

APPENDIX C
OPERATIONAL EMISSION CALCULATIONS

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CHEVRON PRODUCTS COMPANY - EL SEGUNDO REFINERY
OPERATIONAL EMISSIONS CALCULATIONS

APPENDIX C

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Table C-1
OPERATIONAL EMISSION SUMMARY

Source	Estimated Emissions (lbs/day)					
	CO	VOC	NOx	SOx	PM10	PM2.5
No. 2 Crude PRD Fugitive Emissions	--	10.3	--	--	--	--
No. 2 RSU PRD Fugitive Emissions	--	3.4	--	--	--	--
Minal/Merox PRD Fugitive Emissions	--	4.1	--	--	--	--
Waste Gas Compressors Fugitive Emissions ⁽¹⁾	--	0.0	--	--	--	--
FCCU Fugitive Emissions	--	10.8	--	--	--	--
Alkylation Unit Fugitive Emissions	--	15.8	--	--	--	--
VRDS Unit Fugitive Emissions	--	22.6	--	--	--	--
ISOMAX Fugitive Emissions	--	26.7	--	--	--	--
ISOMAX NOx Emissions Reduction	--	--	-555.7	--	--	--
Cogen Train D Combustion Emissions ⁽²⁾	72.3	40.9	178.4	63.1	105.4	105.4
Cogen Train D Fugitive Emissions	--	7.3	--	--	--	--
Railcar Loading and Unloading Rack Fugitive Emiss	--	4.7	--	--	--	--
Sulfur Recovery Facilities						
Sour Water Stripper Fugitive Emissions	--	3.0	--	--	--	--
Sulfur Recovery Unit Fugitive Emissions	--	--	--	--	--	--
Tail Gas Unit Incinerator Emissions	304.6	4.1	133.5	139.3	5.7	5.7
Tail Gas Unit Fugitive Emissions	--	1.0	--	--	--	--
Vapor Recovery and Safety Flare System						
Pilot Combustion Emissions	2.3	0.5	8.4	0.1	0.5	0.5
Fugitive Emissions	--	2.7	--	--	--	--
Tank Emissions						
Tank 302	--	14.9	--	--	--	--
Tank 303	--	14.6	--	--	--	--
Tank 447	--	12.8	--	--	--	--
Tank 722 Fugitive Emissions	--	3.3	--	--	--	--
Cooling Tower	--	--	--	--	5.76	5.76
Total Emissions from Stationary Sources	379.14	203.34	-235.47	202.41	117.36	
Workers Commuting	3.79	0.36	0.36	0.00	0.02	
Delivery Trucks	0.00	0.00	0.00	0.00	0.00	
Fugitive Road Dust	0.00	0.00	0.00	0	0.15	
Rail Cars	6.32	2.40	46.07	3.92	1.52	
Total Emissions from Mobile Sources	10.11	2.76	46.43	3.92	1.69	
TOTAL EMISSIONS	389.25	206.10	-189.04	206.33	119.05	

(1) Waste Gas Compressors are already vented to a vapor recovery system. Rerouting will not increase fugitive components. Therefore, there is no increase in fugitive emissions.

(2) The PM emissions from Cogen Train D will be grouped with the existing Cogen Units and capped at existing limits by permit conditions. Therefore, no increase PM10 and PM2.5 will occur from the facility by the addition of Cogen Train D.

Table C-2
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Cogen Plant Criteria Pollutant Emission Calculations

Pollutant	Basis	Emission Factor	Units	Emission Factor lb/MMBtu	Cogeneration Plant Emissions					
					MHU Lb/hr	MHC Lb/hr	MDU Lb/day	MDC Lb/day	AA Tons/yr	30-DA Lbs/day
NOx	Uncontrolled, assumed	25	ppmv @ 15% O ₂	0.0936	49.12	--	259.7	259.7	--	259.7
NOx	Controlled, BACT	3.0	ppmv @ 15% O ₂	0.0112	--	7.34	--	--	32.6	178.4
SO ₂	Short-term, BACT	100	ppmv S, 24-hour annual ave.	0.0161	10.52	10.52	252.4	252.4	--	252.4
SO ₂	Annual, BACT	25	ppmv S, annual ave.	0.00403	--	--	--	--	11.5	63.1
PM10	Duct Burner	7.6	lbs/MMscf	0.00724	0.93	0.93	22.3	22.3	4.1	22.3
PM10	Gas Turbine	0.0066	lbs/MMBtu	0.00660	3.46	3.46	83.1	83.1	15.2	83.1
PM10 Total	Duct Burner & Gas Turbine	---	---	---	4.39	4.39	105.43	105.43	19.24	105.43
VOC	Uncontrolled, SCAQMD Default	7.0	lb/MMscf	0.00667	3.50	--	44.4	44.4	--	44.4
VOC	Controlled, BACT	2.0	ppmv @ 15% O ₂	0.00261	--	1.70	--	--	7.5	40.9
CO	Uncontrolled, assumed	35.0	lbs/MMscf	0.0333	17.49	--	100.5	100.5	--	100.5
CO	Controlled, BACT	2.0	ppmv @ 3% O ₂	0.00456	--	2.98	--	--	13.2	72.3

Parameters

Higher Heating Value of Fuel Gas	1,050 Btu/scf
Annual Operational Schedule	8,760 hrs/year
Daily Operational Schedule	24 hrs/day
F-factor	8,710 scf/MMBtu
Molar Volume	379 scf/mole
Number of Starts/Stops per year	10 each
Duration of Start/Stop	1 hours
Heat Input Combustion Turbine	524.7 MMBtu/hr
Heat Input Duct Burner	128.5 MMBtu/hr
Heat Input Total	653.2 MMBtu/hr

MHU = Maximum Hourly Uncontrolled
MHC = Maximum Hourly Controlled
MDU = Maximum Daily Uncontrolled
MDC = Maximum Daily Controlled
AA = Annual Average
30-DA = Thirty-day Average

TABLE C-3
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
SULFUR RECOVERY FACILITY EMISSIONS
FROM TAIL GAS TREATING PLANT INCINERATOR

Pollutant	Units	CO	VOC	NO _x	SO _x	PM ₁₀
Permit Limit	ppmv, dry, 0% O ₂	150		40	30	
Stack Flow	lb mols/hr, dry, 0% O	3022		3022	3022	
Pollutant Flow	lb mols/hr	0.4533		0.1209	0.0907	
Pollutant MW	lb/lb-mol	28		46	64	
Pollutant Flow	lb/hr	12.69		5.56	5.80	
Burner Duty	mmBTU/hr		32.7			32.7
Fuel Heating Value	BTU/scf (HHV)		1050			1050
Fuel Flow	scf/hr		31,143			31,143
Fuel Flow	mmscf/day		0.747			0.747
Emission Factor	lb/mmscf		5.5			7.6
Pollutant Flow	lb/day	304.6	4.1	133.5	139.3	5.7

Note:

Calculation of mass emission limits for criteria pollutants from anticipated permit limits

VOC and PM₁₀ emission factors from SCAQMD General Instruction Book for 2006-2007 AER, Appendix A
Table 1.

Table C-4
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Flare Emission Calculations

Pollutant	Emission factor lbs/MMscf	MHC lbs/hr	MDC lbs/day	AA Tons/year
NOx	130	0.35	8.38	1.53
SOx	0.83	2.23E-03	0.05	0.01
CO	35	0.09	2.26	0.41
VOC	7	0.02	0.45	0.08
PM10	7.5	0.02	0.48	0.09

Parameters

Pilot Gas flow rate	100,000 BTU/hr
Number of Pilots	3
Total Pilot Flow	300,000 BTU/hr
Heating Value NG	1,050 BTU/scf
Pilot Gas Flow Rate	285.7 scf/hr
Purge Gas Flow Rate	40 scf/min
Purge Gas Flow Rate	2,400 scf/hr
Total Combustion Flow	2.69E-03 MMscf/hr

MHU = Maximum Hourly Uncontrolled

MHC = Maximum Hourly Controlled

MDU = Maximum Daily Uncontrolled

MDC = Maximum Daily Controlled

AA = Annual Average

30-DA = Thirty-day Average

Table C-5
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
ISOMAX Furnace Burner Replacement

Furnace Information

Permitted Fired Duty (mmBtu/hr/furnace) ⁽¹⁾	57
No. of Furnaces Being Retrofitted	4

	Current Conditions	Post-Project Conditions	NOx Emissions Reduction (lbs/day)
Emission Factor (lbs/mmBtu) ⁽²⁾	0.1492	0.04762	
NOx Emissions (lbs/hr)	34.01	10.86	
NOx Emissions (lbs/day)	816.3	260.6	555.7

(1) Permitted Fired Duty is appropriate because historical data indicates furnaces have operated at the permitted limit. Therefore, the potential to emit for current conditions are compared to the potential to emit for post-project conditions.

(2) Current emission factor based on 2-year average of CEMS monitoring data. Post-project emission factor from U.S. EPA AP-42 Table 1.4-1 (July 1998) converted to lbs/mmBtu using 1050 Btu/scf.

TABLE C-6
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 1 - System 3 No. 2 Crude Unit
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS
No. 2 Crude PRDs- No Bellow Seals

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	92	23	2116
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	28	19	532
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	0	3	0
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	252	1.5	378
Flanges	Heavy Liquid	0	1.5	0
Connectors	Light Liquid/Vapor	205	1.5	307.5
Connectors	Heavy Liquid	0	1.5	0
Pumps	Light Liquid	4	104	416
Pumps	Heavy Liquid	0	80	0
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2 = 104)	0
Compressors	HC Gas/Vapor	0	514	0
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's Heavy Liquid (To Atmosphere)		0	1,135	0
PRV's Heavy Liquid (Closed System)		0	0	0
PRV's Light Liquid/Vapor (To Atmosphere)		0	1,135	0
PRV's Light Liquid/Vapor (Closed System)		0	0	0
Drains (with water seals)		0	0	0

Total Count:	581	<u>Total (lb/yr)</u>
		<u>3,749.5</u>
		<u>Hydrocarbon</u>
		<u>Emissions (lbs/day)</u>
		<u>10.3</u>

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

TABLE C-7
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 01 - System 13 (2 Resid Unit)
Modification ID 01-13-XXX
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS
No Bellows Seals

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	33	23	1138.5
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	0	19	0
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	0	3	0
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	30	1.5	67.5
Flanges	Heavy Liquid	0	1.5	0
Connectors	Light Liquid/Vapor	18	1.5	40.5
Connectors	Heavy Liquid	0	1.5	0
Pumps	Light Liquid	0	104	0
Pumps	Heavy Liquid (Non-Rule 1173)	0	80	0
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2 = 104)	0
Compressors	HC Gas/Vapor	0	514	0
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's Heavy Liquid (To Atmosphere)		0	1,135	0
PRV's Heavy Liquid (Closed System)		0	0	0
PRV's Light Liquid/Vapor (To Atmosphere)		0	1,135	0
PRV's Light Liquid/Vapor (Closed System)		0	0	0
Drains		0	80	0
(non-emergency, without water seal and venting to atmosphere)				
Total Count:	81	Total (lb/yr) Hydrocarbon Emissions (lbs/day)	<u>1,246.5</u> <u>3.4</u>	

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of kerosene ($> 0.1 \text{ psia} @ 100^\circ\text{F}$ or $689 \text{ Pa} @ 38^\circ\text{C}$), based on the most volatile class present at $> 20\%$ by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene ($= 0.1 \text{ psia} @ 100^\circ\text{F}$ or $689 \text{ Pa} @ 38^\circ\text{C}$) based on the most volatile class present $> 20\%$ by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

NOTE: It is assumed replacement of equipment in identical service in the absence of external piping or instrumentation configuration changes will not have impact on the respective fugitive emissions component count.

TABLE C-8
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 12 - System 18: Minalk/Merox Plant
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS
Minalk PRDs- No Bellow Seals

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	48	23	1104
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	0	19	0
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	0	3	0
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	144	1.5	216
Flanges	Heavy Liquid	0	1.5	0
Connectors	Light Liquid/Vapor	120	1.5	180
Connectors	Heavy Liquid	0	1.5	0
Pumps	Light Liquid	0	104	0
Pumps	Heavy Liquid (Non-Rule 1173)	0	80	0
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2= 104)	0
Compressors	HC Gas/Vapor	0	514	0
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's	Heavy Liquid (To Atmosphere)	0	1,135	0
PRV's	Heavy Liquid (Closed System)	0	0	0
PRV's	Light Liquid/Vapor (To Atmosphere)	0	1,135	0
PRV's	Light Liquid/Vapor (Closed System)	0	0	0
Drains (with water seals)		0	0	0

Total Count:	312	Total (lb/yr)	<u>1,500.0</u>
Hydrocarbon			
Emissions (lbs/day)			<u>4.1</u>

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

TABLE C-9
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 03 - System 01 (FCCU)
Modification ID 03-01-001
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS
No Bellow Seals

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	79	23	2725.5
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	50	19	-1425
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	35	3	157.5
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	74	1.5	166.5
Flanges	Heavy Liquid	61	1.5	137.25
Connectors	Light Liquid/Vapor	74	1.5	166.5
Connectors	Heavy Liquid	42	1.5	94.5
Pumps	Light Liquid	0	104	0
Pumps	Heavy Liquid (Non-Rule 1173)	1	80	123.2
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2= 104)	0
Compressors	HC Gas/Vapor	2	514	1542
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's Heavy Liquid (To Atmosphere)		0	1,135	0
PRV's Heavy Liquid (Closed System)		0	0	0
PRV's Light Liquid/Vapor (To Atmosphere)		0	1,135	0
PRV's Light Liquid/Vapor (Closed System)		1	0	0
Drains		2	80	240
(non-emergency, without water seal and venting to atmosphere)				

Total Count:	321	Total (lb/yr)	<u>3,928.0</u>
Hydrocarbon		Emissions (lbs/day)	<u>10.8</u>

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

NOTE: It is assumed replacement of equipment in identical service in the absence of external piping or instrumentation configuration changes will not have impact on the respective fugitive emissions component count.

TABLE C-10
CHEVRON PRODUCTS COMPANY - EL SEGUNDO REFINERY
Process 08 - System 01 (Alkylation Plant)
Modification ID 08-01-XXX

REFINERY FUGITIVE EMISSIONS SUMMARY - AQMD FACTORS

Case: Valves Are Bellows Sealed per Existing Piping Specifications Only

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	16	23	368
	Bellows Sealed	2	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	160	19	3040
	Bellows Sealed	53	0	0
Valves	Heavy Liquid	28	3	84
	Bellows Sealed	18	0	0
Flanges	Light Liquid/Vapor	695	1.5	1042.5
Flanges	Heavy Liquid	78	1.5	117
Connectors	Light Liquid/Vapor	316	1.5	474
Connectors	Heavy Liquid	34	1.5	51
Pumps	Light Liquid	0	104	0
Pumps	Heavy Liquid (Non-Rule 1173)	1	80	80
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2= 104)	0
Compressors	HC Gas/Vapor	1	514	514
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's Heavy Liquid (To Atmosphere)		0	1,135	0
PRV's Heavy Liquid (Closed System)		0	0	0
PRV's Light Liquid/Vapor (To Atmosphere)		0	1,135	0
PRV's Light Liquid/Vapor (Closed System)		19	0	0
Drains		0	80	0
(non-emergency, without water seal and venting to atmosphere)				

Total Count:	1,421	Total (lb/yr)	5,770.5
Hydrocarbon			
Emissions (lbs/day)			15.8

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

NOTE: It is assumed replacement of equipment in identical service in the absence of external piping or instrumentation configuration changes will not have impact on the respective fugitive emissions component count.

TABLE C-11
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 04 - System 11 (VRDS)
Modification ID 04-11-001
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS
No Bellows Seals

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	162	23	3726
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	40	19	760
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	306	3	918
	Bellows Sealed	0	0	0
<hr/>				
Flanges	Light Liquid/Vapor	368	1.5	552
Flanges	Heavy Liquid	302	1.5	453
Connectors	Light Liquid/Vapor	133	1.5	199.5
Connectors	Heavy Liquid	320	1.5	480
<hr/>				
Pumps	Light Liquid	0	104	0
Pumps	Heavy Liquid (Non-Rule 1173)	4	80	320
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2 = 104)	0
<hr/>				
Compressors	HC Gas/Vapor	1	514	514
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
<hr/>				
PRV's	Heavy Liquid (To Atmosphere)	0	1,135	0
PRV's	Heavy Liquid (Closed System)	0	0	0
PRV's	Light Liquid/Vapor (To Atmosphere)	0	1,135	0
PRV's	Light Liquid/Vapor (Closed System)	10	0	0
Drains		4	80	320
(non-emergency, without water seal and venting to atmosphere)				

Total Count:	1,650	Total (lb/yr)	8,242.5
Hydrocarbon			_____
Emissions (lbs/day)			22.6

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

TABLE C-12
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 07 - System 04 (ISOMAX)
Modification ID 07-04-001
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS
No Below Seals

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	146	23	3358
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	46	19	874
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	332	3	996
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	346	1.5	519
Flanges	Heavy Liquid	352	1.5	528
Connectors	Light Liquid/Vapor	354	1.5	531
Connectors	Heavy Liquid	618	1.5	927
Pumps	Light Liquid	2	104	208
Pumps	Heavy Liquid (Non-Rule 1173)	12	80	960
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2 = 104)	0
Compressors	HC Gas/Vapor	1	514	514
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's	Heavy Liquid (To Atmosphere)	0	1,135	0
PRV's	Heavy Liquid (Closed System)	0	0	0
PRV's	Light Liquid/Vapor (To Atmosphere)	0	1,135	0
PRV's	Light Liquid/Vapor (Closed System)	12	0	0
Drains		4	80	320
(non-emergency, without water seal and venting to atmosphere)				

Total Count:	2,225	Total (lb/yr)	<u>9,735.0</u>
Hydrocarbon		Emissions (lbs/day)	<u>26.7</u>

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

TABLE C-13
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 17 - System New (Cogen train D)
Modification ID XX-XX-XXX
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS
No Below Seals

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	102	23	2346
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	0	19	0
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	0	3	0
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	186	1.5	279
Flanges	Heavy Liquid	0	1.5	0
Connectors	Light Liquid/Vapor	15	1.5	22.5
Connectors	Heavy Liquid	0	1.5	0
Pumps	Light Liquid	0	104	0
Pumps	Heavy Liquid (Non-Rule 1173)	0	80	0
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2 = 104)	0
Compressors	HC Gas/Vapor	0	514	0
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's	Heavy Liquid (To Atmosphere)	0	1,135	0
PRV's	Heavy Liquid (Closed System)	0	0	0
PRV's	Light Liquid/Vapor (To Atmosphere)	0	1,135	0
PRV's	Light Liquid/Vapor (Closed System)	0	0	0
Drains		0	0	0
(non-emergency, without water seal and venting to atmosphere)				
Total Count:		303	Total (lb/yr)	<u>2,647.5</u>
			Hydrocarbon Emissions (lbs/day)	<u>7.3</u>

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

TABLE C-14
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 16 - System New (Railcar Unloading Rack)
Modification ID XX-XX-XXX
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS
No Bellows Seals

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	34	23	782
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	32	19	608
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	0	3	0
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	84	1.5	126
Flanges	Heavy Liquid	0	1.5	0
Connectors	Light Liquid/Vapor	138	1.5	207
Connectors	Heavy Liquid	0	1.5	0
Pumps	Light Liquid	0	104	0
Pumps	Heavy Liquid (Non-Rule 1173)	0	80	0
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2 = 104)	0
Compressors	HC Gas/Vapor	0	514	0
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's	Heavy Liquid (To Atmosphere)	0	1,135	0
PRV's	Heavy Liquid (Closed System)	0	0	0
PRV's	Light Liquid/Vapor (To Atmosphere)	0	1,135	0
PRV's	Light Liquid/Vapor (Closed System)	0	0	0
Drains		0	80	0
(non-emergency, without water seal and venting to atmosphere)				
Total Count:		288	Total (lb/yr)	<u>1,723.0</u>
			Hydrocarbon Emissions (lbs/day)	<u>4.7</u>

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

TABLE C-15
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 20 - System 00 (SWS Unit)
Modification ID XX-XX-XXX
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS
No Below Seals

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	6	23	138
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	23	19	437
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	0	3	0
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	63.5	1.5	95.25
Flanges	Heavy Liquid	0	1.5	0
Connectors	Light Liquid/Vapor	75.5	1.5	113.25
Connectors	Heavy Liquid	0	1.5	0
Pumps	Light Liquid	3	104	312
Pumps	Heavy Liquid (Non-Rule 1173)	0	80	0
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2 = 104)	0
Compressors	HC Gas/Vapor	0	514	0
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's Heavy Liquid (To Atmosphere)		0	1,135	0
PRV's Heavy Liquid (Closed System)		0	0	0
PRV's Light Liquid/Vapor (To Atmosphere)		0	1,135	0
PRV's Light Liquid/Vapor (Closed System)		0	0	0
Drains		0	80	0
(non-emergency, without water seal and venting to atmosphere)				

Total Count:	120	Total (lb/yr)	<u>1,095.5</u>
Hydrocarbon			
Emissions (lbs/day)			<u>3.0</u>

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

TABLE C-16
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 13 - System New (TGTU Fuel Gas)
Modification ID XX-XX-XXX
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS
Fuel Gas - < 2-Inch Valves With Bellows Seals

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	0	23	0
	Bellows Sealed	0	0	0
Valves	Fuel Gas	13	12	153.6
	Bellows Sealed	3	0	0
Valves	Light Liquid	0	19	0
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	0	3	0
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	74	1.5	111
Flanges	Heavy Liquid	0	1.5	0
Connectors	Light Liquid/Vapor	63	1.5	93.8
Connectors	Heavy Liquid	0	1.5	0
Pumps	Light Liquid	0	104	0
Pumps	Heavy Liquid (Non-Rule 1173)	0	80	0
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2 = 104)	0
Compressors	HC Gas/Vapor	0	514	0
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's Heavy Liquid (To Atmosphere)		0	1,135	0
PRV's Heavy Liquid (Closed System)		0	0	0
PRV's Light Liquid/Vapor (To Atmosphere)		0	1,135	0
PRV's Light Liquid/Vapor (Closed System)		0	0	0
Drains		0	80	0
(non-emergency, without water seal and venting to atmosphere)				

Total Count:	120	Total (lb/yr)	<u>358.4</u>
Hydrocarbon Emissions (lbs/day)			<u>1.0</u>

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

TABLE C-17
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 20 - System New (Flare)
Modification ID XX-XX-XXX
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS
No Below Seals

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	14	23	322
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	8	19	152
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	0	3	0
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	56	1.5	84
Flanges	Heavy Liquid	0	1.5	0
Connectors	Light Liquid/Vapor	36	1.5	54
Connectors	Heavy Liquid	0	1.5	0
Pumps	Light Liquid	2	104	208
Pumps	Heavy Liquid (Non-Rule 1173)	0	80	0
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2 = 104)	0
Compressors	HC Gas/Vapor	0	514	0
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's	Heavy Liquid (To Atmosphere)	0	1,135	0
PRV's	Heavy Liquid (Closed System)	0	0	0
PRV's	Light Liquid/Vapor (To Atmosphere)	0	1,135	0
PRV's	Light Liquid/Vapor (Closed System)	2	0	0
Drains		2	80	160
(non-emergency, without water seal and venting to atmosphere)				

Total Count:	120	Total (lb/yr)	980.0
Hydrocarbon			
Emissions (lbs/day)			2.7

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

TABLE C-18
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 16 - System New (Tank New 722 - Sphere LPG)
Modification ID XX-XX-XXX
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	2	23	46
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	32	19	608
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	0	3	0
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	88	1.5	132
Flanges	Heavy Liquid	0	1.5	0
Connectors	Light Liquid/Vapor	22	1.5	33
Connectors	Heavy Liquid	0	1.5	0
Pumps	Light Liquid	3	104	312
Pumps	Heavy Liquid (Non-Rule 1173)	0	80	0
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2 = 104)	0
Compressors	HC Gas/Vapor	0	514	0
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's Heavy Liquid (To Atmosphere)		0	1,135	0
PRV's Heavy Liquid (Closed System)		0	0	0
PRV's Light Liquid/Vapor (To Atmosphere)		0	1,135	0
PRV's Light Liquid/Vapor (Closed System)		1	0	0
Drains		1	80	80
(non-emergency, without water seal and venting to atmosphere)				
Total Count:		149	Total (lb/yr)	<u>1,211.0</u>
			Hydrocarbon Emissions (lbs/day)	<u>3.3</u>

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

TABLE C-19
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 16 - System New (Tank 302 - Floating Roof with External Fixed Dome)
Modification ID XX-XX-XXX
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	0	23	0
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	23	19	437
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	0	3	0
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	56	1.5	84
Flanges	Heavy Liquid	0	1.5	0
Connectors	Light Liquid/Vapor	13	1.5	19.5
Connectors	Heavy Liquid	0	1.5	0
Pumps	Light Liquid	3	104	312
Pumps	Heavy Liquid (Non-Rule 1173)	0	80	0
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2 = 104)	0
Compressors	HC Gas/Vapor	0	514	0
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's Heavy Liquid (To Atmosphere)		0	1,135	0
PRV's Heavy Liquid (Closed System)		0	0	0
PRV's Light Liquid/Vapor (To Atmosphere)		0	1,135	0
PRV's Light Liquid/Vapor (Closed System)		2	0	0
Drains		4	80	320
(non-emergency, without water seal and venting to atmosphere)				

Total Count:	101	Total (lb/yr) 1,172.5
		Hydrocarbon Emissions (lbs/day) 3.2

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

TABLE C-20

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification			Quantity
User Identification:			
City:	Los Angeles AP		
State:	California		
Company:	Chevron Products USA		
Type of Tank:	Domed External Floating Roof Tank		
Description:	New FCCU Light Gasoline (150' x 64')		
Tank Dimensions		1	1
Diameter (ft):	150.00		
Volume (gallons):	5,250,000.00	26	46
Turnovers:	67.20		
Paint Characteristics		1	1
Internal Shell Condition:	Light Rust		
Shell Color/Shade:	Gray/Light		
Shell Condition:	Good		
Roof Characteristics		1	1
Type:	Pontoon		
Fitting Category	Detail		
Tank Construction and Rim-Seal System		1	1
Construction:	Welded		
Primary Seal:	Mechanical Shoe		
Secondary Seal:	Rim-mounted		
Deck Fitting/Status		1	1
Access Hatch (24-in. Dia. in.)/Bolted Cover, Gasketed			
Automatic Gauge Float Well/Bolted Cover, Gasketed			
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.			
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.			
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Sock			
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Sock			
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Pole Sleeve/Wiper			

Meteorological Data used in Emissions Calculations: Los Angeles AP, California (Avg Atmospheric Pressure = 14.67 psia)

TABLE C-20 (Continued)

TANKS 4.0 Report

TANKS 4.0.9d

Emissions Report - Detail Format
Liquid Contents of Storage Tank

Tank302New-10-24-2007 - Domed External Floating Roof Tank
 Los Angeles AP, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (Deg F)	Liquid Bulk Temp (deg F)	Vapor Pressure (psia)	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight.	Basis for Vapor Pressure Calculations
Petroleum Hydrocarbon Product	All	71.00	62.31	79.70	65.19	10.9800	N/A	N/A	114.00
1,2,4,7-timethylbenzene			0.0314	N/A	120.1900	0.0479	0.0002	152.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene			1.5725	N/A	78.1100	0.0836	0.0201	73.11	Option 2: A=6.995, B=1211.03, C=220.79
Butadiene, 1,3-			36.6817	N/A	N/A	0.0010	0.0056	54.10	Option 2: A=6.8499, B=920.546, C=238.854
Cyclohexane			1.6820	N/A	54.1000	0.1172	0.0280	84.16	Option 2: A=6.841, B=1201.53, C=222.85
Ethylbenzene			0.1576	N/A	84.1800	0.0584	0.0014	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)			2.5297	N/A	106.1700	0.2150	0.0830	86.17	Option 2: A=6.876, B=171.17, C=224.41
Naphthalene			0.0046	N/A	86.1700	0.0178	0.0000	128.20	Option 2: A=7.3729, B=1668.35, C=222.61
Propylene			140.8109	N/A	42.0800	0.0890	0.1833	42.08	Option 2: A=7.58, B=1135.65, C=283.26
Toluene			0.4611	N/A	N/A	0.2000	0.0141	92.13	Option 2: A=6.984, B=1344.8, C=219.46
Unidentified Components			-26.5572	N/A	N/A	0.0001	0.6484	-0.05	
Xylene (mixed isomers)			0.1317	N/A	N/A	0.2800	0.0050	106.17	Option 2: A=7.009, B=1422.286, C=215.11

TABLE C-20 (Continued)

TANKS 4.0 Report

TANKS 4.0.9d Emissions Report - Detail Format Detail Calculations (AP-42)

Tank302New-10-24-2007 - Domed External Floating Roof Tank Los Angeles AP, California

Annual Emission Calculations				
Rim Seal Losses (lb):	2,034,289			
Seal Factor A (lb/mole/ft ² /yr):	0.9000			
Seal Factor B (lb/mole/ft ² /yr):	0.4000			
Average Wind Speed (mph):	0.0000			
Sea-related Wind Speed Exponent:	1.0000			
Value of Vapor Pressure Function:	0.3324			
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	10.8900			
Tank Diameter (ft):	150.0000			
Vapor Molecular Weight (lb/mole):	68.0000			
Product Factor:	1.0000			
Windrawal Losses (lb):	562,3074			
Annual Net Throughput (gal/yr):	352,590,000.0000			
Shell Crimpage Factor (for OGCS sat):	0.0015			
Average Organic Liquid Density (lb/gal):	71.0000			
Tank Diameter (ft):	150.0000			
Root Fitting Losses (lb):	1,652,83004			
Value of Vapor Pressure Function:	0.3324			
Vapor Molecular Weight (lb/mole):	68.0000			
Product Factor:	1.0000			
Tot. Root Fitting Loss Fact. (lb-mole/yr):	73,110			
Average Wind Speed (mph):	0.0000			
Total Losses (lb):	4,248,8347			
Root Fitting Loss Factors				
Quantity	KF(a)(lb-mole/yr)	KF(b)(lb-mole/yr m ²)	m	Losses(lb)
1	1.60	0.00	0.00	36,144.7
1	2.80	0.00	0.00	63,282.2
1	0.47	0.02	0.97	10,633.4
1	6.20	1.20	0.94	140,183.2
26	1.20	0.14	0.85	705,211.5
46	0.49	0.16	0.14	509,470.1
1	8.30	4.40	1.60	187,864.3

TABLE C-20 (Concluded)

TANKS 4.0.gd
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Tank302New-10-24-2007 - Domed External Floating Roof Tank
Los Angeles AP, California

Components	Losses(lbs)		
	Rim Seal Loss	Withdrawal Loss	Deck Fitting Loss
Petroleum Hydrocarbon Product	2,034.26	562.07	1,652.50
Hexane (-n)	168.77	120.85	137.10
Benzene	40.79	46.99	38.14
Toluene	28.61	112.41	23.24
Ethylbenzene	2.86	32.82	2.32
Xylene (mixed isomers)	10.22	140.52	8.30
1,2,4-Trimethylbenzene	0.47	26.92	0.38
Cyclohexane	58.92	65.87	47.86
Naphthalene	0.02	10.00	0.02
Butadiene, 1,3-	11.38	0.56	9.25
Propylene	393.26	5.06	319.46
Unidentified Components	1,318.95	0.06	1,071.43
			2,390.43

TABLE C-21
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 16 - System New (Tank 303 - Floating Roof with External Fixed Dome)
Modification ID XX-XX-XXX
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	0	23	0
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	23	19	437
	Bellows Sealed	0	0	0
Valves	Heavy Liquid	0	3	0
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	56	1.5	84
Flanges	Heavy Liquid	0	1.5	0
Connectors	Light Liquid/Vapor	13	1.5	19.5
Connectors	Heavy Liquid	0	1.5	0
Pumps	Light Liquid	2	104	208
Pumps	Heavy Liquid (Non-Rule 1173)	0	80	0
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2= 104)	0
Compressors	HC Gas/Vapor	0	514	0
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's Heavy Liquid (To Atmosphere)		0	1,135	0
PRV's Heavy Liquid (Closed System)		0	0	0
PRV's Light Liquid/Vapor (To Atmosphere)		0	1,135	0
PRV's Light Liquid/Vapor (Closed System)		2	0	0
Drains		4	80	320
(non-emergency, without water seal and venting to atmosphere)				
		Total Count: 100	Total (lb/yr) Hydrocarbon Emissions (lbs/day)	<u>1,068.5</u> <u>2.9</u>

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

TANKS 4.0 Report

TABLE C-22

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		Quantity
User Identification:	Tank303New-10-24-2007	
City:	Los Angeles AP	
State:	California	
Company:	Chevron Products USA	
Type of Tank:	Domed External Floating Roof Tank	
Description:	New FCCU Light Gasoline (150' x 64')	
Tank Dimensions		Quantity
Diameter (ft):	150.00	
Volume (gallons):	5,250,000.00	
Turnovers:	67.20	
Paint Characteristics		Quantity
Internal Shell Condition:	Light Rust	
Shell Color/Shade:	Gray/Light	
Shell Condition	Good	
Roof Characteristics		Quantity
Type:	Pontoon	
Fitting Category	Detail	
Tank Construction and Rim-Seal System		Quantity
Construction:	Welded	
Primary Seal:	Mechanical Shoe	
Secondary Seal	Rim-mounted	
Deck Fitting/Status		Quantity
Access Hatch (24-in. Diam.)	Bolted Cover, Gasketed	
Automatic Gauge Float Well/Bolted Cover, Gasketed		
Gauge-Hatch/Sample Well (8-in. Diam.)	Weighted Mech. Actuation, Gask.	
Vacuum Breaker (10-in. Diam.)	Weighted Mech. Actuation, Gask.	
Roof Leg (3-in. Diameter)Adjustable, Pontoon Area, Sock		
Roof Leg (3-in. Diameter)Adjustable, Center Area, Sock		
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Pole Sleeve,Wiper		

Meteorological Data used in Emissions Calculations: Los Angeles AP, California (Avg Atmospheric Pressure = 14.67 psia)

TANKS 4.0 Report

TABLE C-22 (Continued)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Tank303New-10-24-2007 - Domed External Floating Roof Tank
Los Angeles AP, California

Mixture/Component	Month	Daily Liquid Surf. Avg.	Daily Liquid Surf. Min.	Daily Liquid Surf. Max.	Liquid Temp. (deg F)	Bulk Temp. (deg F)	Vapor Pressure (psi) Avg.	Vapor Pressure (psi) Min.	Vapor Mol. Weight	Liquid Mol. Weight	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Petroleum Hydrocarbon Product	All	71.00	62.31	79.70	65.19	10.9800	N/A	N/A	68.0000	0.0479	0.0062	114.00	Option 2: A=7.04383, B=-1573.287, C=-208.56
1,2,4-Trimethylbenzene					0.0314	1.5725	N/A	N/A	120.1500	0.0836	0.0201	120.19	Benzene Option 2: A=6.956, B=1211.033, C=220.79
Benzene						36.9617	N/A	N/A	78.1100	0.0010	0.0056	78.11	Option 2: A=6.9439, B=830.546, C=238.854.
Butadiene, 1,3-						1.6200	N/A	N/A	84.1500	0.1172	0.0280	54.10	Option 2: A=6.241, B=1201.53, C=222.65.
Cyclohexane						0.1576	N/A	N/A	106.1703	0.0584	0.0014	54.16	Option 2: A=6.975, B=1424.235, C=2213.21
Ethylbenzene						2.5297	N/A	N/A	86.1700	0.2160	0.0830	106.17	Option 2: A=6.376, B=1171.17, C=224.41
Hexane (n)						0.040	N/A	N/A	128.2000	0.0178	0.0000	128.20	Option 2: A=2.3729, B=1968.36, C=222.61
Naphthalene						140.8109	N/A	N/A	42.0800	0.0090	0.1933	42.08	Option 2: A=7.98, B=1133.65, C=233.26
Propylene						0.4611	N/A	N/A	92.1500	0.2000	0.0141	92.13	Option 2: A=6.054, B=1344.8, C=239.48
Toluene						-26.5572	N/A	N/A	78.7864	0.0001	0.6844	-0.06	
Unidentified Components						0.1317	N/A	N/A	106.1700	0.2500	0.0050	106.17	Option 2: A=7.009, B=1462.286, C=215.11
Xylene (mixed isomers)													

TANKS 4.0 Report

TABLE C-22 (Continued)

TANKS 4.0.9d Emissions Report - Detail Format Detail Calculations (AP-42)

Tank303New-10-24-2007 - Domed External Floating Roof Tank Los Angeles AP, California

Annual Emission Calculations					
Rim Seal Losses (lb/yr):	2,084,283.9				
Seal Factor A (lb-mole/lb-yr):	0.6000				
Seal Factor B (lb-mole/lb-yr mph):	0.4000				
Average Wind Speed (mph):	0.0000				
Seal-related Wind Speed Exponent:	1.0000				
Value of Vapor Pressure Function:	0.3324				
Vapor Pressure at Daily Average (Liquid Surface Temperature) (psia):	10.9900				
Tank Diameter (ft):	150.0000				
Vapor Molecular Weight (lb/lb-mole):	68.0000				
Product Factor:	1.0000				
Withdrawal Losses (lb):	582,070.4				
Annual Net Throughput (lb/day):	362,580,000.0000				
Shell Capacity Factor (lb/lb-mole):	0.0016				
Average Organic Liquid Density (lb/gal):	7.1000				
Tank Diameter (ft):	150.0000				
Roof Filling Losses (lb):	1,652,503.4				
Value of Vapor Pressure Function:	0.3324				
Vapor Molecular Weight (lb/lb-mole):	68.0000				
Product Factor:	1.0000				
T _c : Roof Filling Loss Fact. (lb-mole/yr):	73.1100				
Average Wind Speed (mph):	0.0000				
Total Losses (lb):	4,248,834.7				
Roof Fitting Loss Factors					
Roof Fitting/Status	Quantity	KFath·mole/yr	KFbf(lb-mole/yr mph ^{0.75})	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation Gask.	1	1.60	0.00	0.00	36,164.7
Automatic Gauge Flat Wall/Bolted Cover, Gasketed Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation Gask.	1	2.80	0.00	0.00	63,289.2
Roof Log (3-in. Diameter)/Adjustable, Pontoon Area, Stock	1	0.47	0.02	0.97	10,623.4
Roof Log (3-in. Diameter)/Adjustable, Center Area, Stock	26	6.20	1.20	0.94	140,138.2
Sloped Guide-Pole/Sample Well/Cask, Sliding Cover, w. Pole Slave Wiper	46	0.49	0.14	0.65	705,211.5
	1	8.30	4.40	0.14	509,470.1
				1.60	187,604.3

TABLE C-22 (Concluded)

TANKS 4.0 Report

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Tank303New-10-24-2007 - Domed External Floating Roof Tank
Los Angeles AP, California

Components	Losses(lbs)			Total Emissions
	Rim Seal Loss	Withdraw Loss	Deck Fitting Loss	
Petroleum Hydrocarbon Product	2,034.26	562.07	1,652.50	0.00
Hexane (-n)	168.77	120.85	137.10	0.00
Benzene	40.79	46.99	33.14	0.00
Toluene	28.61	112.41	23.24	0.00
Ethylbenzene	2.86	32.82	2.32	0.00
Xylene (mixed isomers)	10.22	140.52	8.30	0.00
1,2,4-Trimethylbenzene	0.47	26.92	0.38	0.00
Cyclohexane	58.92	66.87	47.86	0.00
Naphthalene	0.02	10.00	0.02	0.00
Butadiene, 1,3-	11.38	0.56	9.25	0.00
Propylene	393.26	5.06	319.46	0.00
Unidentified Components	1,318.95	0.06	1,071.43	0.00
				2,390.43

TABLE C-23
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Process 16 - System 10 (ISOMAX Tank 447 - Floating Roof with Dome)
New ID 16-10-XXX
REFINERY FUGITIVE EMISSIONS - AQMD FACTORS

EQPT. TYPE	SERVICE	No. of Sources	Controlled Emission Factors lbs/yr*	Annual ROG Emission lbs/yr
Valves	HC Vapor	0	23	0
	Bellows Sealed	0	0	0
Valves	Fuel Gas	0	12	0
	Bellows Sealed	0	0	0
Valves	Light Liquid	0	19	0
	Bellows Sealed	23	0	0
Valves	Heavy Liquid	0	3	0
	Bellows Sealed	0	0	0
Flanges	Light Liquid/Vapor	8	1.5	12
Flanges	Heavy Liquid	0	1.5	0
Connectors	Light Liquid/Vapor	0	1.5	0
Connectors	Heavy Liquid	0	1.5	0
Pumps	Light Liquid	2	104	208
Pumps	Heavy Liquid (Non-Rule 1173)	0	80	0
Pumps	< 10% HC (Non-Rule 1173)	0	104 (520 x 0.2 = 104)	0
Compressors	HC Gas/Vapor	0	514	0
Compressors	< 10% HC (Non-Rule 1173)	0	51.4 (514 x 0.1 = 51.4)	0
PRV's	Heavy Liquid (To Atmosphere)	0	1,135	0
PRV's	Heavy Liquid (Closed System)	0	0	0
PRV's	Light Liquid/Vapor (To Atmosphere)	0	1,135	0
PRV's	Light Liquid/Vapor (Closed System)	7	0	0
Drains		2	80	160
(non-emergency, without water seal and venting to atmosphere)				
		Total Count:	42	<u>389.0</u>
		Total (lb/yr) Hydrocarbon Emissions (lbs/day)		<u>1.1</u>

Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

kerosene (> 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at > 20% by volume.

Heavy liquid: Streams with a vapor pressure equal to or less than that of kerosene (= 0.1 psia @ 100°F or 689 Pa @ 38°C) based on the most volatile class present > 20% by volume.

* Emission factors for all components based on factors used for Chevron Reformulated Gasoline Project.

TABLE C-24

TANKS 4.0 Report

TANKS 4.0.9d Emissions Report - Detail Format Tank Identification and Physical Characteristics

Identification	
User Identification:	Tank447New-10-24-2007
City:	Los Angeles AP
State:	California
Company:	Chevron Products USA
Type of Tank:	Domed External Floating Roof Tank
Description:	Tank 447Storage (New)
Tank Dimensions	
Diameter (ft):	125.00
Volume (gallons):	3,360,000.00
Turnovers:	182.50
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	
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	3
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	2
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Sock	22
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Sock	28
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Pole Sleeve, Wiper	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meteorological Data used in Emissions Calculations: Los Angeles AP, California (Avg Atmospheric Pressure = 14.67 psia)

TABLE C-24(Continued)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Tank447New-10-24-2007 - Domed External Floating Roof Tank
Los Angeles AP, California

Mixture/Component	Month	Avg.	Daily Liquid Surf. Temp. (deg F) Min. Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg. Min. Max.	Vapor Mcl. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Petroleum Hydrocarbon Product	All	71.00	62.31	79.70	65.19	10.9690	N/A	68.6000	0.0479	0.0002
Benzene				0.0314	N/A	120.1900	0.0479	120.19	114.00	Option 2: A=7.0/333, B=1573.267, C=208.56
Butadiene, 1,3-				1.5725	N/A	78.1100	0.0536	78.11	78.11	Option 2: A=6.935, B=1211.033, C=220.79
Cyclohexane				36.8117	N/A	54.1000	0.0010	0.0056	54.10	Option 2: A=6.8499, B=920.546, C=238.854
Ethylbenzene				1.6200	N/A	84.1800	0.1172	0.0290	84.18	Option 2: A=6.841, B=1201.53, C=222.65
Hexane (-n)				0.1576	N/A	105.1700	0.0584	0.0014	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Naphthalene				2.5287	N/A	85.1700	0.2150	0.0830	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Propylene				0.0040	N/A	128.2000	0.0778	0.0000	128.20	Option 2: A=7.3728, B=1968.36, C=222.61
Toluene				140.0108	N/A	42.0800	0.0390	0.1933	42.08	Option 2: A=7.58, B=1132.65, C=282.26
Unidentified Components				0.4611	N/A	92.1300	0.2030	0.0141	92.13	Option 2: A=6.954, B=1344.8, C=215.48
Xylenes (mixed isomers)				-28.5572	N/A	78.7864	0.0001	0.6484	-0.05	
				0.1817	N/A	106.1700	0.2500	0.0050	106.17	Option 2: A=7.3009, B=1462.266, C=216.11

TANKS 4.0 Report

TANKS 4.0.9d Emissions Report - Detail Format Detail Calculations (AP-42)

Tank447New-10-24-2007 - Domed External Floating Roof Tank Los Angeles AP, California

Annual Emission Calculations	
Rim Seal Losses (lb):	1,695.2199
Seal Factor A (lb-mole/ft ²):	0.6000
Seal Factor B (lb-mole/ft ²):	0.4000
Average Wind Speed (mph):	0.0000
Seal-related Wind Speed Exponent:	1.0000
Vapor Pressure Function:	0.3824
Value of Vapor Pressure Function:	
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	10.9800
Tank Diameter (ft):	125.0000
Vapor Molecular Weight (lb/lb-mole):	68.0000
Product Factor:	1.0000
Withdrawal Losses (lb):	613,200.0000
Annual Net Throughput (gal/or/yr):	1,173,0166
Shell Climatic Factor (tsbf/1000 sqft):	0.0015
Average Organic Liquid Density (lb/gal):	71.0000
Tank Diameter (ft):	125.0000
Roof Filling Losses (lb):	1,427,6012
Value of Vapor Pressure Function:	0.3824
Vapor Molecular Weight (lb/lb-mole):	68.0000
Product Factor:	1.0000
Total Roof Filling Loss Factor (lb-mole/ft ²):	63.1600
Average Wind Speed (mph):	0.0000
Total Losses (lb):	4,295.8376

Roof Fitting/Status		Quantity	KF _{fit} (lb-mole/ft ²)	Roof Fitting Loss Factors K _{fit} (lb-mole/yr mph ²)	m	Losses(lb)
Access Hatch (24-in. Diam) /Bolted Cover Gasketed		3	1.60	0.00	0.00	108.4941
Automatic Gauge Float Wall/Bolted Cover Gasketed		1	2.80	0.00	0.00	63.2882
Gauge-Hatch/Standpipe Wall (6-in. Diam) /Weighted Mach. Actuation, Gask.		2	0.47	0.02	0.97	21.2468
Foal Leg (3-in. Diam) /Adjustable, Pontoon Area, Sock		22	1.20	0.14	0.65	596.7174
Roof Leg (3-in. Diam) /Adjustable, Center Area, Sock		28	0.49	0.16	0.14	310.1122
Sloped Guide-Pole/Sample Wall/Gask. Sliding Cover, Sock		1	8.30	4.40	1.50	187.6043
Vacuum Breaker (10-in. Diam) /Weighted Mach. Actuation, Gask.		1	6.20	1.20	0.84	140.1382

TABLE C-24 (Concluded)

TANKS 4.0 Report

TANKS 4.0.9d Emissions Report - Detail Format Individual Tank Emission Totals

Emissions Report for: Annual Tank447New-10-24-2007 - Domed External Floating Roof Tank Los Angeles AP, California

Components	Losses(lbs)		
	Rim Seal Loss	Withdrawal Loss	Deck Fitting Loss
Petroleum Hydrocarbon Product	1,695.22	1,173.02	1,427.60
Hexane (-n)	140.65	252.20	118.44
Benzene	34.00	98.06	28.63
Toluene	23.85	234.60	20.08
Ethylbenzene	2.38	68.50	0.00
Xylene (mixed isomers)	8.52	293.25	7.17
1,2,4-Trimethylbenzene	0.39	56.19	0.33
Cyclohexane	49.10	137.48	41.35
Naphthalene	0.02	20.88	0.02
Butadiene, 1,3-	9.49	1.17	7.99
Propylene	327.72	10.56	275.98
Unidentified Components	1,059.12	0.12	925.61
			2,024.86

TABLE C-25
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
COOLING TOWER EMISSION CALCULATIONS

Variable	Value⁽¹⁾	Units
Cooling Tower Circluation Rate (Q):	12,000	gal/min
Total Dissolved solid in water (TDS):	4,000	ppmw
Drift Loss (η):	0.001	%
Density of water (ρ):	8.34	lb/gal
Annual Operating Hours (OH):	8760	hours/yr
PM Emissions ⁽²⁾ :	2104	lbs/yr
PM Emissions:	5.76	lbs/day

(1) Values are from data for existing equipment or vendor design specifications.

(2) PM Emissions (lbs/yr) = $Q \times TDS/106 \times \eta/100 \times \rho \times 60 \times OH$ from SCAQMD Guidelines for Calculating Emissions from Cooling Towers, June 2006.

Note: Facility data shows no other criteria pollutants expected to be emitted.

TABLE C-26
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Fugitive Dust Emission Estimates
From Vehicles (Operational Emissions)

Source Type	Number of Vehicles	Fuel	Peak Daily Trips	One-way Factor (lb/vmt)	Peak PM-10 Emissions (lbs/day)
Passenger Vehicle/ On Paved Roadways	12	Gasoline	2	16.2	0.000386
On-site cars	0	Gasoline	1	2.5	0.000386
Light Duty Trucks on Paved Roadways	0	Gasoline	2	16.2	0.00213
Buses	0	Diesel	2	2.5	0.02013
Trucks on Paved Roadways	0	Diesel	2	44	0.02013
Total	12				0.15

* 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: $k = 0.016 \text{ lb/VMT}$ for PM10, $sL = \text{road silt loading (gms/m}^2\text{)}$ from CARB Methodology 7.9 for paved roads (0.240 for local roads and 0.037 for major/collector roads), $W = \text{weight of vehicles (2.4 tons for cars; 5 for pickup trucks, and 20 for heavy trucks), and } C = \text{emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (0.00047 lbs/VMT).}$

TABLE C-27
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Off-site Vehicle Emissions
(Operational Emissions)

On Road Mobile Emission Factors from California ARB EMFAC2007 Scenario Year 2009 (Model Years 1965 to 2009)

Vehicle Type	CO Emissions	VOC Emission	NOx Emissions Factor	SOx Emissions Factor	PM10 Emissions
Workers					
Commuting	0.009752	0.000931	0.000928	0.000010	0.000041
Delivery Trucks	0.012379	0.003281	0.040394	0.000042	0.001874

Source	Parameters				Peak Day Emissions, lbs/day				
	Number of Vehicles per Day	Trips per Day per Vehicle	Distance Traveled per Trip	Distance Traveled per Day	CO Emissions	VOC Emissions	NOx Emissions	SOx Emissions	PM10 Emissions
Workers									
Commuting	12	2	16.2	388.8	3.79	0.36	0.36	0.00	0.02
Delivery Trucks ⁽¹⁾	0	2	30	0	0.00	0.00	0.00	0.00	0.00
Totals					3.79	0.36	0.36	0.00	0.02

Based on 2007 SCAQMD on-road emission rates. (<http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html>)

Peak Day Emissions = Emission Factor x Distance Travelled per Day

- (1) The proposed project will result in a reduction of daily delivery trucks. Therefore, no emissions increase will result from delivery trucks.

TABLE C-28
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
Railcar Emissions Associated with Increased LPG Movement
at the LPG Loading/Unloading Rack

Cargo Weight (Rail Car and Freight)				
Number of Railcars	12	cars/day		
Rail car tare weight ⁽¹⁾	31	tons/one car		
Weight of Product	77	tons/car		
Gross Weight	1,296	tons/day		
Fuel Consumption				
Distance within CA outside of Air Basin	160	miles		
Fuel Factor ⁽²⁾	1.329	gal/1000 GTM ⁽³⁾		
Total ton-miles	207,360	ton-miles		
Total Fuel consumption	275.6	gal/day		
Distance within CA inside of Air Basin	60	miles		
Fuel Factor ⁽²⁾	1.329	gal/1000 GTM ⁽³⁾		
Total tons-mile	77,760	ton-miles		
Total Fuel consumption	103.3	gal/day		

(1) Oteko, 2007. www.oteko.com

(2) Port of Los Angeles, 2004

(3) GTM = gross ton miles

EMISSION FACTORS⁽⁴⁾	CO	VOC	NOx	SOx	PM10
gram/gallon	27.4	10.4	199.8	17	6.6
lbs/gallon	0.0604	0.0229	0.4405	0.0375	0.0146

(4) Emission Factors for Locomotives, U.S. EPA 420-F-97-05, December 1997, Table 9.

Link	EMISSIONS				
	CO	VOC	NOx	SOx	PM10
Within Basin (lbs/day)	6.243	2.369	45.520	3.873	1.504
Outside Basin (lbs/day)	16.647	6.318	121.387	10.328	4.010

Idling Emissions at Site ⁽⁵⁾	EMISSIONS				
	CO	VOC	NOx	SOx	PM10
Locomotive Idling (lbs/day)	0.076	0.029	0.551	0.047	0.018

(5) Idling Emissions = Emission factor (lbs/gal) x Fuel Use (gal/hr) x Idling Time (hr/day)

Where: Fuel use = 5 gallons/hour (SCAQMD, 2003b) and idling time is a maximum of 15 minutes per day.

TOTAL RAILCAR EMISSIONS	EMISSIONS				
	CO	VOC	NOx	SOx	PM10
Within Basin (lbs/day)	6.318	2.398	46.071	3.920	1.522
Outside Basin (lbs/day)	16.647	6.318	121.387	10.328	4.010

TABLE C-29
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
COMPARATIVE CO₂ EMISSIONS
NEW COGEN VS UTILITY-SUPPLIED POWER AND NEW FIRED BOILER

New Cogen Train D

GHG	Fuel Input		Emission Factor	Emissions (lbs/day)	CO ₂ e Emissions (metric tons/yr)
	MMBTUH	MMSCFD			
CO ₂					
CGT	524.7	11.99	110	lb/mm/Btu	1,385,208
Duct Burners	128.5	2.94	120000	lb/MMSCF	352,457
Total Fuel Input	653.2				229,339
N ₂ O					
CGT	524.7	11.99	0.003	lb/mm/Btu	38
Duct Burners	128.5	2.94	0.64	lb/MMSCF	2
Methane (CH ₄)					
CGT	524.7	11.99	0.0086	lb/mm/Btu	108
Duct Burners	128.5	2.94	2.3	lb/MMSCF	7
Total CO ₂ e Emissions (metric tons/yr)					290,075

Currently Supplied SCE Power

GHG	Fuel Input		Emission Factor	Emissions (lbs/day)	CO ₂ e Emissions (tonnes/yr)
	MMBTUH	MMSCFD			
CO ₂					
	200.0	4.57	120000	lb/MMSCF	548,571
N ₂ O					
	200.0	4.57	0.64	lb/MMSCF	3
Methane (CH ₄)					
	200.0	4.57	2.3	lb/MMSCF	11
Total CO ₂ e Emissions (metric tons/yr)					91,007

Aux Boiler Emissions

GHG	Fuel Input		Emission Factor	Emissions (lbs/day)	CO ₂ e Emissions (metric tons/yr)
	MMBTUH	MMSCFD			
CO ₂					
	105.9	2.42	120000	lb/MMSCF	290,469
N ₂ O					
	105.9	2.42	0.64	lb/MMSCF	2
Methane (CH ₄)					
	105.9	2.42	2.3	lb/MMSCF	6
Total CO ₂ e Emissions (metric tons/yr)					48,189

PRO Project Power Demand (without Cogen)

GHG	Fuel Input		Emission Factor	Emissions (lbs/day)	CO ₂ e Emissions (metric tons/yr)
	MMBTUH	MMSCFD			
CO ₂					
	299.0	6.83	120000	lb/MMSCF	820,114
N ₂ O					
	299.0	6.83	0.64	lb/MMSCF	4
Methane (CH ₄)					
	299.0	6.83	2.3	lb/MMSCF	16
Total CO ₂ e Emissions (metric tons/yr)					136,056

TABLE C-29 (concluded)
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
COMPARATIVE CO₂ EMISSIONS
NEW COGEN VS UTILITY-SUPPLIED POWER AND NEW FIRED BOILER

New Fired Boiler

GHG	Fuel Input		Emission Factor	Emissions (lbs/day)	CO ₂ e Emissions (metric tons/yr)
	MMBTUH	MMSCFD			
CO ₂	330.2	7.55	120,000 lb/MMSCF	905,691	149,949
N ₂ O	330.2	7.55	0.64 lb/MMSCF	4.83	237
Methane (CH ₄)	330.2	7.55	2.3 lb/MMSCF	17.359	66
Total CO ₂ e Emissions (metric tons/yr)					150,252

Notes

Basis: 49.9 mW power plus 270,000 lb/hr 850 psig steam

Heat inputs for cogeneration and fired boiler from manufacturer's estimates

Edison heat input based on 10,000 BTU/kWH

Assumed natural gas fuel at 1020 BTU/SCF HHV

CO₂ factor is from EPA AP-42

TABLE C-30
CHEVRON PRODUCTS COMPANY
EL SEGUNDO REFINERY
COGEN TRAIN "D" GREENHOUSE GAS INTENSITY
COMPARED TO CEC STANDARD

Cogen CO₂e Emissions

GHG	Fuel Input		Emission Factor	Emissions	CO ₂ e Emissions
	MMBTUH	MMSCFH		(lbs/hr)	(lbs/hr)
CO ₂					
CGT	524.7	0.50	110	lb/mm/Btu	57,717
Duct Burners	128.5	0.12	120000	lb/MMSCF	14,686
Total Fuel Input	653.2				
N ₂ O					
CGT	524.7	0.50	0.003	lb/mm/Btu	2
Duct Burners	128.5	0.12	0.64	lb/MMSCF	0.08
Methane (CH ₄)					
CGT	524.7	0.50	0.0086	lb/mm/Btu	5
Duct Burners	128.5	0.12	2.3	lb/MMSCF	0.28
CO₂e Emissions Total					73,002

Electrical Output

	Electrical Output MW-hr
Gas Turbine	42.15
Steam Turbine	7.75
Total Electrical	49.90

Thermal Output

	Flow lb	Energy Content over datum BTU/lb	Thermal Output BTU	Thermal Output MW-hr
850 psig Steam	40,000	1319.4	52,776,000	15.47
150 psig Steam	230,000	1204.2	276,966,000	81.17
15 psig Steam MU	25,000	1136.0	-28,400,000	-8.32
Stm. Cond. MU	170,000	119.8	-20,366,000	-5.97
NOx Inj. Steam	24,000	1175.0	-28,200,000	-8.26
Boiler BD	10,000	190.7	-1,907,000	-0.56
Total			250,869,000	73.53

Energy Efficiency

Efficiency	lb CO ₂ (e)/MW-hr
Cogen	591

Notes

CEC STANDARD: 1100 lb CO₂ per MW-hr

Basis: One hour of operation

CO₂, N₂O, and CH₄ factors for CGT is from EPA AP-42 for stationary gas turbines burning natural gas

CO₂, N₂O, and CH₄ factors for duct burners is from EPA AP-42 for external combustion sources burning natural gas

Fuel quantities and factors based on HHV

Thermal datum is liquid water at 60° F.

Steam Generator steam throughput based on 70% overall turbine/generator efficiency

Methodology per Jim Ross of RCS, Inc.

Energy Efficiency = CO₂e Emissions / (Electrical Output + Thermal Output)

**Chevron El Segundo Refinery
PRO Project
Ambient Air Quality Analysis**

**Chevron El Segundo Refinery
Product Reliability and Optimization Project
Ambient Air Quality Report**

January 22, 2008

Prepared for Chevron El Segundo Refinery
Environmental Audit, Inc.

**Chevron El Segundo Refinery
PRO Project
Ambient Air Quality Analysis**

INTRODUCTION

The Chevron Products Company (Chevron) El Segundo Refinery (Refinery) is located at 324 West El Segundo Boulevard in the City of El Segundo, California, as shown in C- 1. The El Segundo Refinery occupies an irregularly shaped parcel of land, between Vista Del Mar on the west, El Segundo Boulevard on the north, Sepulveda Boulevard on the east, and Rosecrans Avenue on the south. Chevron is proposing modifications to existing specific process units, new process units, and also new infrastructure that supports and links these units to other processes, units or facilities throughout the Refinery as part of their Product Reliability and Optimization (PRO) project. The proposed project will involve physical changes and additions to multiple process units and operations as well as operational and functional improvements primarily within the confines of the Refinery. The proposed locations within the Refinery for the units are shown in Figure C-2.

As part of the permitting process, Environmental Audit, Inc. (EA) has calculated emissions to evaluate the potential impacts of the criteria pollutants carbon monoxide (CO), nitrogen dioxide (NO₂), particulate matter less than 10 microns in diameter (PM10), and particulate matter less than 2.5 microns in diameter (PM2.5). Based on information provided by Chevron, the sections of the project that will include the criteria pollutants are the new Safety Flare, the new Congeneration train, the Tail Gas Unit (TGU) from the new Sulfur Recovery Facility, and the new Cooling Tower. The project descriptions and the results of this evaluation are provided below.

PROJECT DESCRIPTIONS

The Pressure Relief Devices (PRDs) on the No. 2 Crude Unit, the No. 2 Residuum Stripper Unit, the waste gas compressors, and the Minalk/Merox Unit that currently may vent to atmosphere under upset conditions will be routed to this new Vapor Recovery and Safety Flare System. In addition, PRDs from the new Sour Water Stripper (SWS), Sulfur Recovery Unit (SRU) and TGU will be routed to this new Vapor Recovery and Safety Flare System. The recovered gases will be treated prior to being added to the existing refinery fuel gas system.

The new 49 MW Cogen Train D includes a natural gas and refinery gas-fired turbine electric generator, a new steam-driven turbine electrical generator, feed gas compressors, knockout and surge pots, waste heat boilers (including duct burners) to generate steam, a carbon monoxide oxidation catalyst unit, and a Selective Catalytic Reactor (SCR) unit to control emissions.

A new SRU with a capacity of 175 long tons per day will be installed to process increased amounts of H₂S to commercial grade, molten sulfur for sale. Ammonia in the feed stream to the SRU will be converted to atmospheric nitrogen and water and exhausted through the TGU to the atmosphere. The exhaust from the SRU will be vented to a new TGU for further processing before discharging to the atmosphere. The TGU will include a new incinerator.

A new cooling tower with a water circulation rate of approximately 12,000 gpm will be constructed to support cooling needs at the existing Alkylation Unit, new SRU, new SWS, and new TGU. The cooling tower has two exhaust fans.

**Chevron El Segundo Refinery
PRO Project
Ambient Air Quality Analysis**

EMISSION ESTIMATES

The emissions estimates emissions associated with the project were provided by Chevron. No best available control technology (BACT) considerations were used in these calculations to create a worst-case scenario for the evaluation. BACT, however, will be applied to the actual units, as required. The calculated emissions are presented in Table C-31.

CRITERIA POLLUTANT IMPACT MODELING

In order to determine the ground level concentrations, the U.S. EPA ISCST3 (Version 02035) air dispersion model is used to calculate the annual average and maximum 1-hour, 8-hour, and 24-hour concentrations. While the U.S. EPA has approved AERMOD to replace ISCST3, the necessary area-specific meteorological data are not readily available. Therefore, ISCST3 is an appropriate model for determining the worst-case air quality impacts from a site.

The location of the source is identified based on data provided by Chevron and the Venice USGS Quadrangle (see attached Figures C-1 and C-2). Calculated emissions rates were used in the ISCST3 model. The ISCST3 model is run using the Lennox meteorological data available from the SCAQMD. The following settings are used in running the ISCST3 dispersion model:

- Use stack-tip downwash;
- Use buoyancy-induced dispersion;
- Do not use gradual plume rise;
- Do not use calm wind processing routine;
- Do not use missing data processing routine;
- Use default wind profile exponents;
- Use default vertical potential temperature gradients; and
- Use urban mode dispersion.

ISCST3 also is set to include algorithms to model the effects of building downwash on emissions from nearby or adjacent point sources. The model makes use of direction-specific information for all building downwash cases. Terrain elevations were taken into account even though the Refinery and the vicinity are in a relatively flat area.

The receptors used in the model include a fenceline receptors and a fine receptor grid. The terrain surrounding the facility is relatively constant; however, terrain variations were included for the receptor networks. The fenceline receptors (maximal spacing every 100 meters(m)) were used to determine the maximum concentrations at the property line of the Refinery. A fine receptor grid (100 m x 100 m spacing) was used to identify maximum impact locations. The grid originates near the southwestern corner of the facility and extends 3,900 meters to the west, and 3,600 meters to the north.

The maximum impact location is determined for the applicable averaging periods from the ISCST3 model output. The summary tables from the ISCST3 output files are included in Attachment A.

**Chevron El Segundo Refinery
PRO Project
Ambient Air Quality Analysis**

The maximum ground level concentration and the Universal Tranverse Mercator (NAD 27) coordinates for each maximum impact point are presented in Table C-32. Figure C-2 show the maximum impact locations.

CRITERIA POLLUTANT IMPACT ANALYSIS

The proposed project maximum ground level concentrations are compared to the significance thresholds established in Rule 1303, Appendix A, Table A-2 to demonstrate that the project will not cause a violation of any state or national ambient air quality standard. The ambient air quality data for Southwest Coastal Los Angeles County (Station No. 820) is used to establish background levels of NOx, CO, and PM10. Table C-33 identifies the maximum concentration published by the SCAQMD in the last three years (2004, 2005, and 2006) for each of the pollutants.

The CO 8-hour, PM10 24-hour, and PM10 annual average concentrations are compared to the Significant Change in Air Quality Concentration thresholds. The CO 1-hour, NO₂ 1-hour, and NO₂ annual average concentrations are combined with the maximum ambient concentrations and compared to the Most Stringent Air Quality Standard. The results are presented in Table C-34.

The maximum NO₂ impact concentrations for 1-hour and annual averages are 101.66 and 5.05 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), respectively. The maximum CO impact concentrations for 1-hour and 8-hour averages are 233.91 and 93.67 $\mu\text{g}/\text{m}^3$, respectively. The maximum PM10 impact concentrations for 24-hour and annual averages are 0.70 and 0.28 $\mu\text{g}/\text{m}^3$, respectively. Since PM2.5 is either equal to or a fraction of PM10 and the thresholds are the same, PM2.5 was not modeled. The maximum PM2.5 impact concentration will be equal to or less than the PM10 impact concentrations.

CONCLUSIONS

The criteria pollutant analysis results in no significant change in air quality and no exceedance of the most stringent air quality standard for NO₂, CO, PM10, or PM2.5. Therefore, the proposed project complies with Ambient Air Quality Standards.

MRB:mc

Attachments

TABLES

TABLE C-31**Chevron PRO Project
Criteria Pollutant Emission Rates**

Source	CO (lb/hr)	NOx (lb/hr)	PM10 (lb/hr)
Flare	9.40E-02	3.49E-01	2.01E-02
Cogen	2.98E+00	1.08E+01	0.00E+00
TGU	1.30E+01	5.69E+00	2.76E-01
Cooling Tower Fan 1	0.00E+00	0.00E+00	1.20E-01
Cooling Tower Fan 2	0.00E+00	0.00E+00	1.20E-01

TABLE C-32

**Chevron PRO Project
Criteria Pollutant Groundlevel
Concentration Calculations**

NOx Groundlevel Concentrations

Averaging Period	Coordinates		Calculated Concentration ($\mu\text{g}/\text{m}^3$)
	UTME	UTMN	
1 Hour	370054	3752640	101.6594
Annual	370354	3752740	5.0512

CO Groundlevel Concentrations

Averaging Period	Coordinates		Calculated Concentration ($\mu\text{g}/\text{m}^3$)
	UTME	UTMN	
1 Hour	370054	3752640	233.9060
8 Hour	370054	3752640	93.6725
Annual	370054	3752640	8.8753

PM10 Groundlevel Concentrations

Averaging Period	Coordinates		Calculated Concentration ($\mu\text{g}/\text{m}^3$)
	UTME	UTMN	
24	370254	3752640	0.6987
Annual	370254	3752640	0.2846

Calculated emission are outputs from the ISCST3 model (v.02035).

TABLE C-33

**Chevron PRO Project
Criteria Pollutant Ambient
Concentration Calculations**

Criteria Pollutant	Averaging Period	Concentration (ppm)			Max Conc.	
		2004	2005	2006	(ppm)	($\mu\text{g}/\text{m}^3$)
NO ₂	1-hr	0.09	0.09	0.02	0.09	169.92
	Annual	0.0136	0.0134	0.002	0.0136	25.68
CO	1-hr	4	3	3	4	4597.60
	8-hr	3	2.1	2.3	3	3448.20
Concentration ($\mu\text{g}/\text{m}^3$)						
PM10	24-hr	47	44	45		47
	AAM	25.1	22.9	26.5		26.5

Data from Source No. 3 Southwestern Coastal Los Angeles Station number 820

TABLE C-34

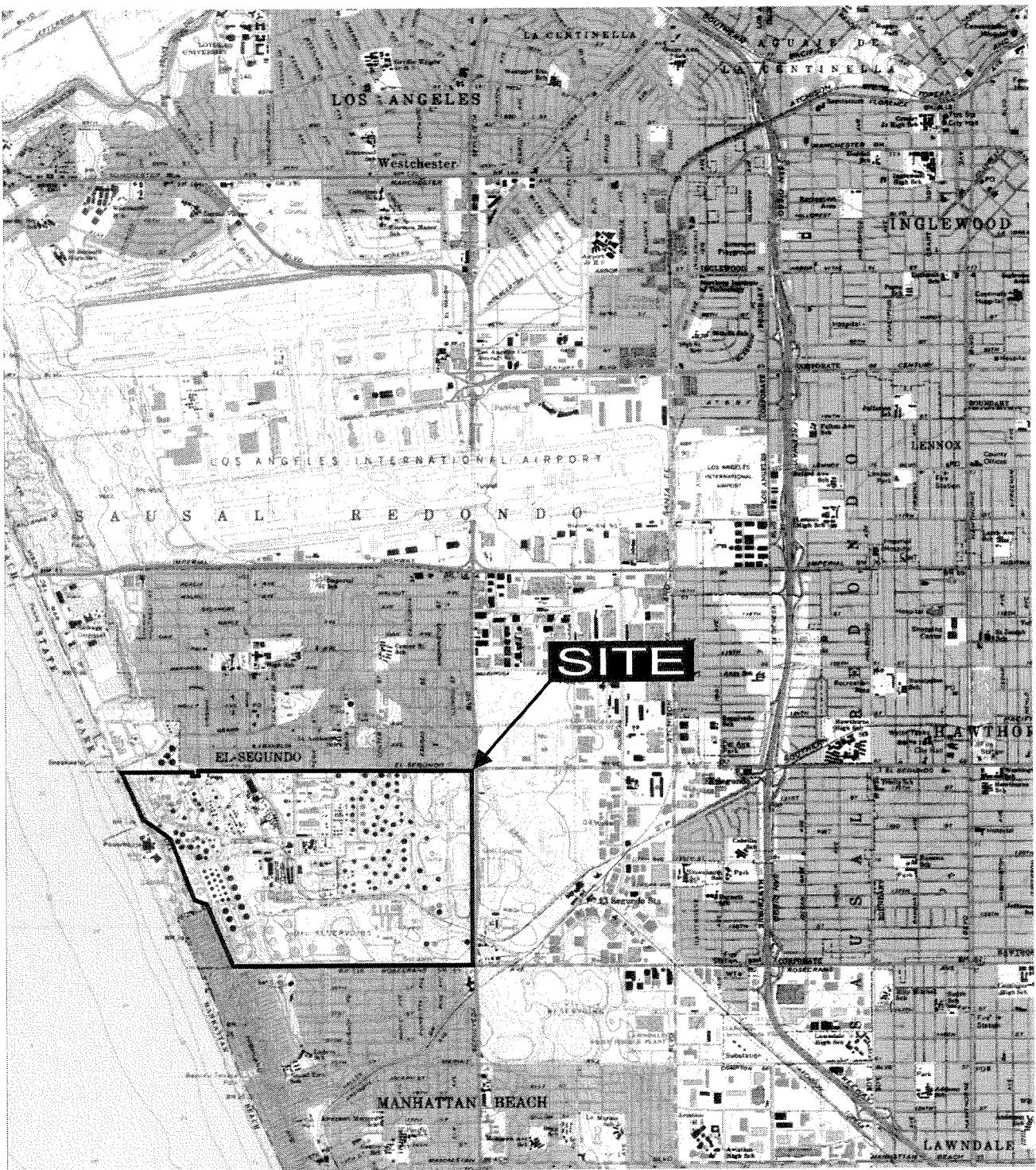
Chevron PRO Project
Significance Threshold Evaluation

Criteria Pollutant	Averaging Period	Ambient Background Conc. ($\mu\text{g}/\text{m}^3$)	Calculated Conc. ($\mu\text{g}/\text{m}^3$)	Total Conc. ($\mu\text{g}/\text{m}^3$)	Most Stringent Air Quality Standard ($\mu\text{g}/\text{m}^3$)	Significant Change in Air Quality Conc. ($\mu\text{g}/\text{m}^3$)	Below Threshold? Yes/No
NO2	1-hr	169.9	101.659	271.6	500	20	Yes
	Annual	25.7	5.051	30.7	100	1	Yes
CO	1-hr	4597.6	233.906	4831.5	23000	1100	Yes
	8-hr	3448.2	93.672	3541.9	10000	500	Yes
PM10	24-hr	47.0	0.699	47.7	50	2.5	Yes
	AAM	26.5	0.285	26.8	30	1	Yes

PM2.5 will be equal to PM10 with the same threshold and therefore, below significance.

Evaluation Criteria **Bolded**

FIGURES



Environmental Audit, Inc.

0 4,000'

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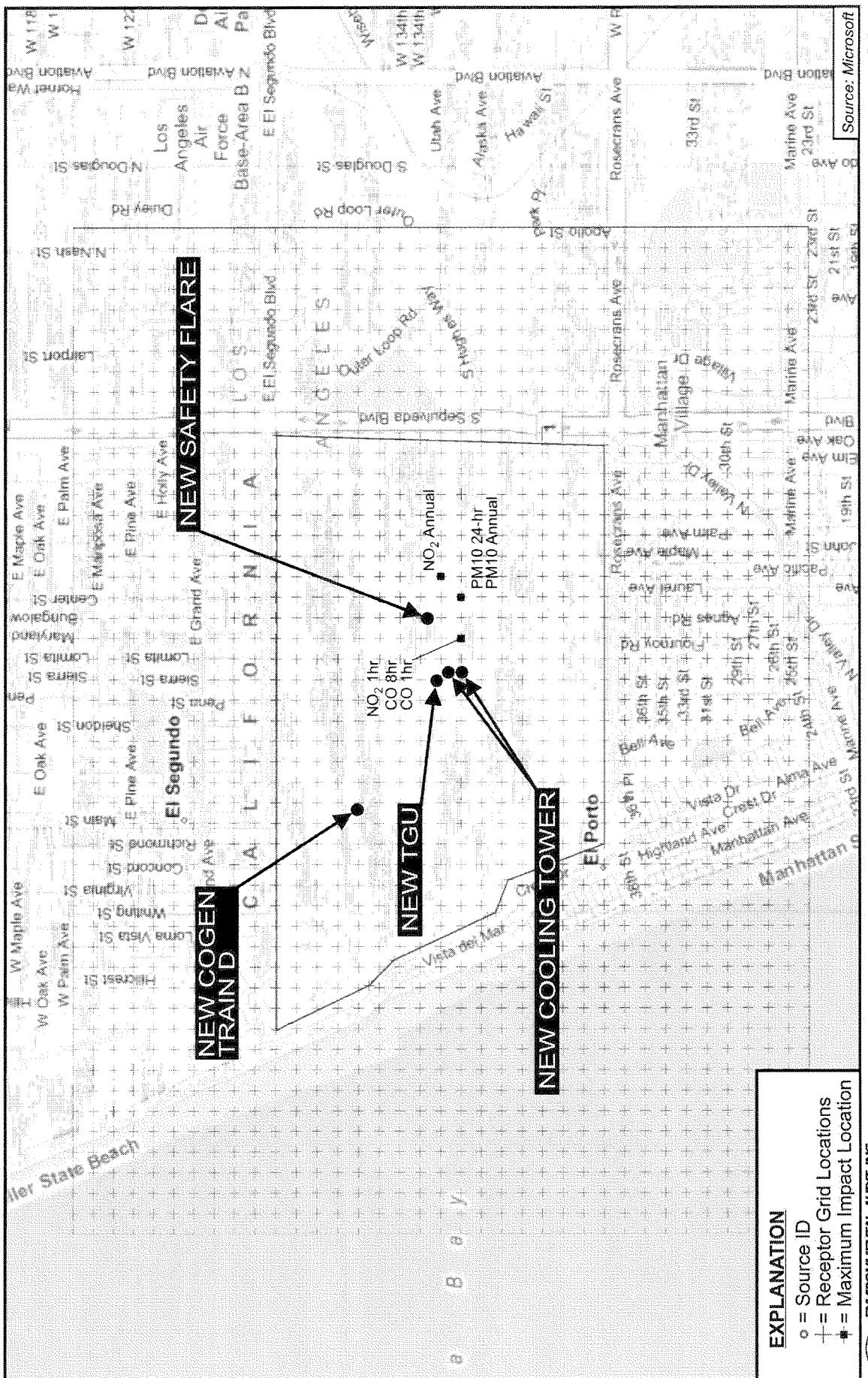


SITE LOCATION MAP
324 West El Segundo Boulevard
El Segundo, California

Project No. 2505

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Figure C-1



ATTACHMENT A

ISCST3 Model Output Summary Tables

*** ISCSIT3 - VERSION 02035 *** *** C:\Documents and Settings\Micheal\My Documents\Projects\My Projects\2505Chev\ ***

*** NOX

*** MODELOPTS:

CONC

URBAN ELEV

TOXICS

NOSTD

*** CONC OF AAQ IN MICROGRAMS/M**3

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	101.65942	ON 81111204: AT (370054.00,	3752640.00,	0.00) GC 1

*** RECEPTOR TYPES: GC = GRIDCART
 GP = GRIDPOLR
 DC = DISCCART
 DP = DISCPOLR
 BD = BOUNDARY

*** ISCST3 - VERSION 02035 *** *** C:\Documents and Settings\Michael\My Documents\Projects\My Projects\2505Chev\ ***
 *** NOX

*MODEL/OPTS:
 CONC URBAN ELEV TOXICS NOSTD

*** THE SUMMARY OF MAXIMUM ANNUAL (1 YRS) RESULTS ***

** CONC OF AAQ IN MICROGRAMS/M**3

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZLEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS 2ND HIGHEST VALUE IS 3RD HIGHEST VALUE IS 4TH HIGHEST VALUE IS 5TH HIGHEST VALUE IS 6TH HIGHEST VALUE IS 7TH HIGHEST VALUE IS 8TH HIGHEST VALUE IS 9TH HIGHEST VALUE IS 10TH HIGHEST VALUE IS	5.05122 AT { 370354.00, 4.18024 AT { 370254.00, 3.94573 AT { 370454.00, 3.93552 AT { 370054.00, 3.91792 AT { 370254.00, 3.42418 AT { 370354.00, 3.26237 AT { 370154.00, 3.00345 AT { 370354.00, 2.86308 AT { 370054.00, 2.81882 AT { 370054.00,	162.00, 142.40, 166.00, 121.40, 158.80, 158.80, 126.00, 152.20, 108.20, 131.20,	0.00) 0.00) 0.00) 0.00) 0.00) 0.00) 0.00) 0.00) 0.00) 0.00)

*** RECEPTOR TYPES:

GC = GRIDCART
 GP = GRIDPOLR
 DC = DISCCART
 DP = DISCPOLR
 BD = BOUNDARY

*** ISCSST3 - VERSION 02035 *** *** C:\Documents and Settings\Micheal\My Documents\My Projects\2505Chev\ ***
 *** CO
 **MODELOPTS:
 CONC URBAN ELEV TOXICS NOSTD

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF AAQ IN MICROGRAMS/M**3

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR	(XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
----------	--------------	--------------------	----------	---------------------------	---------	--------------------

FLARE	HIGH 1ST HIGH VALUE IS	4.17648 ON 81120624: AT (370254.00,	3752640.00,	158.80,	0.00)	GC 1
COGEN	HIGH 1ST HIGH VALUE IS	6.25046 ON 81061522: AT (368554.00,	3753540.00,	178.40,	0.00)	GC 1
TGU	HIGH 1ST HIGH VALUE IS	232.44193 ON 81111204: AT (370054.00,	3752640.00,	121.40,	0.00)	GC 1
ALL	HIGH 1ST HIGH VALUE IS	233.90604 ON 81111204: AT (370054.00,	3752640.00,	121.40,	0.00)	GC 1

*** RECEPTOR TYPES: GC = GRIDCART
 GP = GRIDPOIR
 DC = DISCCART
 DP = DISCPOLR
 BD = BOUNDARY

*** ISCSST3 - VERSION 02035 *** *** C:\Documents and Settings\Michael\My Documents\My Projects\2505Chev\ ***
 *** CO *** CO
 *** MODELOPTS:
 CONC URBAN ELEV TOXICS NOSTD

*** THE SUMMARY OF HIGHEST 8-HR RESULTS ***

** CONC OF AAQ IN MICROGRAMS/M**3

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
FLARE HIGH 1ST HIGH VALUE IS	1.57589C ON 81030724: AT (370354.00,	3752740.00,	162.00,	0.00)	GC 1
COGEN HIGH 1ST HIGH VALUE IS	2.77D06C ON 81031408: AT (368854.00,	3752840.00,	169.20,	0.00)	GC 1
TGU HIGH 1ST HIGH VALUE IS	92.93473C ON 81072208: AT (370054.00,	3752640.00,	121.40,	0.00)	GC 1
ALL HIGH 1ST HIGH VALUE IS	93.67245C ON 81072208: AT (370054.00,	3752640.00,	121.40,	0.00)	GC 1

*** RECEPTOR TYPES: GC = GRIDCART
 GP = GRIDPOLR
 DC = DISCCART
 DP = DISCPOLR
 BD = BOUNDARY

*** ISCSST3 - VERSION 02035 *** *** C:\Documents and Settings\Micheal\My Documents\My Projects\2505Chev\ ***
 *** MODELOPTS: CO

CONC URBAN ELEV TOXICS NOSTD

*** THE SUMMARY OF MAXIMUM ANNUAL (1 YRS) RESULTS ***

** CONC OF AAQ IN MICROGRAMS/M** 3

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS 8.87525 AT { 370054.00,	3752640.00, 121.40,	0.00)	GC 1
	2ND HIGHEST VALUE IS 8.47523 AT { 370254.00,	3752740.00, 142.40,	0.00)	GC 1
	3RD HIGHEST VALUE IS 8.32280 AT { 370354.00,	3752740.00, 162.00,	0.00)	GC 1
	4 TH HIGHEST VALUE IS 7.49533 AT { 370254.00,	3752640.00, 158.80,	0.00)	GC 1
	5TH HIGHEST VALUE IS 7.16834 AT { 370154.00,	3752640.00, 126.00,	0.00)	GC 1
	6TH HIGHEST VALUE IS 6.59772 AT { 370454.00,	3752740.00, 166.00,	0.00)	GC 1
	7TH HIGHEST VALUE IS 6.36653 AT { 370054.00,	3752740.00, 108.20,	0.00)	GC 1
	8TH HIGHEST VALUE IS 6.11926 AT { 370054.00,	3752540.00, 131.20,	0.00)	GC 1
	9TH HIGHEST VALUE IS 6.11320 AT { 370354.00,	3752640.00, 158.80,	0.00)	GC 1
	10TH HIGHEST VALUE IS 5.83212 AT { 369954.00,	3752640.00, 111.50,	0.00)	GC 1

*** RECEPTOR TYPES:

GC = GRIDCART
 GP = GRIDPOLR
 DC = DISCCART
 DP = DISCPOLR
 BD = BOUNDARY

File: M:\MrB\2505 Chevron\AAQ\2505PM10.OUT 1/30/2008, 11:01:40AM

*** ISCSIT3 - VERSION 02035 *** *** C:\Documents and Settings\Micheal\My Documents\Projects\2505Chev\ ***
 *** PM10
 *** PAGE 64

***MODELOPTS:
CONC URBAN ELEV TOXICS
 NOSTD

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF AAQ IN MICROGRAMS/M**3

GROUP ID	AVERAGE CONC	DATE (YMMDDHH)	RECEPATOR					NETWORK GRID-ID
			(XR, YR,	ZLEV, ZFLAG)	OF TYPE	GC	1	
ALL HIGH 1ST HIGH VALUE IS	0.69865	ON 81070124: AT (370254.00,	3752640.00,	48.00,	0.00)			

*** RECEPTOR TYPES: GC = GRIDCART
 GP = GRIDPOLR
 DC = DISCCART
 DP = DISCPOLR
 BD = BOUNDARY

*** ISCSIT3 - VERSION 02035 *** *** C:\Documents and Settings\Michael\My Documents\My Projects\2505Chev\ ***
 *** PM10 *** PM10

**MODELOPTS:
 CONC

***** THE SUMMARY OF MAXIMUM ANNUAL (1 YRS) RESULTS *****

** CONC OF AAQ IN MICROGRAMS/M**3

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	0.28455 AT (0.23739 AT (0.21928 AT (0.21253 AT (0.16868 AT (0.15861 AT (0.14626 AT (0.12519 AT (0.12512 AT (0.12362 AT (370254.00, 370254.00, 370354.00, 370354.00, 370454.00, 370454.00, 370254.00, 370354.00, 370554.00, 370554.00, 370554.00,	48.00, 44.00, 50.00, 49.00, 50.00, 45.00, 41.00, 41.00, 41.00, 37.00, 41.00,	0.00) GC 1 0.00) GC 1

*** RECEPTOR TYPES:

GC = GRIDCART
 GP = GRIDPOLR
 DC = DISCCART
 DP = DISCPOLR
 BD = BOUNDARY