CHAPTER 3.0

EXISTING ENVIRONMENTAL SETTING

INTRODUCTION

This chapter presents the existing environmental setting for the proposed project against which the potential impacts will be evaluated. The EIR is focused only on the environmental resources identified in the Notice of Preparation and Initial Study as having potentially significant impacts (see Appendix A).

A. AIR QUALITY

Meteorological Conditions

The proposed project site is located within the South Coast Air Basin (Basin) which consists of all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. The climate in the Basin generally is characterized by sparse winter rainfall and hot summers tempered by cool ocean breezes. A temperature inversion, a warm layer of air that traps the cool marine air layer underneath it and prevents vertical mixing, is the prime factor that allows contaminants to accumulate in the Basin. The mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, and Santa Ana winds. The climate of the area is not unique but the high concentration of mobile and stationary sources of air contaminants in the western portion of the Basin, in addition to the mountains, which surround the perimeter of the Basin, contribute to poor air quality in the region.

Temperature and Rainfall

Temperature affects the air quality of the region in several ways. Local winds are the result of temperature differences between the relatively stable ocean air and the uneven heating and cooling that takes place in the Basin due to a wide variation in topography. Temperature also has a major effect on vertical mixing height and affects chemical and photochemical reaction times. The annual average temperature varies little throughout the Basin, averaging 75^{o}F. The coastal areas show little variation in temperature on a year round basis due to the moderating effect of the marine influence. On average, August is the warmest month while January is the coolest month. Most of the annual rainfall in the Basin falls between November and April. Annual average rainfall varies from nine inches in Riverside to 14 inches in downtown Los Angeles.

Wind Flow Patterns

Wind flow patterns play an important role in the transport of air pollutants in the Basin. The winds flow from offshore and blow eastward during the daytime hours. In summer, the sea breeze starts in mid-morning, peaks at 10-15 miles per hour and subsides after sundown. There is a calm period until about midnight. At that time, the land breeze begins from the northwest, typically becoming calm again about sunrise. In winter, the same general wind flow patterns exist except that summer wind speeds average slightly higher than winter wind speeds. This pattern of low wind speeds is a major factor, which allows the pollutants to accumulate in the Basin.

The normal wind patterns in the Basin are interrupted by the unstable air accompanying the passing storms during the winter and infrequent strong northeasterly Santa Ana wind flows from the mountains and deserts north of the Basin.

Existing Air Quality

Local air quality in the Basin is monitored by the SCAQMD, which operates a network of monitoring stations throughout the Basin. The CARB operates additional monitoring stations.

Criteria Pollutants: The sources of air contaminants in the Basin vary by pollutant but generally include on-road mobile sources (e.g., automobiles, trucks and buses), other mobile sources (e.g., airplanes, ships, trains, construction equipment, etc.), residential/commercial sources, and industrial/manufacturing sources. Mobile sources are responsible for a large portion of the total Basin emissions of several pollutants.

Mobile sources account for 65 percent of the volatile organic compound (VOC) emissions, 88 percent of the nitrogen oxides (NOx) emissions, 77 percent of the sulfur dioxides (SO_2) emissions, 99 percent of the carbon monoxide (CO) emissions, and 11 percent of the particulate matter less than 10 microns in diameter (PM10) emissions in the Basin. Emissions from on-road vehicles are much higher than those from off-road sources for all criteria pollutants except SO_2. This can be explained by the fact that the sulfur content in fuels used for off-road vehicles is relatively higher than that in fuels used for on-road vehicles (SCAQMD, 1996a).

Criteria air pollutants are those pollutants for which the federal and State governments have established ambient air quality standards or criteria for outdoor concentrations in order to protect public health (see Table 3-1). National ambient air quality standards were first authorized by the federal Clean Air Act of 1970 and have been set by the U.S. EPA. State ambient air quality standards were authorized by the State legislature in 1967 and have been set by the CARB. Air quality of a region is considered to be in attainment of the standards if the measured concentrations of air pollutants are continuously equal to or less than the standards.

The U.S. EPA and CARB have established health-based air quality standards for ozone, CO, NOx, PM10, SO_2, and lead. The California standards are more stringent than the federal air quality standards. California also has established standards for sulfate, visibility, hydrogen sulfide, and vinyl chloride. Hydrogen sulfide and vinyl chloride currently are not monitored in the Basin because they are not a regional air quality problem but are generally associated with localized emission sources. The Basin is not in attainment for CO, PM10, and ozone for both State and federal standards. The Basin, including the project area, complies with the State and federal standards for NOx, SO_2, sulfates, and lead.

TABLE 3-1

AMBIENT AIR QUALITY STANDARDS

POLLUTANT	NATIONAL STANDARDS	STATE STANDARDS
Ozone		
1-hour (federal)	0.12 ppm[1]	0.09 ppm
Carbon Monoxide		
1-hour	35 ppm	20 ppm
8-hour	9 ppm	9 ppm
Nitrogen Dioxide		
1-Hour	None	0.25 ppm
Annual	0.053 ppm	None
Suspended Particulates		
PM10: 24-hour	150 ug/m^3[2]	50 ug/m^3
Annual	50 ug/m^3	30 ug/m^3
PM2.5: 24-hour	65 ug/m^3	None
Annual	15 ug/m^3	None
Sulfur Dioxide		
1-hour	None	0.25 ppm
24-hour	0.14 ppm	0.04 ppm
Annual	0.03 ppm	None
Lead		
30-Day Average	None	1.5 ug/m^3
Quarterly Average	1.5 ug/m^3	None
Sulfate		
24-hour	None	25 ug/m^3
Visibility 8-hour (10 am -6 p.m.)	None	10 miles for hours with humidity less than 70%
Hydrogen Sulfide		
1-hour	None	0.03 ppm
Vinyl Chloride		
24-hour	None	0.01 ppm

(1) ppm = parts per million

(2) ug/m^3 = micrograms per cubic meter

Regional Air Quality: The SCAQMD monitors levels of various criteria pollutants at 30 monitoring stations. In 1999, the Basin or district exceeded the federal and state standards for ozone at most monitoring locations on one or more days. The federal and state ozone standards were exceed most frequently (30 and 93 days, respectively) in the Central San Bernardino Mountains. Other areas that frequently exceeded the state ozone standards included the San Gabriel Valley, Riverside, Coachella Valley and San Bernardino Valley.

In 1999, the state and federal maximum concentrations of CO were only exceeded in the South Central Los Angeles area. Other portions of the Basin complied with the CO standards.

Portions of the Basin exceed the federal and state standards for PM10. The federal PM10 standards where only exceeded in Riverside and the San Bernardino Valley. The state PM10 standards were exceeded at most monitoring locations in the Basin including the coast, central Los Angeles, San Fernando Valley, Santa Clarita Valley, Orange County, Riverside, San Bernardino Valley and Coachella Valley. The federal PM2.5 standard was exceeded at most monitoring locations in the Basin on one or more occasions.

In 1999, no areas of the Basin exceeded standards for NOx, SOx, lead or sulfate. However, NOx contributes to PM10. Currently, the district is in attainment with state and national the ambient air quality standards for lead, SOx, and NOx (SCAQMD, 1998). The SCAQMD predicts that the Basin will comply with the federal CO requirements by 2001, the federal PM10 requirements by 2006, and the federal ozone standard by 2010 (SCAQMD, 1997). Compliance with the state standards for ozone and PM10 are not expected until after 2010 (SCAQMD, 1997).

Local Air Quality: The Refinery, Carson Terminal, Mormon Island Terminal, Wilmington Terminal and Signal Hill Terminal are located within the SCAQMD's South Coastal Los Angeles monitoring area. Recent background air quality data for criteria pollutants for the South Coastal Los Angeles monitoring station are presented in Table 3-2. The Van Nuys Terminal is located near the East San Fernando Valley monitoring station (see Table 3-3) and the Colton and Rialto Terminals are located near the Central San Berndardino monitoring station (see Table 3-4). The data generally indicate an improvement in air quality in recent years with decreases in the maximum concentrations of most pollutants. The air quality in the Basin area is in compliance with the state and federal ambient air quality standards for CO, NOx, SOx, lead, and sulfate. The air quality in the Basin is not in compliance with the ozone standard or the PM10 and PM2.5 standard. The area has shown a general improvement in air quality since 1995 with decreasing concentrations of most pollutants (see Tables 3-2 through 3-4).

TABLE 3-2
AMBIENT AIR QUALITY
SOUTH COASTAL LOS ANGELES COUNTY MONITORING STATION (1995-1999)
Maximum Observed Concentrations

CONSTITUENT	1995	1996	1997	1998	1999
Ozone: 1-hour (ppm)	0.11	0.11	0.10	0.12	0.13
Federal Standard	(0)	(0)	(0)	(0)	(1)
State Standard	(3)	(5)	(1)	(2)	(3)
8-hour (ppm)	--	--	0.07	0.08	0.08
	--	--	(0)	(0)	(0)
Carbon Monoxide:					
1-hour (ppm)	9	10	9	8.0	7
	(0)	(0)	(0)	(0)	(0)
8-hour (ppm)	6.6	6.9	6.7	6.6	5.4
	(0)	(0)	(0)	(0)	(0)
Nitrogen Dioxide:					
1-hour (ppm)	0.21	0.17	0.20	0.16	0.15
	(0)	(0)	(0)	(0)	(0)
Annual (ppm)	0.037	0.034	0.0333	0.0339	0.0342
PM10:					
24-hour (ug/m^3)	146	113	87	69	79
federal standard	(0)	(0)	(0)	(0)	(0)
state standard	(18.6%)	(14.6%)	(17.5%)	(10.2%)	(13%)
Annual (ug/m^3)					
Geometric	32.3	30.8	38.2	29.2	38.9
Arithmetic	38.7	35.3	40.5	32.3	36.4
PM2.5:					
24-hour (ug/m^3)	--	--	--	--	66.9
Federal standard	--	--	--	--	(1%)
Annual Arithmetic Mean	--	--	--	--	21.5
Sulfur Dioxide:					
1-hour (ppm)	0.14	0.04	0.04	0.08	0.05
	(0)	(0)	(0)	(0)	(0)
24-hour (ppm)	0.018	0.013	0.011	0.013	0.011
	(0)	(0)	(0)	(0)	(0)
Annual (ppm)	0.0023	0.0025	0.0024	--	0.0027
Lead:					
30-day (ug/m^3)	0.05	0.08	0.05	0.07	0.06
	(0)	(0)	(0)	(0)	(0)
Quarter (ug/m^3)	0.04	0.08	0.03	0.04	0.05
	(0)	(0)	(0)	(0)	(0)
Sulfate:					
24-hour (ug/m^3)	16.9	19.9	11.4	14.5	13.7
	(0%)	(0%)	(0%)	(0%*)	(0%)

Source: SCAQMD Air Quality Data Annual Summaries 1995-1999.
Notes: (18) = Number of days or percent of samples exceeding the state standard, -- = Not monitored , ppm = parts per million, ug/m^3 = micrograms per cubic meter, * = Less than 12 full months of data. May not be representative.

TABLE 3-3
AMBIENT AIR QUALITY
EAST SAN FERNANDO VALLEY MONITORING STATION (1995-1999)
Maximum Observed Concentrations

CONSTITUENT	1995	1996	1997	1998	1999
Ozone: 1-hour (ppm)	0.17	0.14	0.13	0.18	0.12
Federal Standard	(20)	(6)	(2)	(7)	(0)
State Standard	(58)	(31)	(15)	(34)	(13)
8-hour (ppm)	--	--	0.11	0.13	0.10
	--	--	(6)	(14)	(0)
Carbon Monoxide:					
1-hour (ppm)	13	12	9	8	9
	(0)	(0)	(0)	(0)	(0)
8-hour (ppm)	12.0	9.3	7.4	7.5	9.0
	(6)	(1)	(0)	(0)	(0)
Nitrogen Dioxide:					
1-hour (ppm)	0.18	0.20	0.20	0.14	0.18
	(0)	(0)	(0)	(0)	(0)
Annual (ppm)	0.0454	0.0461	0.0424	0.0416	0.0456
PM10:					
24-hour (ug/m^3)	135	110	92	75	82
federal standard	(0)	(0)	(0)	(0)	(0)
state standard	(25.4%)	(25%)	(30.4%)	(15.3%)	(35%)
Annual (ug/m^3)					
Geometric	37.2	37.6	41.9	32.8	40.6
Arithmetic	42.2	41.7	44.8	36.0	43.7
PM2.5:					
24-hour (ug/m^3)	--	--	--	--	79.5
Federal standard	--	--	--	--	(1%)
Annual Arithmetic Mean	--	--	--	--	23.3
Sulfur Dioxide:					
1-hour (ppm)	0.01	0.01	0.04	0.01	0.01
	(0)	(0)	(0)	(0)	(0)
24-hour (ppm)	0.005	0.009	0.008	0.009	0.003
	(0)	(0)	(0)	(0)	(0)
Annual (ppm)	0.0001	0.0004	0.0003	0.0002	0.0001
Lead:					
30-day (ug/m^3)	0.05	--	--	--	--
	(0)	--	--	--	--
Quarter (ug/m^3)	0.04	--	--	--	--
	(0)	--	--	--	--
Sulfate:					
24-hour (ug/m^3)	13.7	--	--	14.5	--
	(0%)	--	--	(0%*)	--

Source: SCAQMD Air Quality Data Annual Summaries 1995-1999.
Notes: (18) = Number of days or percent of samples exceeding the state standard, -- = Not monitored , ppm = parts per million, ug/m^3 = micrograms per cubic meter, * = Less than 12 full months of data. May not be representative.

TABLE 3-4
AMBIENT AIR QUALITY
CENTRAL SAN BERNARDINO VALLEY MONITORING STATION (1995-1999)
Maximum Observed Concentrations

CONSTITUENT	1995	1996	1997	1998	1999
Ozone: 1-hour (ppm)	0.22	0.24	0.20	0.21	0.16
Federal Standard	(61)	(63)	(32)	(39)	(14)
State Standard	(111)	(113)	(102)	(65)	(45)
8-hour (ppm)	--	--	0.14	0.18	0.13
	--	--	(65)	(50)	(31)
Carbon Monoxide:					
1-hour (ppm)	8	6	8	6	5
	(0)	(0)	(0)	(0)	(0)
8-hour (ppm)	6.3	4.6	6.0	4.6	4.0
	(0)	(0)	(0)	(0)	(0)
Nitrogen Dioxide:					
1-hour (ppm)	0.17	0.15	0.14	0.11	0.14
	(0)	(0)	(0)	(0)	(0)
Annual (ppm)	0.0424	0.0384	0.0353	0.0339	0.0358
PM10:					
24-hour (ug/m^3)	178	136	108	114	134
federal standard	(3.3%)	(0)	(0)	(0)	(0)
state standard	(57.4%)	(58.3%)	(45.0%)	(37.9%)	(56%)
Annual (ug/m^3)					
Geometric	50.6	45.9	45.6	39.3	50.6
Arithmetic	61.0	52.5	51.4	46.3	56.5
PM2.5:					
24-hour (ug/m^3)	--	--	--	--	121.5
Federal standard	--	--	--	--	(4%)
Annual Arithmetic Mean	--	--	--	--	25.7
Sulfur Dioxide:					
1-hour (ppm)	0.02	--	--	--	--
	(0)	--	--	--	--
24-hour (ppm)	0.010	--	--	--	--
	(0)	--	--	--	--
Annual (ppm)	0.0006	--	--	--	--
Lead:					
30-day (ug/m^3)	0.05	0.06	0.04	0.05	0.07
	(0)	(0)	(0)	(0)	(0)
Quarter (ug/m^3)	0.04	0.04	0.04	0.03	0.05
	(0)	(0)	(0)	(0)	(0)
Sulfate:					
24-hour (ug/m^3)	13.4	11.2	9.1	11.5	10.9
	(0%)	(0)	(0)	(0%)	(0)

Source: SCAQMD Air Quality Data Annual Summaries 1995-1999.
Notes: (18) = Number of days or percent of samples exceeding the state standard, -- = Not monitored , ppm = parts per million, ug/m^3 = micrograms per cubic meter, * = Less than 12 full months of data. May not be representative.

Facility Criteria Air Emissions

Operation of the existing Refinery and terminals results in the emissions of criteria pollutants. The reported emissions of criteria air pollutants from the Refinery and terminals for the last two-year period are shown in Table 3-5.

TABLE 3-5

EQUILON FACILITIES BASELINE CRITERIA POLLUTANT EMISSIONS[(1)] (tons/year)

REPORTING PERIOD	CO	VOC	NOx	SOx	PM10
Equilon Refinery:					
1998-1999	180	557	1,020	952	169
1999-2000	224	419	1,006	923	189
Carson Terminal:					
1998-1999	<1	163	0	0	<1
1999-2000	<1	181	1	0	<1
Mormon Island:					
1998-1999	<1	37	<1	0	<1
1999-2000	<1	24	1	<1	<1
Wilmington Terminal:					
1998-1999	0	31	0	0	0
1999-2000	0	6	0	0	0
Signal Hill Terminal:					
1998-1999	0	27	0	0	0
1999-2000	0	10	0	0	0
Van Nuys Terminal:					
1998-1999	0	17	0	0	0
1999-2000	0	14	0	0	0
Colton Terminal:					
1998-1999	0	7	0	0	0
1999-2000	0	6	0	0	0
Rialto Terminal[(2)]	--	--	--	--	--

(1) Baseline emissions are based on the annual emission fee reports prepared for the SCAQMD during the July 1997 through June 1998 and July 1998 through June 1999 reporting period.

(2) The emissions from the Rialto Terminal are below the SCAQMD reporting threshold of 2 tons/year so no annual emission fee reports were submitted.

Toxic Air Contaminants

Toxic air contaminants are air pollutants which may cause or contribute to an increase in mortality or severe illness, or which may pose a potential hazard to human health. The California Health and Safety Code (Section 39655) defines a toxic air contaminant as an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health. Under California's toxic air contaminant program (Assembly Bill 1807, Health and Safety Code Section 39650 et seq.), the CARB, with the participation of the local air pollution control districts, evaluates and develops any needed control measures for air toxics. The general goal of regulatory agencies is to limit exposure to toxic air contaminants to the maximum extent feasible.

Monitoring for toxic air contaminants is limited compared to monitoring for criteria pollutants because toxic pollutant impacts are typically more localized than criteria pollutant impacts. CARB conducts air monitoring for a number of toxic air contaminants every 12 days at approximately 20 sites throughout California (CARB, Mike Redgrave, personal communication, April 1999). The Equilon Refinery, Carson Terminal, Mormon Island Terminal, Wilmington Terminal and Signal Hill Terminal are located closest to the North Long Beach station. A summary of the averaged data from 1997 and 1998 monitoring from the Long Beach station for various toxic air contaminants is considered to be an appropriate estimate of the toxic air contaminant concentration in the Long Beach area (see Table 3-6).

The CARB has estimated cancer risk based on exposure to the background concentrations of toxic air contaminants in the Long Beach area (see Table 3-7). The CARB provides cancer risk estimates for carcinogens for which CARB recognizes a unit risk factor. The estimated background cancer risk at the Long Beach monitoring station, based on CARB monitoring data is about 305 per million.

The SCAQMD measured toxic air contaminant concentration as part of its Multiple Air Toxic Exposure Study, referred to as the MATES-II study. The purpose of the study is to provide a complete estimate of exposure to toxic air contaminants to individuals within the South Coast Air Basin. The SCAQMD conducted air sampling at about 24 different sites for over 30 different toxic air contaminants (see Table 3-8) between April 1998 and March 1999. The SCAQMD has released a Final Report from this study which indicate the following: (1) cancer risk levels appear to be decreasing since 1990 by about 44 percent to 63 percent; (2) mobile source components dominate the risk; (3) about 70 percent of all risk is attributed to diesel particulate emissions; (4) about 20 percent of all risk is attributed to other toxics associated with mobile sources; (5) about 10 percent of all risk is attributed to stationary sources; and (6) no local “hot spots” have been identified. The average carcinogenic risk in the Basin is about 1,400 per million people. This means that 1,400 people out of a million are susceptible to contracting cancer from exposure to the known TACs over a 70-year period of time. The cumulative risk averaged over the four counties (Los Angeles, Orange, Riverside, San Bernardino) of the South Coast Air Basin is about 980 in one million when diesel sources are included and about 260 in one million when diesel sources are excluded. Of the ten monitoring sites in the MATES II study, Wilmington is the closest site to the Equilon Refinery. The cancer risk at the Wilmington site, based on monitoring data, was about 380 per million from stationary and mobile sources.

The cancer risk from mobile sources (alone) was about 240 per million. The complete Final Report on the MATES-II Study is available from the SCAQMD (SCAQMD, 2000h).

TABLE 3-6
AMBIENT AIR QUALITY
TOXIC AIR CONTAMINANTS – NORTH LONG BEACH
1997-1998

POLLUTANT	ANNUAL AVERAGE	POLLUTANT	ANNUAL AVERAGE
VOC's	ppb/v[1]		ppb/v
Acetaldehyde[2]	1.43	Methyl Ethyl Ketone[3]	0.21
Benzene	0.87	Methyl Tertiary Butyl Ether[2]	2.73
1,3-Butadiene	0.29	Methylene Chloride	0.67
Carbon Tetrachloride[3]	0.12	Perchloroethylene	0.16
Chloroform	0.04	Styrene[3]	0.13
o-Dichlorobenzene[3]	0.12	Toluene	2.75
p-Dichlorobenzene [3]	0.16	Trichloroethylene	0.29
Ethyl Benzene	0.39	meta-Xylene	1.02
Formaldehyde[2]	3.68	ortho-xylene[3]	0.41
Methyl Chloroform	0.21		
PAH's[4]	nanograms/m^3		nanograms/m^3
Benzo(a)pyrene	0.17	Benzo(k)fluoranthene	0.81
Benzo(b)fluoranthene	0.20	Dibenz(a,h)anthracene	0.03
Benzo(g,h,i)perylene	0.64	Indeno(1,2,3-cd)pyrene	0.29
Inorganic Compounds	nanograms/m^3		nanograms/m^3
Aluminum	1,147.5	Nickel	7.0
Antimony	3.3	Phosphorus	44.7
Arsenic	1.5	Potassium	501.5
Barium	41.7	Rubidium	1.95
Bromine	10.3	Selenium	1.5
Calcium	936.5	Silicon	3,000.0
Chlorine	2,215.0	Strontium	12.4
Chromium	5.9	Sulfur	1,235.0
Cobalt	8.0	Tin	4.6
Copper	23.1	Titanium	103.0
Hexavalent Chromium	0.13	Uranium	1.0
Iron	1,057.0	Vanadium	11.9
Lead	14.8	Yttrium	1.1
Manganese	19.4	Zinc	70.7
Mercury	1.6	Zirconium	4.7
Molybdenum	2.6		

Source: CARB, ambient toxics air quality data for 1997 and 1998. The CARB notes that sampling periods shorter than 12 months are inappropriate for purposes of calculating annual averages.

Notes:
(1) ppb/v = parts per billion by volume.
(2) Data are the annual average for 1997 as the data for 1998 are based on fewer than 12 months of valid data.
(3) Data are the annual average for 1998 as the data for 1997 are based on fewer than 12 months of valid data.
(4) PAHs = polycyclic aromatic hydrocarbons.

TABLE 3-7

CANCER RISK BASED ON CARB NORTH LONG BEACH MONITORING STATION DATA

SUBSTANCE	CANCER RISK (per million)
Acetaldehyde[(2)]	6.9
Arsenic	5.0
Benzene	80.3
Benzo(a)pyrene	0.2
Benzo(b)fluoranthene	0.02
Benzo(k)fluoranthene	0.009
1,3-Butadiene	110.5
Carbon Tetrachloride[(1)]	31.3
Chloroform	0.9
Chromium (VI)	19.0
Dibenz(a,h)anthracene	0.01
Dichlorobenzene	10.3
Formaldehyde[(2)]	27.1
Indeno(1,2,3-cd)pyrene	0.03
Lead	0.15
Methylene Chloride	2.4
Nickel	1.85
Perchloroethylene	8.4
Trichloroethylene	0.3
TOTAL	**305**

Source: Average of CARB 1997 and 1998 toxic air contaminant monitoring data, unless otherwise noted.

(1) Based on 1998 data only as incomplete data were collected in 1997.

(2) Based on 1997 data only as incomplete data were collected in 1998.

TABLE 3-8

TOXIC COMPOUNDS MODELED AND MEASURED UNDER THE SCAQMD MATES II STUDY

TOXIC COMPOUND	Modeled Annual Average Concentration (ug/m^3)	Measured Annual Average Concentration (ug/m^3)
Benzene	3.13	3.53
1,3-Butadiene	0.34	0.79
p-Dichlorobenzene	0.24	0.92
Methylene chloride	1.08	2.65
Chloroform	0.08	0.24
Perchloroethylene	2.46	1.96
Trichloroethylene	0.26	0.43
Carbon tetrachloride	0.78	0.65
Ethylene dibromide	0.01	0.38
Ethylene dichloride	0.10	0.26
Vinyl chloride	0.01	0.26
Formaldehyde	5.49	4.82
Acetaldehyde	5.21	3.17
Acetone	2.78	5.00
Methyl ethyl ketone	1.72	1.06
Styrene	0.53	1.23
Toluene	12.17	12.98
1,1-Dichloroethane	0.03	0.20
Chloromethane	1.24	1.31
Arsenic	1.69	1.56
Elemental carbon	3.40	3.36
Organic carbon	5.92	6.43
Chromium	0.01441	0.00487
Hexavalent chromium	0.00024	0.00018
Cadmium	0.00193	0.00605
Lead (point sources)	0.00292	0.0197
Lead (area sources)	0.04808	0.0197
Nickel	0.00775	0.00872
Selenium	0.00160	0.00197

Source: SCAQMD, 2000h

Refinery Baseline Health Risk Assessment

Toxic air contaminants (TACs) are emitted from the existing Equilon Refinery. Air toxics include carcinogens and non-carcinogens that can cause health impacts to the exposed population through various pathways including inhalation and noninhalation pathways. The TAC emissions from the Refinery were quantified in the 1995 Air Emission Inventory Report (ATIR) prepared for and submitted to the SCAQMD. The emission inventory was updated in 1999, with SCAQMD approval. At SCAQMD's request, the Refinery's Health Risk Assessment (HRA) was updated using the ATIR and submitted to the SCAQMD (April, 2000). The most recently prepared HRA (April, 2000) has been used to describe the environmental setting associated with TACs emitted from the Equilon Refinery. The list of TACs considered in the HRA were those listed in the AB2588 Air Toxics Hot Spots Act. The emissions of TACs associated with the existing Refinery are shown in Table 3-9.

Using the emission inventory in Table 3-9, the HRA was prepared to assess the individual excess cancer risk at various locations surrounding the Refinery, including residential areas, commercial areas, other industrial areas, and sensitive population locations (e.g., schools and hospitals). The HRA determined the individual excess cancer risk at the maximum exposed individual worker (MEIW) and the maximum exposed individual resident (MEIR). The risk for the MEIW represents exposure to carcinogenic air toxics over a period of 46 years (assumes exposure for eight hours per day, 240 days per year for 46 years); the risk to the MEIR represents a continuous exposure over a period of 70 years.

For assessing the potential effects posed by TACs, the analysis focuses on the area that is subject to a lifetime cancer risk equal to or greater than one in one million. Figure 3-1 shows the 70-year exposure cancer risk isopleth of one in a million for the existing Refinery. Figure 3-2 shows the locations of the MEIR and MEIW. Based on the results of the HRA, the cancer risk associated with exposure to TAC emissions from the existing Refinery operations for the MEIW and MEIR were estimated to be 4.76×10^{-6} (about five per million) and 7.78×10^{-6} (about eight per million), respectively (see Table 3-10).

Cancer risk calculations also were provided for a number of sensitive populations near the Refinery including schools, daycare centers, hospitals, and retirement homes. The peak risk at a sensitive population was estimated to be 3.28×10^{-6} or approximately three per million at a daycare center. This risk estimate is overly conservative as it is based on a 70-year continuous exposure.

The cancer burden for the area surrounding the Refinery was calculated using the same assumptions as the baseline cancer burden calculations. The total excess cancer burden within the area of influence was predicted to be 0.39 and 0.02 for the residential and occupational populations, respectively.

TABLE 3-9

EQUILON REFINERY EMISSIONS OF INDIVIDUAL CHEMICALS

Chemical	CAS NO.	Emissions (pounds/hr)	Emission (pounds/yr)
Acenaphthene*	83329	3.09E-05	2.71E-01
Acenaphthylene*	208968	1.56E-05	1.37E+00
Acetaldehyde	75-07-0	2.15E-01	1.51E+03
Ammonia	7664-41-71	2.02E+01	1.43E+05
Anthracene*	120127	5.27E-05	4.62E-01
Arsenic	7440-38-2	1.03E-03	6.41E+00
Barium*	7440-03-93	2.67E-04	2.34E+00
Benzene	71-43-2	2.204E-01	1.58E+03
Benzo(a)pyrene**	50-32-8	5.14E-06	4.50E-02
Benzo(a)anthracene**	56-55-3	1.79E-05	1.57E-01
Benzo(b)fluoranthene**	205-99-2	6.99E-05	6.12E-01
Benzo(e)pyrene*		2.45E-05	2.15E-01
Benzo(g,h,i)perylene*	191242	3.26E-06	2.86E-02
Benzo(k)fluoranthene**	207-08-9	1.80E-05	1.58E-01
Beryllium	7440-41-7	4.52E-05	3.95E-01
1,3-Butadiene	106-99-0	3.213E-02	2.45E+02
Cadmium	7440-43-9	1.295E-03	6.82E+00
Carbon Disulfide	75-15-0	2.38E-01	5.08E+02
Carbonyl Sulfide*	463581	3.17E+00	2.78E+04
CFCs	NA	3.91E+01	3.42E+05
Chlorine	7782-50-5	2.21E-02	1.87E+02
Chlorobenzene	108907	1.01E-05	8.82E-02
Chloroform	67-66-3	3.81E-03	3.15E+01
Chromium*	18540-29-9	4.77E-03	4.18E+01
Chromium (hexavalent)	18540-29-9	2.88E-04	1.78E+00
Chrysene**	218019	2.72E-04	2.38E+00
Cobalt*	7440-04-84	1.32E-04	1.16E+00
Copper	7440508	4.55E-03	3.98E+01
Cresols	1319773	5.94E-05	5.13E-01
Cumene*	98828	1.56E-03	1.37E+01
Cyclohexane*	110827	4.58E-02	4.01E+02
Dibenz(a,h)anthracene**	226-36-8	2.11E-06	1.85E-02
1,2-Dibromoethane	106-93-4	2.29E-04	1.98E+00
1,2-Dichloroethane	107-06-2	1.48E-03	1.27E+01
Diethanolamine*	111422	5.83E-02	5.11E+02
Dimethyldisulfide*	77781	2.36E-01	2.07E+03
Ethylbenzene*	100-41-4	2.29E-02	2.01E+02
Ethylene*	74851	1.24 E-01	1.09E+03
Fluoranthene*	206440	1.64 E-04	1.44E+00
Fluorene*	86737	2.61 E-04	2.29E+00

TABLE 3-9
(concluded)

Chemical	CAS NO.	Emissions (pounds/hr)	Emission (pounds/yr)
Formaldehyde	50-00-0	1.01E+00	6.98E+03
Hydrochloric Acid	7647-01-0	1.70E+00	1.16E+04
Cyanide	74-90-8	1.26E-01	9.40E+02
Hydrogen Sulfide	7783-06-4	2.65E-01	2.10E+03
Indeno(1,2,3-c,d)pyrene**	193395	4.29 E-06	3.76E-02
Lead	7439-92-1	2.66E-03	1.56E+01
Manganese	7439-96-5	4.72E-02	2.93E+02
Mercury	7439-97-6	3.48E-04	3.040E+00
Methanol	67-56-1	6.61E-02	5.70E+02
Methyl Mercaptan*		1.09 E-02	9.52E+01
Methyl Tert-Butyl Ether*	1634-04-4	4.35 E+00	3.81E+04
Naphthalene	91-20-3	3.93E-03	3.44E+01
Nickel	7440-02-0	2.03E-02	1.40E+02
Perchloroethylene	127184	3.86 E-04	3.38E+00
Phenanthrene*	127-18-4	3.37 E-04	2.95E+00
Phenol	108-95-2	2.70E-02	1.70E+02
Polycyclic Aromatic Hydrocarbons (PAH)	NA	1.98E-05	1.60E-01
Propylene*	115-07-01	2.00E-01	1.65E+03
Pyrene*	129000	1.56 E-04	1.37E+00
Selenium	7782-49-2	9.46E-02	5.79E+02
Sulfuric Acid	7664-93-9	1.15E-08	1.01E-04
Toluene	108-88-3	4.10E-01	2.85E+03
1,1,1-Trichloroethane	71-55-6	5.752E-02	4.97E+02
1,2,4-Trimethylbenzene*	96636	2.45 E-02	2.15E+02
Vanadium	1314-62-1	4.44E-03	3.90E+01
Xylene	NA	1.91E-01	1.35E+03
Zinc	7440-66-6	8.132E-02	5.14E+02

* Emissions were calculated; however, health data does not exist for these compounds. Therefore, health risk calculations using these compounds were not completed.

** These compounds are all considered to be PAHs and have been evaluated as PAHs herein.

Figure 3-1 goes here

Figure 3-2 goes here

TABLE 3-10

SUMMARY OF CANCER RISK

EXPOSURE PATHWAY	Maximum Exposed Individual Resident	Maximum Exposed Individual Worker
Inhalation	7.52×10^{-6}	4.68×10^{-6}
Dermal	9.74×10^{-9}	6.00×10^{-9}
Soil Ingestion	1.85×10^{-7}	4.55×10^{-8}
Water Ingestion	0.00	0.00
Ingestion of Home Grown Produce	6.22×10^{-8}	3.28×10^{-8}
Ingestion of Animal Products	0.00	0.00
Ingestion of Mother's Milk	9.60×10^{-9}	0.00
Total Cancer Risk	**7.78×10^{-6}**	**4.76×10^{-6}**

The HRA also included analysis of acute and chronic non-carcinogenic health impacts. The potential for chronic/acute health effects was evaluated by comparing the reference exposure levels (RELs) with the ground level concentrations developed by the ISCST3 model. The RELs represent the threshold for health effects. Exposure to contaminants at concentrations below the RELs is not expected to result in health effects. The chronic/acute RELs have been compared to the ground level concentration at the maximum impact point for each pollutant. The comparison of the acute/chronic RELs is used to estimate the total acute and chronic hazard indices for exposure to these pollutants. The total maximum acute and chronic hazard indices were estimated to be 0.329 and 0.45, respectively.

Carson Terminal Baseline Health Risk Assessment

TACs are emitted from the existing Carson Terminal. The TAC emissions from the Carson Terminal were updated in a revised air toxics emission inventory that represents the 1999-2000 operation conditions. At SCAQMD's request, the Carson Terminal's HRA was updated using the revised inventory and submitted to the SCAQMD (November, 2000). The most recently prepared HRA (November, 2000) has been used to describe the environmental setting associated with TACs emitted from the Carson Terminal. The list of TACs considered in the HRA were those listed in the AB2588 Air Toxics Hot Spots Act. The emissions of TACs associated with the existing Terminal are shown in Table 3-11.

Using the emission inventory in Table 3-9, the HRA was prepared to assess the individual excess cancer risk at various locations surrounding the Carson Terminal, including residential areas, commercial areas, other industrial areas, and sensitive population locations (e.g., schools and hospitals). The HRA determined the individual excess cancer risk at the MEIW and the MEIR.

TABLE 3-11

CARSON TERMINAL
EMISSION OF INDIVIDUAL CHEMICALS

Chemical	CAS NO.	Emissions (pounds/hr)	Emission (pounds/yr)
Acetaldehyde	75-07-0	2.22E-02	1.44E+00
Acrolein	1207-02-8	5.30E-04	7.10E-02
Arsenic	7440-38-2	2.50E-05	2.90E-03
Benzene	71-43-2	2.51E+01	1.30E+03
1,3-Butadiene	106-99-0	3.40E-03	3.96E-01
Cadmium	7440-43-9	2.30E-05	2.70E-03
Chlorobenzene	108-90-7	3.10E-06	3.60E-04
Chromium (hexavalent)	18540-29-9	1.60E-06	1.80E-04
Copper	7440-50-8	6.40E-05	7.50E-03
Dimethyl formamide	68-12-2	1.75E-02	1.48E+02
Ethylbenzene	100-41-4	1.86E+01	9.10E+02
Ethylene glycol	107-21-1	2.56E-02	2.24E+2
Ethylene glycol butyl ether	111-76-2	3.61E-02	2.38E+02
Formaldehyde	50-00-0	2.68E-02	3.20E+00
Fluorocarbons (chlorinated)	1104	4.00E-03	3.49E+01
Hexane	110-54-3	6.79E+01	3.54E+3
Hydrogen chloride	7647-01-0	2.90E-03	3.39E-01
Isopropyl alcohol	67-63-0	1.85E-01	7.15E+02
Lead	7439-92-1	1.30E-04	1.51E-02
Manganese	7439-96-5	4.80E-05	5.60E-03
Mercury	7439-97-6	3.10E-05	3.60E-03
Methanol	67-56-1	3.75E+00	3.36E+02
Methyl ethyl ketone	78-93-3	4.32E+00	5.27E+02
Methyl Tert-Butyl Ether	1634-04-4	6.27E+02	3.36E+04
Naphthalene	91-20-3	3.50E-02	1.35E+02
Nickel	7440-02-0	6.10E-05	7.10E-03
Polycyclic Aromatic Hydrocarbons (PAH)	1151	5.60E-04	6.62E-02
Propylene	115-07-01	1.50E-02	5.73E+01
Selenium	7782-49-2	3.40E-05	4.00E-03
Stryene	100-42-5	1.06E-01	9.92E+00
Toluene	108-88-3	1.19E+02	4.83E+03
Xylenes	1330-20-7	7.76E+01	4.21E+03
Zinc	7440-66-6	3.50E-04	4.08E-02

For assessing the potential effects posed by TACs, the analysis focuses on the area that is subject to a lifetime cancer risk equal to or greater than one in one million. Figure 3-3 shows the locations of the MEIR and MEIW. Based on the results of the HRA, the cancer risk associated with exposure to TAC emissions from the existing Carson Terminal operations for the MEIW and MEIR were estimated to be 5.1 x 10^{-7} (about five per million) and 6.4 x 10^{-6} (about six per

Figure 3-3 goes here

million), respectively. The major portion of the cancer risk is associated with exposure to benzene via the inhalation pathway.

Cancer risk calculations also were provided for a number of sensitive populations near the Carson Terminal including schools, daycare centers, hospitals, and retirement homes. The peak risk at a sensitive population was estimated to be 1.8 x 10^{-6} or approximately two per million at a daycare center. This risk estimate is overly conservative as it is based on a 70-year continuous exposure.

The maximum potential cancer risk calculated at a residential receptor is 6.4 x 10^{-6}. Assuming all 4,075 people within the zone of impact are exposed to this maximum cancer risk, the cancer burden for the residential population is 0.026.

For workers within the area of influence, the estimated worker population is 2,100. Assuming all of these workers are exposed to the maximum cancer risk of 5.1 x 10^{-7}, the resulting cancer burden for the worker population is 0.0011.

The HRA also included analysis of acute and chronic non-carcinogenic health impacts. The chronic/acute RELs have been compared to the ground level concentration at the maximum impact point for each pollutant. The comparison of the acute/chronic RELs is used to estimate the total acute and chronic hazard indices for exposure to these pollutants. The total maximum acute and chronic hazard indices were estimated to be 0.44 and 0.29, respectively.

Signal Hill Terminal Baseline Health Risk Assessment

The baseline health risks associated with the Signal Hill Terminal were estimated using the latest air toxic inventory developed for the terminal and modeling the total emissions from the facility as a single source using the latest version of the ISCST model. Health risk calculations were completed using the assumptions in the CAPCOA ACE2588 model in order to estimate the existing health risks associated with the Terminal. See Volume II for more detailed information on the baseline health risk assessment.

Maximum Exposed Individual Risk

The predicted maximum cancer risk at the MEIR area due to exposure to emissions from the existing terminal operations was estimated to be 6.12 x 10^{-7} or about 0.6 per million.

Maximum Exposed Individual Worker

The predicted maximum cancer risk at the MEIW area due to exposure to emissions from the existing terminal operations was estimated to be 2.31 x 10^{-7} or about 0.2 per million.

Acute Hazard Index

The highest total acute hazard index for any single toxicological endpoint due to exposure to emissions from the existing terminal operations was estimated to be about 0.00253.

Chronic Hazard Index

The highest chronic hazard index for any single toxicological endpoint associated with exposure to emissions from the existing terminal operations was estimated to be 0.00097.

Van Nuys Terminal Baseline Health Risk Assessment

The baseline health risks associated with the Van Nuys Terminal were estimated using the latest air toxic inventory developed for the terminal and modeling the total emissions from the facility as a single source using the latest version of the ISCST model. Health risk calculations were completed using the assumptions in the CAPCOA ACE2588 model in order to estimate the existing health risks associated with the Terminal.

Maximum Exposed Individual Risk

The predicted maximum cancer risk at the MEIR area due to exposure to emissions from the existing terminal operations was estimated to be 3.16×10^{-7} or about 0.3 per million.

Maximum Exposed Individual Worker

The predicted maximum cancer risk at the MEIW area due to exposure to emissions from the existing terminal operations was estimated to be 1.50×10^{-7} or about 0.2 per million.

Acute Hazard Index

The highest total acute hazard index for any single toxicological endpoint associated with exposure to emissions from existing terminal operations was estimated to be about 0.0017.

Chronic Hazard Index

The highest chronic hazard index for any single toxicological endpoint associated with exposure to emissions from existing terminal operations was estimated to be 0.00067.

Colton Terminal Baseline Health Risk Assessment

The baseline health risks associated with the Colton Terminal were estimated using the latest air toxic inventory developed for the terminal and modeling the total emissions from the facility as a single source using the latest version of the ISCST model. Health risk calculations were completed using the assumptions in the CAPCOA ACE2588 model in order to estimate the existing health risks associated with the Terminal.

Maximum Exposed Individual Risk

The predicted maximum cancer risk at the MEIR area due to exposure to emissions from the existing terminal operations was estimated to be 2.61 x 10^{-7} or about 0.3 per million.

Maximum Exposed Individual Worker

The predicted maximum cancer risk at the MEIW area due to exposure to emissions from the existing terminal operations was estimated to be 2.38 x 10^{-7} or about 0.2 per million.

Acute Hazard Index

The highest total acute hazard index for any single toxicological endpoint associated with exposure to emissions from existing terminal operations was estimated to be about 0.0014.

Chronic Hazard Index

The highest chronic hazard index for any single toxicological endpoint associated with exposure to emissions from existing terminal operations was estimated to be 0.001.

Rialto Terminal Baseline Health Risk Assessment

The baseline health risks associated with the Rialto Terminal were estimated using the results of the AB2588 health risk calculations prepared for the facility and submitted to the SCAQMD in February 1992. Health risk calculations were completed using screening calculations and conservative assumptions and are expected to overestimate the actual risks.

Maximum Exposed Individual Risk

The predicted maximum cancer risk at the MEIR due to exposure to emissions from the existing terminal operations was estimated to be 3.8 x 10^{-6} or about four per million. This was the maximum exposed receptor, which was assumed to be a residential exposure.

Maximum Exposed Individual Worker

The predicted maximum cancer risk at the MEIW area due to exposure to emissions from the existing terminal operations was estimated to be 5.32 x 10^{-7} or about 0.5 per million.

Acute Hazard Index

An acute hazard index was not prepared since no chemical was emitted that had an acute exposure level.

Chronic Hazard Index

The highest chronic hazard index for any single toxicological endpoint associated with exposure to emissions from existing terminal operations was estimated to be 0.0021.

Regulatory Background

Ambient air quality standards in California are the responsibility of, and have been established by, both the U.S. EPA and CARB. These standards have been set at concentrations, which provide margins of safety for the protection of public health and welfare. Federal and State air quality standards are presented in Table 3-1. The SCAQMD has established levels of episode criteria and has indicated measures that must be initiated to immediately reduce contaminant emissions when these levels are reached or exceeded. The federal, State, and local air quality regulations are identified below in further detail.

Federal Regulations: The U.S. EPA is responsible for setting and enforcing the National Ambient Air Quality Standards for oxidants (ozone), CO, NOx, SO_2, PM10, and lead. The U.S. EPA has jurisdiction over emissions sources that are under the authority of the federal government including aircraft, locomotives, and emissions sources outside State waters (Outer Continental Shelf). The U.S. EPA also establishes emission standards for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission requirements of the CARB.

In 1990, the amendments to the federal Clean Air Act (CAA) conditionally required states to implement programs in federal carbon monoxide (CO) non-attainment areas to require gasoline to contain a minimum oxygen content in the winter beginning in November 1992. In response to the federal CAA requirements to reduce CO emissions, California established a wintertime oxygenate gasoline program requiring between 1.8 and 2.2 weight percent oxygen content in gasoline.

The Equilon Refinery is subject to the requirements of Regulation XXX – Title V Permits and has submitted its Title V permit application which is currently under review by the SCAQMD. The Refinery has submitted its permit applications for the CARB Phase 3 RFG proposed project prior to the issuance of the initial Title V permit. As discussed in the AQMD Technical Guidance Document for Title V (January 1998), the District can issue non-Title V permits to construct up to the date the initial Title V permit is issued for concurrent EPA and public review. The manner in which the new/modified permit sources will be handled at the Refinery will depend on the timing of the issuance of the final Title V permit for Equilon. Upon approval and issuance of the Title V permit, the Refinery will be bound by the Regulation XXX requirements.

Other federal regulations applicable to the proposed project include Title III of the Clean Air Act, which regulates 189 toxic air contaminants. Under this provision the U.S. EPA has promulgated Maximum Achievable Control Technology (MACT) standards for petroleum refineries, which applies to the Equilon Refinery. However, the modifications made to the facility will not increase individual Hazardous Air Pollutant emissions by more than 10 tons per year, or total hazardous air pollutant emissions more than 25 tons per year. Therefore, the CARB Phase 3 modifications are not subject to the New Source Review provisions of Title III.

The Equilon Refinery is considered a "major source" under the federal Prevention of Significant Deterioration (PSD) regulations. The CARB Phase 3 project will not be subject to review under the federal PSD rule as the Permit to Construct issued by the SCAQMD will limit actual emission increases of both NOx and SOx below PSD significance thresholds [i.e., 40 tons/year above the average two year actual emissions baseline of the affected combustion units which include Boiler 7, Boiler 8, Boiler 9, Boiler 10, CO Boiler, Auxillary Boiler (H-43), Sulfur Recover Plant Boilers, CRU-2 Heaters (including H-501A, H-501B, H-502, H-503, H-504, and H-510), HTU4 Heater (H-41), HTU2 Heater (H-500), and HTU-1 Heater (H-31)].

California Regulations: The CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California Clean Air Act, responding to the federal Clean Air Act, and for regulating emissions from consumer products and motor vehicles. The CARB has established California Ambient Air Quality Standards for all pollutants for which the federal government has National Ambient Air Quality Standards and also has standards for sulfates, visibility, hydrogen sulfide and vinyl chloride. Hydrogen sulfide and vinyl chloride are not measured at any monitoring stations in the Basin because they are not considered to be a regional air quality problem. California standards are generally more stringent than the National Ambient Air Quality Standards. The CARB has established emission standards for vehicles sold in California and for various types of equipment. The CARB also sets fuel specifications to reduce vehicular emissions, although it has no direct regulatory approval authority over the proposed project. Federal and state air quality standards are presented in Table 3-1.

California gasoline specifications are governed by both state and federal agencies. During the past decade, federal and state agencies have imposed numerous requirements on the production and sale of gasoline in California. Recent legislation in California (SB 521, The MTBE Public Health and Environmental Protection Act of 1997) directed the University of California to conduct a study of the health and environmental risks and benefits of MTBE in gasoline compared to other oxygenates, due to concerns raised by the use of MTBE. SB 521 also required the Governor to take appropriate action based on the findings of the report and information from public hearings.

In consideration of this study, public testimony, and other relevant information, California's Governor Davis found that, "on balance, there is significant risk to the environment from using MTBE in gasoline in California." In response to this finding, on March 25, 1999, the Governor issued Executive Order D-5-99 which directed, among other things, that California phase out the use of MTBE in gasoline by December 31, 2002. As part of the Executive Order, on December 9, 1999, CARB adopted new gasoline specifications, which are known as RFG Phase 3 requirements (see Table 2-2). The project is being proposed to comply with these RFG Phase 3 requirements.

The California Clean Air Act (AB2595) mandates achievement of the maximum degree of emission reductions possible from vehicular and other mobile sources in order to attain the state ambient air quality standards by the earliest practical date.

California also has established a state air toxics program (AB1807, Tanner) which was revised by the new Tanner Bill (AB2728). This program sets forth provisions to implement the national program for control of hazardous air pollutants.

The Air Toxic "Hot Spots" Information and Assessment Act (AB2588), as amended by Senate Bill (SB) 1731, requires operators of certain stationary sources to inventory air toxic emissions from their operations and, if directed to do so by the local air district, prepare a health risk assessment to determine the potential health impacts of such emissions. If the health impacts are determined to be "significant" (cancer risk greater than 10 per million exposures or non-cancer hazard index greater than 1.0), each facility must, upon approval of the health risk assessment, provide public notification to affected individuals.

Local Regulations: The Basin is under the jurisdiction of the SCAQMD, which has regulatory authority over stationary sources air pollution and limited authority over mobile sources. The SCAQMD and the Southern California Association of Governments jointly are responsible for air quality planning in the Basin and development of the Air Quality Management Plan (AQMP). The AQMP establishes the strategies that will be used to achieve compliance with national Ambient Air Quality Standards and California Ambient Air Quality Standards. The SCAQMD generally regulates stationary sources of air pollutants. There are a number of SCAQMD regulations that may apply to the proposed project including Regulation II – Permits, Regulation III – Fees, Regulation IV – Prohibitions, Regulation IX – New Source Performance Standards, Regulation X - National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Regulations, Regulation XI – Source Specific Standards, Regulation XIII – New Source Review, Regulation XIV – New Source Review of Carcinogenic Air Contaminants, Regulation XVII – Prevention of Significant Deterioration, Regulation XX – Regional Clean Air Incentives Market (RECLAIM) Program, and Regulation XXX – Title V Permits.

B. GEOLOGY

Topography and Soils

The Equilon Refinery and surrounding area overlies a portion of the Wilmington Oil Field. Discovered in 1936, the Wilmington Oil Field is a broad, asymmetric anticline which is broken by a series of transverse normal faults. These faults created seven major oil producing zones which are of late Miocene to early Pliocene age (Mayuga, 1970). The field is approximately 11 miles long and three miles wide, covering about 13,500 acres. The Wilmington Oil Field extends southeast from the Wilmington District of Los Angeles, through the Long Beach Harbor, beyond the offshore limits of the City of Long Beach.

The Refinery and terminals are located along the southwest margin of the Los Angeles Basin, immediately north of the Los Angeles/Long Beach Harbor. This basin, approximately 50 miles long and 20 miles wide, slopes gently in a southwesterly direction to the Pacific Ocean. Unconsolidated and semi-consolidated Quaternary marine and nonmarine sediments fill the basin. Sediments are underlain by volcanic rocks and marine sedimentary rocks of early Pleistocene, Pliocene and Miocene age.

Recent deposits (10,000 years and younger) in the area are comprised of sands and gravels of the ancestral Los Angeles River. During the Pleistocene glacial period, the last major worldwide drop in sea level, the ancestral Los Angeles River incised into upper Pleistocene marine deposits, downcutting to a depth of 180 feet (Zielbauer et al., 1962). As sea level rose with the end of the glacial period, fluvial sediments filled this incised trench. Coarse sands and gravels comprise the basal portion of this fill, while the upper portion is comprised of fine sands, silts and clays. These trench-filling sediments are known as the Gaspur Aquifer.

The Refinery and terminals are located in industrial areas with generally flat topography.

In 1985, the RWQCB adopted Order 85-17 requiring Equilon (Texaco at the time) (and 14 other local refineries) to conduct subsurface investigations of soil and ground water. Areas of soil contamination have been detected at the site and remediated, as appropriate. CEQA §21092.6 requires the lead agency to consult the lists compiled pursuant to §65962.5 of the Government Code to determine whether the project and any alternatives are located on a site that is included on such list. The SCAQMD has not received any list compiled and distributed by CalEPA in accordance with Government Code §65962.5. However, the SCAQMD has been informed that the Equilon Refinery is included on a list compiled by CalEPA under Government Code §65962.5, dated May 6, 1999. The SCAQMD was advised that the Refinery is listed on the May 6, 1999 list because it is on a list of Cleanup and Abatement Orders prepared by the State Water Resources Control Board (Order No. 97-118). For sites that are listed pursuant to Government Code §65962.5, the following information is required:

Equilon Refinery:

Applicant:	Equilon Enterprises LLC (Texaco Refining & Marketing, Inc.)
Address:	2101 Pacific Coast Highway, Wilmington, California 90748
Phone:	(310) 522-6000
Address of Site:	2101 E. Pacific Coast Highway, Wilmington, California 90744
Local Agency:	Wilmington, City of Los Angeles
Assessor's Book:	Parcel numbers 7315-014-008, 7315-017-005, 7428-007-003
List:	See above.
Regulatory ID No:	19290032, 4B192121001
Date of List:	See above.

Wilmington Terminal:

Applicant:	Equilon Enterprises LLC (LA Refining Co.)
Address:	1926 Pacific Coast Highway, Wilmington, California 90748
Phone:	(310) 513-2602
Address of Site:	1926 E. Pacific Coast Highway, Wilmington, California 90744
Local Agency:	Wilmington, City of Los Angeles
Assessor's Book:	Parcel numbers 7428-007-005
List:	See above.
Regulatory ID No:	907440189
Date of List:	See above.

Carson Terminal:

Applicant:	Equilon Enterprises LLC (Shell Carson Plant)
Address:	20945 S. Wilmington Ave., Carson CA 90745
Phone:	(310) 816-2000
Address of Site:	20945 S. Wilmington Ave., Carson, California 90745
Local Agency:	City of Carson
Assessor's Book:	Parcel numbers 7318-018-002, 7318-018-004, 7327-002-008, 7327-002-012, 7327-002-013, 7327-002-014, 7327-002-015, 7327-002-016, 7327-002-017, 7327-002-019, 7327-002-021.
List:	See above.
Regulatory ID No:	R-00144
Date of List:	See above.

Signal Hill Terminal:

Applicant:	Equilon Enterprises LLC (Shell – Signal Hill Fuel)
Address:	2457 Redondo Avenue, Signal Hill, California 90806
Phone:	(562) 988-3326
Address of Site:	2457 Redondo Avenue, Signal Hill, California 90806
Local Agency:	City of Signal Hill
Assessor's Book:	Parcel numbers 7217-002-011
List:	See above.
Regulatory ID No:	I-11995
Date of List:	See above.

Van Nuys Terminal:

Applicant:	Equilon Enterprises LLC (Shell – Signal Hill Fuel)
Address:	8100 Haskell Boulevard, Van Nuys, California 91406
Phone:	(818) 901-4867
Address of Site:	8100 Haskell Boulevard, Van Nuys, 91406
Local Agency:	City of Los Angeles
Assessor's Book:	Parcel numbers 2673-022-050
List:	See above.
Regulatory ID No:	914061089
Date of List:	See above.

Earthquake Faults

The Los Angeles area is considered a seismically active region. The most significant potential geologic hazard at the Refinery and terminal sites is seismic shaking from future earthquakes generated by active faults in the region. Table 3-12 identifies those faults considered important to the Southern California area in terms of potential for future activity. Seismic records have been available for the last 200 years, with improved instrumental seismic records available for the past 50 years. Based on review of earthquake data, most of the earthquake epicenters occur along the San Andreas, San Jacinto Whittier-Elsinore and Newport-Inglewood faults (Jones and

Hauksson, 1986). All these faults are elements of the San Andreas fault system. Past experience indicates that there has never been significant damage from an earthquake at the Equilon Refinery and terminals. However, faults in the area are potential sources of strong ground shaking, including the following: 1) the San Andreas fault; 2) the Newport-Inglewood fault; 3) the Malibu-Santa Monica-Raymond Hills fault; 4) the Palos Verdes fault; 5) the Whittier-Elsinore fault; 6) the Sierra Madre fault; 7) the San Fernando fault; 8) the Elysian Park fault; and 9) the Torrance-Wilmington fault. The locations of these faults are identified in Figure 3-4. Each of these faults is briefly discussed below.

TABLE 3-12

MAJOR ACTIVE OR POTENTIALLY ACTIVE FAULTS SOUTHERN CALIFORNIA

FAULT	FAULT LENGTH (miles)	MAXIMUM CREDIBLE EARTHQUAKE	MAXIMUM ACCELERATION (G's)
San Andreas	200+	8.25	0.21
Newport-Inglewood	25	7.0	0.42
Malibu-Santa Monica -Raymond Hill	65	7.5	0.49
Palos Verdes	20	7.0	0.24
Whittier-Elsinore	140	7.1	0.46
Sierra Madre	55	7.3	0.23
San Fernando	8	6.8	0.17
Elysian Park – Montebello	15	7.1	0.27

Note: G = acceleration of gravity.
Sufficient data to describe the Torrance-Wilmington and Norwalk faults are not available.

San Andreas Fault Zone: The San Andreas fault is recognized as the longest and most active fault in California. It is generally characterized as a right-lateral strike-slip fault which is comprised of numerous sub-parallel faults in a zone over two miles wide. There is a high probability that southern California will experience a magnitude 7.0 or greater earthquake along the San Andreas or San Jacinto fault zones, which could generate strong ground motion in the project area. There is a five to 12 percent probability of such an event occurring in southern California during any one of the next five years and 47 percent chance within the same five-year period (Reich, 1992). The Colton and Rialto terminals are the components of the proposed project that are located the closest (about 60 miles) to the San Andreas fault.

The Newport-Inglewood Fault Zone: The Newport-Inglewood fault is a major tectonic structure within the Los Angeles Basin. This fault is best described as a structural zone comprising a series of en echelon and sub-parallel fault segments and folds. The faults of the Newport-Inglewood uplift in some cases exert considerable barrier influence upon the movement of subsurface water (DWR, 1961). Offsetting of sediments along these faults usually is greater

FIGURE 3-4 GOES HERE

in deeper, older formations. Displacement is less in younger formations. The Alquist-Priolo Act has designated this fault as an earthquake fault zone. This designation has since been legislated along this "sufficiently active" fault after extensive geologic and seismic studies. This designation of an earthquake fault zone helps to mitigate the hazards of fault rupture by prohibiting building structures across the trace of the Newport-Inglewood fault. This fault poses a seismic hazard to Los Angeles (Toppozada et al., 1988, 1989), although no surface faulting has been associated with earthquakes along this structural zone during the past 200 years. Since this fault is located within the Los Angeles Metropolitan area, a major earthquake along this fault would produce more destruction than a magnitude 8.0 on the San Andreas fault. The largest instrumentally recorded event was the 1933 Long Beach earthquake, which occurred on the offshore portion of the Newport-Inglewood structural zone with a magnitude of 6.3. A maximum credible earthquake of magnitude 7.0 has been assigned to this fault zone (Yerkes, 1985). The fault is located within the vicinity (about one to three miles) of the Refinery, Wilmington Terminal, Carson Terminal, and Signal Hill Terminal.

A portion of the Newport-Inglewood fault is sometimes referred to as the Compton fault. It is estimated that this portion of the fault is capable of producing earthquakes of magnitude 6.8.

Malibu-Santa Monica-Raymond Hills Fault Zone: The Raymond Hills fault is part of the fault system that extends from the base of the San Gabriel Mountains westward to beyond the Malibu coast line. The fault has been relatively quiet with no recorded seismic events in historic time; however, recent studies have found evidence of ground rupture within the last 11,000 years.

The Palos Verdes Fault Zone: The Palos Verdes fault extends for about 50 miles from the Redondo submarine canyon in Santa Monica Bay to south of Lausen Knoll and is responsible for the uplift of the Palos Verdes Peninsula. This fault is both a right-lateral strike-slip and reverse separation fault. The Gaffey anticline and syncline are reported to extend along the northwestern portion of the Palos Verdes hills. These folds plunge southeast and extend beneath recent alluvium east of the hills and into the San Pedro Harbor where they may affect ground water (DWR, 1961). The probability of a moderate or major earthquake along the Palos Verdes fault is low compared to movements on either the Newport-Inglewood or San Andreas faults (Los Angeles Harbor Department, 1980). However, this fault is capable of producing strong to intense ground motion and ground surface rupture. This fault zone has not been placed by the California State Mining and Geology Board into an Alquist-Priolo special studies zone. The marine terminal is located near this fault zone (within about one mile).

Whittier-Elsinore Fault Zone: The Whittier fault is a prominent structural feature in the Los Angeles Basin. It extends from Turnbull Canyon near Whittier, California southeast to the Santa Ana River where it merges with the Elsinore fault. Yerkes (1972) indicated that vertical separation on the fault in the upper Miocene strata increases from approximately 2,000 feet at the Santa Ana River northwestward to approximately 14,000 feet in the Brea-Olinda oil field. Farther to the northwest, the vertical separation decreases to approximately 3,000 feet in the Whittier Narrows of the San Gabriel River.

The fault also has a major right-lateral strike slip component. Yerkes (1972) indicates streams along the fault have been deflected in a right-lateral sense from 4,000 to 5,000 feet. The fault is capable of producing a maximum credible earthquake event of magnitude 7.0 every 500 to 700 years. This fault is located about 20 miles of the Colton and Rialto Terminals.

Sierra Madre Fault System: The Sierra Madre fault system extends for approximately 60 miles along the northern edge of the densely populated San Fernando and San Gabriel valleys (Dolan et al., 1995) and includes all faults that have participated in the Quaternary uplift of the San Gabriel Mountains. The fault system is complex and appears to be broken into five or six segments each 10 to 15 miles in length (Ehlig, 1975). The fault system is divided into three major faults by Dolan et al. (1995) including the Sierra Madre, the Cucamonga and the Clamshell-Sawpit faults. The Sierra Madre fault is further divided into three minor fault segments the Azusa, the Altadena and the San Fernando fault segments. The Sierra Madre fault is capable of producing a 7.3 magnitude fault every 805 years (Dolan et al., 1995). This fault is located within about 20 miles of the Van Nuys Terminal.

San Fernando Fault: The westernmost segment of the Sierra Madre fault system is the San Fernando segment. This segment extends for approximately 12 miles beginning at Big Tujunga Canyon on the east to the joint between the San Gabriel Mountains and the Santa Susana Mountains on the west (Ehlig, 1975). The 1971 Sylmar earthquake occurred along this segment of the Sierra Madre fault system resulting in a 6.4 magnitude fault. Dolan et al. (1995) indicates the San Fernando fault segment is capable of producing a 6.8 magnitude fault every 455 years.

The 1994 Northridge earthquake occurred on a fault parallel to the 1971 Sylmar earthquake. However, the dip direction of the two faults is opposite. The Northridge fault dips down to the south and the Sylmar fault dips down to the north. The Van Nuys terminal is located near (within about 10 miles) the San Fernando Fault system.

Elysian Park Thrust System: The Elysian Park fault is a blind thrust fault system, i.e., not exposed at the surface, who's existence has been inferred from seismic and geological studies. The system as defined by Dolan et al. (1995) comprises two distinct thrust fault systems; 1) an east-west-trending thrust ramp located beneath the Santa Monica Mountains; and 2) a west-northwest-trending system that extends from Elysian Park Hills through downtown Los Angeles and southeastward beneath the Puente Hills. The Elysian Park thrust is capable of producing a magnitude 7.1 earthquake every 1,475 years. Portions of this fault are located about 20-25 miles from the Van Nuys Terminal.

Torrance-Wilmington Fault Zone: The Torrance-Wilmington fault has been reported to be a potentially destructive, deeply buried fault that underlies the Los Angeles Basin. Kerr (1988) has reported this fault as a low-angle reverse or thrust fault. This proposed fault could be interacting with the Palos Verdes hills at depth. Little is known about this fault and its exact location. The existence of the Torrance-Wilmington fault is inferred from the study of deep earthquakes. Although information is still too preliminary to be able to quantify the specific characteristics of this fault system, this fault appears to be responsible for many of the small to moderate earthquakes within Santa Monica Bay and easterly into the Los Angeles area. This fault itself should not cause surface rupture, only ground shaking in the event of an earthquake. The Torrance-Wilmington fault is believed capable of generating earthquakes of magnitude 6.5 to 7.5. Sufficient data are not available to predict the probability of an earthquake along this fault.

The distance of this fault zone to the Refinery and terminals is unknown since the specific location of the fault is not known.

Earthquake Probability

Based on the historical record, it is highly probable that the Los Angeles region will be affected by future earthquakes. Recent research shows that damaging earthquakes will be likely to occur on or near recognized faults showing evidence of geologically recent activity.

Based on the historical record, it is highly probable that the Southern California area will be affected by future earthquakes. Recent research shows that damaging earthquakes will be likely to occur on or near recognized faults showing evidence of geologically recent activity. Table 3-13 lists those faults considered important to the proposed project site in terms of potential for future activity.

TABLE 3-13

SIGNIFICANT HISTORICAL EARTHQUAKES IN SOUTHERN CALIFORNIA

DATE	LOCATION	MAGNITUDE
1915	Imperial Valley	6.3
1925	Santa Barbara	6.3
1920	Inglewood	4.9
1933	Long Beach	6.3
1940	El Centro	6.7
1940	Santa Monica	4.7
1941	Gardena	4.9
1941	Torrance	5.4
1947	Mojave Desert	6.2
1951	Imperial Valley	5.6
1968	Borrego Mountain	6.5
1971	San Fernando Valley	6.4
1975	Mojave Desert	5.2
1979	Imperial Valley	6.6
1987	Whittier	5.9
1992	Joshua Tree	6.3
1992	Landers	7.4
1992	Big Bear	6.5
1994	Northridge	6.7
1999	Hector Mine	7.1

Sources: Bolt (1988), Jennings (1985), Gere and Shah (1984), Source Fault Hazard Zones in California (1988), and Yanev (1974) and personal communication with the California Division of Mines and Geology.

Liquefaction

Soil liquefaction can accompany strong earth movement caused by earthquakes. Liquefaction would most likely occur in unconsolidated granular sediments that are water saturated less than 30 feet below ground surface (Tinsley et al., 1985). The pore water pressure can increase in certain soils during extended periods of ground shaking which can change the soil from a solid to liquid state. Structures that are built on soils subject to liquefaction can sink during an earthquake and be damaged since the soils cannot support their weight.

The California Division of Mines and Geology has prepared seismic hazard map zones for areas in California as required by the Seismic Hazards Mapping Act (Public Resources Code Sections 2690-2699.6). The Equilon Refinery is located in the Long Beach Quadrangle and the area has been mapped for seismic hazards by the Division of Mines and Geology. The Hazard Map for the area indicates that portions of the Refinery, along the Dominguez Channel, are located within an area where there has been historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements in the event of an earthquake (California Division of Mines and Geology, Map of Seismic Hazard Zones, Long Beach Quadrangle, March 25, 1999). The Wilmington Terminal, located adjacent to the Refinery is located outside of the potential liquefaction zone.

Based on the latest seismic hazards maps developed under the Seismic Hazards Mapping Act, the Van Nuys and the Signal Hill Terminals are not located in areas of potential liquefaction. The Carson Terminal is located within areas of potential liquefaction. The Seismic Hazard Map for the vicinity of the Colton and Rialto Terminals has not yet been completed. The Mormon Island Terminal is located on fill within the Port of Los Angeles and is in an area of historic liquefaction (California Division of Mines and Geology, Map of Seismic Hazard zones). Therefore, portions of the proposed project could be subject to liquefaction in the event of an earthquake.

Other Geological Issues

Subsidence: Subsidence has been a historic problem in the Los Angeles/Long Beach area due to the removal of subsurface oil and gas reserves. Subsidence is the settling of the earth’s surface due to compaction of underlying soils. This is most common in uncompacted soils, thick unconsolidated alluvial material and artificial fill. Subsidence was accelerated in the Los Angeles/Long Beach Harbors area due to extraction of oil and gas reserves in the Wilmington Oil Field (ACE, 1990). This affected the majority of the harbor area. The City of Long Beach Department of Oil Properties instituted the first major water injection program in 1958 to replace the removed oil and gas and allow the ground surface to rebound. This program has been successful so that subsidence has been reversed and the area has rebounded. Subsidence is no longer considered a problem in the Wilmington Oil Field and will not be addressed further in this EIR.

Other potential geologic hazards, including flooding, seiches, and tsunamis, surface rupture, and slope stability, are not expected to have significant potential hazards at the Equilon Refinery or terminals. The reader is referred to the Initial Study in Appendix A for a discussion explaining why the proposed project will not generate significant adverse environmental impacts to these geological resources subtopics.

Regulatory Background

The General Plans for the cities of Los Angeles, Signal Hill, Carson, and Rialto includes the Seismic Safety Element. The Element serves primarily to identify seismic hazards and their location in order that they may be taken into account in the planning of future development. The Uniform Building Code is the principle mechanism for protection against and relief from the danger of earthquakes and related events.

In addition, the Seismic Hazard Zone Mapping Act (Public Resources Code §2690 – 2699.6) was passed by the California legislature in 1990 following the Loma Prieta earthquake. The Act required that the California Division of Mines and Geology (DMG) develop maps that identify the areas of the State that require site specific investigation for earthquake-trigger landslides and/or potential liquefaction prior to permitting most urban developments. The act directs cities, counties and state agencies to use the maps in their land use planning and permitting processes.

Local governments are responsible for implementing the requirements of the Seismic Hazards Mapping Act. The maps and guidelines are tools for local governments to use in establishing their land use management policies and in developing ordinances and review procedures that will reduce losses from ground failure during future earthquakes. Where seismic hazard maps have been prepared by the DMG, cities and counties must:

- Determine the need for geotechnical reports prior to approving a development project (PRC §2697).
- Approve the site-investigation reports prior to issuing development permits (PRC §2697).
- Provide a copy of the site-specific report, including any mitigation measures imposed, to the State Geologist within 30 days of approval (PRC §2697).
- Provide a copy of any waiver request granted, along with report and commentary, to the State Geologist within 30 days.
- Collect building fees and remit to the Department of Conservation.
- Take the hazard map information into account when adopting or revising the safety elements of general plans and land use planning or permitting ordinances (PRC §2699).

C. HAZARDS AND HAZARDOUS MATERIALS

Hazards at a facility can occur due to natural events such as earthquake, mechanical failure or human error. A hazard analysis generally considers compounds or physical forces that can migrate off-site and result in acute health effects to individuals outside of the proposed project site. The risk associated with a facility is defined by the probability of an event and the consequence (or hazards) should the event occur. The hazards can be defined in terms of the distance that a release would travel or the number of individuals of the public potentially affected by a maximum single event defined as a worst-case scenario. This section discusses existing hazards to the community from potential upset conditions at the Refinery or terminals, to provide a basis for evaluating the changes in hazards posed by the proposed project.

The major types of public safety risks at the Equilon facilities consist of risk from releases of regulated substances and from major fires and explosions. The discussion of the hazards associated with the existing Refinery and terminals relies on data in the Worst Case Consequence Analysis for Equilon Enterprises, LLC Reformulated Fuels Project (see Volume III).

Shipping, handling, storing, and disposing of hazardous materials inherently poses a certain risk of a release to the environment. The regulated substances handled by the Refinery include chlorine, and ammonia. The Refinery and terminals also handle petroleum products including propane, butane, isobutane, MTBE, gasoline, fuel oils, diesel and other products, which pose a risk of fire and explosion. Accident scenarios for the existing facilities evaluated herein include releases of regulated substances and potential fires/explosions. The transportation risks are also described below.

Types of On-Site Hazards

A hazard analysis generally considers the compounds or physical forces that can migrate off-site and result in acute health effects to individuals outside of the Refinery or terminal boundaries. It should be noted that hazards exist to workers on-site. However, the workers have the benefit of training in fire and emergency response procedures, protective clothing, access to respiratory protection, and so forth. The general public does not have access to these safety precautions and measures. Therefore, workers could be exposed to hazards and still be protected because of training and personal protective equipment.

The hazards can be defined in terms of the distance that a release may travel or the number of individuals of the public potentially affected by maximum single events defined as "worst-case" scenarios. Worst-case scenarios represent the maximum extent of potential hazards that could occur within the process area that was evaluated, based on "worst-case" (generally low wind speed) meteorological conditions and assuming a complete release of materials.

The most probable natural event that would lead to a worst case event would be a major earthquake. Seismic hazards affecting the Southern California area and mitigation to minimize impacts (e.g., compliance with the Uniform Building Codes) are discussed in Chapter 4, Geology/Soils. The hazards of an earthquake on the facility are addressed in this section.

The potential hazards associated with industrial activities are a function of the materials being processed, processing systems, and procedures used to operate and maintain the facility. The hazards that are likely to exist are identified by the physical and chemical properties of the materials being handled and their process conditions, including the following:

Toxic gas clouds

Toxic gas clouds are releases of volatile chemicals (e.g., anhydrous ammonia, chlorine, and hydrogen fluoride) that could form a cloud and migrate off-site, thus exposing individuals. Worst-case conditions tend to arise when very low wind speeds coincide with accidental release, which can allow the chemicals to accumulate rather than disperse.

Torch fires (gas and liquefied gas releases), flash fires (liquefied gas releases), pool fires, and vapor cloud explosions (gas and liquefied gas releases)

The rupture of a flammable gaseous material (like propane) from a storage tank, without immediate ignition, can result in a vapor cloud explosion. The worst case upset assumes that a release occurs and produces a large aerosol cloud with flammable properties. If the flammable cloud does not ignite after dispersion, the cloud would simply dissipate. If the flammable cloud were to ignite during the release, a flash fire or vapor cloud explosion could occur. If the flammable cloud were to ignite immediately upon release, a torch fire would ensue.

Thermal Radiation

Thermal radiation is the heat generated by a fire and the potential impacts associated with exposure. Exposure to thermal radiation would result in burns, the severity of which would depend on the intensity of the fire, the duration of exposure, and the distance of an individual to the fire.

Explosion/Overpressure

Several process vessels would contain flammable explosive vapors and potential ignition sources are present at the Refinery and terminals. Explosions may occur if the flammable/explosive vapors came into contact with an ignition source. An explosion could cause impacts to individuals and structures in the area due to overpressure.

A summary of hazards at the Refinery and terminals associated with the units that are a part of the proposed project (being modified as part of the CARB RFG Phase 3 project) is shown in Table 3-14.

An upset condition and spill has the potential to affect ground water and water quality. A spill of hazardous materials could occur under upset conditions, e.g., earthquake, tank rupture, and tank overflow. In the event of a spill, materials could migrate off-site, if secondary containment and appropriate spill control measures were not in place.

The Refinery, Marine Terminal and truck terminals have spill containment systems in place to reduce the impacts of spills of petroleum products. The Marine Terminal uses a water collection and treatment system to prevent discharges of petroleum products to the Los Angeles Harbor. Drip pans and funnels drain to collection areas to contain leaks. Ship washings and ballast water are stored in tanks for further treatment and disposal. Spills that would reach the water are controlled by deploying oil booms available at the Marine Terminal. Additional spill equipment is available through commercial contracts with suppliers that specialize in spill cleanup. Commercial contractors that specialize in oil cleanup are employed to place any additional booms or equipment, and to remove oil from the water and adjacent areas.

TABLE 3-14

SUMMARY OF EXISTING HAZARDS(1)

Process Areas	Types of Hazards Found in the Area
Process areas: Alkylation Unit Hydrocracking Unit Catalytic Reforming Units Hydrotreating Units Butane Isomerization Fluid Catalytic Cracking Unit	Breach of liquid line or vessel resulting in: Pool fire
	Breach of flashing liquid line or vessel resulting in: Flash fire, VCE(2), pool fire, torch fire, toxic cloud (hydrogen sulfide, sulfuric acid, ammonia)
	Breach of vapor line or vessel resulting in: Torch fire, VCE, or toxic cloud (hydrogen sulfide, etc.)
Storage Tanks	Breach of atmospheric storage resulting in: Tank fire, dike fire
Product Transfer Truck Transfer Railcar Transfer Marine Transfer	Breach of low pressure piping resulting in: Pool fire
	Breach of flashing liquid piping resulting in: Flash fire, VCE, torch fire, pool fire, toxic cloud
	Breach of vapor line resulting in: Torch fire
	BLEVE(2) of pressurized storage vessel

(1) The hazard analysis is limited to the units being modified as part of the proposed project.
(2) VCE = Vapor cloud explosion. BLEVE = Boiling liquid expanding vapor explosion.

All Equilon facilities have a Spill Prevention Containment and Countermeasures (SPCC) Plan per the requirements of 40 Code of Federal Regulations, Section 112. The SPCC is designed to prevent spills from on-site facilities and includes requirements for secondary containment, provides emergency response procedures, establishes training requirements, and so forth.

Hazards Related to MTBE

Equilon currently transports, stores, and blends MTBE at its Los Angeles Refinery. MTBE has a vapor pressure of 245-256 mmHg (API, 2000). The one-hour and annual average acceptable exposure level for MTBE is 25,000 ug/m^3 and 3,000 ug/m^3, respectively. MTBE also is considered to be a carcinogen (unit risk factor of 2.6 x 10^{-7}) (OEHHA, 2000).

MTBE has been determined to be an environmental hazard due to leaks. The proposed project is expected to reduce the total volume of material transported by the Equilon pipeline because less ethanol will be blended into gasoline compared to MTBE. The use of ethanol is expected to provide an environmental benefit over the use of MTBE. In the event of a leak or spill, ethanol is expected to break down in the environment more rapidly than MTBE.

Transportation Risks

The transportation of hazardous substances poses a potential for fires, explosions, and hazardous materials releases. In general, the greater the vehicle miles traveled, the greater the potential for an accident. Statistical accident frequency varies (especially for truck transport) and is related to the relative accident potential for the travel route since some freeways and streets are safer than others. The size of a potential release is related to the maximum volume of a hazardous substance that can be released in a single accident, should an accident occur, and the type of failure of the containment structure, e.g., rupture or leak. The potential consequences of the accident are related to the size of the release, the population density at the location of the accident, the specific release scenario, the physical and chemical properties of the hazardous material, and the local meteorological conditions.

The factors that enter into accident statistics include distance traveled and type of vehicle or transportation system. Factors affecting automobiles and truck transportation accidents include the type of roadway, presence of road hazards, vehicle type, maintenance and physical condition, and driver training. A common reference frequently used in measuring risk of an accident is the number of accidents per million miles traveled. Complicating the assessment of risk is the fact that some accidents can cause significant damage without injury or fatality.

Every time hazardous materials are moved from the site of generation, opportunities are provided for accidental (unintentional) release. A study conducted by the U.S. EPA indicates that the expected number of hazardous materials spills per mile shipped ranges from one in 100 million to one in one-million, depending on the type of road and transport vehicle used. The U.S. EPA analyzed accident and traffic volume data from New Jersey, California, and Texas, using the Resource Conservation and Recovery Act Risk/Cost Analysis Model and calculated the accident involvement rates presented in Table 3-15. This information was summarized from the Los Angeles County Hazardous Waste Management Plan (Los Angeles County, 1988).

TABLE 3-15

TRUCK ACCIDENT RATES FOR CARGO ON HIGHWAYS

Highway Type	Accidents Per 1,000,000 miles
Interstate	0.13
U.S. and State Highways	0.45
Urban Roadways	0.73
Composite*	0.28

Source: U.S. Environmental Protection Agency, 1984.
* Average number for transport on interstates, highways, and urban roadways.

In the Study completed by the U.S. EPA, cylinders, cans, glass, plastic, fiber boxes, tanks, metal drum/parts, and open metal containers were identified as usual container types. For each container type, the expected fractional release en route was calculated. The study concluded that the release rate for tank trucks is much lower than for any other container type (Los Angeles County, 1988).

The County of Los Angeles has developed criteria to determine the safest transportation routes. Some of the factors which need to be considered when determining the safest direct routes include traffic volume, vehicle type, road capacity, pavement conditions, emergency response capabilities, spill records, adjacent land use, and population density. In managing the risk involved in the transportation of hazardous materials, all these factors must be considered.

The actual occurrence of an accidental release of a hazardous material cannot be predicted. The location of an accident or whether sensitive populations would be present in the immediate vicinity also cannot be identified. In general, the shortest and most direct route that takes the least amount of time would have the least risk of an accident. Hazardous material transporters do not routinely avoid populated areas along their routes, although they generally use approved truck routes that take population densities and residential areas into account.

The hazards associated with the transport of acutely hazardous materials, e.g., ammonia, would include the potential exposure of numerous individuals in the event of an accident that would lead to a spill.

Regulatory Background

There are many federal and state rules and regulations that Equilon must comply with which serve to minimize the potential impacts associates with hazards at these facilities.

Under the Occupational Safety and Health Administration (OSHA) regulations [29 Code of Federal Regulations (CFR) Part 1910], facilities which use, store, manufacture, handle, process, or move highly hazardous materials must prepare a fire prevention plan. In addition, 29 CFR Part 1910.119, Process Safety Management (PSM) of Highly Hazardous Chemicals, and Title 8 of the California Code of Regulations, General Industry Safety Order Section 5189, specify required prevention program elements to protect workers at facilities that have toxic, flammable, reactive or explosive materials. Prevention program elements are aimed at preventing or minimizing the consequences of catastrophic releases of the chemicals and include, process hazard analyses, formal training programs for employees and contractors, investigation of equipment mechanical integrity, and an emergency response plan.

Title 1 §112 (r) of the Clean Air Act Amendments of 1990 [42 U.S.C. 7401 et. Seq.] and Article 2, Chapter 6.95 of the California Health and Safety Code require facilities that handle listed regulated substances to develop Risk Management Programs (RMPs) to prevent accidental releases of these substances, U.S. Environmental Protection Agency (EPA) regulations are set forth in 40 CFR Part 68. In California, the California Accidental Release Prevention (CalARP) Program regulation (CCR Title 19, Division 2, Chapter 4.5) was issued by the Governor's Office Of Emergency Services (OES). RMPs consist of three main elements: a hazard assessment that includes off-site consequence analyses and a five-year accident history, a prevention program, and an emergency response program. RMPs for existing facilities were required to be submitted by June 21, 1999. The Los Angeles City Fire Department administers the CaLARP program for the Wilmington Plant. Equilon is also required to comply with the U.S. EPA's Emergency Planning and Community Right-to-Know Act (EPCRA).

The Hazardous Materials Transportation Act is the federal legislation that regulates transportation of hazardous materials. The primary regulatory authorities are the U.S. Department of Transportation, the Federal Highway Administration, and the Federal Railroad Administration. The Act requires that carriers report accidental releases of hazardous materials to the Department of Transportation at the earliest practicable moment (49 Code of Federal Regulations Subchapter C). Incidents that must be reported include deaths, injuries requiring hospitalization, and property damage exceeding $50,000. The California Department of Transportation (Caltrans) sets standards for trucks in California. The regulations are enforced by the California Highway Patrol.

California Assembly Bill 2185 requires local agencies to regulate the storage and handling of hazardous materials and requires development of a plan to mitigate the release of hazardous materials. Businesses that handle any of the specified hazardous materials must submit to government agencies (i.e., fire departments), an inventory of the hazardous materials, an emergency response plan, and an employee training program. The business plans must provide a description of the types of hazardous materials/waste on-site and the location of these materials. The information in the business plan can then be used in the event of an emergency to determine the appropriate response action, the need for public notification, and the need for evacuation.

D. NOISE

Noise is a by-product of urbanization and there are numerous noise sources and receptors in an urban community. Noise is generally defined as unwanted sound. The range of sound pressure perceived as sound is extremely large. The decibel is the preferred unit for measuring sound since it accounts for these variations using a relative scale adjusted to the human range for hearing (referred to as the A-weighted decibel or dBA). The A-weighted decibel is a method of sound measurement that assigns weighted values to selected frequency bands in an attempt to reflect how the human ear responds to sound. The range of human hearing is from 0 dBA (the threshold of hearing) to about 140 dBA, which is the threshold for pain. Examples of noise and their A-weighted decibel levels are shown in Figure 3-5.

In addition to the actual instantaneous measurements of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. To analyze the overall noise levels in an area, noise events are combined for an instantaneous value or averaged over a specific time period. The time-weighted measure is referred to as equivalent sound level and represented by energy equivalent sound level (Leq). The percentage of time that a given sound level is exceeded also can be designated as L_{10}, L_{50}, L_{90}, etc. The subscript notes the percentage of time that the noise level was exceeded during the measurement period. Namely, an L_{10} indicates the sound level is exceeded 10 percent of the time and is generally taken to be indicative of the highest noise levels experienced at the site. The L_{90} is that level exceeded 90 percent of the time

Figure 3-5 goes here

and this level is often called the base level of noise at a location. The L_{50} sound (that level exceeded 50 percent of the time) is frequently used in noise standards and ordinances.

The sound pressure level is measured on a logarithmic scale with the 0 dBA level based on the lowest detectable sound pressure level that people can perceive. Decibels cannot be added arithmetically, but rather are added on a logarithmic basis. A doubling of sound energy is equivalent to an increase of three dBA. Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged twice as loud. In general, a three to five dBA change in community noise levels starts to become noticeable, while one-two dBA changes are generally not perceived. Quiet suburban areas typically have noise levels in the range of 40-50 dBA, while those along arterial streets are in the 50-60+ dBA range. Normal conversational levels are in the 60-65 dBA range, and ambient noise levels greater than that can interrupt conversations (City of Carson, 1995).

Existing Noise Levels

A detailed noise analysis was completed for the areas adjacent to the Equilon Refinery and Wilmington Terminal due to the number of existing noise sources and since the proposed project will introduce a number of new noise sources into the Refinery. The proposed modifications at the Terminals generally involve the addition of storage tanks which are not sources of noise so detailed noise analyses were not completed for the terminals.

Refinery and Wilmington Terminal

The vicinity of the existing Refinery and Wilmington Terminals is surrounded by an urban environment characterized by extensive industrial, commercial and transportation-related land uses. The Equilon Refinery and Wilmington Terminal is surrounded by industrial facilities, commercial activities and transportation corridors. Major contributors to the ambient noise levels in the general vicinity of the Equilon Refinery include the following:

- The local railways which run along the northern and western boundaries of the Refinery;
- Vehicular traffic on the Terminal Island Freeway, Pacific Coast Highway, Alameda Street, and Sepulveda Boulevard, especially the large number of trucks that use these arterials into and out of the port area;
- The industrial facilities which include the Refinery, container facilities, automobile import facilities, other refineries and tank farms, and automobile wrecking/dismantling operations; and
- The numerous port-related activities such as vessel traffic and loading/unloading of cargo.

Traffic, both vehicular and railroad, is a major source of noise in the area. The Terminal Island Freeway located east of the Refinery is a major noise source at the site since it is elevated above most structures and buildings; therefore, the noise is not attenuated as quickly as noise generated at ground level. The estimated noise level 50 feet from the Terminal Island Freeway is about 70 dBA. Alameda Street is located adjacent to the western boundaries of the Refinery.

The principal noise sources in an industrial area are impact, friction, vibration, and air turbulence from air and gas streams. Process equipment, heaters, cooling towers, pumps and compressors, contribute to noise emitted from the Refinery. The major noise sources within the Refinery are associated with the main processing units. Noise surveys conducted near the processing units of the Refinery indicate elevated noise readings in the typical range of 80 to 95 dBA at areas within or adjacent to the processing units. Elevated noise sources are not attenuated as quickly as ground sources due to the lack of interference from fences, structures, buildings, etc. Most of the noise sources at the Refinery are not elevated but are located near ground level.

The Equilon Refinery and Wilmington Terminal are located in an M3-1 zoned (heavy industrial) area, as established by the City of Los Angeles. The areas surrounding the Refinery Terminal are also industrial. Noise readings were taken in the area surrounding the Refinery and Wilmington Terminal in September 2000 (see Figure 3-6). The location of the noise readings are identified in Figure 3-6 and explained in Table 3-16. Measurements were taken during the morning, afternoon, evening, and nighttime using a GenRad Sound Level Meter. Noise readings were taken at approximately five feet above the local grade at all locations. The measurements quantified the equivalent sound levels over a 24-hour period and were used to estimate the Community Noise Equivalent Level (CNEL). The results of the background noise readings are provided in Table 3-17.

TABLE 3-16

NOISE LEVEL MEASUREMENT LOCATIONS

LOCATION	DESCRIPTION
1	At the corner of Blinn Avenue and Grant Street. Residential area with a concrete plant located immediately south of the location. The Refinery is located east of this location. The existing noise level at this location is influenced mainly by concrete plant and traffic on Anaheim Street.
2	Entrance to Equilon's coke barn at 2160 E. Sepulveda Blvd. This is the northern boundary of the Refinery. The current ambient noise levels are mainly influenced by construction activities on Sepulveda and by truck traffic.
3	Entrance to Equilon's administrative offices at 2101 E. Pacific Coast Hwy. The existing noise level at this location is influenced by traffic on Anaheim Street and the refining activities.
4	At the corner of Cruces and Drumm in a residential area west of the Refinery. A container terminal is located two blocks north of this location and this area receives a lot of truck traffic. The existing noise level at this location is influenced mainly by traffic on Alameda Blvd.
5	Entrance to Equilon truck terminal at 1926 Pacific Coast Hwy. The existing noise levels at this location are influenced mainly by traffic on Pacific Coast Hwy and industrial activities.
6	West of the Refinery, Terminal Island Freeway and the Dominguez Channel at the location of a new high school and adjacent to a park. Residential areas are located east of this location. The ambient noise levels are primarily influenced by the traffic on the Terminal Island Freeway.
7	At the corner of Opp and Goodrich, immediately south of the southern boundary of the Equilon Refinery and the FCCU. This is an industrial area with industrial facilities that include container terminals and scrap yards. The ambient noise levels at this site are primarily influenced by the Refinery, Air Products hydrogen plant and traffic on Anaheim Street.

Figure 3-6 goes here

TABLE 3-17

SAMPLING RESULTS
BACKGROUND AMBIENT NOISE LEVELS, dBA

LOCATION	NOISE LEVELS (dBA)				
	Morning	Afternoon	Evening	Nighttime	CNEL
1	58.0	61.0	53.0	60.2	61.8
2	64.2	63.2	59.4	55.6	64.4
3	65.0	63.0	64.2	62.2	67.4
4	52.2	55.2	53.4	55.4	57.8
5	64.6	66.8	64.4	63.8	68.7
6	61.2	61.0	53.0	54.2	61.1
7	64.0	65.4	62.8	62.2	67.4

* See Figure 3-6 for noise reading locations.

The ambient noise readings indicate that the noise levels in the vicinity of the Refinery and Wilmington Terminal are generally below the City of Los Angeles noise limits of 70 dBA at the property boundaries and acceptable for industrial zoned areas. Noise levels adjacent to the Refinery generally range from 60 to 70 dBA. Noise levels near Pacific Coast Highway (bisecting Refinery), Anaheim Street (south) and Alameda Street (west) tend to be higher than noise levels along Sepuleveda Boulevard (north). Traffic contributes to the higher noise readings along Pacific Coast Highway and Alameda Street. Since Pacific Coast Highway, Alameda Street, and the Terminal Island Freeway are located very close to the Refinery boundaries, a portion of the ambient noise within the Refinery and at its boundary is due to traffic.

Although there are numerous sources of noise in the area, there are few sensitive receptors (i.e., residential areas, hospitals, rest homes, and schools). The closest residential area to the Refinery is near the intersection of Blinn Avenue and Grant Street, west of Alameda Street. This residential area is about 0.5 mile southwest of the Refinery. The noise levels at this residential area (location 1) range from about 53 to 61 dBA. This residential area is affected by a concrete plant, traffic noise along Anaheim Street and Alameda Street, and railway traffic noise since railroad tracks are located immediately adjacent to the residential area. The Refinery's contribution to noise at this location is negligible due to the presence of other industrial facilities and the distance of the residential area to the Equilon Refinery.

The overall ambient noise levels during the night are lower due to reduced traffic volumes. The Refinery operations are continuous during a 24-hour period; i.e., processing equipment is not shut down during the night, weekends, or holidays. The Refinery's relative contribution to ambient noise during the night, therefore, is greater since the number of other noise sources in the area are reduced. The overall impact on sensitive receptors is minimal since the residential areas are located about one-half mile away from the Refinery.

Carson Terminal

The Carson Terminal is located within the City of Carson at the location of the former Shell Oil Refinery. The terminal is located in an industrial area and surrounded by industrial and commercial land uses on the east, west, and north. Residential land uses are located adjacent to and south of the terminal. The ambient noise level near the Wilmington and Del Amo intersections as reported by the City of Carson is about 71 dBA (City of Carson, 1996).

Mormon Island Terminal

The Mormon Island Terminal is located within the Port of Los Angeles. The terminal is located at Berths 167-169 and is surrounded by other heavy industrial port-related uses. The closest residential land uses are located about one mile north of the terminal. The existing noise levels in the vicinity of the marine terminal have not been measured. However, the CNEL is assumed to be between 65-70 dBA. The assumed ambient CNELs are based on the land use designations in the area surrounding the marine terminal.

Signal Hill Terminal

The Signal Hill Terminal is located south of the San Diego I-405 Freeway and south of Willow Street within Signal Hill. The Signal Hill terminal is located in a commercial industrial area. The land use in the vicinity of the terminal also includes light and general industrial. Residential land uses are located about one-quarter mile south of the Terminal. The existing ambient CNEL around the Signal Hill Terminal has not been measured. The estimated ambient CNELs at the Terminal are expected to be approximately 60 to 65 dBA, and are based on noise surveys conducted by Signal Hill and the CNEL contour maps (Signal Hills, 1991).

Van Nuys Terminal

The Van Nuys Terminal is located immediately west of the I-405 Freeway and south of Roscoe Blvd. and is primarily surrounded by heavy industrial land uses. The Van Nuys Terminal is located in a heavy industrial zone (M2-1). The land use in the immediate vicinity of the terminal is primarily zoned heavy industrial. Residential land uses are located north and northeast of the terminal. (see Figure 2-5). The Van Nuys airport is located just west of the terminal. The existing ambient CNEL around the Van Nuys Terminal has not been measured. The estimated ambient CNELs at the Terminal are expected to be approximately 65-70 dBA based on the surrounding land use and the City’s noise ordinance.

Colton and Rialto Terminals

The Colton and Rialto Terminals are located south of Slover Avenue, east of Willow Avenue, to the north of Santa Ana Avenue, and are primarily surrounded by heavy industrial land uses. The Colton and Rialto Terminals and surrounding land uses in the immediate vicinity of the terminal are primarily zoned for heavy industrial. Residential land uses are located north and northeast of the terminal (see Figure 2-6). The existing ambient CNEL around the Colton and Rialto Terminals have not been measured. The estimated ambient CNELs at the terminals are expected to be between 60 and 65 dBA and are based on noise surveys conducted by Rialto and the CNEL contour maps in the noise ordinance (Rialto, 1991).

Regulatory Background

The State Department of Aeronautics and the California Commission of Housing and Community Development have adopted the CNEL. The CNEL is the adjusted noise exposure level for a 24-hour day and accounts for noise source, distance, duration, single event occurrence frequency, and time of day. The CNEL considers a weighted average noise level for the evening hours, from 7:00 p.m. to 10:00 p.m., increased by five dBA, and the late evening and morning hour noise levels from 10:00 p.m. to 7:00 a.m., increased by 10 dBA. The daytime noise levels are combined with these weighted levels and averaged to obtain a CNEL value. The adjustment accounts for the lower tolerance of people to noise during the evening and nighttime periods relative to the daytime period. Land use compatibility guidelines have been developed and they outline noise exposure levels (Ldn or CNEL) which are clearly acceptable, normally acceptable, normally unacceptable, and clearly unacceptable at various land uses (see Figure 3-7).

City of Los Angeles

The noise element of the General Plan for the City of Los Angeles sets forth standards to control noises on land use zoning as shown in Table 3-18. The City's Noise Ordinances (Nos. 1156,363 and 11574) apply to the Equilon Refinery, Wilmington Terminal, Mormon Island Terminal, and Van Nuys Terminal. The allowable noise level in residential areas during the day is 50 dBA and industrial areas is 70 dBA. The allowable noise level in residential areas during the night is 40 dBA and industrial areas is 70 dBA. The City of Los Angeles Noise ordinance prohibits construction noise between 9:00 p.m. and 7:00 a.m.

TABLE 3-18
CITY OF LOS ANGELES NOISE ORDINANCE
(dBA)*

ZONE	DAY	NIGHT
Residential Zones	50	40
P, PB, CR, C1, C2, C4, C5, CM (commercial and public zones)	60	55
M1, MR1, MR2 (industrial/manufacturing zones)	65	65
M2, M3 (heavy industrial zones)	70	70

* The "presumed minimum ambient noise levels" shown above are to be used only if the true "measured" ambient noise levels are less than the values designated. In most cases, when there is a difference between the measured ambient and the presumed ambient, the greater level will be allowed.

City of Carson

The City of Carson Noise Ordinance applies to portions of the Equilon Refinery and to the Carson Terminal. The City of Carson adopted the Los Angeles County Noise Control Ordinance, with amendments, on August 1, 1995. The City's Municipal Code, Ordinance No. 4101, limits the noise from mechanical equipment to less than audible within 10 feet of any

Figure 3-7 goes here

residence. Construction activities and pile driving are prohibited between the hours of 6:00 p.m. and 7:00 a.m. and on Sunday. If the City Engineer determines that public health, safety, comfort, and convenience will not be affected during these times, he may grant special permission for those noise-generating activities. The Noise Ordinance has established exterior noise thresholds for designated zones for both construction and operational activities. The construction noise level is 60 dBA for single family residential areas and 65 dBA for multi-family residential areas. The noise levels applicable during project operation are identified in Table 3-19.

The Noise Element of the General Plan for the City of Carson recommends that the interior community noise exposure level for any habitable room should not exceed a CNEL of 45 dBA. The exterior noise exposures at residential locations should not exceed a CNEL of 65 dBA. Exterior spaces include, yards and patios, pool areas, balconies, and recreation areas.

For commercial areas, land use suitability planning guidelines contained in the City's Noise Element indicate that exterior noise levels up to a CNEL of 75 dBA are normally acceptable for retail, restaurant, office and similar uses. Normally acceptable levels for industrial and manufacturing land uses include those up to 80 dBA CNEL for exterior areas (City of Carson, 1995).

TABLE 3-19

CITY OF CARSON NOISE ORDINANCE THRESHOLDS

Duration	Symbol	Industrial* Limit (dBA)	Residential Limit (dBA)
15 minutes in any half hour	L_{50}	70	45
7.5 minutes in any half hour	L_{25}	75	50
2.5 minutes in any half hour	L_8	80	55
30 seconds in any half hour	L_2	85	60
Anytime in any half hour	L_0	90	65

* City of Carson Ordinance No. 4101. Noise levels for residential areas are for nighttime hours (10 pm to 7 am).

Signal Hill

The Signal Hill General Plan basis its noise limitations on a CNEL land-use compatibility matrix. Based on the matrix, a CNEL of greater than 65 dBA would be “normally unacceptable” for residential land use, and a CNEL of 60 to 65 dBA would be “conditionally acceptable”. The Signal Hill General Plan does not address construction noise

Rialto

The Colton and Rialto Terminals are located within the City of Rialto in San Bernardino County. The City of Rialto General Plan limits outdoor noise to an Leq of 67 dBA outdoor or 52 dBA indoors, and limits the Ldn to 55 dBA. The Rialto General Plan also specifies a CNEL of 65 dBA for residences as "normally unacceptable" and refers to the San Bernardino County noise standard that limits residential exterior noise to a CNEL of 60 dBA. The Rialto General Plan does not address construction noise.

E. SOLID/HAZARDOUS WASTE

The Equilon Refinery processes generate material that would be classified as hazardous waste including alkylation sludge, oil/water separation sludge, spent catalyst, and tank bottom sludge. Hazardous waste generated by the terminals is generally limited to tank bottom sludge. Hazardous waste, which is not reused on-site, or recycled off-site, is disposed of at a licensed in-state hazardous waste disposal facility. Two such facilities are the Chemical Waste Management Inc. (CWMI) Kettleman Hills facility in King County, and the Safety-Kleen facility in Buttonwillow (Kern County). Kettleman Hills has an estimated 6.5 million cubic yard capacity and expects to continue receiving wastes for approximately 18 years under their current permit, or for approximately another 24 years with an approved permit modification (Personal Communication, Terry Yarbough, Chemical Waste Management Inc., June 2000). Buttonwillow receives approximately 960 tons of hazardous waste per day and has a remaining capacity of approximately 10.3 million tons. The expectant life of the Buttonwillow Landfill is approximately 35 years (Personal Communication, Marianna Buoni, Safety-Kleen (Buttonwillow), Inc., July 2000). Equilon can also send hazardous waste to facilities outside of California.

As part of ongoing site maintenance, the Equilon Refinery also disposes of contaminated soils. If contaminated soils are encountered, soil samples are collected and analyzed by a state certified laboratory to determine the level of contamination. Based on laboratory results, contaminated soils are excavated and hauled to the appropriate landfill. In addition, the Refinery intermittently generates hydrocarbon-contaminated soil from operational spills or construction activities. When feasible, this soil is recycled into asphalt.

Non-Hazardous Solid Waste

The Equilon Refinery and terminals also generate non-hazardous solid or municipal wastes. Most of these wastes are generated in the administrative operations. The status of the landfills to which the Equilon facilities may send municipal solid wastes is summarized in Table 3-20.

The Los Angeles County Sanitation Districts (LACSD) anticipates the landfill capacity in the county will be exceeded in the near future. Because of community resistance to the extension of operating permits for existing facilities and to the opening of new landfills in the county and the dwindling capacity of those landfills with operating permit time left, the exact date on which that capacity will be exceeded is uncertain. The LACSD is currently exploring out of county disposal options in addition to continuing negotiations to extend current operating permits.

Regulatory Background

The Hazardous Materials Transportation Act is the federal legislation regulating the trucks that transport hazardous wastes. The primary regulatory authority include the U.S. Department of

Transportation, the Federal Highway Administration, and the Federal Railroad Administration. The Act requires that carriers report accidental releases of hazardous materials to the Department of Transportation at the earliest practicable moment (49 CFR Subchapter C, Part 171).

The California Environmental Protection Agency, Department of Toxic Substances Control is responsible for the permitting of transfer, disposal, and storage facilities. The regulations applicable to waste generators are applicable to the Equilon facility. The Department of Toxic Substances Control conducts annual inspections of hazardous waste facilities. Other inspections can occur on an as-needed basis.

Caltrans sets standards for trucks in California. The regulations are enforced by the California Highway Patrol. Trucks transporting hazardous wastes are required to maintain a hazardous waste manifest. The manifest is required to describe the contents of the material within the truck so that wastes can readily be identified in the event of a spill.

TABLE 3-20
LOS ANGELES COUNTY LANDFILL STATUS

Facility Name	Permitted tons/day	2000 Average tons/day	Remaining Permitted Capacity (tons)	Notes
Antelope Valley I	1,400	695	3,429,000	
Antelope Valley II	1,800	N/O	8,206,000	See footnote (1)
Azusa	6,500	500	34,100,000	See footnote (2)
BKK	12,000	9,786	0	Closed (3)
Bradley W.	10,000	4,961	9,885,000	
Chiquita Canyon	6,000	3,293	45,889,000	
Lancaster	1,000	588	414,000	
Pebbly Beach	49	4.8	31,000	
Puente Hills	13,200	11,808	33,884,000	See footnote (4)
Scholl Canyon	3,400	1,510	16,382,000	See footnote (5)
Spadra	3,700	2,862	0	Closed (6)
Sunshine	6,600	3,481	17,200,000	
Savage Canyon	350	306	8,672,000	See footnote (7)

Sources: California Integrated Waste Management Board Web Site (www.ciwmb.ca.gov/swis/); Martin Ayetiwa, Los Angeles County Department of Public Works, Personal Communication, June 2000; and the Los Angeles County Countywide Siting Element prepared by the Los Angeles County Public Works Department, June 1997.

(1) Facility is planned and permitted, but not yet operational.
(2) Facility only accepts inert waste.
(3) Closed due to permit expiration in 1996.
(4) Origin of waste limited to all jurisdictions except Orange County and the portion of the City of Los Angeles outside the jurisdictional boundary of the County Sanitation Districts.
(5) Restricted Waste shed. Origin of waste is limited to that generated in the Scholl Canyon Waste shed as defined by the City of Glendale Ordinance #4780.
(6) Facility closed April 8, 2000.
(7) Restricted Waste shed. Origin of waste limited to that generated in the City of Whittier per City Ordinance.
N/O Not in operation.

The California Integrated Waste Management Act of 1989 (AB939), as amended, requires each county to prepare a countywide siting element which identifies how the county and the cities within the county will handle solid waste disposal over a 15 year period. AB 939 has recognized that landfills and transformation facilities are necessary components of any integrated solid waste management system, and an essential component of the waste management hierarchy. AB 939 establishes a hierarchy of waste management practices in the following order and priority: (1) source reduction; (2) recycling and composting; and (3) environmentally safety transformation/land disposal (LACDWP, 1997).

The Los Angeles Countywide Siting Element addresses landfill disposal. The purpose of the Countywide Siting Element is to provide a planning mechanism to address the solid waste disposal capacity needed by the 88 cities in Los Angeles County and its unincorporated communities for each year of the 15-year planning period, through a combination of existing facilities, expansion of existing facilities, planned facilities, and other strategies. Other elements of waste management planning and practices include the Source Reduction and Recycling Element which is part of the Los Angeles County Integrated Waste Management Summary Plan (LACDWP, 1997).

F. TRANSPORTATION/TRAFFIC

Regional Circulation

Regional access to the Equilon Refinery and terminals is provided by the greater Los Angeles freeway system. The Equilon Refinery and Wilmington Terminal are located within the City of Los Angeles, in the community of Wilmington. Regional access to the Equilon Refinery and Wilmington Terminal is provided by the Long Beach Freeway (I-710), which is located approximately two miles east of the proposed project and the Harbor Freeway (I-110), located approximately three miles west of the site. These freeway facilities are major north and south highways, which extend from the Ports of Los Angeles and Long Beach through Los Angeles County. Pacific Coast Highway bisects the Refinery site, with the majority of the site located to the north of Pacific Coast Highway. The Wilmington Terminal is located adjacent to the western Refinery boundary, south of Pacific Coast Highway. Pacific Coast Highway, Sepulveda Boulevard, and Alameda Street are key arterials servicing the area. Other key roadways in the local area network include Anaheim Street, Wilmington Boulevard, and Santa Fe Avenue.

The Carson Terminal is located in the City of Carson and is about four miles north of the Refinery. Access to the Carson Terminal is provided by the San Diego (I-405) Freeway to Wilmington Avenue. The facility is located about one mile north of the San Diego Freeway.

The Mormon Island Terminal is located within the Port of Los Angeles. Access to the Mormon Island Terminal is provided via the Terminal Island Freeway (I-103) and the Harbor (I-110) Freeway. Local access to Mormon Island is provided by Harry Bridges Boulevard, Alameda Street and Fries Avenue.

The Signal Hill Terminal is located within the City of Signal Hill and about seven miles north-east of the Refinery. Access to the Signal Hill Terminal is provided via the San Diego (I-405)

Freeway to Redondo Avenue. The Signal Hill Terminal is located about 0.5 miles south of the San Diego Freeway.

The Van Nuys Terminal is located within the City of Los Angeles in the community of Van Nuys which is located within the San Fernando Valley. Access to the Van Nuys Terminal is provided via the San Diego Freeway to Roscoe Boulevard. The facility is located about 0.25 mile west of the San Diego Freeway and 0.1 mile south of Roscoe Boulevard.

The Colton and Rialto Terminals are located adjacent to each other in San Bernardino County. Access to the Colton and Rialto Terminals is provided via the San Bernardino (10) Freeway to Riverside Avenue. The terminals are located about 0.5 mile south of the San Bernardino Freeway.

Local Circulation

The local streets that provide circulation near the Equilon Refinery are shown in Figure 3-8. The operating characteristics of an intersection are defined in terms of the Level of Service (LOS), which describes the quality of traffic flow based on variations in traffic volume and other variables such as the number of signal phases. LOS A to C operate well. Level C normally is taken as the design level in urban areas outside a regional core. Level D typically is the level for which a metropolitan area street system is designed. Level E represents volumes at or near the capacity of the highway which will result in possible stoppages of momentary duration and fairly unstable traffic flow. Level F occurs when a facility is overloaded and is characterized by stop-and-go (forced flow) traffic with stoppages of long duration.

Traffic counts, including turn counts, were taken during May, June, and November 2000 to determine the existing traffic in the Wilmington/Carson area. Peak hour LOS analyses were developed for intersections in the vicinity of the Refinery (see Table 3-21). The LOS analysis indicates typical urban traffic conditions in the area surrounding the Equilon Refinery, with most intersections operating at Levels A to B during morning and evening peak hours. The intersection of Wilmington Avenue and 223rd Street operates at Level E during a.m. and p.m. peak hours. Traffic associated with the Equilon Carson Terminal could impact this intersection.

LOS analyses were not completed in the vicinity of the Signal Hill, Van Nuys, Colton or Rialto Terminals because the proposed project will not result in a significant increase in peak hour traffic. The maximum increase in truck traffic would be about 18 trucks per day at the Signal Hill Terminal. The traffic increase at the other terminals would be less (three to eight trucks per day). Traffic would be spread throughout the day so that about one to two trucks per hour is expected. See Chapter 4 for further details.

Figure 3-8 goes here

TABLE 3-21

EQUILON REFORMULATED FUELS PROGRAM
EXISTING LEVEL OF SERVICE ANALYSIS
AND VOLUME-TO-CAPACITY-RATIOS

INTERSECTION	A.M LOS	Peak Hour V/C	P.M. LOS	Peak Hour V/C
Alameda Street and I-405 Ramps	A	0.362	A	0.382
Alameda Street and 223rd Ramps	A	0.294	A	0.327
ICTF enty/I-405 Ramps and Wardlow Road/223rd Street	A	0.497	A	0.549
Alameda Street and Sepulveda Boulevard	A	0.395	A	0.432
Alameda Street and Pacific Coast Highway	A	0.497	B	0.617
Alameda Street and Anaheim Street	B	0.623	B	0.690
Wilmington Avenue and 223rd Street	E	0.924	E	0.988
Wilmington Avenue and Sepulveda Boulevard	A	0.563	A	0.595
Santa Fe Avenue and Pacific Coast Highway	B	0.648	B	0.693

v/c = volume to capacity ratio (capacity utilization ratio)
LOS = Level of Service

Regulatory Background

The City of Los Angeles prepared a Transportation Improvement and Mitigation Program (TIMP) for the Wilmington-Harbor City Community Plan through an analysis of the land use impacts on transportation. The TIMP establishes a program of specific measures that are recommended to be undertaken during the life of the Community Plan.

The Wilmington-Harbor City Community Plan provides specific objectives and goals for traffic in the area. It is the City's objective that the traffic LOS on the street system in the community not exceed LOS E. Most of the Wilmington-Harbor City's major street intersections are in compliance with this policy. The City has prepared a Transportation Demand Management (TDM) program for the Wilmington areas that includes: (1) encouragement of the formation of Transportation Management Associations in order to assist employers in creating and managing trip reduction programs; (2) participation in local and regional TDM programs; (3) continued implementation of the Wilmington-Harbor City TDM which calls for several measures to be taken in developments to achieve trip reduction targets; (4) implementation of the bikeways Master Plan's recommendations for the area; (5) encourage telecommuting to minimize traffic; (6) encouragement the development of pedestrian oriented areas; (7) development of a parking management strategy (City of Los Angeles, 1999).