APPENDIX B
PEAK CONSTRUCTION EMISSION CALCULATIONS

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CHEVRON EL SEGUNDO REFINERY
PRODUCT RELIABILITY AND OPTIMIZATION PROJECT

APPENDIX B
PEAK EMISSION CALCULATIONS

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Table B-1
Chevron El Segundo Refinery
Product Reliability and Optimization Project
CONSTRUCTION SUMMARY

Construction Period	Estimated Emissions - 8/08						
	VOC	CO	NOx	SOx	PM10	PM2.5[1]	CO_2
Construction Equipment	70.73	231.99	459.34	0.45	30.79	17.86	38499.80
Vehicle Emissions	15.50	140.23	58.40	0.16	2.34	1.36	16027.02
Fugitive Construction	0.00	0.00	0.00	0.00	128.25	74.38	0.00
Fugitive Road Dust	0.00	0.00	0.00	0.00	15.63	9.07	0.00
Architectural Coatings	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL EMISSIONS	86.23	372.23	517.74	0.61	177.00	102.66	54526.82
SCAQMD Thresholds	75	550	100	150	150	55	--
Significant	Yes	No	Yes	No	Yes	Yes	--

Construction Period	Estimated Emissions - 1/09						
	VOC	CO	NOx	SOx	PM10	PM2.5[1]	CO_2
Construction Equipment	117.85	372.32	671.58	0.66	50.19	29.11	56661.14
Vehicle Emissions	34.60	336.67	82.69	0.38	3.47	2.01	38867.44
Fugitive Construction	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Road Dust	0.00	0.00	0.00	0.00	27.68	16.05	0.00
Architectural Coatings	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL EMISSIONS	152.45	708.98	754.28	1.04	81.34	47.18	95528.58
SCAQMD Thresholds	75	550	100	150	150	55	--
Significant	Yes	Yes	Yes	No	No	No	--

(1) PM2.5 is calculated using Profile #391 from the SCAQMD Methodology to Calculate Particulate Matter (PM2.5) and PM2.5 CEQA Signficance Thresholds, SCAQMD , October 2006, https://www.aqmd.gov/ceqa/handbook/pm2_5/pm2_5ratio.xls.

Peak Value

Table B-2
Construction Equipment Emissions

Chevron El Segundo Refinery
Product Reliability and Optimization Project
Construction Equipment - August 2008

Equipment Type	Total Hours Per Day[1]	2008 Emission Factors lb/hr[1]						Daily Emissions (lbs/day)					
		VOC	CO	NOx	SOx	PM10	CO_2	VOC	CO	NOx	SOx	PM10	CO_2
Air Compressor	0	0.1112	0.3395	0.6505	0.0006	0.0578	46.9502	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	70	0.1265	0.2903	0.2442	0.0003	0.0283	22.2713	8.86	20.32	17.09	0.02	1.98	1558.99
Backhoe	57	0.1405	0.5903	1.1212	0.0011	0.0634	101.3869	8.01	33.65	63.91	0.07	3.61	5779.05
Cherry Picker	85	0.0781	0.2542	0.4910	0.0004	0.0386	38.0718	6.64	21.61	41.74	0.04	3.29	3236.10
Concrete Finisher	14	0.0119	0.0617	0.0750	0.0002	0.0046	10.1073	0.17	0.86	1.05	0.00	0.06	141.50
Concrete Pump	30	0.1823	0.5452	2.1931	0.0023	0.0688	201.3693	5.47	16.36	65.79	0.07	2.06	6041.08
Concrete Saw	16	0.0206	0.0681	0.1344	0.0002	0.0079	16.4777	0.33	1.09	2.15	0.00	0.13	263.64
Crawler Crane	8	0.2012	0.7762	1.9878	0.0018	0.0771	180.1013	1.61	6.21	15.90	0.01	0.62	1440.81
Crawler Crane	8	0.1392	0.3881	1.3867	0.0013	0.0535	112.1589	1.11	3.10	11.09	0.01	0.43	897.27
Crawler Crane	8	0.1345	0.4936	1.0417	0.0009	0.0589	80.3446	1.08	3.95	8.33	0.01	0.47	642.76
Crawler Crane	0	0.1261	0.3807	0.7275	0.0006	0.0664	50.1480	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	67	0.0724	0.2304	0.4055	0.0004	0.0402	31.2249	4.85	15.44	27.17	0.02	2.69	2092.07
Gas Engine Vibrator	3	0.0119	0.0617	0.0750	0.0002	0.0046	10.1073	0.04	0.19	0.22	0.00	0.01	30.32
Generator	110	0.1558	0.5141	0.9918	0.0009	0.0767	77.9494	17.14	56.55	109.09	0.10	8.44	8574.43
Grader	26	0.1956	0.7486	1.5300	0.0014	0.0864	123.9215	5.09	19.46	39.78	0.04	2.25	3221.96
Heavy Roller	24	0.1363	0.4271	0.8203	0.0007	0.0703	58.9888	3.27	10.25	19.69	0.02	1.69	1415.73
Lighting Center	0	0.1661	0.3989	0.3791	0.0005	0.0396	36.1908	0.00	0.00	0.00	0.00	0.00	0.00
Pump - Catalyst Vacuum	0	0.0485	0.1221	0.1954	0.0002	0.0146	19.4874	0.00	0.00	0.00	0.00	0.00	0.00
Pump - Diapragm Sump	14	0.0161	0.0545	0.0924	0.0001	0.0070	7.4238	0.23	0.76	1.29	0.00	0.10	103.93
Pump - Drum Sucker/Minute Man	0	0.0161	0.0545	0.0924	0.0001	0.0070	7.4238	0.00	0.00	0.00	0.00	0.00	0.00
Pump - Dry Vacuum Unit	0	0.0161	0.0545	0.0924	0.0001	0.0070	7.4238	0.00	0.00	0.00	0.00	0.00	0.00
Pump - Gully Sucker	0	0.0161	0.0545	0.0924	0.0001	0.0070	7.4238	0.00	0.00	0.00	0.00	0.00	0.00
Pump - Hydrotest	0	0.1479	0.3563	0.3574	0.0004	0.0359	34.3349	0.00	0.00	0.00	0.00	0.00	0.00
Pump - Hydrotest	0	0.0485	0.1221	0.1954	0.0002	0.0146	19.4874	0.00	0.00	0.00	0.00	0.00	0.00
Pump - Trash	3	0.0485	0.1221	0.1954	0.0002	0.0146	19.4874	0.15	0.37	0.59	0.00	0.04	58.46
Skip Loader	0	0.1083	0.3703	0.6510	0.0006	0.0595	51.7280	0.00	0.00	0.00	0.00	0.00	0.00
Tamper - Plate Type - Gas	58	0.0052	0.0263	0.0328	0.0001	0.0021	4.3138	0.30	1.53	1.91	0.00	0.12	250.20
Tamper - Single Butt	64	0.0052	0.0263	0.0328	0.0001	0.0021	4.3138	0.33	1.69	2.10	0.00	0.13	276.08
Truck Crane	30	0.1261	0.3807	0.7275	0.0006	0.0664	50.1480	3.78	11.42	21.82	0.02	1.99	1504.44
Upright Jumper	122	0.005	0.026	0.033	0.000	0.002	4.314	0.63	3.21	4.01	0.01	0.25	526.28
Welder	21	0.028	0.071	0.113	0.000	0.008	11.286	0.59	1.49	2.38	0.00	0.18	237.01
Welder	8	0.134	0.313	0.279	0.000	0.031	25.958	1.07	2.50	2.23	0.00	0.25	207.66
Emission Totals								70.73	231.99	459.34	0.45	30.79	38499.80

(1) Total hours of multiple pieces of equipment concurrently operating in various Project Units.
Equipment listed with zero hours are not used during the peak month. However, the equipment is used at some time during the project.

Table B-3
Construction Equipment Emissions

Chevron El Segundo Refinery
Product Reliability and Optimization Project
Construction Equipment - January 2009

Equipment Type	Total Hours Per Day[1]	2008 Emission Factors lb/hr[1]						Daily Emissions (lbs/day)					
		VOC	CO	NOx	SOx	PM10	CO_2	VOC	CO	NOx	SOx	PM10	CO_2
Air Compressor	63	0.1066	0.3375	0.6253	0.0006	0.0563	46.9502	6.71	21.26	39.39	0.03	3.55	2957.86
Air Compressor	98	0.1220	0.2867	0.2416	0.0003	0.0275	22.2713	11.96	28.10	23.68	0.03	2.69	2182.58
Backhoe	6	0.1307	0.5891	1.0398	0.0011	0.0597	101.3869	0.78	3.53	6.24	0.01	0.36	608.32
Cherry Picker	200	0.0743	0.2523	0.4715	0.0004	0.0375	38.0718	14.87	50.45	94.30	0.09	7.50	7614.36
Concrete Finisher	4	0.0118	0.0617	0.0739	0.0002	0.0037	10.1073	0.05	0.25	0.30	0.00	0.01	40.43
Concrete Pump	15	0.1710	0.5151	2.0962	0.0023	0.0649	201.3693	2.57	7.73	31.44	0.03	0.97	3020.54
Concrete Saw	0	0.0202	0.0678	0.1295	0.0002	0.0071	16.4777	0.00	0.00	0.00	0.00	0.00	0.00
Crawler Crane	29	0.1913	0.7157	1.8770	0.0018	0.0726	180.1012	5.55	20.76	54.43	0.05	2.11	5222.94
Crawler Crane	21	0.1314	0.3664	1.3105	0.0013	0.0501	112.1589	2.76	7.69	27.52	0.03	1.05	2355.34
Crawler Crane	59	0.1276	0.4905	0.9849	0.0009	0.0564	80.3446	7.53	28.94	58.11	0.05	3.33	4740.33
Crawler Crane	21	0.1187	0.3763	0.6901	0.0006	0.0633	50.1480	2.49	7.90	14.49	0.01	1.33	1053.11
Forklift	88	0.0662	0.2272	0.3757	0.0004	0.0373	31.2249	5.83	20.00	33.06	0.03	3.28	2747.79
Gas Engine Vibrator	0	0.0118	0.0617	0.0739	0.0002	0.0037	10.1073	0.00	0.00	0.00	0.00	0.00	0.00
Generator	180	0.1479	0.5099	0.9509	0.0009	0.0742	77.9494	26.63	91.78	171.16	0.16	13.36	14030.90
Grader	0	0.1846	0.7443	1.4391	0.0014	0.0823	123.9215	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Roller	0	0.1280	0.4221	0.7782	0.0007	0.0672	58.9887	0.00	0.00	0.00	0.00	0.00	0.00
Lighting Center	52	0.1582	0.3915	0.3741	0.0005	0.0381	36.1908	8.23	20.36	19.46	0.02	1.98	1881.92
Pump - Catalyst Vacuum	0	0.0462	0.1183	0.1920	0.0002	0.0140	19.4874	0.00	0.00	0.00	0.00	0.00	0.00
Pump - Diapragm Sump	0	0.0155	0.0537	0.0894	0.0001	0.0066	7.4238	0.00	0.00	0.00	0.00	0.00	0.00
Pump - Drum Sucker/Minute Man	14	0.0155	0.0537	0.0894	0.0001	0.0066	7.4238	0.22	0.75	1.25	0.00	0.09	103.93
Pump - Dry Vacuum Unit	14	0.0155	0.0537	0.0894	0.0001	0.0066	7.4238	0.22	0.75	1.25	0.00	0.09	103.93
Pump - Gully Sucker	14	0.0155	0.0537	0.0894	0.0001	0.0066	7.4238	0.22	0.75	1.25	0.00	0.09	103.93
Pump - Hydrotest	20	0.1414	0.3503	0.3528	0.0004	0.0347	34.3349	2.83	7.01	7.06	0.01	0.69	686.70
Pump - Hydrotest	44	0.0462	0.1183	0.1920	0.0002	0.0140	19.4874	2.03	5.21	8.45	0.01	0.61	857.44
Pump - Trash	23	0.0462	0.1183	0.1920	0.0002	0.0140	19.4874	1.06	2.72	4.42	0.01	0.32	448.21
Skip Loader	4	0.0993	0.3661	0.6071	0.0006	0.0554	51.7280	0.40	1.46	2.43	0.00	0.22	206.91
Tamper - Plate Type - Gas	24	0.0051	0.0263	0.0321	0.0001	0.0018	4.3138	0.12	0.63	0.77	0.00	0.04	103.53
Tamper - Single Butt	18	0.0051	0.0263	0.0321	0.0001	0.0018	4.3138	0.09	0.47	0.58	0.00	0.03	77.65
Truck Crane	83	0.1187	0.3763	0.6901	0.0006	0.0633	50.1480	9.86	31.24	57.28	0.05	5.26	4162.28
Upright Jumper	60	0.005	0.026	0.032	0.000	0.002	4.314	0.31	1.58	1.93	0.00	0.11	258.83
Welder	30	0.027	0.069	0.111	0.000	0.008	11.286	0.80	2.06	3.34	0.00	0.24	338.58
Welder	29	0.129	0.308	0.276	0.000	0.030	25.958	3.75	8.94	8.00	0.01	0.87	752.78
Emission Totals								117.85	372.32	671.58	0.66	50.19	56661.14

(1) Total hours of multiple pieces of equipment concurrently operating in various Project Units.
Equipment listed with zero hours are not used during the peak month. However, the equipment is used at some time during the project.

Table B-4
Chevron El Segundo Refinery
Product Reliability and Optimization Project
Construction Vehicle Emissions for August 2008 and January 2009

Vehicle	Miles/Day/ Vehicle	No. of Vehicles 2008 Aug	No. of Vehicles 2009 Jan	Miles/Day 2008 Aug	Miles/Day 2009 Jan
Commuters	32.4	298	916	9655.2	29678.4
Pickup Trucks	10	49	121	490	1210
Van	10	14	35	140	350
Total Light Vehicle Miles				10285.2	31238.4
Flatbed Truck	10	10	16	100	160
Bus[1]	60	0	11	0	660
Bin Truck	10	0	0	0	0
Concrete Truck	50	10	4	500	200
Delivery Truck	50	0	0	0	0
Dump Truck	50	9	1	450	50
Lube Truck	10	10	14	100	140
Water Truck	10	9	0	90	0
Total Medium/Heavy Duty Truck Miles				1240	1210
Semi Tractor	50	9	13	450	650
Total Heavy-Heavy Duty Truck Miles				450	650

CO	Emission Rate (lb/mi)[2] 2008	Emission Rate (lb/mi)[2] 2009	2008 Aug	2009 Jan
Light Duty	0.0105342	0.0097518	108.35	304.63
Medium Duty	0.0210772	0.0198265	26.14	23.99
Heavy Duty	0.0127847	0.0123793	5.75	8.05
Total			140.23	336.67

NOx	Emission Rate (lb/mi)[2] 2008	Emission Rate (lb/mi)[2] 2009	2008 Aug	2009 Jan
Light Duty	0.0010088	0.0009276	10.38	28.98
Medium Duty	0.0235365	0.0226942	29.19	27.46
Heavy Duty	0.0418542	0.0403943	18.83	26.26
Total			58.40	82.69

CO_2	Emission Rate (lb/mi)[2] 2008	Emission Rate (lb/mi)[2] 2009	2008 Aug	2009 Jan
Light Duty	1.0368352	1.0432521	10664.06	32589.53
Medium Duty	2.8055029	2.8748941	3478.82	3478.62
Heavy Duty	4.1869739	4.3066017	1884.14	2799.29
Total			16027.02	38867.44

VOC	Emission Rate (lb/mi)[2] 2008	Emission Rate (lb/mi)[2] 2009	2008 Aug	2009 Jan
Light Duty	0.0010051	0.0009314	10.34	29.10
Medium Duty	0.0029281	0.0027894	3.63	3.38
Heavy Duty	0.0034094	0.0032809	1.53	2.13
Total			15.50	34.60

SOx	Emission Rate (lb/mi)[2] 2008	Emission Rate (lb/mi)[2] 2009	2008 Aug	2009 Jan
Light Duty	0.0000102	0.0000102	0.10	0.32
Medium Duty	0.0000274	0.0000282	0.03	0.03
Heavy Duty	0.0000399	0.0000421	0.02	0.03
Total			0.16	0.38

PM10	Emission Rate (lb/mi)[2] 2008	Emission Rate (lb/mi)[2] 2009	2008 Aug	2009 Jan
Light Duty Exhaust	0.0000397	0.0000410	0.41	1.28
Medium Duty Exhaust	0.0008391	0.0007996	1.04	0.97
Heavy Duty Exhaust	0.0019783	0.0018742	0.89	1.22
Total Exhaust PM			2.34	3.47
Light Duty Fugitive[3]	0.00038589		3.97	12.05
Medium Duty Fugitve[3]	0.00210368		2.61	2.55
Heavy Duty Fugitive[3]	0.02011945		9.05	13.08
Total Fugitive PM			15.63	27.68
Total			17.97	31.14

(1) Available parking onsite for work force in August 2008. Therefore, no buses required.

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

(3) 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).

Table B-5
Chevron El Segundo Refinery
Product Reliability and Optimization Project
Fugitive PM Construction Emissions for August 2008

Grading Operations	Average Pieces of Equipment Operating	Peak Pieces of Equipment Operating	Hours of Operation	PM10 Emission Factor (lb/hour)	Water Control Factor	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]	8	8	7.5	5.837	0.5	175.12	175.12	350.2373151	350.2373151	Table A9-9-F

TRENCHING OPERATIONS (Backhoe) TEMPORARY STOCKPILES	Average Tons of Materials Handled Per Day	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor	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]	1050	1050	0.0035	0.5	1.8375	1.8375	3.675	3.675	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]	22	0.635	0.635	0.200	0.127	0.127	0.001	0.001	Table A9-9-E

TRUCK FILLING/DUMPING	Estimated Materials Handled Per Day (tons)	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor	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]	1050	1050	0.02205	0.5	11.57625	11.57625	23.1525	23.1525	Table A9-9
Truck Dumping	0	0	0.009075	0.5	0	0	0	0	Table A9-9

TOTAL PM10 Pounds/day	Average	Peak
(Controlled Emissions)	188.6591	188.65911
(Uncontrolled Emissions)	377.192	377.192
Mitigated Emissions[5]	128.245	128.245

(1) Emissions (lbs/hr) = $[0.75 \times (G^{1.5})/(H^{1.4}) \times J$
where G = silt content (7.5%), H = moisture content (2.0%) 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 (12 mph), H=moisture content of surface material (2%); I=lbs of dirt handled per day; and J=2,000 lbs/ton

(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 (50%) and J= fraction of TSP (0.5)

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

(5) Mitigated Emissions assume that watering 3 times per day controls emissions by 66 percent (Uncontrolled Emissions x 0.34)

Chevron El Segundo Refinery
Safety, Compliance and Optimization Project
SCAQMD Localized Significance Threshold Analysis

February 2008

Prepared for: Chevron El Segundo Refinery

By: Environmental Audit, Inc.

INTRODUCTION

The Chevron El Segundo Refinery, located at 324 West El Segundo Boulevard, in the City of El Segundo, is proposing a project at its El Segundo Refinery (Refinery) to increase the reliability, flexibility and capacity of specific Refinery equipment. The overall focus of this project is to increase the reliability of the Refinery's existing equipment, increase the capacity of certain existing equipment, and optimize the ability of specific processes to increase production of transportation fuels and other chemical products derived from the refining process. The Product Reliability and Optimization (PRO) project includes modifications to existing specific process units, and also new infrastructure that supports and links these units to other processes, units or facilities throughout the Refinery. The proposed project will involve physical changes and additions to multiple process units and operations as well as operational and functional improvements within the confines of the Refinery with no increase in crude throughput.

As part of the permitting process, Environmental Audit, Inc. (EAI) has calculated emissions to evaluate the potential localized impacts of criteria pollutants from construction activities as voluntarily required by South Coast Air Quality Management District (SCAQMD) Localized Significance Threshold Methodology. Criteria pollutants evaluated include carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter less than 10 microns in diameter (PM10), and particulate matter less than 2.5 microns (PM2.5) associated with the project. The results of this evaluation are provided below.

Based on information provided by Chevron, construction activities by month for the proposed project are calculated to determine the peak construction day. The peak construction day is expected to occur during January 2009 for CO and NO_2 and August 2008 for PM10. Construction activities included in this evaluation are the use of construction equipment, vehicle activities on-site (i.e., buses, contractors arriving and leaving the site), and fugitive dust emissions from earth moving activities. Criteria pollutants evaluated include CO, NO_2, PM10, and PM2.5 associated with the construction activities.

EMISSION ESTIMATES

Construction emission estimates for the peak day are calculated by each portion of the project that will be under construction during that period (see Table B-6). 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.

CRITERIA POLLUTANT IMPACT MODELING

In order to determine the groundlevel 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. Various construction areas are modeled as area sources with dimensions presented in Table B-6. The release height for all sources is 1.83 meters above the ground.

The location of the source is identified based on data provided by Chevron and the Venice USGS Quadrangle (see Figure B-1). The emissions for each pollutant are run in separate modeling runs using the emissions for each source in grams per second per square meter in the ISCST3 model. The ISCST3 model is run using the Long Beach 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 is not set to include algorithms to model the effects of building downwash on emissions since area sources are not influenced by building downwash in ISCST3.

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

The ISCST3 model is run using a receptor grid of 100 meters, and extends at least 1,000 meters in every cardinal direction from the boundaries of the refinery (see Figure B-1).

The maximum impact location is determined for the applicable averaging periods from the ISCST3 model output. The maximum groundlevel concentration and the Universal Tranverse Mercator (NAD 27) coordinates for each maximum impact point are presented in Table B-7.

CRITERIA POLLUTANT IMPACT ANALYSIS

The project construction maximum groundlevel concentrations are compared to the significance thresholds established in SCAQMD Rule 1303, Appendix A, Table A-2 for CO and NO_2 to demonstrate that construction emissions 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 (Source No. 3) is used to establish background levels of CO and NO_2. Table B-8 identifies the ambient air quality data for CO and NO_2 published by the SCAQMD in the last three years (2004,

2005, and 2006). PM10 and PM2.5 are compared to 10.4 micrograms per cubic meter ($\mu g/m^3$), which is comparable to the requirement in Rule 403. PM10 and PM2.5 are evaluated differently that CO and NO_2 because PM10 in nearly the entire district exceeds the state or federal PM10 and PM2.5 standards.

The CO 1-hour, CO 8-hour, NO_2 1-hour, and NO_2 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 B-9.

The maximum CO impact concentrations for 1-hour and 8-hour averages are 179.1 and 68.9 $\mu g/m^3$, respectively. The maximum NO_2 impact concentrations for 1-hour and annual averages are 187.7 and 4.7 $\mu g/m^3$, respectively because NO_2 formation from nitrogen oxides (NOx) is a function of distance from the source (see SCAQMD Localized Significance Threshold Methodology (June 2003), page 2-8 for further discussion). Therefore, the maximum NO_2 1-hour and annual impact concentrations have been adjusted by a factor of 0.9 to account for the distance from the source to the receptor. The maximum PM10 impact concentration for 24-hour average is 9.7 $\mu g/m^3$. PM2.5 is a fraction of PM2.5. Therefore, the PM2.5 impact concentration for 24-hour average will be less than 9.7 $\mu g/m^3$.

The localized significance threshold analysis results in no significant change in air quality from construction activities for NO_2, CO, PM10, or PM2.5. Therefore, the proposed project complies with the localized significance threshold methodology.

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Attachments

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TABLES

Table B-6. Peak Day Calculated Construction Emissions and Source Dimensions[1]

Phase	Source Description	Source Name	Emissions (lb/day)			Emissions (g/s)			Area of Source (m^2)	Emissions (g/s-m^2)		
			CO	NOx	PM10[2][3]	CO	NOx	PM10		CO	NOx	PM10
Aug '08 - Peak PM10	Cogen Train D	Area1	N/A	N/A	0.00E+00	N/A	N/A	0.00E+00	4180	N/A	N/A	0.00E+00
Aug '08 - Peak PM10	VRDS Modifications	Area2	N/A	N/A	2.02E+01	N/A	N/A	2.55E-01	17570	N/A	N/A	1.45E-05
Aug '08 - Peak PM10	Alky Modifications	Area3	N/A	N/A	2.03E+01	N/A	N/A	2.55E-01	28090	N/A	N/A	9.09E-06
Aug '08 - Peak PM10	Sulfur Recovery Facility	Area4	N/A	N/A	3.88E+01	N/A	N/A	4.88E-01	4640	N/A	N/A	0.000105
Aug '08 - Peak PM10	FCC Modifications	Area5	N/A	N/A	2.18E+01	N/A	N/A	2.74E-01	13820	N/A	N/A	1.98E-05
Aug '08 - Peak PM10	Cooling Tower	Area6	N/A	N/A	4.37E+00	N/A	N/A	5.50E-02	1490	N/A	N/A	3.69E-05
Aug '08 - Peak PM10	Isomax Modifications	Area7	N/A	N/A	0.00E+00	N/A	N/A	0.00E+00	33980	N/A	N/A	0
Aug '08 - Peak PM10	Tanks/Loading Racks	Area8	N/A	N/A	5.73E+00	N/A	N/A	7.22E-02	3715	N/A	N/A	1.94E-05
Aug '08 - Peak PM10	New Safety Flare	Area9	N/A	N/A	1.86E+01	N/A	N/A	2.34E-01	3715	N/A	N/A	6.31E-05
Aug '08 - Peak PM10	Tanks/Loading Racks	Area10	N/A	N/A	5.73E+00	N/A	N/A	7.22E-02	7190	N/A	N/A	1E-05
Aug '08 - Peak PM10	Tanks/Loading Racks	Area11	N/A	N/A	5.73E+00	N/A	N/A	7.22E-02	3620	N/A	N/A	1.99E-05
Aug '08 - Peak PM10	Tanks/Loading Racks	Area12	N/A	N/A	5.73E+00	N/A	N/A	7.22E-02	750	N/A	N/A	9.62E-05
Aug '08 - Peak PM10	OSBL/Edison/Basin	Area13	N/A	N/A	2.39E+01	N/A	N/A	3.01E-01	74320	N/A	N/A	4.05E-06
Aug '08 - Peak PM10	New Safety Flare	Parea1	N/A	N/A	1.49E+00	N/A	N/A	1.88E-02	13980	N/A	N/A	1.35E-06
Aug '08 - Peak PM10	FCC laydown area	Parea3	N/A	N/A	2.83E+00	N/A	N/A	3.57E-02	32160	N/A	N/A	1.11E-06
Aug '08 - Peak PM10	OSBL laydown area	Parea4	N/A	N/A	1.82E+00	N/A	N/A	2.29E-02	18960	N/A	N/A	1.21E-06
Jan '09 - Peak CO/NOx	Cogen Train D	Area1	4.35E+01	4.71E+01	N/A	2.74E-01	2.97E-01	N/A	4180	6.55E-05	7.10E-05	N/A
Jan '09 - Peak CO/NOx	VRDS Modifications	Area2	3.93E+01	5.49E+01	N/A	2.47E-01	3.46E-01	N/A	17570	1.41E-05	1.97E-05	N/A
Jan '09 - Peak CO/NOx	Alky Modifications	Area3	5.59E+01	5.84E+01	N/A	3.52E-01	3.68E-01	N/A	28090	1.25E-05	1.31E-05	N/A
Jan '09 - Peak CO/NOx	Sulfur Recovery Facility	Area4	7.94E+01	7.66E+01	N/A	5.00E-01	4.83E-01	N/A	4640	1.08E-04	1.04E-04	N/A
Jan '09 - Peak CO/NOx	FCC Modifications	Area5	8.86E+01	1.61E+02	N/A	5.58E-01	1.01E+00	N/A	13820	4.04E-05	7.33E-05	N/A
Jan '09 - Peak CO/NOx	Cooling Tower	Area6	3.00E+01	4.06E+01	N/A	1.89E-01	2.56E-01	N/A	1490	1.27E-04	1.72E-04	N/A
Jan '09 - Peak CO/NOx	Isomax Modifications	Area7	7.45E+01	7.22E+01	N/A	4.69E-01	4.55E-01	N/A	33980	1.38E-05	1.34E-05	N/A
Jan '09 - Peak CO/NOx	Tanks/Loading Racks	Area8	1.66E+01	1.38E+01	N/A	1.04E-01	8.70E-02	N/A	3715	2.81E-05	2.34E-05	N/A
Jan '09 - Peak CO/NOx	New Safety Flare	Area9	1.99E+01	3.41E+01	N/A	1.25E-01	2.15E-01	N/A	3715	3.37E-05	5.79E-05	N/A
Jan '09 - Peak CO/NOx	Tanks/Loading Racks	Area10	1.66E+01	1.38E+01	N/A	1.04E-01	8.70E-02	N/A	7190	1.45E-05	1.21E-05	N/A
Jan '09 - Peak CO/NOx	Tanks/Loading Racks	Area11	1.66E+01	1.38E+01	N/A	1.04E-01	8.70E-02	N/A	3620	2.88E-05	2.40E-05	N/A
Jan '09 - Peak CO/NOx	Tanks/Loading Racks	Area12	1.66E+01	1.38E+01	N/A	1.04E-01	8.70E-02	N/A	750	1.39E-04	1.16E-04	N/A
Jan '09 - Peak CO/NOx	OSBL/Edison/Basin	Area13	8.16E+01	1.19E+02	N/A	5.14E-01	7.47E-01	N/A	74320	6.92E-06	1.01E-05	N/A
Jan '09 - Peak CO/NOx	New Safety Flare	Parea1	8.55E+00	3.19E+00	N/A	5.39E-02	2.01E-02	N/A	13980	3.85E-06	1.44E-06	N/A
Jan '09 - Peak CO/NOx	FCC laydown area	Parea3	8.98E+01	1.33E+01	N/A	5.66E-01	8.38E-02	N/A	32160	1.76E-05	2.60E-06	N/A
Jan '09 - Peak CO/NOx	OSBL laydown area	Parea4	1.85E+01	4.14E+00	N/A	1.17E-01	2.61E-02	N/A	18960	6.15E-06	1.38E-06	N/A

(1) Emissions were allocated to each source by engineering estimates.

(2) PM10 emissions adjusted to remove off-site on-road fugitive dust emissions.

(3) The PM2.5 and PM10 significance thresholds are the same, since PM2.5 is a fraction of PM10 and PM10 is not significant for LST, PM2.5 is also not significant.

Table B-7. ISCST3 Modeling Results for November 2007 Peak Day Construction Emissions

Criteria Pollutant	Averaging Period	August 2008 Peak PM10 Max Conc. ($\mu g/m^3$)	January 2009 Peak CO/NOx Max Conc. ($\mu g/m^3$)	Absolute Max Conc. ($\mu g/m^3$)	UTM Coordinates	
					Easting	Northing
CO	1-hr	N/A	179.07	179.07	369254	3753640
	8-hr	N/A	68.88	68.88	369354	3753640
NO_2[(1)]	1-hr	N/A	187.68	187.68	369754	3753640
	Annual	N/A	4.71	4.71	369754	3753640
PM10	24-hr	9.74	N/A	9.74	369854	3751840
PM2.5[(2)]	24-hr	<9.74	N/A	<9.74	369854	3751840

(1) Project Construction Emissions adjusted to NO2 from NOx based on distance to receptor of 3000 meters for the 1-hour and annual averages. (See Table 2-4 of the SCAQMD Localized Significance Threshold Methodology, June 2003.)

(2) The PM2.5 and PM10 significance thresholds are the same, since PM2.5 is a fraction of PM10 and PM10 is not significant for LST, PM2.5 is also not significant.

Table B-8. Maximum Ambient Concentration Data[1]

Criteria Pollutant	Averaging Period	Concentration (ppm)			Max Conc.	
		2004[2]	2005	2006	(ppm)	($\mu g/m^3$)
CO	1-hr	6	3	3	6	6896.40
	8-hr	4.4	2.1	2.3	4.4	5057.36
NO_2	1-hr	0.09	0.09	0.1	0.1	188.80
	Annual	N/A	0.0134	0.0155	0.0155	29.26

(1) Data from Southwest Coastal LA County Station (No. 820)

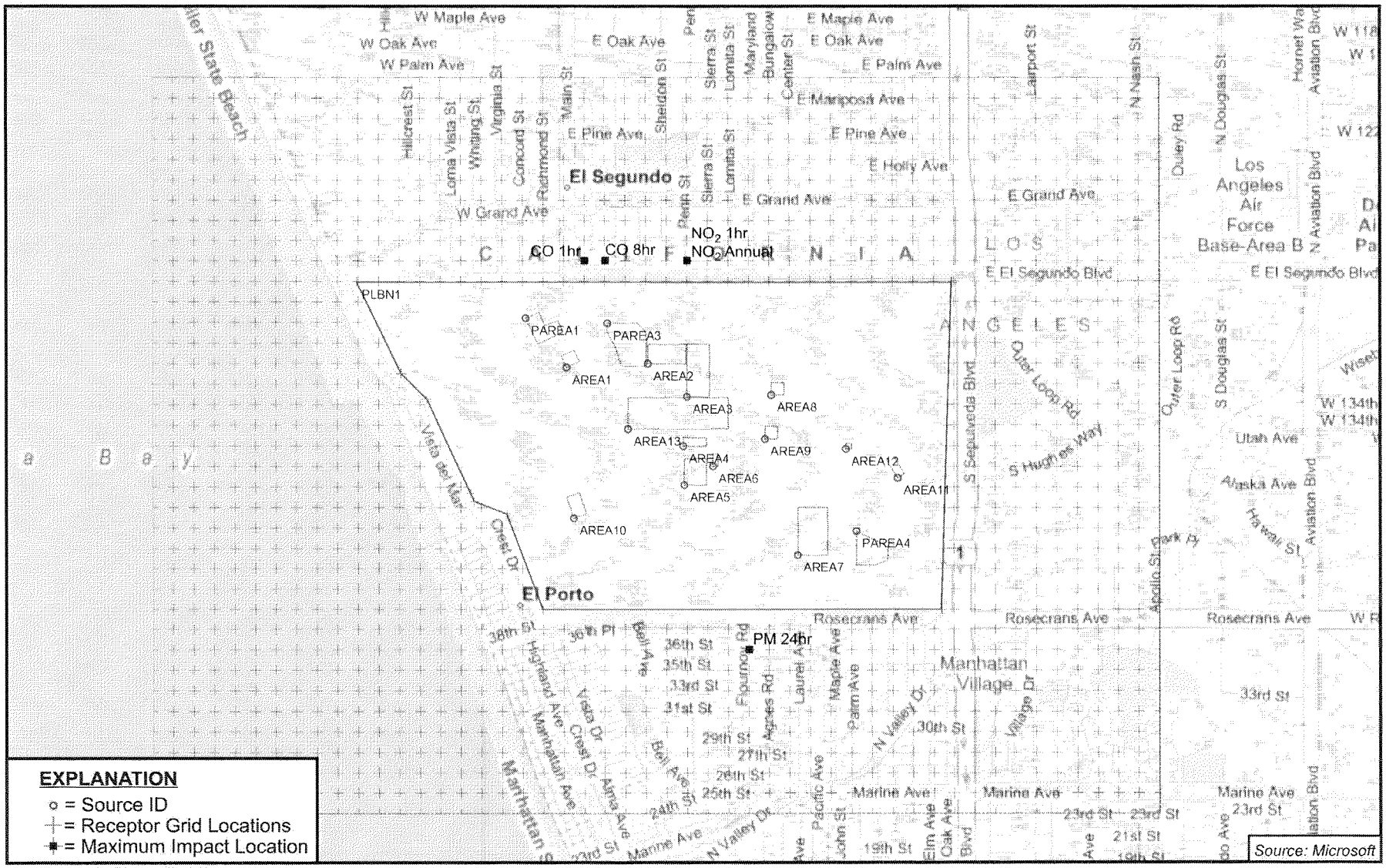
(2) Concentration readings were split between two stations in 2004. The highest 1-hr and 8-hr concentrations from the two stations were used. Annual averages were excluded.

Table B-9. Localized Significance Threshold Evaluation for Construction Emissions

Criteria Pollutant	Averaging Period	Ambient Background Conc. ($\mu g/m^3$)	Calculated Concentration ($\mu g/m^3$)	Total Conc. ($\mu g/m^3$)	Most Stringent Air Quality Standard ($\mu g/m^3$)	Localized Significance Threshold ($\mu g/m^3$)	Exceeds Threshold? Yes/No
CO	1-hr	6896.4	179.1	7075.5	23000		No
	8-hr	5057.4	68.9	5126.2	10000		No
NO_2	1-hr	188.8	187.7	376.5	500		No
	Annual	29.3	4.7	34.0	100		No
PM10	24-hr		9.7			10.4	No
PM2.5[(1)]	24-hr		<9.7			10.4	Yes

(1) The PM2.5 and PM10 significance thresholds are the same, since PM2.5 is a fraction of PM10 and PM10 is not significant for LST, PM2.5 is also not significant.

FIGURE



ENVIRONMENTAL AUDIT, INC.

CHEVRON EL SEGUNDO REFINERY
Localized Significance Threshold Evaluation

Project No. 2505

N:\2505-1\LST Analysis.cdr

Figure B-1

CO Hotspots Analysis

TABLE B-10
Chevron El Segundo Refinery
Product Reliability and Optimization Project
CO Hotspots Analysis
Traffic Data for Aviation Blvd. at El Segundo Blvd.

Movement	Lanes	Capacity	Year 2007		Forecast Year 2008		w/ Proposed Project		w/ All Projects	
			Volume	V/C	Volume	V/C	Volume	V/C	Volume	V/C
NB LEFT	1	1600	150	0.094	151	0.094	151	0.094	151	0.094
THRU	2	3200	901	0.329	906	0.33	906	0.33	906	0.33
RIGHT	0	0	151	0	152	0	152	0	152	0
NB Total			1202		1209		**1209**	0.424	1209	
SB LEFT	1	1600	242	0.151	243	0.152	243	0.152	243	0.152
THRU	2	3200	804	0.251	808	0.253	808	0.253	808	0.253
RIGHT	1	1600	78	0.049	78	0.049	78	0.049	78	0.049
SB Total			1124		1129		**1129**	0.454	1129	
EB LEFT	2	3120	221	0.071	222	0.071	222	0.071	222	0.071
THRU	3	4800	1145	0.239	1151	0.24	1151	0.24	1387	0.289
RIGHT	1	1600	247	0.154	248	0.155	248	0.155	259	0.162
EB Total			1613		1621		**1621**	0.466	1868	
WB LEFT	2	3120	608	0.195	611	0.196	611	0.196	611	0.196
THRU	3	4800	609	0.158	612	0.159	612	0.159	612	0.159
RIGHT	0	0	149	0	150	0	150	0	150	0
WB Total			1366		1373		**1373**	0.355	1373	
Intersection Volume			5305		5332		5332		5579	

Notes:

NB and SB is Aviation Blvd.

EB and WB is El Segundo Blvd.

El Segundo Blvd is the primary street with Aviation being secondary.

TABLE B-11
Chevron El Segundo Refinery
Product Reliability and Optimization Project
CO Hotspots Analysis

Reference Data

Reference CO Concentrations, Cri (ppm)[1]		Emission Rate, EFi (grams/mile)[2]		Averaging	Ambient Concentration, Co (ppm)[3]		
Roadway	At Edge	Year	CO	Period	2005	2006	Avg.
Primary Road	12.95	2008	4.05	1-hr	3	3	3
Secondary Road	3.7			8-hr	2.1	2.3	2.2

(1) Interpolated for 3 lane primary road and as written for 2 land secondary road from BAAQMD CEQA Guidlelines, Table 12.

(2) Inerpolated for model year 2008 from BAAQMD CEQA Guidelines, Table 10.

(3) For Receptor Areas Location 3 - Southwest Coastal LA County

Roadway Contributions

$C_i = C_{ri} * V_i * EF_i / 100{,}000$

where, C_i = is the individual road contribution, V_i = the traffic volume from the individual roadway, and

C_{ri} = the reference case concentration, EF_i = the emission factor for the individual roadway.

Roadway	Cri	Vi	EFi	Ci
NB	3.7	1209	4.05	0.18
SB	3.7	1129	4.05	0.17
EB	12.95	1621	4.05	0.85
WB	12.95	1373	4.05	0.72
Total at Intersection, Ct				1.92

Significance Evaluation

Averaging Period	C_o	C_t	C (ppm)	C ($\mu g/m^3$)	Most Stringent Air Quality Standard ($\mu g/m^3$)	Exceeds Threshold? Yes/No
1-hr	3	1.92	4.92	5656	23000	NO
8-hr	2.2	1.34	3.54	4074	10000	NO

$C = C_o + C_t$