APPENDIX B

PEAK EMISSION CALCULATIONS

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BP CARSON REFINERY
SAFETY, COMPLIANCE, AND OPTIMIZATION PROJECT

APPENDIX B
PEAK EMISSION CALCULATIONS

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Table B-1
Construction Equipment Emission Factors

Construction Equipment

Equipment Type	Fuel	Hp	Load[1]	Emission Factors lb/hp-hr[2]					Emission Factors lb/hr[3]				
				CO	VOC	NOx	SOx	PM10	CO	VOC	NOx	SOx	PM10
Backhoe Case 580	Diesel	75	46.5%	0.015	0.003	0.022	0.002	0.001	0.523	0.105	0.767	0.070	0.035
Bobcat Mod. 873	Diesel	75	46.5%	0.015	0.003	0.022	0.002	0.001	0.523	0.105	0.767	0.070	0.035
Compressor	Diesel	49	48.0%	0.011	0.002	0.018	0.002	0.001	0.259	0.047	0.423	0.047	0.024
Concrete Saw	Gasoline	13	78.0%	0.003	0.043	0.004	0.001	0.000	0.030	0.436	0.041	0.005	0.003
Crane	Diesel	250	43.0%	0.009	0.003	0.023	0.002	0.002	0.968	0.323	2.473	0.215	0.161
Crane (Large)	Diesel	408	43.0%	0.009	0.003	0.023	0.002	0.002	1.579	0.526	4.035	0.351	0.263
Drill Rig Large	Diesel	300	43.0%	0.020	0.003	0.024	0.002	0.002	2.580	0.387	3.096	0.258	0.194
Excavator	Diesel	250	58.0%	0.011	0.001	0.024	0.002	0.002	1.595	0.145	3.480	0.290	0.218
Forklift	Diesel	79	30.0%	0.013	0.003	0.031	0.002	0.002	0.308	0.071	0.735	0.047	0.036
Front End Loader	Diesel	210	46.5%	0.015	0.003	0.022	0.002	0.001	1.465	0.293	2.148	0.195	0.098
Generator[4]	Diesel	250							0.635	0.176	2.499	0.002	0.086
Manlift	Diesel	65	50.5%	0.013	0.003	0.031	0.002	0.002	0.427	0.098	1.018	0.066	0.066
Roll-Off Truck[5]	Diesel								1.800	0.190	4.170	0.450	0.260
Temp. Light Plants	Diesel	13	82.0%	0.011	0.002	0.018	0.002	0.001	0.117	0.021	0.192	0.021	0.011
Tractor/40' Float	Diesel	185	46.5%	0.015	0.003	0.022	0.002	0.001	1.290	0.258	1.893	0.172	0.086
Water Truck	Diesel	207	38.0%	0.010	0.002	0.024	0.002	0.001	0.787	0.157	1.888	0.157	0.079
Welding Machine 300 Amp	Diesel	49	45.0%	0.011	0.002	0.018	0.002	0.001	0.243	0.044	0.397	0.044	0.022

(1) Default load factors from SCAQMD CEQA Air Quality Handbook, Table 9-8-D.

(2) Emission factors from SCAQMD CEQA Air Quality Handbook, Table 9-8-B, unless otherwise noted.

(3)Emission Factor (lbs/hr) = Hp x Load x emission factor (lbs/hp-hr).

(4) http://www.aqmd.gov/ceqa/handbook/offroad/offroadEF05_20.xls

(5)Emissions factors from SCAQMD CEQA Air Quality Handbook, Table 9-8-A. Units are in lbs/hr.

Table B-2
Construction Equipment Emissions

Construction Equipment - December 2006

Equipment Type	Number	Hours Per Day	Emission Factors lb/hr					Daily Emissions (lbs/day)				
			CO	VOC	NOx	SOx	PM10	CO	VOC	NOx	SOx	PM10
Backhoe Case 580	4	8	0.523	0.105	0.767	0.070	0.035	16.74	3.35	24.55	2.23	1.12
Bobcat Mod. 873	1	8	0.523	0.105	0.767	0.070	0.035	4.19	0.84	6.14	0.56	0.28
Compressor	3	8	0.259	0.047	0.423	0.047	0.024	6.21	1.13	10.16	1.13	0.56
Concrete Saw	4	8	0.030	0.436	0.041	0.005	0.003	0.97	13.95	1.30	0.16	0.08
Crane	6	8	0.968	0.323	2.473	0.215	0.161	46.44	15.48	118.68	10.32	7.74
Crane (Large)	0	8	1.579	0.526	4.035	0.351	0.263	0.00	0.00	0.00	0.00	0.00
Drill Rig Large	1	8	2.580	0.387	3.096	0.258	0.194	20.64	3.10	24.77	2.06	1.55
Excavator	2	8	1.595	0.145	3.480	0.290	0.218	25.52	2.32	55.68	4.64	3.48
Forklift	3	8	0.308	0.071	0.735	0.047	0.036	7.39	1.71	17.63	1.14	0.85
Front End Loader	3	8	1.465	0.293	2.148	0.195	0.098	35.15	7.03	51.56	4.69	2.34
Generator	1	8	0.635	0.176	2.499	0.002	0.086	5.08	1.41	19.99	0.02	0.69
Manlift	4	8	0.427	0.098	1.018	0.066	0.066	13.66	3.15	32.56	2.10	2.10
Roll-Off Truck	7	4	1.800	0.190	4.170	0.450	0.260	50.40	5.32	116.76	12.60	7.28
Temp. Light Plants	0	12	0.117	0.021	0.192	0.021	0.011	0.00	0.00	0.00	0.00	0.00
Tractor/40' Float	1	8	1.290	0.258	1.893	0.172	0.086	10.32	2.06	15.14	1.38	0.69
Water Truck	1	8	0.787	0.157	1.888	0.157	0.079	6.29	1.26	15.10	1.26	0.63
Welding Machine 300 Amp	3	8	0.243	0.044	0.397	0.044	0.022	5.82	1.06	9.53	1.06	0.53
Total Emission Totals	44							254.83	63.16	519.55	45.34	29.92

Table B-3
Construction Equipment Emissions

Construction Equipment - November 2007

Equipment Type	Number	Hours Per Day	Emission Factors lb/hr					Daily Emissions (lbs/day)				
			CO	VOC	NOx	SOx	PM10	CO	VOC	NOx	SOx	PM10
Backhoe Case 580	1	8	0.523	0.105	0.767	0.070	0.035	4.19	0.84	6.14	0.56	0.28
Bobcat Mod. 873	0	8	0.523	0.105	0.767	0.070	0.035	0.00	0.00	0.00	0.00	0.00
Compressor	6	8	0.259	0.047	0.423	0.047	0.024	12.42	2.26	20.32	2.26	1.13
Concrete Saw	1	8	0.030	0.436	0.041	0.005	0.003	0.24	3.49	0.32	0.04	0.02
Crane	22	8	0.968	0.323	2.473	0.215	0.161	170.28	56.76	435.16	37.84	28.38
Crane (Large)	5	8	1.579	0.526	4.035	0.351	0.263	63.16	21.05	161.40	14.04	10.53
Drill Rig Large	3	8	2.580	0.387	3.096	0.258	0.194	61.92	9.29	74.30	6.19	4.64
Excavator	2	8	1.595	0.145	3.480	0.290	0.218	25.52	2.32	55.68	4.64	3.48
Forklift	11	8	0.308	0.071	0.735	0.047	0.036	27.11	6.26	64.65	4.17	3.13
Front End Loader	0	8	1.465	0.293	2.148	0.195	0.098	0.00	0.00	0.00	0.00	0.00
Generator	11	8	0.635	0.176	2.499	0.002	0.086	55.88	15.49	219.91	0.18	7.57
Manlift	13	8	0.427	0.098	1.018	0.066	0.066	44.38	10.24	105.83	6.83	6.83
Roll-Off Truck	6	4	1.800	0.190	4.170	0.450	0.260	43.20	4.56	100.08	10.80	6.24
Temp. Light Plants	13	12	0.117	0.021	0.192	0.021	0.011	18.29	3.33	29.93	3.33	1.66
Tractor/40' Float	3	8	1.290	0.258	1.893	0.172	0.086	30.97	6.19	45.42	4.13	2.06
Water Truck	4	8	0.787	0.157	1.888	0.157	0.079	25.17	5.03	60.41	5.03	2.52
Welding Machine 300 Amp	46	8	0.243	0.044	0.397	0.044	0.022	89.26	16.23	146.06	16.23	8.11
Total Emission Totals	147							671.99	163.33	1525.63	116.26	86.58

Table B-4
On-site/Off-site Construction Vehicle Emissions - December 2006

On Road Mobile Emission Factors from California ARB EMFAC2002 Scenario Year 2006 (Model Years 1965 to 2008)

Vehicle Type	CO Emissions Factor (lb/mile)	VOC Emission Factor (lb/mile)	NOx Emissions Factor (lb/mile)	SOx Emissions Factor (lb/mile)	PM10 Emissions Factor (lb/mile)
Construction Workers Commuting	0.013925	0.001497	0.001489	0.000009	0.00008
Pickup Trucks	0.013925	0.001497	0.001489	0.000009	0.00008
Bus	0.019135	0.002779	0.026756	0.000248	0.000483083
Boom Trucks	0.019135	0.002779	0.026756	0.000248	0.000483083
Stakebed Trucks	0.019135	0.002779	0.026756	0.000248	0.000483083
Flatbed Trucks	0.019135	0.002779	0.026756	0.000248	0.000483083
Delivery Trucks	0.019135	0.002779	0.026756	0.000248	0.000483083

	Parameters				Peak Day Emissions, lbs/day				
Source	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
Construction Workers Commuting	125	2	16.2	4050.0	56.40	6.06	6.03	0.04	0.32
Pickup Trucks	13	1	10.0	130.0	1.81	0.19	0.19	0.00	0.01
Bus	5	1	4.0	20.0	0.38	0.06	0.54	0.00	0.01
Boom Trucks	2	1	10.0	20.0	0.38	0.06	0.54	0.00	0.01
Stakebed Trucks	2	1	10.0	20.0	0.38	0.06	0.54	0.00	0.01
Flatbed Trucks	4	1	10.0	40.0	0.77	0.11	1.07	0.01	0.02
Delivery Trucks	33	1	30	990	18.94	2.75	26.49	0.25	0.48
Totals					79.06	9.29	35.39	0.31	0.86

Based on California ARB EMFAC2002 model years 1965-2008, state-wide annual simple averages (www.aqmd.gov/ceqa/handbook/onroadEF03_25.xls)

Peak Day Emissions = Emission Factor x Distance Travelled per Day

Table B-5
On-site/Off-site Construction Vehicle Emissions - November 2007

On Road Mobile Emission Factors from California ARB EMFAC2002 Scenario Year 2007 (Model Years 1965 to 2008)

Vehicle Type	CO Emissions Factor (lb/mile)	VOC Emission Factor (lb/mile)	NOx Emissions Factor (lb/mile)	SOx Emissions Factor (lb/mile)	PM10 Emissions Factor (lb/mile)
Construction Workers Commuting	0.01282	0.001383	0.001361	0.000009	0.00008
Pickup Trucks	0.01282	0.001383	0.001361	0.000009	0.00008
Bus	0.017455	0.002608	0.024978	0.000033	0.000439664
Boom Trucks	0.017455	0.002608	0.024978	0.000033	0.000439664
Stakebed Trucks	0.017455	0.002608	0.024978	0.000033	0.000439664
Flatbed Trucks	0.017455	0.002608	0.024978	0.000033	0.000439664
Delivery Trucks	0.017455	0.002608	0.024978	0.000033	0.000439664

	Parameters				Peak Day Emissions, lbs/day				
Source	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
Construction Workers Commuting	740	2	16.2	23976.0	307.37	33.16	32.63	0.22	1.92
Pickup Trucks	36	1	10.0	360.0	4.62	0.50	0.49	0.00	0.03
Bus	10	1	4.0	40.0	0.70	0.10	1.00	0.00	0.02
Boom Trucks	6	1	10.0	60.0	1.05	0.16	1.50	0.00	0.03
Stakebed Trucks	8	1	10.0	80.0	1.40	0.21	2.00	0.00	0.04
Flatbed Trucks	12	1	10.0	120.0	2.09	0.31	3.00	0.00	0.05
Delivery Trucks	89	1	30	2670	46.60	6.96	66.69	0.09	1.17
Totals					363.83	41.40	107.31	0.32	3.25

Based on California ARB EMFAC2002 model years 1965-2008, state-wide annual simple averages (www.aqmd.gov/ceqa/handbook/onroadEF03_25.xls)

Peak Day Emissions = Emission Factor x Distance Travelled per Day

Table B-6

Fugitive Construction
Emission Estimates - December 2006

REFINERY CONSTRUCTION

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]	0	6	8	5.837	0.5	0.00	140.09	0	280.1898521	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]	0	77.8	0.0035	0.5	0	0.13615	0	0.2723	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	22	0	0.032	19.800	0.000	0.634	0.000	0.007	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]	0	77.8	0.02205	0.5	0	0.857745	0	1.71549	Table A9-9
Truck Dumping	0	77.8	0.009075	0.5	0	0.3530175	0	0.706035	Table A9-9

TOTAL PM10 Pounds/day		Average	Peak
(Controlled Emissions)	Construction	0.0000	140.86468
(Uncontrolled Emissions)		0.000	283.517
Mitigated Emissions (assumes water 3 times/day)[5]		0.000	96.396

(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 (100,000 lbs); 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)

Table B-7

Fugitive Construction
Emission Estimates - November 2007

REFINERY CONSTRUCTION

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]	0	3	8	5.837	0.5	0.00	70.05	0	140.094926	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]	0	33.3	0.0035	0.5	0	0.058275	0	0.11655	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	22	0	0.004	19.800	0.000	0.079	0.000	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]	0	33.3	0.02205	0.5	0	0.3671325	0	0.734265	Table A9-9
Truck Dumping	0	33.3	0.009075	0.5	0	0.15109875	0	0.3021975	Table A9-9

TOTAL PM10 Pounds/day		Average	Peak
(Controlled Emissions)	Construction	0.0000	70.18494
(Uncontrolled Emissions)		0.000	141.327
Mitigated Emissions (assumes water 3 times/day)[5]		0.000	48.051

(1) Emissions (lbs/hr) = [0.75 x $(G^{1.5})/(H^{1.4})$ x 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 x $[(G/5)^{1.3}/(H/2)^{1.4}]$ x I/J; where G=mean wind speed (12 mph), H=moisture content of surface material (2%); I=lbs of dirt handled per day (100,000 lbs); and J=2,000 lbs/ton
(3) Emissions (lbs/day/acre) = 1.7 x [(G/1.5)/(365-H/235)] x I/15 x J; where G = silt content (7.5%); H = days with >0.01 inch of rain (34); I = percentage of time wind speed exceeds 12 mph (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)

Table B-8

Fugitive Dust Construction Emission Estimates From Trucks and Employee Vehicles - December 2006

Source Type	Number	Fuel	Peak Daily Trips	One-way Distance	Emission Factor (lb/vmt)	Peak PM-10 (lbs/day)
Passenger Vehicle/ On Paved Roadways	125	Gasoline	2	16.2	0.000386	1.56
On-site cars	0	Gasoline	1	2.5	0.000386	0.00
Light Duty Trucks on Paved Roadways	13	Gasoline	1	10	0.00213	0.28
Buses	5	Diesel	1	4	0.02013	0.40
Trucks on Paved Roadways	33	Diesel	1	30	0.02013	19.93
Trucks on Paved Roadways - Onsite	8	Diesel	1	10	0.02013	1.61
Total	184					23.78

* 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 cars; 5 for pickup 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-9

Fugitive Dust Construction Emission Estimates From Trucks and Employee Vehicles - November 2007

Source Type	Number	Fuel	Peak Daily Trips	One-way Distance	Emission Factor (lb/vmt)	Peak PM-10 (lbs/day)
Passenger Vehicle/ On Paved Roadways	740	Gasoline	2	16.2	0.000386	9.25
On-site cars	0	Gasoline	1	2.5	0.000386	0.00
Light Duty Trucks on Paved Roadways	36	Gasoline	1	10	0.00213	0.77
Buses	10	Diesel	1	4	0.02013	0.81
Trucks on Paved Roadways	89	Diesel	1	30	0.02013	53.75
Trucks on Paved Roadways - Onsite	26	Diesel	1	10	0.02013	5.23
Total	901					69.81

* 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 cars; 5 for pickup 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-10
Paint Primer Architectural Coating Emissions

Dec-06

Activity	Amount	Notes
Volume Applied (gallons/day)	0	
VOC Content (lb/gallon)	3.51	SCAQMD Rule 1113 Limit
VOC Emissions (lbs/day)	0	

Nov-07

Activity	Amount	Notes
Volume Applied (gallons/day)	13	
VOC Content (lb/gallon)	3.51	SCAQMD Rule 1113 Limit
VOC Emissions (lbs/day)	45.63	

* Emission Calculations from SCAQMD CEQA Air Quality Handbook, Table A9-9

Table B-11

CONSTRUCTION SUMMARY

Construction Period		Estimated Emissions - 12/06				
		CO	VOC	NOx	SOx	PM10
Construction Equipment		254.83	63.16	519.55	45.34	29.92
Vehicle Emissions		79.06	9.29	35.39	0.31	0.86
Fugitive Construction		0.00	0.00	0.00	0.00	96.40
Fugitive Road Dust		0.00	0.00	0.00	0.00	23.78
Architectural Coatings		0.00	0.00	0.00	0.00	0.00
TOTAL EMISSIONS		333.89	72.45	554.94	45.65	150.96
SCAQMD Thresholds		550	75	100	150	150
Significant		No	No	Yes	No	Yes

Construction Period		Estimated Emissions - 11/07				
		CO	VOC	NOx	SOx	PM10
Construction Equipment		671.99	163.33	1525.63	116.26	86.58
Vehicle Emissions		363.83	41.40	107.31	0.32	3.25
Fugitive Construction		0.00	0.00	0.00	0.00	48.05
Fugitive Road Dust		0.00	0.00	0.00	0.00	69.81
Architectural Coatings		0.00	45.63	0.00	0.00	0.00
TOTAL EMISSIONS		1035.82	250.37	1632.94	116.57	207.69
SCAQMD Thresholds		550	75	100	150	150
Significant		Yes	Yes	Yes	No	Yes

Peak Value

~~Table B - 12~~
~~ATTACHMENT AQ-6~~
~~FUGITIVE COMPONENT COUNTS AND VOC EMISSIONS~~
~~FFHDS PROJECT~~

~~Component Type~~		~~Service~~	~~Total Existing Components~~	~~Number of Components Removed~~	~~Number of Components Added~~	~~Net Number of Components Added~~	~~Final Component Count~~	~~Emission Factor (lb/yr/ component)~~	~~Net Change in Annual VOC Emissions (lbs/yr)~~
~~Valves~~	~~Sealed Bellows~~	~~Gas/Vapor and Light Liquid~~	~~57~~	~~0~~	~~157~~	~~157~~	~~214~~	~~0~~	~~0~~
	~~AQMD Approved I&M Program~~	~~Fuel & Natural Gas~~	~~0~~	~~6~~	~~6~~	~~0~~	~~0~~	~~12~~	~~0~~
		~~Gas Vapor~~	~~846~~	~~3~~	~~81~~	~~78~~	~~924~~	~~23~~	~~1794~~
		~~Light Liquid~~	~~227~~	~~0~~	~~180~~	~~180~~	~~407~~	~~19~~	~~3420~~
		~~Heavy Liquid~~	~~0~~	~~15~~	~~20~~	~~5~~	~~5~~	~~3~~	~~15~~
~~Pumps~~	~~Sealless Type~~	~~Light Liquid~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~
	~~Double Mechanical Seals or Equivalent~~	~~Light Liquid~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~104~~	~~0~~
	~~Single Mechanical Seal~~	~~Heavy Liquid~~	~~29~~	~~0~~	~~0~~	~~0~~	~~29~~	~~80~~	~~0~~
~~Compressor~~		~~Gas/Vapor~~	~~3~~	~~0~~	~~0~~	~~0~~	~~3~~	~~514~~	~~0~~
~~Flanges~~		~~All~~	~~4568~~	~~47~~	~~344~~	~~297~~	~~4865~~	~~1.5~~	~~446~~
~~Pressure Relief Valves~~		~~All~~	~~21~~	~~0~~	~~4~~	~~4~~	~~25~~	~~0~~	~~0~~
~~Process Drains~~		~~All~~	~~78~~	~~0~~	~~0~~	~~0~~	~~78~~	~~80~~	~~0~~
								~~Total lbs/year:~~	~~5,675~~
								~~Total lbs/day:~~	~~15.55~~

~~Notes:~~

~~(1) Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of kerosene (>0.1 psia @ 100 deg. F or 689 Pa @ 38 deg.C), based on the most volatile class of liquid at >20% by volume.~~

~~(2) The non-bellows seal valves (BSV) include valves in instrumentation service, control valve, and drains that are exempt from BSV requirements.~~

~~Flange Count Basis:~~

~~a. Flow Orifices = 2 flanges~~

~~b. Flanged Valve = 2 flanges; 3 with spectacle blind~~

~~c. All valves < 2" are socket welded installations - no flanges~~

Table B-12
FUGITIVE COMPONENT COUNTS AND VOC EMISSIONS
FFHDS PROJECT

Component Type		Service	Total Existing Components	Number of Components Removed	Number of Components Added	Net Number of Components Added	Final Component Count	Emission Factor (lb/yr/ component)	Net Change in Annual VOC Emissions (lbs/yr)
Valves	Sealed Bellows	Gas/Vapor and Light Liquid	146	0	97	**97**	243	0	0
	AQMD Approved I&M Program	Fuel & Natural Gas	0	0	0	**0**	0	12	0
		Gas Vapor	1599	9	99	**90**	1689	23	2070
		Light Liquid	222	0	160	**160**	382	19	3040
		Heavy Liquid	160	15	66	**51**	211	3	153
Pumps	Sealless Type	Light Liquid	0	0	0	**0**	0	0	0
	Double Mechanical Seals or Equivalent	Light Liquid	12	0	0	**0**	12	104	0
	Single Mechanical Seal	Heavy Liquid	5	0	0	**0**	5	80	0
Compressor		Gas/Vapor	4	0	0	**0**	4	514	0
Flanges		All	10422	47	331	**284**	10706	1.5	426
Pressure Relief Valves		All	39	0	4	**4**	43	0	0
Process Drains		All	179	0	2	**2**	181	80	160
								Total lbs/year:	**5,849**
								Total lbs/day:	**16.02**

Notes:

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

(2) The non-bellows seal valves (BSV) include valves in instrumentation service, control valve, and drains that are exempt from BSV requirements.

Flange Count Basis:

a. Flow Orifices = 2 flanges
b. Flanged Valve = 2 flanges; 3 with spectacle blind
c. All valves < 2" are socket welded installations - no flanges

Table B - 13
ATTACHMENT AQ-6
FUGITIVE COMPONENT COUNTS AND VOC EMISSIONS
FCC PRODUCT QUALITY UPGRADES PROJECT

Component Type		Service	Total Existing Components	Number of Components Removed	Number of Components Added	Net Number of Components Added	Final Component Count	Emission Factor (lb/yr/ component)	Net Change in Annual VOC Emissions (lbs/yr)
Valves	Sealed Bellows	Gas/Vapor and Light Liquid	201	4	185	**181**	382	0	0
	AQMD Approved I&M Program	Fuel & Natural Gas	0	0	0	**0**	0	12	0
		Gas Vapor	2017	2	0	**-2**	2015	23	-46
		Light Liquid	2197	50	25	**-25**	2172	19	-475
		Heavy Liquid	45	20	68	**48**	93	3	144
Pumps	Sealless Type	Light Liquid	0	0	1	**1**	1	0	0
	Double Mechanical Seals or Equivalent	Light Liquid	42	0	1	**1**	43	104	104
	Single Mechanical Seal	Heavy Liquid	45	0	1	**1**	46	80	80
Compressor		Gas/Vapor	2	0	0	**0**	2	514	0
Flanges		All	19701	86	169	**83**	19784	1.5	125
Pressure Relief Valves		All	68	0	8	**8**	76	0	0
Process Drains		All	245	5	10	**5**	250	80	400
								Total lbs/year:	**332**
								Total lbs/day:	**0.91**

Notes: volatile class of liquid at >20% by volume.

(2) The non-bellows seal valves (BSV) include valves in instrumentation service, control valve, and drains that are exempt from BSV requirements.

(3) Contingency of 30% is used for the project number of components added.

Flange Count Basis:

a. Flow Orifices = 2 flanges
b. Flanged Valve = 2 flanges; 3 with spectacle blind
c. All valves < or = 1" are socket welded installations - no flanges

Table B - 14
ATTACHMENT AQ-6
FUGITIVE COMPONENT COUNTS AND VOC EMISSIONS
ALKY MEROX MODIFICATIONS PROJECT

Component Type		Service	Total Existing Components	Number of Components Removed	Number of Components Added	Net Number of Components Added	Final Component Count	Emission Factor (lb/yr/ component)	Net Change in Annual VOC Emissions (lbs/yr)
Valves	Sealed Bellows	Gas/Vapor and Light Liquid	27	0	0	**0**	27	0	0
	AQMD Approved I&M Program	Fuel & Natural Gas	0	0	0	**0**	0	12	0
		Gas Vapor	7	2	0	**-2**	5	23	-46
		Light Liquid	83	15	0	**-15**	68	19	-285
		Heavy Liquid	0	0	0	**0**	0	3	0
Pumps	Sealless Type	Light Liquid	0	0	0	**0**	0	0	0
	Double Mechanical Seals or Equivalent	Light Liquid	7	0	0	**0**	7	104	0
	Single Mechanical Seal	Heavy Liquid	0	0	0	**0**	0	80	0
Compressor		Gas/Vapor	0	0	0	**0**	0	514	0
Flanges		All	117	32	0	**-32**	85	1.5	-48
Pressure Relief Valves		All	17	1	0	**-1**	16	0	0
Process Drains		All	33	1	0	**-1**	32	80	-80
								Total lbs/year:	**-459**
								Total lbs/day:	**-1.26**
								Contingency:	***6.26***
								Total lbs/day:	***5.00***

Notes:

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

(2) The non-bellows seal valves (BSV) include valves in instrumentation service, control valve, and drains that are exempt from BSV requirements.

Flange Count Basis:

a. Flow Orifices = 2 flanges
b. Flanged Valve = 2 flanges; 3 with spectacle blind
c. All valves < or = 1" are socket welded installations - no flanges

Table B - 15
ATTACHMENT AQ-6
FUGITIVE COMPONENT COUNTS AND VOC EMISSIONS
ALKY MODIFICATION PROJECT

Component Type		Service	Total Existing Components	Number of Components Removed	Number of Components Added	Net Number of Components Added	Final Component Count	Emission Factor (lb/yr/ component)	Net Change in Annual VOC Emissions (lbs/yr)
Valves	Sealed Bellows	Gas/Vapor and Light Liquid	193	0	3	**3**	196	0	0
	AQMD Approved I&M Program	Fuel & Natural Gas	0	0	0	**0**	0	12	0
		Gas Vapor	2626	0	0	**0**	2626	23	0
		Light Liquid	754	0	0	**0**	754	19	0
		Heavy Liquid	0	0	0	**0**	0	3	0
Pumps	Sealless Type	Light Liquid	0	0	0	**0**	0	0	0
	Double Mechanical Seals or Equivalent	Light Liquid	25	2	2	**0**	25	104	0
	Single Mechanical Seal	Heavy Liquid	2	0	0	**0**	2	80	0
Compressor		Gas/Vapor	1	0	0	**0**	1	514	0
Flanges		All	6883	0	8	**8**	6891	1.5	12
Pressure Relief Valves		All	63	1	1	**0**	63	0	0
Process Drains		All	60	0	0	**0**	60	80	0
								Total lbs/year:	**12**
								Total lbs/day:	**0.03**
								Contingency:	***4.97***
								Total lbs/day:	***5.00***

Notes:

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

(2) The non-bellows seal valves (BSV) include valves in instrumentation service, control valve, and drains that are exempt from BSV requirements.

(3) Contingency of 30% is used for the project number of components added.

Flange Count Basis:

a. Flow Orifices = 2 flanges
b. Flanged Valve = 2 flanges; 3 with spectacle blind
c. All valves < or = 1" are socket welded installations - no flanges

Table B - 16
ATTACHMENT AQ-6
FUGITIVE COMPONENT COUNTS AND VOC EMISSIONS
HYDROCRACKER MODIFICATIONS PROJECT

Component Type		Service	Total Existing Components	Number of Components Removed	Number of Components Added	Net Number of Components Added	Final Component Count	Emission Factor (lb/yr/ component)	Net Change in Annual VOC Emissions (lbs/yr)
Valves	Sealed Bellows	Gas/Vapor and Light Liquid	138	4	66	**62**	200	0	0
	AQMD Approved I&M Program	Fuel & Natural Gas	0	0	2	**2**	2	12	24
		Gas Vapor	1046	4	12	**8**	1054	23	184
		Light Liquid	475	0	0	**0**	475	19	0
		Heavy Liquid	0	97	62	**-35**	-35	3	-105
Pumps	Sealless Type	Light Liquid	0	0	0	**0**	0	0	0
	Double Mechanical Seals or Equivalent	Light Liquid	14	2	2	**0**	14	104	0
	Single Mechanical Seal	Heavy Liquid	15	0	0	**0**	15	80	0
Compressor		Gas/Vapor	3	0	0	**0**	3	514	0
Flanges		All	11402	98	156	**58**	11460	1.5	87
Pressure Relief Valves		All	18	1	2	**1**	19	0	0
Process Drains		All	152	0	0	**0**	152	80	0
								Total lbs/year:	**190**
								Total lbs/day:	**0.52**

Notes: (1) Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of kerosene (>0.1 psia @ 100 deg. F or 689 Pa @ 38 deg.C), based on the most volatile class of liquid at >20% by volume.

Table B-16
FUGITIVE COMPONENT COUNTS AND VOC EMISSIONS
HYDROCRACKER MODIFICATIONS PROJECT

Component Type		Service	Total Existing Components	Number of Components Removed	Number of Components Added	Net Number of Components Added	Final Component Count	Emission Factor (lb/yr/ component)	Net Change in Annual VOC Emissions (lbs/yr)
Valves	Sealed Bellows	Gas/Vapor and Light Liquid	7	4	55	**51**	58	0	0
	AQMD Approved I&M Program	Fuel & Natural Gas	0	0	0	**0**	0	12	0
		Gas Vapor	1339	4	15	**11**	1350	23	253
		Light Liquid	631	0	0	**0**	631	19	0
		Heavy Liquid	188	97	56	**-41**	147	3	-123
Pumps	Sealless Type	Light Liquid	0	0	0	**0**	0	0	0
	Double Mechanical Seals or Equivalent	Light Liquid	15	2	2	**0**	15	104	0
	Single Mechanical Seal	Heavy Liquid	27	0	0	**0**	27	80	0
Compressor		Gas/Vapor	6	0	0	**0**	6	514	0
Flanges		All	14321	98	130	**32**	14353	1.5	48
Pressure Relief Valves		All	34	1	0	**-1**	33	0	0
Process Drains		All	156	0	1	**1**	157	80	80
								Total lbs/year:	**258**
								Total lbs/day:	**0.71**

Notes: (1) Light liquid and gas/liquid streams: Liquid or gas/liquid stream with a vapor pressure greater than that of kerosene (>0.1 psia @ 100 deg. F or 689 Pa @ 38 deg.C), based on the most volatile class of liquid at >20% by volume.

Table B - 17
ATTACHMENT AQ-6
FUGITIVE COMPONENT COUNTS AND VOC EMISSIONS
COKER GAS DEBUTANIZER RELIEF PROJECT

Component Type		Service	Total Existing Components	Number of Components Removed	Number of Components Added	Net Number of Components Added	Final Component Count	Emission Factor (lb/yr/ component)	Net Change in Annual VOC Emissions (lbs/yr)
Valves	Sealed Bellows	Gas/Vapor and Light Liquid	292	0	10	**10**	302	0	0
	AQMD Approved I&M Program	Fuel & Natural Gas	468	0	0	**0**	468	12	0
		Gas Vapor	937	0	3	**3**	940	23	69
		Light Liquid	1956	0	0	**0**	1956	19	0
		Heavy Liquid	6	0	0	**0**	6	3	0
Pumps	Sealless Type	Light Liquid	0	0	0	**0**	0	0	0
	Double Mechanical Seals or Equivalent	Light Liquid	49	0	0	**0**	49	104	0
	Single Mechanical Seal	Heavy Liquid	0	0	0	**0**	0	80	0
Compressor		Gas/Vapor	2	0	0	**0**	2	514	0
Flanges		All	11655	0	17	**17**	11672	1.5	26
Pressure Relief Valves		All	44	0	1	**1**	45	0	0
Process Drains		All	0	0	0	**0**	0	80	0
								Total lbs/year:	**95**
								Total lbs/day:	**0.26**

Notes:

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

(2) The non-bellows seal valves (BSV) include valves in instrumentation service, control valve, and drains that are exempt from BSV requirements.

(3) Contingency of 30% is used for the project number of components added.

Flange Count Basis:

a. Flow Orifices = 2 flanges
b. Flanged Valve = 2 flanges; 3 with spectacle blind
c. All valves < or = 1" are socket welded installations - no flanges

Table B - 18
ATTACHMENT AQ-6
FUGITIVE COMPONENT COUNTS AND VOC EMISSIONS
EXISTING VAPOR RECOVERY MODIFICATIONPROJECT

Component Type		Service	Total Existing Components	Number of Components Removed	Number of Components Added	Net Number of Components Added	Final Component Count	Emission Factor (lb/yr/ component)	Net Change in Annual VOC Emissions (lbs/yr)
Valves	Sealed Bellows	Gas/Vapor and Light Liquid	377	0	621	**621**	998	0	0
	AQMD Approved I&M Program	Fuel & Natural Gas	1130	40	0	**-40**	1090	12	-480
		Gas Vapor	3345	0	2	**2**	3347	23	46
		Light Liquid	2236	0	0	**0**	2236	19	0
		Heavy Liquid	69	48	130	**82**	151	3	246
Pumps	Sealless Type	Light Liquid	0	0	0	**0**	0	0	0
	Double Mechanical Seals or Equivalent	Light Liquid	118	0	6	**6**	124	104	624
	Single Mechanical Seal	Heavy Liquid	0	0	0	**0**	0	80	0
Compressor		Gas/Vapor	8	1	2	**1**	9	514	514
Flanges		All	20630	129	1108	**979**	21609	1.5	1469
Pressure Relief Valves		All	100	6	20	**14**	114	0	0
Process Drains		All	174	0	1	**1**	175	80	80
								Total lbs/year:	**2499**
								Total lbs/day:	**6.85**

Notes:

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

(2) The non-bellows seal valves (BSV) include valves in instrumentation service, control valve, and drains that are exempt from BSV requirements.

Flange Count Basis:

a. Flow Orifices = 2 flanges

b. Flanged Valve = 2 flanges; 3 with spectacle blind

c. All valves < or = 1" are socket welded installations - no flanges

Table B-18
FUGITIVE COMPONENT COUNTS AND VOC EMISSIONS
ENHANCED VAPOR RECOVERY PROJECT

Component Type		Service	Number of Components Removed	Number of Components Added	Net Number of Components Added	Emission Factor (lb/yr/ component)	Net Change in Annual VOC Emissions (lbs/yr)
Valves	Sealed Bellows	Gas/Vapor and Light Liquid	0	273	**273**	0	0
	AQMD Approved I&M Program	Fuel & Natural Gas	0	0	**0**	12	0
		Gas Vapor	5	51	**46**	23	1058
		Light Liquid	2	56	**54**	19	1026
		Heavy Liquid	0	0	**0**	3	0
Pumps	Sealless Type	Light Liquid	0	0	**0**	0	0
	Double Mechanical Seals or Equivalent	Light Liquid	0	8	**8**	104	832
	Single Mechanical Seal	Heavy Liquid	0	0	**0**	80	0
Compressor		Gas/Vapor	1	2	**1**	514	514
Flanges		All	19	499	**480**	1.5	720
Pressure Relief Valves		All	1	8	**7**	0	0
Process Drains		All	0	3	**3**	80	240
						Total lbs/year:	**4390**
						Total lbs/day:	**12.03**
						Contingency	***4.97***
						Total lbs/day:	***17.00***

Notes:

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

(2) The non-bellows seal valves (BSV) include valves in instrumentation service, control valve, and drains that are exempt from BSV requirements.

Flange Count Basis:

a. Flow Orifices = 2 flanges
b. Flanged Valve = 2 flanges; 3 with spectacle blind
c. All valves < or = 1" are socket welded installations - no flanges

Table B - 19
ATTACHMENT AQ-6
FUGITIVE COMPONENT COUNTS AND VOC EMISSIONS
NORTH AREA FLARE GAS RECOVERY PROJECT

Component Type		Service	Total Existing Components	Number of Components Removed	Number of Components Added	Net Number of Components Added	Final Component Count	Emission Factor (lb/yr/ component)	Net Change in Annual VOC Emissions (lbs/yr)
Valves	Sealed Bellows	Gas/Vapor and Light Liquid	377	0	126	**126**	503	0	0
	AQMD Approved I&M Program	Fuel & Natural Gas	1130	0	0	**0**	1130	12	0
		Gas Vapor	3345	0	48	**48**	3393	23	1104
		Light Liquid	2236	0	42	**42**	2278	19	798
		Heavy Liquid	69	0	0	**0**	69	3	0
Pumps	Sealless Type	Light Liquid	0	0	0	**0**	0	0	0
	Double Mechanical Seals or Equivalent	Light Liquid	118	0	4	**4**	122	104	416
	Single Mechanical Seal	Heavy Liquid	0	0	0	**0**	0	80	0
Compressor		Gas/Vapor	8	0	2	**2**	10	514	1028
Flanges		All	20630	0	400	**400**	21030	1.5	600
Pressure Relief Valves		All	100	0	6	**6**	106	0	0
Process Drains		All	174	0	2	**2**	176	80	160
								Total lbs/year:	**4106**
								Total lbs/day:	**11.25**

Notes:

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

(2) The non-bellows seal valves (BSV) include valves in instrumentation service, control valve, and drains that are exempt from BSV requirements.

Flange Count Basis:

a. Flow Orifices = 2 flanges

b. Flanged Valve = 2 flanges; 3 with spectacle blind

c. All valves < or = 1" are socket welded installations - no flanges

Table B-19
FUGITIVE COMPONENT COUNTS AND VOC EMISSIONS
NORTH AREA FLARE GAS RECOVERY PROJECT

Component Type		Service	Total Existing Components	Number of Components Removed	Number of Components Added	Net Number of Components Added	Final Component Count	Emission Factor (lb/yr/ component)	Net Change in Annual VOC Emissions (lbs/yr)
Valves	Sealed Bellows	Gas/Vapor and Light Liquid	63	0	230	**230**	293	0	0
	AQMD Approved I&M Program	Fuel & Natural Gas	0	0	24	**24**	24	12	288
		Gas Vapor	316	0	29	**29**	345	23	667
		Light Liquid	115	0	8	**8**	123	19	152
		Heavy Liquid	0	0	0	**0**	0	3	0
Pumps	Sealless Type	Light Liquid	0	0	0	**0**	0	0	0
	Double Mechanical Seals or Equivalent	Light Liquid	11	0	2	**2**	13	104	208
	Single Mechanical Seal	Heavy Liquid	0	0	0	**0**	0	80	0
Compressor		Gas/Vapor	0	0	1	**1**	1	514	514
Flanges		All	1735	0	338	**338**	2073	1.5	507
Pressure Relief Valves		All	0	0	7	**7**	7	0	0
Process Drains		All	21	0	2	**2**	23	80	160
								Total lbs/year:	**2496**
								Total lbs/day:	**6.84**

Notes:

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

(2) The non-bellows seal valves (BSV) include valves in instrumentation service, control valve, and drains that are exempt from BSV requirements.

Flange Count Basis:

a. Flow Orifices = 2 flanges
b. Flanged Valve = 2 flanges; 3 with spectacle blind
c. All valves < or = 1" are socket welded installations - no flanges

Table B-19A
FUGITIVE COMPONENT COUNTS AND VOC EMISSIONS
REPLACEMENT OF THE FEED SURGE DRUM RPV-3410 IN THE 52 VACUUM DISTILLATION UNIT

Component Type		Service (1)	Total Existing Components (2)	Number of Components Removed	Number of Components Added	Net Number of Components Added	Final Component Count	Emission Factor (lb/yr/ component)	Net Change in Annual VOC Emissions (lbs/yr)
Valves	Bellows Seal	Gas/Vapor and Light Liquid	TBD	0	20	**20**	TBD	0	0
	AQMD Approved I&M Program (3)	Fuel & Natural Gas	TBD	0	0	**0**	TBD	12	0
		Gas Vapor	TBD	24	0	**-24**	TBD	23	-552
		Light Liquid	TBD	4	0	**-4**	TBD	19	-76
		Heavy Liquid	TBD	59	46	**-13**	TBD	3	-39
Pumps	Sealless Type	Light Liquid	TBD	0	0	**0**	TBD	0	0
	Double Mechanical Seals or Equivalent	Light Liquid	TBD	0	0	**0**	TBD	104	0
	Single Mechanical Seal	Heavy Liquid	TBD	0	0	**0**	TBD	80	0
Compressor		Gas/Vapor	TBD	0	0	**0**	TBD	514	0
Flanges (4)		All	TBD	98	111	**13**	TBD	1.5	20
Pressure Relief Valves		All	TBD	1	1	**0**	TBD	0	0
Process Drains		All	TBD	0	0	**0**	TBD	80	0
								Total lbs/year:	**-648**
								Total lbs/day:	**-1.77**

Notes:

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

(2) Existing component count to be submitted as an update to this table by July 15, 2006.

(3) The non-bellows seal valves (BSVs) include valves in instrumentation service, colntrol valve, and drains that are exempt from BSV requirements.

(4) Flange count basis: a) flow orifices = 2 flanges, b) flanged valve = 2 flanges, 3 with a spectacle blind, c) all valves ≤ 1" are socket welded with no flanges.

Table B-20

Fugitive Dust Emission Estimates From Trucks (Operational Emissions)

Source Type	Number	Fuel	Peak Daily Trips	One-way Distance	Emission Factor (lb/vmt)	Peak PM-10 (lbs/day)
Passenger Vehicle/ On Paved Roadways	4	Gasoline	2	16.2	0.000386	0.05
On-site cars	0	Gasoline	1	2.5	0.000386	0.00
Light Duty Trucks on Paved Roadways	0	Gasoline	2	16.2	0.00213	0.00
Buses	0	Diesel	2	2.5	0.02013	0.00
Trucks on Paved Roadways	8	Diesel	2	44	0.02013	14.17
Total	12					14.22

* 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 cars; 5 for pickup 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-21
On-site/Off-site Vehicle Emissions

On Road Mobile Emission Factors from California ARB EMFAC2002 Scenario Year 2008 (Model Years 1965 to 2008)

Vehicle Type	CO Emissions Factor (lb/mile)	VOC Emission Factor (lb/mile)	NOx Emissions Factor (lb/mile)	SOx Emissions Factor (lb/mile)	PM10 Emissions Factor (lb/mile)
Construction Workers Commuting	0.011798	0.001277	0.001245	0.000009	0.00008
Pickup Trucks	0.011798	0.001277	0.001245	0.000009	0.00008
Bus	0.015942	0.00245	0.023199	0.000033	0.000419
Boom Trucks	0.015942	0.00245	0.023199	0.000033	0.000419
Stakebed Trucks	0.015942	0.00245	0.023199	0.000033	0.000419
Flatbed Trucks	0.015942	0.00245	0.023199	0.000033	0.000419
Delivery Trucks	0.015942	0.00245	0.023199	0.000033	0.000419

	Parameters				Peak Day Emissions, lbs/day				
Source	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
Construction Workers Commuting	4	2	16.2	129.6	1.53	0.17	0.16	0.00	0.01
Pickup Trucks	0	1	10.0	0.0	0.00	0.00	0.00	0.00	0.00
Bus	0	1	4.0	0.0	0.00	0.00	0.00	0.00	0.00
Boom Trucks	0	1	10.0	0.0	0.00	0.00	0.00	0.00	0.00
Stakebed Trucks	0	1	10.0	0.0	0.00	0.00	0.00	0.00	0.00
Flatbed Trucks	0	1	10.0	0.0	0.00	0.00	0.00	0.00	0.00
Delivery Trucks	8	2	30	480	7.65	1.18	11.14	0.02	0.20
Totals					9.18	1.34	11.30	0.02	0.21

Based on California ARB EMFAC2002 model years 1965-2008, state-wide annual simple averages (www.aqmd.gov/ceqa/handbook/onroadEF03_25.xls)

Peak Day Emissions = Emission Factor x Distance Travelled per Day

Table B-22
Operational Rail Car Emissons

Railcar Emissions Associated with Increased Delivery of Catalyst to the FCC

Cargo Weight (Rail Car and Freight)		
Number of Railcars	1	car/day
Rail car tare weight[1]	23.2	tons/one car
Weight of Product	73	tons/day
Gross Weight	96.20	tons
Fuel Consumption		
Distance within CA outside of Air Basin	160	miles
Fuel Factor[2]	1.329	gal/1000 GTM[3]
Total tons-mile	15392	ton-mile
Total Fuel consumption	20.46	gal/day
Distance within CA inside of Air Basin	60	miles
Fuel Factor[2]	1.329	gal/1000 GTM[3]
Total tons-mile	5772	ton-miles
Total Fuel consumption	7.67	gal/day

(1) Oteko, 2004. 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 are based on 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)	0.463	0.176	3.379	0.287	0.112
Outside Basin (lbs/day)	1.236	0.469	9.010	0.767	0.298

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)	0.539	0.205	3.929	0.334	0.130
Outside Basin (lbs/day)	1.236	0.469	9.010	0.767	0.298

Table B-23

OPERATIONAL EMISSION SUMMARY

Source		Estimated Emissions (lbs/day)				
		CO	VOC	NOx	SOx	PM10
Fugitive Emissions		0.00	49.96	0.00	0.00	0.00
Total Emissions from Stationary Sources		0.00	49.96	0.00	0.00	0.00
Workers Commuting		1.53	0.17	0.16	0.00	0.01
Delivery Trucks		7.65	1.18	11.14	0.02	0.20
Fugitive Road Dust		0.00	0.00	0.00	0	14.22
Rail Cars		0.54	0.20	3.93	0.33	0.13
Total Emissions from Mobile Sources		9.72	1.55	15.23	0.35	14.56
TOTAL EMISSIONS		9.72	51.51	15.23	0.35	14.56

BP Carson Refinery
Safety, Compliance and Optimization Project
SCAQMD Localized Significance Threshold Analysis

May 17, 2006

Prepared for: BP Carson Refinery

By: Environmental Audit, Inc.

INTRODUCTION

The BP Carson Refinery, located at 1801 East Sepulveda Boulevard, in the City of Carson, is proposing a project to enhance safety, to comply with South Coast Air Quality Management District (SCAQMD) rules and a settlement agreement between the SCAQMD and BP, and to optimize operations relating to various existing Refinery units including the Fluid Feed Hydrodesulfurization (FFHDS) Unit, the Fluidized Catalytic Cracking Unit (FCCU), the Alky Merox Unit, the Alkylation Unit, the Hydrocracker Unit, and the Sulfur Plant. 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), and particulate matter less than 10 microns in diameter (PM10) associated with the project. The results of this evaluation are provided below.

Based on information provided by BP, 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 November 2007. 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, and PM10 associated with the construction activities.

EMISSION ESTIMATES

Construction emission estimates for the peak day in November 2007 are calculated by each portion of the project that will be under construction during that period (see Table B-24). 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-24. 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 BP and the Long Beach 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 not taken into account because the facility and the vicinity are in a relatively flat area.

The ISCST3 model is run using a receptor grid of 50 meters in residential areas located within 1,800 meters 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-25.

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 South Coastal Los Angeles County (Source No. 4) is used to establish background levels of NO_2 and CO. Table B-26 identifies the ambient air quality data published by the SCAQMD in the last three years (2003, 2004, and 2005) for each pollutant. PM10 is compared to 10.4 micrograms per cubic meter ($\mu g/m^3$), which is comparable to the requirement in Rule 403. PM10 is evaluated differently that CO and NO_2 because PM10 in nearly the entire district exceeds the state or federal PM10 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-27.

The maximum CO impact concentrations for 1-hour and 8-hour averages are 97.9 and 58.6 $\mu g/m^3$, respectively. The maximum NO_2 impact concentrations for 1-hour and annual averages are 52.1 and 1.89 $\mu g/m^3$, 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). The maximum NO_2 1-hour and annual impact concentrations have been adjusted by a factor of 0.279 and 0.417, respectively. The maximum PM10 impact concentration for 24-hour average is 4.62 $\mu g/m^3$.
The localized significance threshold analysis results in no significant change in air quality from construction activities for NO_2, CO, or PM10. Therefore, the proposed project complies with the localized significance threshold methodology.

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Attachments

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TABLES

Localized Significance Threshold Evaluation for
BP Carson Refinery
Safety, Compliance and Optimization Project Construction Emissions

Table B-24. Peak Day Calculated Construction Emissions and Source Dimensions

Source No.	Source Description	Emissions (lb/day)			Emissions (g/s)			Source Dimensions			Emissions (g/s-m^2)		
		CO	NOx	PM10	CO	NOx	PM10	Length of X Side (m)	Length of Y Side (m)	Area (m^2)	CO	NOx	PM10
1	FFHDS	65.48	132.61	3.57	0.34376	0.696203	0.018736	65.55	65.55	4296.803	8.00E-05	1.62E-04	4.36E-06
2	1105.1	69.33	138.14	3.68	0.363971	0.725217	0.019294						
2	FCC	78.42	165.09	4.28	0.411694	0.866745	0.022451						
2	FCC Total	147.75	303.23	7.95	0.78	1.59	0.04	131.4	103.05	13540.77	5.73E-05	1.18E-04	3.08E-06
3	Alky	93.14	148.83	3.70	0.489	0.781342	0.01942	81.4	86.28	7023.192	6.96E-05	1.11E-04	2.77E-06
4	Hydro	0.00	0.00	0.00	0	0	0	131.4	33.84	4446.576	0.00E+00	0.00E+00	0.00E+00
5	Coker	0.00	0.00	0.00	0	0	0	109.45	71.65	7842.093	0.00E+00	0.00E+00	0.00E+00
6	EVRS1	22.52	23.23	12.27	0.118215	0.12196	0.064443	38.42	49.39	1897.564	6.23E-05	6.43E-05	3.40E-05
7	EVRS2	22.52	23.23	12.27	0.118215	0.12196	0.064443	17.38	49.39	858.3982	1.38E-04	1.42E-04	7.51E-05
8	EVRS3	22.52	23.23	12.27	0.118215	0.12196	0.064443	46.34	49.39	2288.733	5.17E-05	5.33E-05	2.82E-05
9	EVRS4	22.52	23.23	12.27	0.118215	0.12196	0.064443	135.37	75.61	10235.33	1.15E-05	1.19E-05	6.30E-06
10	1118 (FGR1)	13.87	25.70	10.33	0.072794	0.134904	0.054256	50	100.31	5015.5	1.45E-05	2.69E-05	1.08E-05
11	1118 (FGR2)	13.87	25.70	10.33	0.072794	0.134904	0.054256	73.78	176.22	13001.51	5.60E-06	1.04E-05	4.17E-06
12	1118 (FGR3)	13.87	25.70	10.33	0.072794	0.134904	0.054256	46.34	49.39	2288.733	3.18E-05	5.89E-05	2.37E-05
13	1118 (FGR4)	13.87	25.70	10.33	0.072794	0.134904	0.054256	46.34	49.39	2288.733	3.18E-05	5.89E-05	2.37E-05
14	1118 (FGR5)	13.87	25.70	10.33	0.072794	0.134904	0.054256	77.74	32.93	2559.978	2.84E-05	5.27E-05	2.12E-05
15	Vehicles	58.12	74.85	1.34	0.30512	0.392968	0.007061	56	163	9128	3.34E-05	4.31E-05	7.74E-07
16	Alky Merox	45.05	91.34	6.58	0.236536	0.47954	0.034524	24	52	1248	1.90E-04	3.84E-04	2.77E-05
17	Sulfur	21.36	46.08	1.26	0.112133	0.241906	0.006602	56	163	9128	1.23E-05	2.65E-05	7.23E-07

Peak day emissions expected to occur in November 2007.

Table 2. ISCST3 Modeling Results for November 2007 Peak Day Construction Emissions

Criteria Pollutant	Averaging Period	Max Conc. ($\mu g/m^3$)	UTM Coordinates	
			Easting	Northing
CO	1-hr	97.90	384605	3743425
	8-hr	58.63	384305	3743325
NO_2(1)	1-hr	52.08	384605	3743425
	Annual	2.82	386805	3742725
PM10	24-hr	4.62	387105	3742325

(1) Project Construction Emissions adjusted to NO2 from NOx based on distance to receptor of 550 meters and 875 meters for the 1-hour and annual averages, respectively. (See Table 2-4 of the SCAQMD Localized Significance Threshold Methodology, June 2003.)

Table 3. Maximum Ambient Concentration Data

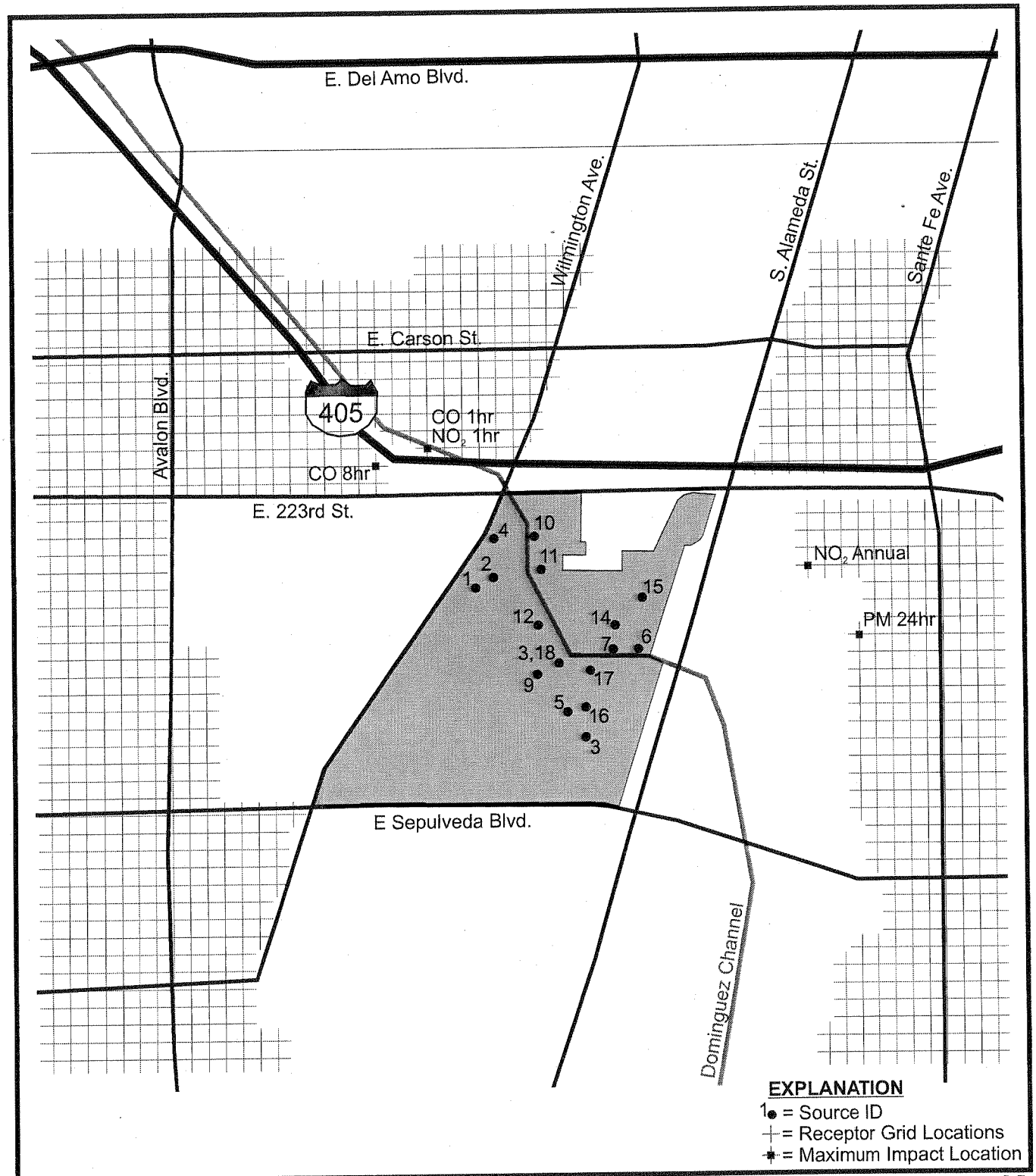
Criteria Pollutant	Averaging Period	Concentration (ppm)			Max Conc.	
		2003	2004	2005	(ppm)	($\mu g/m^3$)
CO	1-hr	6	4	5	6	6896.40
	8-hr	4.7	3.4	3.7	4.7	5402.18
NO_2	1-hr	0.14	0.12	0.12	0.14	264.33
	Annual	0.0288	0.028	0.0241	0.0288	54.38

Data from Source No. 4 South Coastal LA County Station No. 084

Table 4. 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 ($\mu g/m^3$)	Significant Change in Air Quality Conc. ($\mu g/m^3$)	Below Threshold? Yes/No
CO	1-hr	6896.4	97.9	6994.3	23000		Yes
	8-hr	5402.2	58.6	5460.8	10000		Yes
NO_2	1-hr	264.3	52.1	316.4	500		Yes
	Annual	54.4	2.8	57.2	100		Yes
PM10	24-hr		4.6			10.4	Yes

FIGURE



Environmental Audit, Inc.

LOCALIZED SIGNIFICANCE THRESHOLD EVALUATION
SITE, SOURCE, RECEPTOR, AND MAXIMUM IMPACT LOCATION MAP
BP CARSON REFINERY

Figure B-1

Project No. 2393

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