CHAPTER 3.0

EXISTING ENVIRONMENTAL SETTING

INTRODUCTION

CEQA Guidelines §15125 requires that an EIR include a description of the environment within the vicinity of the proposed project as it exists at the time the NOP is published, or if no NOP is published, at the time the environmental analyses commences, from both a local and regional perspective. This chapter describes the existing environment around the Ultramar Refinery that could be adversely affected by the proposed project.

The environmental topics identified in this chapter include both a regional and local setting. The analyses included in this Chapter focus on those aspects of the environment that could be adversely affected by the proposed project and not those environmental topic areas determined to have no potential adverse impact from the proposed project.

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 that 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. 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 off-road 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 VOC emissions, 88 percent of the NOx emissions, 77 percent of the SO_2 emissions, 99 percent of the CO emissions, and 11 percent of the PM10 emissions in the Basin (SCAQMD, 1996). 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, 1996).

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 with a margin of safety (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. California 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.

Health-based air quality standards have been established by the U.S. EPA and the CARB 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, is classified as attainment for both 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

Notes:
(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 exceeded 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. No other source receptor areas of the Basin exceeded 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 state or federal standards for NOx, SOx, lead or sulfate. Currently, the district is in attainment with the ambient air quality standards for lead, SOx, and NOx (SCAQMD, 1998). The SCAQMD predicts that the Basin will comply with 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 project site is located within the SCAQMD's South Coastal Los Angeles monitoring area. Recent background air quality data for criteria pollutants for the South Coast Los Angeles monitoring station are presented in Table 3-2. The data generally indicate an improvement in air quality in recent years with decreases in the maximum concentrations of most pollutants. Air quality in the South Coast Los Angeles monitoring area is considered to be in attainment for the state and federal ambient air quality standards for CO, NOx, SOx, lead, and sulfate. The air quality in the area also is in compliance with the federal eight-hour ozone standard, and the 24-hour and annual PM10 standard. The air quality in the South Coast Los Angeles area is not in compliance with the state and federal one-hour average ozone standard and the 24-hour PM10 and PM2.5 standard. The area has shown a general improvement in air quality since 1995 with decreasing concentrations of most pollutants (see Table 3-2).

Refinery Criteria Pollutant Emissions

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

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, so data may not be representative.

TABLE 3-3

REFINERY BASELINE
CRITERIA POLLUTANT EMISSIONS
(tons/year)

REPORTING PERIOD	CO	VOC	NOx	SOx	PM10
1997-98	94	368	343	600	198
1998-99	85	208	330	620	191
Average Baseline Emissions*	90	288	337	610	195

* 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.

Toxic Air Contaminants

Toxic air contaminants (TACs) 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 (§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 §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). Ultramar is 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 3-4).

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 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

TABLE 3-4

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	nanograms/m^3[4]		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.

(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.

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 Ultramar 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).

The CARB has estimated cancer risk based on exposure to the background concentrations of toxic air contaminants in the Long Beach area (see Table 3-4). The CARB provides cancer risk estimates for carcinogens for which CARB recognizes a unit risk factor. A unit risk factor is needed to calculate cancer risk. The estimated background cancer risk at the Long Beach monitoring station, based on CARB monitoring data is about 305 per million (see Table 3-5).

Refinery Baseline Health Risk Assessment

TACs are emitted from the existing Ultramar 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 current TAC emissions from the Refinery were recently quantified in an Air Toxics Inventory Report (ATIR) prepared for and submitted to the SCAQMD (September, 2000) to comply with the deadlines imposed under SCAQMD Rule 1402 – Control of Toxic Air Contaminants from Existing Sources. At SCAQMD's request, the Refinery's Health Risk Assessment (HRA), last done in 1991, was updated using the ATIR (September, 2000 which was based on 1999 Refinery emissions) and submitted to the SCAQMD (October, 2000). The most recently prepared HRA (October, 2000) will be used to describe the environmental setting associated with TACs emitted from the Refinery. The list of TACs considered in the HRA were those listed in the AB2588 Air Toxics Hot Spots Act and by the Office of Environmental Health Hazard Assessment (OEHHA). The emissions of TACs associated with the existing operations at the Wilmington Plant are shown in Table 3-6.

TABLE 3-5

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 3-6

EMISSIONS OF INDIVIDUAL TOXIC AIR CONTAMINANTS FROM EXISTING OPERATIONS AT THE ULTRAMAR WILMINGTON REFINERY

CHEMICAL	CAS NO.	Emissions (lbs/hr)	Emissions (lbs/yr)
Acenaphthene(1)	83-32-9	2.37E-05	1.88E-01
Acenaphthylene(1)	208-96-8	1.34E-05	1.15E-01
Acetaldehyde	75-07-0	2.37E-01	1.11E+03
Acrolein	107-02-8	3.57E-03	1.70E-01
Ammonia	7664-41-7	9.11E+00	6.81E+04
Aniline	62-53-3	6.81E-03	5.95E+01
Anthracene(1)	120-12-7	1.11E-04	9.16E-01
Arsenic	7440-38-2	9.84E-04	3.89E+00

TABLE 3-6 (continued)

CHEMICAL	CAS NO.	Emissions (lbs/hr)	Emissions (lbs/yr)
Benz(a)anthracene[(2)]	56-55-3	9.66E-05	8.12E-01
Benzene	71-43-2	1.19E-01	6.18E+02
Benzo(a)pyrene[(2)]	50-32-8	2.85E-06	1.86E-02
Benzo(b)fluoranthene[(2)]	205-99-2	4.02E-06	1.76E-02
Benzo(e)pyrene[(1)]	192-97-2	5.60E-07	3.57E-03
Benzo(g,h,i)perylene [(1)]	191-24-2	2.37E-06	1.31E-02
Benzo (j) fluoranthene[(2)]	205-82-3	7.30E-07	5.73E-03
Benzo(k)fluoranthene[(2)]	207-08-9	1.04E-06	6.80E-03
Beryllium	7440-41-7	1.82E-08	1.42E-04
1,3-Butadiene	106-99-0	2.39E-02	9.03E+00
Cadmium	7440-43-9	7.54E-04	1.10E+00
Chlorobenzene	108-90-7	1.79E-03	1.19E+01
Chloromethane[(1)]	74-87-3	1.03E-04	9.05E-01
Chromium (Total) [(1)]	7440-47-3	2.59E-03	1.11E+01
Chromium (Hexavalent)	18540-29-9	1.05E-05	2.25E-03
Chrysene[(1)]	218-01-9	1.76E-04	1.52E+00
Copper	7440-50-8	3.17E-03	8.42E+00
Cresols	1319-77-3	6.43E-03	5.61E+01
Cumene[(1)]	98-82-8	3.73E-03	3.26E+01
1,2-Dibromo-3-chloropropane	96-12-8	7.22E-08	6.32E-04
Dibenz(a,h)anthracene[(2)]	53-70-3	5.65E-07	4.43E-03
Dibenzofuran[(1)]	132-64-9	1.30E-04	1.14E+00
Diesel engine exhaust, organic gas[(1)]	9-90-2	3.94E+00	1.88E+02
Diesel engine exhaust, particulate matter[(3)]	9-90-1	3.52E+00	1.68E+02
7,12-Dimethylbenz (a) anthracene[(2)]	57-97-6	1.51E-05	1.32E-01
Ethylbenzene	100-41-4	2.45E-02	2.01E+02
Ethylene[(1)]	74-85-1	4.54E-02	3.52E+02
Ethylene Glycol[(1)]	107-21-1	3.97E-04	3.48E+00
Fluoranthene[(1)]	206-44-0	2.29E-05	1.03E-01
Fluorene[(1)]	86-73-7	2.74E-02	2.40E+02
Formaldehyde	50-00-0	4.76E-01	2.09E+03
Gasoline vapors[(3)]	1-11-0	1.76E+00	1.71E+04
Hexane	110-54-3	2.29E-01	1.98E+03
Hydrogen Chloride	7647-01-0	1.96E-02	9.33E-01
Hydrogen Cyanide[(4)]	74-90-8	5.75E-01	3.35E+03
Hydrogen Fluoride	7664-39-3	9.68E-03	8.48E+01
Hydrogen Sulfide	7783-06-4	9.38E-01	7.08E+03
Hydroquinone[(1)]	123-31-9	2.28E-06	2.00E-02
Indeno(1, 2, 3-c,d)pyrene[(2)]	193-39-5	3.51E-07	2.76E-03
Lead	7439-92-1	3.13E-03	8.93E+00
Manganese	7439-96-5	4.26E-03	1.78E+01
Mercury	7439-97-6	2.78E-04	4.04E-01

TABLE 3-6 (concluded)

CHEMICAL	CAS NO.	Emissions (lbs/hr)	Emissions (lbs/yr)
3-Methylcholanthrene(2)	56-49-5	2.72E-05	2.39E-01
Methyl Chloroform (1,1,1-Trichloroethane)	71-55-6	5.38E-03	4.71E+01
Methyl Ethyl Ketone (MEK)	78-93-3	8.78E-04	5.83E+00
Methyl methacrylate(1)	80-62-6	3.88E-05	3.40E-01
Methyl Tert-Butyl Ether (MTBE)	1634-04-4	6.98E-01	6.11E+03
Naphthalene	91-20-3	7.52E-03	4.55E+01
Nickel	7440-02-0	8.55E-03	3.65E+01
PAHs	1-15-0	4.20E-03	3.63E+00
Perchloroethylene	127-18-4	3.24E-03	2.84E+01
Phenanthrene(1)	85-01-8	8.85E-03	7.72E+01
Phenol	108-95-2	2.89E-05	2.42E-01
Propylene	115-07-1	1.15E-01	5.67E+02
Pyrene(1)	129-00-0	2.39E-05	1.17E-01
Pyridine(1)	110-86-1	3.98E-10	3.49E-06
Selenium	7782-49-2	6.03E-04	2.63E+00
Styrene	100-42-5	6.53E-04	5.73E+00
1,1,2,2-Tetrachloroethane	79-34-5	1.04E-07	7.61E-05
1,2,4-Trimethylbenzene(1)	95-63-6	1.01E-01	8.79E+02
Toluene	108-88-3	2.75E-01	1.57E+03
Xylenes	1-21-0	2.61E-01	1.48E+03
Zinc	7440-66-6	6.64E-02	2.38E+02

CAS No. = Chemical Abstract Service Number

(1) Emissions were calculated; however, health data do not exist for these compounds. Therefore, health risk calculations using these compounds were not completed.
(2) These compounds are all considered to be PAHs and evaluated as PAHs herein.
(3) The health risk of individual compounds contained in the mixture were evaluated in the health risk calculations.
(4) Hydrogen cyanide was reported as cyanide in the 1999 ATIR

Using the emission inventory in Table 3-6, the HRA was prepared to assess the individual excess cancer risk at various locations surrounding the Ultramar Refinery, including residential areas, commercial areas, other industrial areas, and sensitive population locations (e.g., schools and hospitals). The HRA identified 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 existing TAC emissions, 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 existing MEIR and MEIW. Based on the results of the

Figure 3-1 goes here

Figure 3-2 goes here

HRA, the cancer risk associated with exposure to TAC emissions from the existing Refinery operations for the MEIW and MEIR were estimated to be 1.51 x 10^{-6} (about two per million) and 0.92 x 10^{-6} (about one per million), respectively (see Table 3-7).

TABLE 3-7

SUMMARY OF CANCER RISK

EXPOSURE PATHWAY	Maximum Exposed Individual Resident	Maximum Exposed Individual Worker
Inhalation	3.70E-07	3.56E-07
Dermal	4.83E-08	1.12E-07
Soil Ingestion	1.28E-07	1.89E-07
Water Ingestion	0.00E+00	0.00E+00
Ingestion of Home Grown Produce	3.75E-07	8.57E-07
Ingestion of Animal Products	0.00E+00	0.00E+00
Ingestion of Mother's Milk	0.00E+00	0.00E+00
Total Cancer Risk	**9.22E-07**	**1.51E-06**

Existing cancer risk calculations also were provided for a number of sensitive populations near the Ultramar Refinery including schools, daycare centers, hospitals, and retirement homes. The existing peak risk at a sensitive population was estimated to be 7.37 x 10^{-7} or slightly less than one per million at the Edison School. This risk estimate is overly conservative as it is based on a 70-year continuous exposure.

Using the one per million isopleth from the coarse gride ACE1588 modeling as a study area, cancer risk levels at the census tract centroids with their respective populations contained within the one per million isopleth were developed.

The excess cancer burden for each centroid was calculated by multiplying the predicted 70-year lifetime risk at each centroid with the population within the census tract. The total excess cancer burden is computed as the sum of cancer burden for each census tract. The total excess cancer burden within the area of influence was predicted to be 0.0011 and 0.0056 for the residential and occupational populations, respectively.

The HRA also included analysis of existing 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 existing total maximum acute and chronic hazard indices were estimated to be 0.796 and 0.064, respectively.

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 CAA conditionally required states to implement programs in federal 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.

Other federal regulations applicable to the proposed project include Title III of the Clean Air Act, which regulates 189 toxic air contaminants. The regulations implementing Title III have not been developed. Title V of the Act establishes a federal permit program. Ultramar has submitted its Title V permit application and the proposed project will require modifications to the Title V application and/or operating permit. The Title V program is implemented by the SCAQMD in the Southern California area.

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 the RFG Phase III requirements (see Table 2-2).

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), and 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" (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 source air pollution control and limited authority over mobile sources. The SCAQMD is 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/SOILS

Topography and Soils

The Ultramar 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 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 Ultramar Refinery and surrounding area is underlain by a sequence of granular fill extending to 15 or 20 feet below ground surface. From 20 to 70 feet below ground surface are soft to firm lagoonal/lacustrine silts and clays interbedded with thin layers of fine sand. Shallow saline groundwater is present on-site at elevations of six to ten feet below mean sea level (msl).

Earthquake Faults

The Los Angeles area is considered a seismically active region. The most significant potential geologic hazard at the Refinery is seismic shaking from future earthquakes generated by active faults in the region. Table 3-8 identifies those faults considered important to the Refinery site in terms of potential for future activity. Los Angeles area is considered a seismically active region. 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. There are no known active faults in the immediate project vicinity. Past Refinery experience indicates that there has never been significant damage from an earthquake. 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 3-3. Each of these faults are briefly discussed below.

TABLE 3-8

MAJOR ACTIVE OR POTENTIALLY ACTIVE FAULTS SOUTHERN CALIFORNIA

FAULT	FAULT LENGTH (Miles)	MAXIMUM CREDIBLE EARTHQUAKE	MAXIMUM ACCELERATION (G's)	DISTANCE FROM Refinery (miles)
San Andreas	200+	8.25	0.21	48
Newport-Inglewood	25	7.0	0.42	3
Malibu-Santa Monica-Raymond Hill	65	7.5	0.49	25
Palos Verdes	20	7.0	0.24	3
Whittier-Elsinore	140	7.1	0.46	20
Sierra Madre	55	7.3	0.23	29
San Fernando	8	6.8	0.17	45
Elysian Park-Montebello	15	7.1	0.27	20

Note: G = acceleration of gravity.
Sufficient data to describe the Torrance-Wilmington and Norwalk faults are not available.
Source: Various, see text for details.

San Andreas Fault Zone: The San Andreas fault is located approximately 50 miles northeast of the Refinery. This 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 Newport-Inglewood Fault Zone: The Newport-Inglewood fault is approximately three miles northeast of the Refinery and 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 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

Figure 3-3 goes here

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).

Malibu-Santa Monica-Raymond Hills Fault Zone: The Raymond Hills fault is about 25 miles northwest of the site. 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 is located about three miles southwest of the site. The 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.

Whittier-Elsinore Fault Zone: The Whittier fault is one of the more prominent structural features 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.

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).

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 San Fernando fault is located about 45 miles north of the site.

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.

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.

Torrance-Wilmington Fault Zone: The Torrance-Wilmington fault has been reported to be a potentially destructive, deeply buried fault which 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 deep below the ground surface. 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.

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. Table 3-9 lists those faults considered important to the proposed project site in terms of potential for future activity.

TABLE 3-9
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 Ultramar 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 the Refinery is 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).

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 Refinery. 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.

On-Site Wells: The Wilmington area was a source of crude oil in the 1900s. Therefore, a number of abandoned oil wells are present in the area, including within the confines of the Ultramar Refinery. There are about 75 plugged and abandoned oil wells, 17 water injection wells, and 12 idle oil wells within the Ultramar Refinery.

Regulatory Background

The Los Angeles General Plan 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. Seismic hazards affecting the Wilmington area and mitigation measures to minimize impacts (e.g., compliance with the Uniform Building Codes) are discussed in Chapter 4, Geology/Soils.

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, and non-natural events, such as 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 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, to provide a basis for evaluating the changes in hazards posed by the proposed project.

The major types of public safety risks at the Refinery consist of risk from releases of regulated substances and from major fires and explosions. The discussion of the hazards associated with the existing Refinery relies on data in the Worst Case Consequence Analysis for Ultramar's 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 also handles petroleum products including propane, butane, isobutane, MTBE, gasoline, fuel oils, diesel and other products, which pose a risk of fire and explosion at the Refinery. Accident scenarios for the existing Refinery 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 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 in the event that the hazard situation occurs or migrates off-site. 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. 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, hydrogen fluoride, chlorine, and hydrogen sulfide) 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 storage tank containing a flammable gaseous material (like propane), 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 containing flammable explosive vapors and potential ignition sources are present at the Refinery. 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.

Other Refinery Hazards

Sulfur is contained in many of the Refinery streams. Sulfur compounds, when heated in the presence of a catalyst, will combine with hydrogen to form hydrogen sulfide. The hydrogen sulfide (H_2S) most likely to be of concern is found in some of the vapor or overhead streams at the Refinery. Hydrogen sulfide in the vapor streams is collected through the vapor recovery system where hydrogen sulfide is removed from the vapor by the amine stripper and converted to elemental sulfur in the Sulfur Recovery Plant. In the event of an upset in the Sulfur Recovery Units, gas containing hydrogen sulfide would be flared, thus minimizing the release of hydrogen sulfide. If the Tail Gas Treatment Unit was to shutdown, tail gas (which contains hydrogen sulfide) from the Sulfur Recovery Units will bypass that Tail Gas Treatment Unit and be combusted in the Tail Gas Incinerator. The gases would be incinerated at 1500^{o}F that is expected to be about 98 percent efficient in the removal of hydrogen sulfide.

A summary of existing hazards at the Refinery associated with the units at the Refinery that are a part of the proposed project (being modified as part of the CARB RFG Phase 3 project) is shown in Table 3-10.

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.

Hazards Related to MTBE

The Ultramar Refinery currently transports, stores, and blends MTBE at its Wilmington 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).

The leaking of gasoline containing MTBE from storage tanks has been determined to be an environmental threat to ground water and drinking water. The use of ethanol is expected to provide an environmental benefit over the use of MTBE since, in the event of a leak or spill, ethanol is expected to break down in the environment more rapidly than MTBE, even though ethanol is more soluble 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.

TABLE 3-10

SUMMARY OF EXISTING HAZARDS(1)

Process Areas(2)	Types of Hazards Found in the Area
Process Areas FCCU GCU/SHU NHT OLEFIN LER1 LER2 MEROX	Breach of liquid line or vessel resulting in: Pool fire
	Breach of flashing liquid line or vessel resulting in: Flash fire Vapor cloud explosion Pool fire Torch fire Toxic cloud (hydrogen sulfide)
	Breach of vapor line or vessel resulting in: Torch fire Vapor cloud explosion Toxic cloud (hydrogen sulfide)
Storage Tanks Propane/Propylene	Breach of atmospheric storage resulting in: Tank fire, dike fire
	Breach of pressurized storage resulting in: flash fire, VCE, or torch fire
	BLEVE of pressurized storage tank
Product Transfer Truck Transfer Pipeline Transfer	Breach of low pressure piping resulting in: Pool fire
	Breach of flashing liquid piping resulting in: Flash fire, VCE, torch fire
	Breach of vapor line resulting in: Torch fire

(1) The hazard analysis is limited to the units being modified as part of the proposed project.
(2) FCCU = Fluid catalytic cracking unit. GCU/SHU = Gas concentration/selective hydrogenation unit. NHT = Naphtha hydrotreating unit. OLEFIN = Olefin treater unit. LER1, LER2 = Light ends recovery units. MEROX = Fuel gas mercaptn treatment unit. VCE = Vapor cloud explosion. BLEVE = Boiling liquid expanding vapor explosion.

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 3-11. This information was summarized from the Los Angeles County Hazardous Waste Management Plan (Los Angeles County, 1988).

TABLE 3-11

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 accident rates developed based on transportation in California were used to predict the accident rate associated with trucks transporting materials to/from the Refinery. Table 3-12 estimates the accident rate for truck traffic assuming an average truck accident rate of 0.28 accidents per million miles traveled (Los Angeles County, 1988). The estimated accident rate associated with the existing Refinery is about 0.37 or about one accident every 2.7 years.

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.

TABLE 3-12

ULTRAMAR REFINING COMPANY PREDICTED TRUCK ACCIDENT RATES ASSOCIATED WITH THE CURRENT REFINERY OPERATIONS

Trucks	**No. of Trips per week[(1)]**	**Approx. Miles One Way**	**Estimated Accident rate/year[(2)]**
Delivery/transport trucks:			
Gas Oil	257	25	0.094
Propane	78	25	0.028
Butane	61	25	0.022
Sulfur	82	10	0.012
Chemicals	17	25	0.006
Distillate Materials	375	30	0.164
Deliveries	100	25	0.036
Misc.	12	30	0.005
TOTALS:	**982**		**0.37**

1 Number of truck trips that may involve the transport of hazardous materials. It is assumed that trucks that deliver or transport materials (e.g., petroleum products, ammonia trucks) would arrive carrying hazardous materials but would leave empty or vice versa (arrive empty and leave transporting materials).
2 Reported accident rate for trucks is about 0.28 accidents per million miles traveled (Transportation Research Board, 1984). It should be noted that not every truck accident results in an explosion or release of hazardous substances.

The hazards associated with the transport of regulated (CCR Title 19, Division 2, Chapter 4.5 or the CalARP requirements) hazardous materials, e.g., anhydrous ammonia and hydrogen fluoride, would include the potential exposure of numerous individuals in the event of an accident that would lead to a spill. Ammonia and hydrogen fluoride are currently used and transported to the Ultramar Refinery. Factors such as amount transported, wind speed, ambient temperatures, route traveled, distance to sensitive receptors are considered when determining the consequence of a hazardous material spill.

Pipeline Hazards

In March 1993, the California State Fire Marshal (CSFM) issued a report that analyzed data related to pipeline leaks and ruptures for hazardous materials pipelines operating in California during the previous ten years. This study examined the effect of earthquakes on these pipelines and, based on historical statistics, concluded that the impact of earthquakes on pipelines was limited. Only three leaks out of 500 during the ten-year study period were judged to be directly related to earthquake effects. The study also emphasized that older pipelines (pre-1935) with acetylene welds were much more vulnerable than newer pipelines constructed with electric arc welds. The study found that the injury and fatality rates associated with crude oil pipelines were very low (CSFM, 1993).

Pipelines have historically had the lowest release rates for the transport of liquid material in comparison with other modes of transportation (NRC, 1988). However, there is always the potential for leakage or rupture when operating a pipeline system. The major causes of leakage or rupture are: (1) corrosion; (2) third party excavation; (3) damage by a seismic event; and (4) operator error.

An analysis of pipeline accidents was completed based on data from the 1970s which provides an indication of the probability of a pipeline spill based on pipeline age (Mastandrea, 1982). The data shown in Table 3-13 are supported by the CSFM Report (1993) that shows incident rates of pipelines built during the 1950s and 1960s are four times those built during the 1980s, while pipelines built during the 1940s had an incident rate over eight times greater than those built during the 1980s.

TABLE 3-13

PIPELINE SPILL PROBABILITY

TYPE OF SPILL	**Spill Probability per Mile/year(1)**		
	Age of Pipeline		
	New	**20 Years**	**40 Years**
LEAK Less than 2,100 gallons	7×10^{-4}	1.8×10^{-3}	4.5×10^{-3}
RUPTURE Greater than 2,100 gallons	3×10^{-4}	9×10^{-4}	2.3×10^{-3}

Source: Mastandrea, 1982
(1) For example, the spill probability for a new pipeline is about 7 accidents per 10,000 miles as compared to a 20-year old pipeline of about 1.8 per 1,000 miles (or about 18 per 10,000 miles).

Regulatory Background

There are many federal and state rules and regulations that refineries must comply with which serve to minimize the potential impacts associated 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 of Highly Hazardous Chemicals, and Title 8 of the California Code of Regulations, General Industry Safety Order §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.

Section 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. 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 consequences 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 Refinery. Ultramar 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 practical moment (49 CFR Subchapter C). Incidents which 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. HYDROLOGY/WATER QUALITY

Ground Water Quality

The Ultramar Refinery site is located over the Los Angeles Basin ground water aquifer system. Four major aquifers are present within the Los Angeles Basin, and are used for industrial and municipal water supply outside of the harbor area. In the vicinity of the Refinery, no aquifers are present that have a usable fresh water supply because of salt water intrusion. From oldest to youngest, these aquifers include the Silverado, Lingo, Gaspur, and Gage Aquifers which are found within the San Pedro Formation. Movement along seismic faults within this zone has created barriers to the migration of ground water within these aquifers. These barriers subdivide the Los Angeles River Basin into separate ground water basins. The proposed project is located within the West Coast Basin. Site-specific ground water information described below is derived from the California Department of Water Resources Bulletin No. 104 (1961) and Zielbauer et al. (1962).

The top of the lower Pleistocene Silverado Aquifer is found at a depth of approximately 800 feet. It is divided into upper and lower zones reaching a total thickness between 400 and 450 feet. An unnamed aquatard, about 100 feet thick, overlies the Silverado Aquifer. (Note that an aquatard is a geologic formation through which virtually no water moves.) It is composed of marine clays, silt and sandy silt. The Lingo Aquifer, overlies this aquatard, and is found at a depth of 300 to 350 feet. It is approximately 50 feet thick. An unnamed aquatard overlies the Lingo Aquifer separating it from the overlaying Gage Aquifer. It consists of clays, silts, sandy silts, and sandy clays, reaching a thickness of about 50 feet. The upper Pleistocene Gage Aquifer is found at a depth between 100 to 250 feet below site, reaching a thickness of approximately 150 feet.

The Recent Gaspur Aquifer fills a trench incised (or cut) into upper Pleistocene marine deposits (Gage Aquifer), down to a depth of about 180 feet below sea level. The aquifer is comprised of trench-filling sands and gravels of the ancestral Los Angeles River. This aquifer is in hydraulic continuity with the water of San Pedro Bay. The proposed project is located near the western boundary of this aquifer, where the ancestral river drained into the ocean. The top of the Gaspur Aquifer may be 90 feet below sea level at the site. The exact depth of the aquifer unit in the area is not known.

Ground water within the Silverado, Lingo, Gage, and Gaspur Aquifers underlying the Ultramar Refinery site is not considered usable for a fresh water supply. Seawater intrusion has occurred along much of the coastal area as a result of historic fresh ground water removal in portions of the Los Angeles Basin. Chloride levels of the Gage Aquifer are estimated at 15,000 parts per million (ppm), and those of the Gaspur Aquifer are estimated at over 18,000 ppm. Both the Lingo and Silverado Aquifers also exhibit elevated chloride levels and very low transmissivities (the rate that water moves through a unit area times the thickness of the aquifer). Shallow saline ground water has no direct beneficial uses except for limited industrial uses such as reinjection water for enhanced oil recovery operations.

Steam injection wells are in use near the Refinery. These wells penetrate the Gaspur Aquifer to inject steam into the Tar Zone, which is about 2,500 feet below mean sea level. This steam flooding technology is used to enhance oil recovery operations within the Wilmington Oil Field.

Ultramar has an on-going ground water monitoring program within the existing Refinery designed to detect hydrocarbon contamination. The monitoring program requires quarterly monitoring, sampling, and laboratory analyses for total petroleum hydrocarbons (as diesel and as gasoline), benzene, toluene, ethylbenzene, and total xylenes, MTBE, pH, electrical conductivity, and total dissolved solids. There are currently 20 ground water monitoring wells at the Refinery. Based on the results of recent monitoring, nine of the wells contained free hydrocarbon product. The majority of free product appears to be limited to the following areas: (1) near the intersection of E street and J Street; (2) the area southwest of Tank 95-TK-1; (3) the area southeast of tank 81-TK-4; and (4) the vicinity of the former safety basin. With the exception of the area around Tank 95-TK-1, these areas coincide with locations of historic oil field trenches, sumps, and or spreading grounds (EEC, 2000).

The depth to ground water also is monitored on a quarterly basis as part of the Refinery's ground water monitoring program. The depth to ground water ranges from about three to 10 feet below ground level. The ground water flow in the vicinity of the Refinery is generally south to southeast, i.e., towards the ocean (EEC, 2000).

Potential contamination of the nearby surface waters from ground water migration from the Refinery site is mitigated by a system of hydraulic controls in the area. These include the Dominguez Gap Saltwater Hydraulic Barrier which is a system of injection wells to protect the Gaspur Aquifer, and the Cerritos Channel Levee Toe Drain System which collects shallow ground water flowing in a south-southeasterly direction from the site toward the Cerritos Channel and ground water flowing inland from the Cerritos Channel. The collected water is directed to an on-site oil-water separator, and then injected into the underlying oil reservoir for subsidence control. This system of controls serves to protect the adjacent surface water from shallow aquifer contamination (ICF-Kaiser Engineers, 1993).

In 1985, the RWQCB adopted Order 85-17 requiring Ultramar (and 14 other local refineries) to conduct subsurface investigations of soil and ground water. CEQA Section 21092.6 requires the lead agency to consult the lists compiled pursuant to Section 65962.5 of the Government Code to determine whether the project and any alternatives are located on a site which is included on such list. The SCAQMD has not received any list compiled and distributed by CalEPA in accordance with Government Code Section 65962.5. However, the SCAQMD has been informed that the Refinery is included on a list compiled by CalEPA and 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 which are listed pursuant to Government Code Section 65962.5, the following information is requested:

Applicant:	Ultramar Refinery
Address:	2402 Anaheim Street, Wilmington, California 90809
Phone:	(562) 491-6877
Address of Site:	2402 Anaheim Street, Wilmington, California 90809
Local Agency:	Wilmington, City of Los Angeles
Assessor's Book:	7440-2-20,22
List:	See above.
Regulatory ID No:	4B192023NO6
Date of List:	See above.

In Chapter 5, Alternatives, this EIR considers alternatives to the proposed project. However, since the proposed project is required to comply sith the RFG Phase 3 requirements an alternative site analysis is not required. Therefore, there is no alternative site listed pursuant to Government Code Section 65962.5.

MTBE in Ground Water

The use of MTBE in gasoline increased as a result of various state and federal regulations requiring that fuels contain oxygenates. At the same time, MTBE was increasingly being detected in drinking water supplies, with between five and 10 percent of drinking water supplies in high oxygenate use areas (areas using RFG at two percent by weight oxygen) showing at least detectable amounts of MTBE. The great majority of these detections have been below levels of public health concern with about one percent rising to levels above 20 ppb. Detections at lower levels raised consumer taste and odor concerns that have caused water suppliers to stop using some water supplies and to incur costs of treatment and remediation (Blue Ribbon Panel on Oxygenates in Gasoline, 1999).

MTBE has been determined to pose an environmental threat to ground water and drinking water. The effective solubilities of fuel oxygenates are commonly higher than those of other fuel-related hydrocarbons (benzene, xylene, toluene and ethyl benzene) since oxygenates (including MTBE) are more soluble and may occur at higher concentrations in oxygenated fuels. Other properties of oxygenates compound this problem. Oxygenates generally have low soil-water distribution coefficients (K_{oc} values) and low water-air distribution coefficients (K_h values). Ether oxygenates (including MTBE) also have low biodegradation rates. Dissolved-phase MTBE therefore, tends to remain in groundwater, instead of adsorbing to soil, volatilizing to soil vapor, or biodegrading.

Since oxygenates have relatively low K_{oc} values, they also have low retardation factors and high plume migration velocities. MTBE plumes can advance down gradient at relatively high rates in many hydrogeologic settings, even when the associated benzene, toluene, ethylbenzene, and xylenes (BTEX) plumes are significantly retarded. Furthermore, MTBE plumes appear to naturally attenuate at slower rates, and so they may continue to advance even after the associated BTEX plume has stabilized (API, 2000).

Contamination of water supplies by gasoline components has occurred as a result of leakage, spills, and transportation accidents. High concentrations of MTBE or other oxygenates in ground water are typically associated with point sources of fuels, such as storage tanks and pipelines. Specific source release scenarios include subsurface releases from underground tanks, piping, and sumps; surface releases from above ground spills; and subsurface vapor releases from underground storage tanks or vapor recovery systems. MTBE releases are most commonly associated with older fuel storage tank systems, but they may occur even with systems that meet 1998 federal standards. There is evidence that even relatively small releases of oxygenated fuels (such as leaking automobile gas tanks, “backyard” fuel storage, or storage tank overfills) can lead to measurable concentrations of MTBE in shallow ground water (API, 2000).

Nonpoint sources of oxygenates may also affect shallow ground water, particularly in urban areas. Recent studies have found detectable concentrations of dissolved-phase MTBE in precipitation, storm water runoff, and surface water bodies (such as rivers, reservoirs, and lakes). The available evidence suggest that infiltration of affected water from such nonpoint sources could lead to low concentrations of oxygenates in shallow groundwater. Precipitation in some urban areas could have MTBE concentrations as high as 3 micrograms per liter (ug/l), with even higher concentrations possible in the immediate vicinity of MTBE vapor sources (e.g., parking garages, gas stations, or roads). Precipitation could contribute MTBE to shallow ground water in concentrations as high as 20 ug/l. MTBE concentrations in water samples from lakes and reservoirs used by recreational water craft have been detected in the 10 to 50 ug/l range (API, 2000).

Due to the environmental concerns related to the use of MTBE described above, California Governor Davis issued Executive Order D-5-99 on March 25, 1999 which, among other things, requires the phase out of MTBE from gasoline in California.

Surface Water Quality Setting

The Ultramar Refinery is located immediately east of the Dominguez Channel, less than one-half mile north of the Cerritos Channel, and approximately 1.3 miles west of the Los Angeles River. The Los Angeles River and the Dominguez Channel are the major drainages that flow into the Los Angeles-Long Beach Harbor complex. Sediments and contaminants are transported into the harbor with the flows from the Los Angeles River and, to a lesser degree, the Dominguez Channel.

The Los Angeles River drains an 832-square mile basin, and enters Long Beach Harbor approximately 2.2 miles east of the proposed project. The Los Angeles River watershed is controlled by a series of dams, and an improved river channel with a design flow capacity of 146,000 cubic feet per second.

The Dominguez Channel originates in the area of the Los Angeles International Airport and flows southward into the East Channel of the Los Angeles Harbor. The Dominguez Channel, an 8.5-mile long structure, drains approximately 80 square miles west of the Los Angeles River drainage basin. Permitted discharges from industrial sources are a substantial percentage of the persistent flows in the Dominguez Channel. Water quality objectives and beneficial uses for the Dominguez Channel tidal prism have been established by the Regional Water Quality Control Board, Los Angeles Region, in the Water Quality Control Plan for the Los Angeles River Basin (1978).

The Cerritos Channel is part of the Inner Harbor and runs along the northern boundary of Terminal Island. Water quality in the Cerritos Channel is primarily affected by climate, circulation, biological activity, and surface runoff, dredging activities, and plankton blooms. In 1988, transparency in the Cerritos Channel was measured at nine feet, which was greater than measurements taken in the Outer Long Beach Harbor (POLB, 1988).

Storm Water

Surface water runoff and storm water runoff is controlled by the Ultramar Refinery in order to prevent direct runoff into the Dominguez and Cerritos Channels. Storm water that falls in the process units is processed through Ultramar's effluent water treatment system prior to discharge into the LACSD sewerage system. The Refinery has provisions to release storm water runoff from areas outside the process units to a storm water system owned by the Port of Long Beach. The storm water runoff is sampled according to the Port's National Pollutant Discharge Elimination System (NPDES) Permit issued by the RWQCB. The NPDES permit regulates discharges to surface water bodies. In accordance with the NPDES permit, effluent is monitored at the point of discharge to the Cerritos Channel. The storm water runoff must meet minimum oil and grease, phenol, and total residual chlorine requirements prior to discharge to the Cerritos Channel.

Spill Control and Containment

The Ultramar Refinery has a Spill Prevention, Control and Countermeasure (SPCC) Plan, as required by 40 CFR Part 112. The purpose of this plan is to prevent the discharge of oil into navigable waters and to contain such discharge should it occur. The SPCC describes the spill prevention and containment methods implemented at the Refinery. Primary spill prevention methods implemented at the Refinery include: automatic tank gauging devices that measure the level in storage tanks; doubled bottom tanks; diking around all tanks to contain leaks or spills; and pipeline integrity testing. A wall, seven foot high, is constructed on the western boundary of the Refinery which provides a barrier to prevent spilled material from migrating into the Dominguez Channel.

The Refinery maintains an Oil Spill Contingency Plan which includes support by Clean Coastal Waters and other oil spill response companies which have the capability to provide additional oil booms and barriers in the event of a spill. Response times range from 15 minutes to one hour. In addition, there is a permanent oil containment boom installed across the Dominguez Channel at Henry Ford Avenue.

Wastewater

Major sources of wastewater at the Refinery include water containing impurities from splitters and strippers (stripped sour water); desalter water; water discharged from cooling towers (blowdown); boiler blowdown; oily water from drips, spills, washdown water, and contaminated storm water runoff from paved portions of the process areas; water softener regeneration; storage tank drainoff water; and ground water from free hydrocarbon recovery. A considerable volume of water is lost through evaporation at the cooling towers and through coke handling operations.

Oily wastewater collected in the enclosed sewers flows from a diversion box into to an API separator, and then to a surge tank feeding an induced gas unit (IGU). Non-oily wastewater collected from other sources is stored in separate storage tanks and is pumped, with the discharge from the IGU, to the LACSD sewer. During periods of high water runoff (heavy rainfall), water in the diversion box is pumped into the storm water tank and is stored until it can be treated and discharged.
Sour water, produced in the Refinery process units, is treated in the Sour Water Strippers. Stripper overhead is sent to the Sulfur Recovery Unit and the Stripper bottoms are reused in the Refinery or are sent to the effluent water treating system. The Refinery utilizes a pressurized drain system to minimize fugitive hydrocarbon emissions. This drain system terminates at the Refinery vapor recovery area, where a knockout vessel removes liquids. Vapors are routed to the vapor recovery system, and the water is routed to the Sour Water Stripping Unit.

Wastewater generated by the Ultramar Refinery is treated by the LACSD at their Joint Water Pollution Control Plant (JWPCP) located in Carson. The Refinery currently discharges an average of about 1.0 million gallons per day of wastewater. Wastewater discharge is regulated by the LACSD through an Industrial Wastewater Discharge Permit (Permit No. 11945 R1) which was issued on July 27, 2000. The LACSD regulates the discharges through enforceable permit conditions that limit the total wastewater discharge, the temperature, concentration of various pollutants, and pH. Table 3-14 provides the wastewater effluent limitations. The LACSD permit allows a discharge of 409.62 x 10^6 gallons per year of wastewater.

TABLE 3-14

MAXIMUM ALLOWABLE WASTEWATER CONCENTRATIONS FROM THE INDUSTRIAL WASTEWATER DISCHARGE PERMIT

CONSTITUENT	DAILY MAXIMUMS	UNITS
Flow	409.42	10^6 gal/yr
Temperature °F	<140	°F
pH	>6	pH units
Dissolved sulfides	0.1	mg/l
Oil and Grease	75	mg/l
Ammonia	100	mg/l
Total Mercaptans	2.0	mg/l
Thiosulfate	50	mg/l
Flammable materials	<20%	LEL
Arsenic	3	mg/l
Cadmium	15	mg/l
Chromium (total)	10	mg/l
Copper	15	mg/l
Lead	40	mg/l
Mercury	2	mg/l
Nickel	12	mg/l
Silver	5	mg/l
Zinc	25	mg/l
Cyanide (total)	10	mg/l
Chlorinated hydrocarbons	None	-

Regulatory Background

The Federal Clean Water Act of 1972 primarily establishes regulations for pollutant discharges into surface waters. This Act requires industries that discharge wastewater to municipal sewer systems to meet pretreatment standards. The regulations authorize the U.S. Environmental Protection Agency to set the pretreatment standards. The regulations also allow the local treatment plants to set more stringent wastewater discharge requirements, if necessary, to meet local conditions.

The 1987 amendments to the Clean Water Act enabled the U.S. Environmental Protection Agency to regulate, under the National Pollutant Discharge Elimination System program, storm water discharges from industries and large municipal sewer systems. The U.S. Environmental Protection Agency set initial permit application requirements in 1990. The State of California, through the State Water Resources Control Board, has authority to issue general industrial storm water permits, which meet U.S. Environmental Protection Agency requirements, to specified industries.

The Porter-Cologne Water Quality Act is the state of California's primary water quality control law. It implements the state's responsibilities under the Federal Clean Water Act but also establishes state wastewater discharge requirements. The RWQCB administers the state requirements as specified under this Act, which include storm water discharge permits. The Los Angeles County Sanitation Districts assumes responsibility for establishing discharge standards for sewer discharges into the Los Angeles County Sanitation Districts' system.

In response to the Federal Act, the State Water Resources Control Board prepared two state-wide plans in 1991 and 1995 that address storm water runoff: the California Inland Surface Waters Plan and the California Enclosed Bays and Estuaries Plan. These Plans contain similar provisions and complement each other. Both establish numerous water quality objectives for water bodies. The California Enclosed Bays and Estuaries Plan specifies the Los Angeles-Long Beach Harbor (to which surface water from the Los Angeles River eventually flows) as an enclosed bay.

E. LAND USE/PLANNING

Regional Land Use and Zoning

The Refinery is located in Wilmington District of the City of Los Angeles within southern Los Angeles County. The community of Wilmington is generally urbanized and includes a substantial amount of industrial and port-related development. The Ports of Los Angeles and Long Beach are located along the coastal boundary of Wilmington.

The proposed pipeline is located within the Wilmington District of the City of Los Angeles and the southern portion of the City of Carson. The pipeline route is proposed to be located within heavy industrial areas that contain mostly petroleum refining and related facilities, and storage facilities.

The Wilmington area is bordered by the Harbor Interstate 110 Freeway on the west, the Long Beach Interstate 710 Freeway on the east, the San Diego Interstate 405 Freeway on the north and the Pacific Ocean on the south. The Dominguez Channel runs adjacent to the Refinery from the north to the south. Railroad tracks service the area along the western boundary of the Refinery and along Alameda Street.

Regional Plans and Policies

Regional planning programs that assist in coordinating long-range planning within the region include the Los Angeles County Congestion Management Plan; the Southern California Association of Governments Regional Comprehensive Plan and Guide (RCPG); and the SCAQMD's AQMP. The Congestion Management Plan is a planning document that includes measures to reduce or prevent congestion on major freeways and highways. The RCPG is intended to be used as a decision-making guide for future growth and as an overview of other regional plans. The RCPG is a tool used by the city governments to advise and support their planning policy and does not mandate or regulate planning. The SCAQMD developed the AQMP as a comprehensive air pollution control plan that provides for the attainment of state and federal ambient air quality standards.

Project Site Land Use and Zoning

The Refinery is located within a district zoned by the City of Los Angeles for heavy industrial uses (M3-1-VL). Refinery land uses are compatible within this zoning designation. The land use in the vicinity of the Refinery includes oil production and refineries, hydrogen plants, coke calcining, power generation, container terminals, automobile wrecking/dismantling facilities, the Dominguez Channel, and other industrial facilities. The facilities and terminals associated with the Port of Long Beach are located south of the Refinery. The City of Los Angeles' "VL" designation limits construction of buildings and structures to a height not greater than 45 feet. The City of Los Angeles in December 1996, enacted a zoning ordinance which eliminated the 1VL height limit designation for the Refinery to make it consistent with the local land use plan (Los Angeles City Ordinance No. 171439, 1996).

Photographs of the existing Refinery site and the adjacent properties were taken at various locations shown on Figure 3-4. Photographs corresponding to the letters on the map are found on Figures 3-4.1 through Figure 3-4.8. The figures show the views of the site from Anaheim Street, Henry Ford Avenue and adjacent properties in the Port of Long Beach.

The topography of the site is flat terrain and the Refinery is visible from Anaheim Street, Henry Ford Avenue, Pier B Street, and the Terminal Island Freeway. Existing views of the Refinery along these streets include storage tanks, processing units, and buildings. Taller structures, including stacks and vessels, are visible along these streets and from a greater distance from the site. The views of the Refinery from Anaheim Street are often block by train cars parked along the railroad tracks. Sources of light at the Refinery include interior and exterior lighting and security lighting.

The land uses along the proposed pipeline routes generally include heavy industrial land uses (primarily other refineries and petroleum storage facilities) with a few commercial areas near the intersection of Pacific Coast Highway and Alameda Avenue. The proposed pipelines will be located within the City of Los Angeles from the Refinery up to Alameda Street near the Tosco Refinery where the pipelines will fall into the jurisdiction of the City of Carson. The proposed new pipelines will generally follow existing pipeline routes.

The pipeline will be located in the City of Carson's MH zone, according to the City of Carson's Land use element of its General Plan. The MH zone allows for the full range of industrial uses that are acceptable within the community as a whole, with provisions for controlling adverse effects upon the more sensitive areas of the City. The pipelines will be located adjacent to Alameda Street and adjacent to the Alameda Corridor. The Alameda Corridor will link the ports of Los Angeles and Long Beach to the downtown Los Angeles area, from where the railroads serving the region leave to destinations throughout the United States. The purpose of the Alameda Corridor is to facilitate access to the ports to accommodate anticipated port growth and to reduce highway traffic congestion, air pollution, vehicle delays at grade crossing, and noise in residential areas. More details associated with the Alameda Corridor and potential conflicts with the proposed project are addressed in Chapter 6 – Cumulative Impacts.

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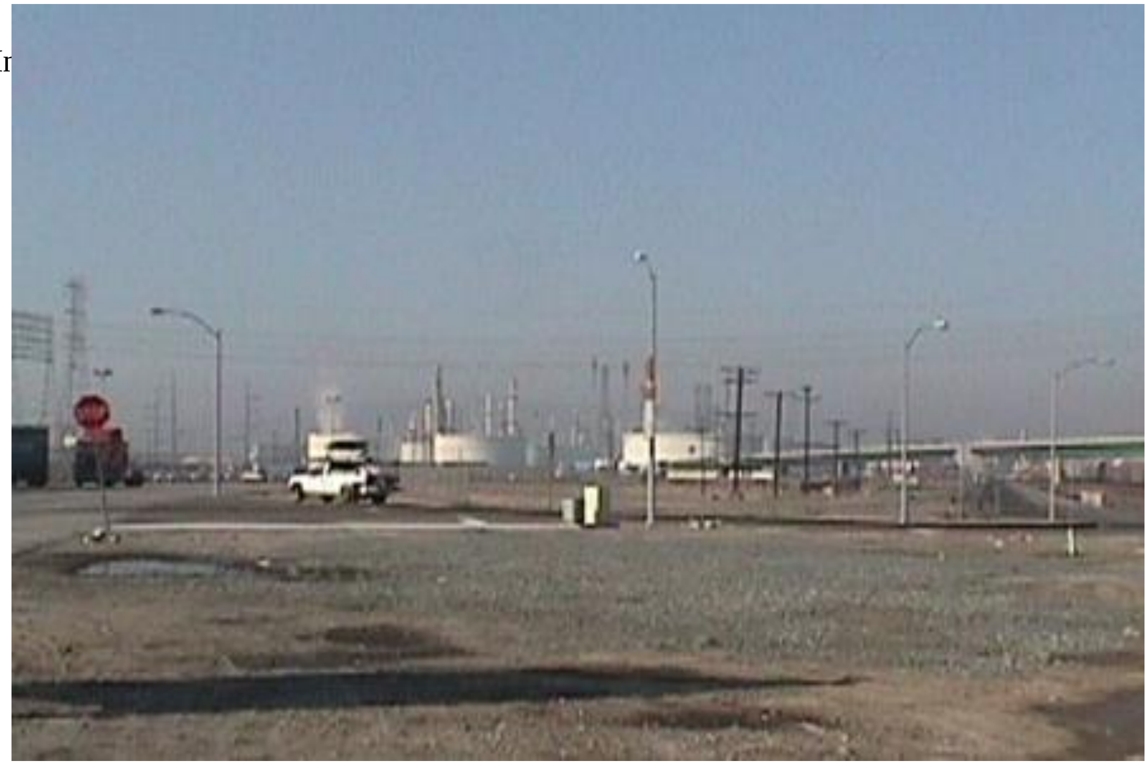

Figure 3-4.1: View of Refinery from Anaheim Street looking south-west.

Figure 3-4.2: View of Refinery from Anaheim Street looking south.

Figure 3-4.3: View of Refinery from Henry Ford looking east.

Figure 3-4.4: View of Refinery from Henry Ford looking east.

Figure 3-4.5: View of Refinery from the southern property line looking north.

Figure 3-4.6: View of Refinery from south-eastern property line looking north-west.

Figure 3-4.7: View of Refinery from eastern property line looking west.

Figure 3-4.8: View of Refinery from eastern property line looking west.

General Plans

The Refinery is located within the Wilmington-Harbor City Planning Area (City of Los Angeles), which permits heavy industrial uses including petroleum refining on the Ultramar property (City of Los Angeles, 1993). A conditional use permit is thus not required for this project. The Wilmington-Harbor City Plan places no additional restrictions on refineries, and specifically allows for construction without regard to height limitations. Therefore, the Refinery is not required to have a conditional use permit from the City.

A large portion of the southeast quadrant of the Wilmington community is industrial. Heavy industrial uses are mostly concentrated near the Refinery in the southern and eastern portions of Wilmington near the Harbor. The industrial character of Wilmington is largely defined and influenced by its strategic location adjacent to the Los Angeles and Long Beach harbors. Also, oil extraction and refining activities have a predominant influence on land use. A recent trend is the utilization of industrial properties for cargo container storage (City of Los Angeles, 1999).

Land uses within Wilmington consist primarily of low to medium density residential with commercial uses concentrated near the transit corridors of Pacific Coast Highway, Anaheim Street, and Avalon. Single family neighborhoods are located throughout the north, central and western portions of Wilmington, in south Wilmington between Fries Avenue and Wilmington Boulevard north of C Street. Concentrations of multi-family residential uses can be found near Anaheim Street in Wilmington. Most of the housing stock is over 30 years of age, and one-third is over 50-years of age.

Commercial uses in the Wilmington area are primarily located along Avalon Boulevard near the intersection with Anaheim Street, and also along Pacific Coast Highway. Intensive commercial development is located along Avalon Boulevard near the intersection with Anaheim Street, and also along Pacific Coast Highway, that includes many different types of retail establishments and services. Many existing commercial areas in downtown Wilmington, are in need of revitalization (City of Los Angeles, 1999).

Open space areas serving Wilmington include Banning Park and Harbor Regional Park. Additional open space is provided by several other parks, including portions of an abandoned railroad right-of-way. Public facilities in the area include Los Angeles Harbor College, Kaiser Hospital, a branch library, and a number of Department of Water and Power facilities that provide service to greater Los Angeles (City of Los Angeles, 1999).

The Ultramar Refinery is located within the Coastal Zone, as defined by the California Coastal Act. The proposed project will require issuance of a Coastal Development Permit to assure that the project will comply with the coastal protection requirements of the Coastal Act. The California Coastal Commission has reviewed development in the past at the Refinery and has issued a number of coastal development permits and de minims waivers. For each permit the Commission found the proposed development to be consistent with the goals and policies of the California Coastal Act.

Vegetation in the area is minimal and limited to landscape vegetation near a few office buildings. Native vegetation has been removed due to the urbanization and development in the area. No natural scenic features occur within the Refinery or adjacent to the Refinery. No scenic highways or corridors are located in the Wilmington area.

The land use element of the City of Carson identifies the proposed general distribution, location, and extent of residential, commercial, industrial, public and quasi-public activities within the City. The pipelines will be located in areas designated as MH (heavy manufacturing). The pipelines are surrounded by other heavy manufacturing areas. The General Plan Land Use Element establishes general policies to guide future development and improvement. Applicable goals and objectives including the following:

- Allow each type of land use sufficient acreage to develop to the fullest extent indicated by the economy and general welfare;
- Industrial areas should be served with adequate accessibility to transportation, utilities, public streets or highways and with adequate internal circulation, off street parking and loading and service facilities;
- Encourage the development of stable industrial and commercial uses which will broaden the economic base to create a more self-sufficient local economy;
- Appropriate pollution and environmental standards should be enforce; and
- Attempt to maintain the industrial areas mainly in the sections of the City presently designated for that land use.

The proposed pipeline routes also will be located in the Merged and Amended Redevelopment Area (Nos. 2 and 3) of the City of Carson, which is a comprehensive program for the elimination of blight within the boundaries set forth in the redevelopment plan. The redevelopment plan includes a number of components, which establish the Agency's policy for the future development of the area, and actions the Redevelopment Agency may take in implementing that policy. The proposed pipeline route would not lie within an area where potential conflicts may arise between heavy industrial uses and residential uses.

Sensitive Land Uses

Sensitive land uses include residences, schools, day care facilities, churches, hospitals, recreational areas, and retirement homes. 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 0.6 mile northwest of the Refinery. The closest school is also located in this residential neighborhood, about 1.1 miles from the Refinery. Residential areas, schools and recreation areas are also located immediately east of the Dominguez Channel in the City of Long Beach.

Regulatory Background

Land use in the vicinity of the Refinery is controlled and regulated by the City of Los Angeles General Plan and the Wilmington-Harbor City Specific Plan. The Specific Plan identifies the area near the Refinery as heavy industrial and encourages the area to continue to develop as a major industrial and employment center within the Wilmington community by attracting new industrial uses that create jobs in the local economy. The Specific Plan land use goals and policies that apply to the proposed project include (City of Los Angeles, 1999):

Objective: To provide locations for future industrial development and employment which are convenient to transportation facilities and compatible with surrounding land use.

Policy 3-1.1: Designate lands for the continuation of existing industry and development of new industrial parks, research and development uses, light manufacturing, and similar uses which provide employment opportunities.

Policy 3-1.2: Define and separate new and/or expanded industrial uses from other uses by freeways, flood control channels, highways and other physical barriers.

Policy 3-1.4: Land use compatibility should be achieved by including environmental protection standards and health and safety requirements in the design and operation of industrial facilities, including strict compliance with all applicable air quality standards.

Objective: To retain industrial lands for industrial use to maintain and expand the industrial employment base for the community residents.

Policy 3-2.2: Large industrially planned parcels located in predominantly industrial areas should be protected from development by other uses which do not support the industrial base of the City and community.

Policy 19-1.1: Require development within the Coastal Zone to conform to all applicable objectives and policies set forth in the Community Plan since the Plan constitutes the Land Use portion of the City's Local Coastal Program for Wilmington.

Policy 19-1.4: New and/or expanded industrial facilities to be sited to provide sufficient open space, landscaped and maintained buffer area to minimize adverse impacts on surrounding property.

Zoning within the City of Carson is governed by the Carson Zoning Ordinance (Article IX, Chapter 1 of the City of Carson Municipal Code). The Zoning Ordinance was adopted in 1997, and has been amended as necessary. The purpose of the Zoning Ordinance is to establish land use districts designed to obtain advantages from planned use of land, and to establish regulations for development and land uses within these districts.

Development within the Coastal Zone requires approval of a Coastal Development Permit from the California Coastal Commission (California Code of Regulations, Title 14, §13050.5) and must comply with the coastal protection provisions of the California Coastal Act. The Act includes provisions for industrial development in areas that are currently developed with industrial facilities.

F. 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 which 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 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

The vicinity of the proposed Refinery project is an urban environment characterized by extensive industrial, commercial and transportation-related land uses. The Ultramar Refinery is surrounded by industrial facilities, commercial activities and transportation corridors. Major contributors to the ambient noise levels in the general vicinity of the Ultramar 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, Henry Ford Avenue, and Anaheim Street, especially the large number of trucks that use these arterials into and out of the port area;
- The industrial facilities which include the Refinery, a hydrogen plant, a coke calcining facility, cogeneration plant, container facilities, automobile import facilities, other refineries, and automobile wrecking/dismantling operations;

Figure 3-5 goes here

- Construction activities on Henry Ford Avenue; 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 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.

The principle 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 Ultramar Refinery is located in an M3-1 zoned (heavy industrial) areas, as established by the City of Los Angeles. The areas surrounding the Refinery are also industrial. Noise readings were taken in the area surrounding the Refinery in September 2000 (see Figure 3-6). The location of the noise readings are identified in Figure 3-6 and explained in Table 3-15. 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 3-16.

The ambient noise readings indicate that the noise levels in the vicinity of the proposed project sites 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 Anaheim Street (north) and Henry Ford Avenue (west) tend to be higher than noise levels along Pier B street (east and south). Traffic contributes to the higher noise readings along Anaheim Street and Henry Ford Avenue. Since Anaheim Street, Henry Ford Avenue, 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 0.6 mile northwest of the Refinery. The noise levels at this residential area (location 6) 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

Figure 3-6 goes here

TABLE 3-15

NOISE LEVEL MEASUREMENT LOCATIONS

LOCATION	DESCRIPTION
1	At the corner of Anaheim St. and Sigsbee Ave. North of the Refinery in an industrial area with scrap yard facilities and container operations. The dominant source of noise is traffic on Anaheim Street.
2	On Henry Ford south of the Air Products hydrogen plant. West of the Refinery, railroad tracks and the Dominguez Channel in an industrial area. Extensive construction activities were underway along Henry Ford Avenue. The dominant noise sources are the Refinery and cooling towers at the hydrogen plant.
3	On Pier B Street at the intersection with Carrack Ave. East of the Refinery and the Terminal Island Freeway in an industrial area next to the Toyota import facility, ARCO Coke Calcining (CQC) plant, and the Harbor Cogeneration Plant. Dominant noise sources include the ARCO CQC plant, Harbor Cogeneration Plant, the Refinery and the Terminal Island Freeway.
4	On Pier B Street about 500 feet east of Hanjin Way. South of the Refinery and across the street from the Hanjin container terminal in an industrial area. The dominant noise source is the Refinery and trucks along Pier B street.
5	On Pier B Street about 200 feet east of the GOH unit at the Refinery and about 100 feet east of Henry Ford Avenue. West of the Refinery in an industrial area adjacent to the Terminal Island Freeway. The dominant noise source is the Refinery GOH unit and traffic along the Terminal Island Freeway.
6	On Blinn Avenue at the intersection of Grant St. Northwest of the Refinery in a residential area located adjacent to Pacific Concrete plant. Dominant noise sources are the concrete plant and traffic on Anaheim St.

TABLE 3-16

SAMPLING RESULTS
BACKGROUND AMBIENT NOISE LEVELS, dBA

LOCATION	NOISE LEVELS (dBA)				
	Morning	Afternoon	Evening	Nighttime	CNEL
1	68.4	68.6	66.8	68	71.7
2	64.8	65.8	65.4	64	68.7
3	66.4	66.2	63.2	58.4	67.3
4	62.8	60.2	68.8	61.6	67.1
5	63.4	62.2	60.2	64.2	66.2
6	58	61	53	60.2	61.8

* See Figure 3-6 for noise reading locations.

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 Ultramar 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. For example, the noise contribution at Location 5 is primarily associated with operation of the GOH where the noise levels range from 60 to 64 dBA.

The ambient noise levels along the pipeline routes are assumed to be about 70 dBA since they will be located within industrial areas (other refineries) and near major arterials (Anaheim Street, Pacific Coast Highway, Alameda Street, and Sepulveda Boulevard).

Regulatory Background

The State Department of Aeronautics and the California Commission of Housing and Community Development have adopted the Community Noise Equivalent Level (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.

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 3-17. The City's Noise Ordinances (Nos. 1156,363 and 11574) apply to the Ultramar Refinery. 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 3-17

CITY OF LOS ANGELES NOISE ORDINANCE
(dBA)*

ZONE	**DAY**	**NIGHT**
Residential Land Uses	50	40
Public and Commercial Land Uses (P, PB, CR, C1, C2, C4, C5, CM)	60	55
Industrial Land Uses(M1, MR1, MR2)	65	65
Heavy Industrial Land Uses (M2, M3)	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.

Portions of the pipeline will be within the City of Carson. 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 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 3-18.

TABLE 3-18

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).

The noise ordinance regulates the allowable noise levels within the City. The City also has adopted a Noise Element which describes the noise sources and levels within the City and establishes goals for the City General Plan.

City of Carson General Plan Noise Element: Portions of the pipeline are located within the City of Carson and is subject to the city's regulations. 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).

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).

Figure 3-7 goes here

G. SOILD/HAZARDOUS WASTE

In 1999, the Ultramar Refinery processes generated approximately 760 tons of materials classified as hazardous waste. Alkylation sludge, oil/water separation sludge, spent catalyst, dissolved air flotation unit (DAF) float, and tank bottom sludge account for approximately 97 percent of the process hazardous waste at the Refinery. A small portion of the hazardous waste generated (95 tons) was sent to an out-of state incineration facility at Port Arthur, Texas. 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 Kings County, and the Safety-Kleen facility in Buttonwillow (Kern County). Kettleman Hills has an estimated 6 million cubic yard capacity and expects to continue receiving wastes for approximately 6 years under their current permit, or for approximately another 12 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 10.8 million tons. The expectant life of the Buttonwillow Landfill is approximately 35 years (Personal Communication, Marianna Buoni, Safety-Kleen (Buttonwillow), Inc., July 2000).

As part of ongoing site maintenance, the Ultramar 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 1999, the Refinery did not encounter any contaminated soil that required disposal.

In addition, the Refinery intermittently generates hydrocarbon-contaminated soil from operational spills or construction activities. When feasible, this soil is recycled into asphalt at the Gibson facility in Bakersfield.

Non-Hazardous Solid Waste

The Ultramar Refinery also generates non-hazardous solid or municipal wastes. Most of these wastes are generated in the administrative operations of the Refinery. The Refinery requires pick up of its 23 municipal waste bins two times a week.

This material is picked up and hauled by BFI Waste Systems to the BFI Falcon Refuse Center in Wilmington for final transport and disposal at the Puente Hills Class III Landfill, the Bradley West Class III Landfill, the Sunshine Landfill or the Community Recycling and Resource Recovery facility which are all located in Los Angeles County (Personal Communication, Robert Lenner, BFI Waste Systems, July 2000). The status of the landfills to which the Ultramar Refinery may send municipal solid wastes is summarized in Table 3-19.

The Los Angeles County Sanitation Districts (LACSD) anticipates that 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.

TABLE 3-19

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.

Regulatory Background

The Hazardous Materials Transportation Act is the federal legislation regulating the trucks that transport hazardous wastes. The primary regulatory authority is 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 Ultramar 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. Truck 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 an readily be identified in the event of a spill.

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 address the need for 15 years of disposal (landfill and/or transformation) capacity to safely handle solid waste generated in the county which remains after recycling, composting, and other waste diversion activities. 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 the Los Angeles County and 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).

H. TRANSPORTATION/TRAFFIC

Regional Circulation

The Ultramar Refinery is located south of Anaheim Street and east of Henry Ford Avenue. Regional access to the Ultramar Refinery 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. The Terminal Island Freeway bisects the Refinery site, but provides no access to the Refinery. 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, Anaheim Street, and Alameda Street are key arterials servicing the area. Other key roadways in the local area network include "B" Street, Figueroa Street, Wilmington Boulevard, and Avalon Boulevard.

Major streets in the Wilmington area include Anaheim Street, Pacific Coast Highway, Sepulveda Boulevard and Alameda Street. Alameda Street is being upgraded, expanded and modified to provide a dedicated roadway system for trucks and railcars leaving the Ports of Los Angeles/Long Beach to provide more efficient movements of goods and materials into/out of the port areas.

In addition to the freeway system, railroad facilities service the Refinery providing an alternative mode of transportation for the distribution of goods and materials. The area is served by the

Union Pacific, and Atchison, Topeka and Santa Fe railroads with several main lines occurring near the Refinery.

The Ultramar Refinery is located near the Port of Los Angeles which provides a mode for transportation of goods and materials via marine vessels.

Local Circulation

The Ultramar Refinery is located at 2402 East Anaheim Street in the community of Wilmington, California, approximately one mile west of the Long Beach Interstate 710 Freeway. The Refinery occupies about 400 acres and is generally located between Anaheim Street on the north, Henry Ford Avenue on the west, Pier A Street on the south, and Pier B Street and the Terminal Island Freeway on the east (see Figure 3-8). The Wilmington Plant currently employs about 250 full-time employees. The predominate route used to reach the Refinery is from the Long Beach 710 Freeway at Anaheim Street. Anaheim street is an east-west, four lane divided roadway that carries about 20,000 to 24,000 vehicles per day.

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 and June, 2000 to determine the existing traffic in the area. Peak hour LOS analyses were developed for intersections in the vicinity of the Refinery (see Table 3-20). The LOS analysis indicates typical urban traffic conditions in the area surrounding the Ultramar Refinery, with most intersections operating at Levels A to B during morning and evening peak hours. The intersection of Wilmington Avenue and 223rd Street, located over two mile north of the Ultramar Refinery (and adjacent to the ARCO Refinery), operates at Level E during a.m. and p.m. peak hours. Traffic associated with Ultramar generally would not impact this intersection.

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 which 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 and the intersections near the Refinery 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

(Figure 3-8 goes here)

TABLE 3-20

ULTRAMAR 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 St. and I-405 Ramps	A	0.362	A	0.382
Alameda St. and 223rd Ramps	A	0.294	A	0.327
ICTF enty/I-405 Ramps and Wardlow/223rd St.	A	0.497	A	0.549
Alameda St. and Sepulveda Blvd.	A	0.395	A	0.432
Alameda St. and Pacific Coast Hwy.	A	0.497	B	0.617
Alameda St. and Anaheim St.	B	0.623	B	0.690
Wilmington Ave. and 223rd St.	E	0.924	E	0.988
Wilmington Ave. and Sepulveda Blvd.	A	0.563	A	0.595
Santa Fe and Pacific Coast Hwy.	B	0.648	B	0.693
Henry Ford and Anaheim St.	A	0.513	A	0.581
Santa Fe and Anaheim St.	A	0.425	A	0.535
9th St./“I” St. and Anaheim St.	A	0.506	A	0.505

v/c = volume to capacity ratio (capacity utilization ratio)
LOS = Level of Service
It should be noted that Henry Ford was under construction during the period when traffic studies were conducted. Henry Ford was closed south of Anaheim so that existing traffic at this intersection may not be representative of normal traffic patterns.

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).