23.8	0.8	0.1	0.1	0.5
Existing	1.0	2.4	27.1	1.3	0.1	0.1	0.9
Delta	(0.1)	(0.3)	(3.3)	(0.5)	(0.0)	(0.0)	(0.3)

Emission per Barrel (lb/yr-1000 bbl delivered)

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Project	9.6	23.1	260.8	8.5	1.2	1.0	6.0
Existing	13.2	31.8	356.1	16.5	1.9	1.6	11.4
Delta	(3.6)	(8.6)	(95.3)	(8.0)	(0.7)	(0.6)	(5.4)

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Appendix B-5
Tesoro Integration and Compliance Project
Operational Marine Vessel Emissions
Aframax Emissions

Total Emissions per Delivery (lb/visit) - Existing

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Marine Vessels - Point Conception to AQMD x 2	267.6	627.5	7,619.1	182.1	30.4	24.3	123.5
Marine Vessels - AQMD to 20 mile x 2	35.6	84.0	1,018.7	24.7	4.1	3.3	16.8
Marine Vessels - 20 mile to PZ x 2	31.2	73.5	891.7	21.7	3.6	2.9	14.7
Marine Vessels - PZ x 2	7.6	18.2	220.5	5.6	0.9	0.7	3.8
Marine Vessels - Harbor Transit Inbound	4.6	7.2	48.4	1.2	0.3	0.2	0.8
Marine Vessels - Harbor Transit Outbound	2.0	4.6	45.6	1.3	0.2	0.2	0.9
Marine Vessels - Turning	2.1	2.6	17.9	0.4	0.1	0.1	0.3
Marine Vessels - Docking	2.1	2.6	17.9	0.4	0.1	0.1	0.3
Marine Vessels - Hoteling	170.4	399.3	4,266.0	645.8	46.1	39.6	437.8
Tugboats	13.4	59.2	153.2	0.1	2.9	2.3	8.4
Total	**536.67**	**1,278.63**	**14,298.94**	**883.40**	**88.73**	**73.71**	**607.21**

Total Emissions per Delivery (lb/visit) - Project

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Marine Vessels - Point Conception to AQMD x 2	267.6	627.5	7,619.1	182.1	30.4	24.3	123.5
Marine Vessels - AQMD to 20 mile x 2	35.6	84.0	1,018.7	24.7	4.1	3.3	16.8
Marine Vessels - 20 mile to PZ x 2	31.2	73.5	891.7	21.7	3.6	2.9	14.7
Marine Vessels - PZ x 4	15.3	36.4	441.0	11.1	1.8	1.5	7.5
Marine Vessels - Harbor Transit Inbound x 2	9.3	14.4	96.7	2.4	0.6	0.5	1.7
Marine Vessels - Harbor Transit Outbound x 2	3.9	9.1	91.1	2.7	0.4	0.3	1.8
Marine Vessels - Turning x 2	4.2	5.1	35.8	0.8	0.2	0.2	0.5
Marine Vessels - Docking x 2	4.2	5.1	35.8	0.8	0.2	0.2	0.5
Marine Vessels - Hoteling	58.5	137.1	1,464.4	221.7	15.8	13.6	150.3
Tugboats x 2	26.7	118.4	306.3	0.3	5.8	4.7	16.8
Total	**456.55**	**1,110.73**	**12,000.78**	**468.31**	**62.99**	**51.33**	**334.14**

Emission per Barrel (lb/1000 bbl delivered)

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Project	0.6	1.5	16.7	0.7	0.1	0.1	0.5
Existing	0.7	1.8	19.9	1.2	0.1	0.1	0.8
Delta	(0.1)	(0.2)	(3.2)	(0.6)	(0.0)	(0.0)	(0.4)

Emission per Barrel (lb/yr-1000 bbl delivered)

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Project	6.9	16.9	182.3	7.1	1.0	0.8	5.1
Existing	9.8	23.3	261.0	16.1	1.6	1.3	11.1
Delta	(2.9)	(6.5)	(78.6)	(9.0)	(0.7)	(0.6)	(6.0)

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