CHAPTER 4.0

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

INTRODUCTION

This chapter assesses the potential environmental impacts of construction and operation of the Equilon CARB RFG Phase 3 proposed project discussed in Chapter 2.

Chapter 4 evaluates those impacts that are considered potentially significant under the requirements of CEQA. Specifically, an impact is considered significant under CEQA if it leads to a "substantial, or potentially substantial, adverse change in the environment."

Impacts from the proposed project fall within one of the following categories:

Beneficial – Impacts will have a positive effect on the resource.

No impact – There would be no impact to the identified resource as a result of the proposed project.

Adverse but not significant – Some impacts may result from the project; however, they are judged to be insignificant. Impacts are frequently considered insignificant when the changes are minor relative to the size of the available resource base or would not change an existing resource.

Potentially significant but mitigation measures reduce to insignificance – Significant adverse impacts may occur; however, with proper mitigation, the impacts can be reduced to insignificance.

Potentially significant and mitigation measures are not available to reduce to insignificance – Adverse impacts may occur that would be significant even after mitigation measures have been applied to lessen their severity.

A. AIR QUALITY

SIGNIFICANCE CRITERIA

To determine whether or not air quality impacts from the proposed project are significant, impacts will be evaluated and compared to the significance criteria in Table 4-1. If impacts equal or exceed any of the following criteria, they will be considered significant. All feasible mitigation measures will be identified and implemented to reduce significant impacts to the maximum extent feasible.

TABLE 4-1

AIR QUALITY SIGNIFICANCE THRESHOLDS

Mass Daily Thresholds		
Pollutant	**Construction**	**Operation**
NO_x	100 pounds per day	55 pounds per day
VOC	75 pounds per day	55 pounds per day
PM10	150 pounds per day	150 pounds per day
SOx	150 pounds per day	150 pounds per day
CO	550 pounds per day	550 pounds per day
Lead	3 pounds per day	3 pounds per day
TAC, AHM, and Odor Thresholds		
Toxic Air Contaminants (TACs)	Maximum Incremental Cancer Risk $\geq$ 10 in 1 million Hazard Index $\geq$ 1.0 (project increment) Hazard Index $\geq$ 3.0 (facility-wide)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
Ambient Air Quality for Criteria Pollutants		
NO_2 1-hour average annual average	 20 ug/m^3 (= 1.0 pphm) 1 ug/m^3 (= 0.05 pphm)	
PM10 24-hour annual geometric mean	 2.5 ug/m^3 1.0 ug/m^3	
Sulfate 24-hour average	 1 ug/m^3	
CO 1-hour average 8-hour average	 1.1 mg/m^3 (= 1.0 ppm) 0.50 mg/m^3 (= 0.45 ppm)	

ug/m^3 = microgram per cubic meter; pphm = parts per hundred million; mg/m^3 = milligram per cubic meter; ppm = parts per million; TAC = toxic air contaminant; AHM = Acutely Hazardous Material

The SCAQMD considers a project proposed by a RECLAIM facility to be significant if the incremental mass daily emissions of NOx and/or SOx from sources regulated under the RECLAIM permit, when added to the allocation for the year in which the project will commence operations, will be greater than the facility's 1994 allocation (including non-tradable credits) plus the increase established in the SCAQMD Air Quality Handbook for that pollutant (55 pounds per day for NOx and 150 pounds per day for SOx). In order to make this calculation, annual allocations as well as the project's incremental annual emissions are converted to a daily average by dividing by 365. Thus, the proposed project is considered significant if:

$(A_1/365) + I < (P + A_2)/365$

Where:

P = the annual emissions increase associated with the proposed project.
A_1 = 1994 initial annual allocation (including non-tradable credits).
A_2 = Annual allocation in the year the proposed project will commence operations.
I = Incremental emissions established as significant in the SCAQMD Air Quality Handbook (55 pounds per day NOx or 150 pounds per day SOx).

The Equilon Refinery and Carson Terminals are both RECLAIM facilities for NOx and SOx, therefore, the significance thresholds for NOx and SOx are calculated in Table 4-2.

TABLE 4-2

SIGNIFICANCE THRESHOLDS FOR NOx AND SOx

POLLUTANT	INITIAL ALLOCATION* (annual)	INITIAL ALLOCATION (pounds per day)	CEQA INCREMENT (pounds per day)	SIGNIFICANCE THRESHOLD (pounds per day)
Refinery:				
NOx	3,077,340	8,431	55	8,486
SOx	1,589,708	4,355	150	4,505
Carson Terminal:				
NOx	1,525,972	4,181	55	4,236
SOx	1,265,929	3,468	150	3,618

* Including non-tradable credits.

The revised RECLAIM significance thresholds apply only to operational emissions of NOx and/or SOx that would be included in the RECLAIM allocation and subject to the RECLAIM regulations. These significance thresholds do not apply to sources that would not be regulated by the RECLAIM regulations (i.e., indirect sources of emissions such as trucks, rail cars, and marine vessels), construction emission sources, and to non-RECLAIM pollutants (i.e., VOCs, CO, and PM10). This EIR uses these RECLAIM NOx and SOx significance criteria to determine the significance of air quality impacts from stationary sources on-site at the Refinery and stationary sources on-site at the Carson Terminal only. The other Equilon terminals are non-RECLAIM facilities.

CONSTRUCTION IMPACTS

Construction activities associated with the proposed project would result in emissions of CO, VOCs, NOx, SOx, and PM10. Significance determinations are based on the maximum daily emissions during the construction period, which provides a worst-case analysis of the construction

emissions. Construction activities will consist of completing projects necessary for eliminating MTBE, importing and distributing ethanol, producing reformulated fuels and adding new facilities to improve the operational efficiency of the Refinery. Construction emissions are expected from the following equipment and processes:

Construction Equipment (dump trucks, backhoes, graders, etc.)
Equipment Delivery/On-Site Travel
Heavy Diesel Trucks
Construction Workers Commuting
Fugitive Dust Associated with Site Construction Activities
Fugitive Dust Associated with Travel on Unpaved and Paved Roads

Daily construction emissions were calculated for peak construction day activities. Peak day emissions are the sum of the highest daily emissions from employee vehicles, fugitive dust sources, construction equipment, and transport activities for the construction period. Construction activities will occur at the Refinery, Carson Terminal, Mormon Island Terminal, Wilmington Terminal, Signal Hill Terminal, Van Nuys Terminal, Colton Terminal and Rialto Terminal. Overall construction emissions are summarized in Table 4-3. Detailed construction emissions calculations are provided in Appendix B.

Construction Equipment

On-site construction equipment will be a source of combustion emissions. Construction equipment may include: backhoes, compressors, forklifts, generators, manlifts, welding machines, cranes, front end loaders, and dump trucks. Most of the equipment is assumed to be operational for eight hours per day, which likely over estimates actual operations and the related emissions. Emission factors for construction equipment were taken from the CEQA Air Quality Handbook (SCAQMD, 1993). Estimated emissions from construction equipment used for construction activities are provided in Table 4-3.

Equipment Delivery/On-Site Travel

Light duty trucks will be used for delivering supplies to the construction sites and transporting various materials on-site to other locations. Primary emissions generated will include combustion emissions from engines during idling and while operating. Emissions are based on the estimated number of trips per day and the round trip travel distances. All light duty trucks whether used for delivery or on-site travel were assumed to travel 11.5 miles per day (SCAQMD 1993, Table A9-5-D). Emission factors, their sources, and other assumptions used to estimate emissions from trucks are provided in Appendix B. Estimated emissions for light duty trucks are provided in Table 4-3.

TABLE 4-3

SUMMARY OF CONSTRUCTION ACTIVITIES
(pounds per day)

Construction Activities	CO	VOC	NOx	SOx	PM10
Refinery Construction					
Construction Equipment	578.5	65.8	461.2	38.8	29.4
Construction Worker Vehicles	208.2	23.4	19.6	-	1
Light Duty Trucks	32.9	1.1	1.0	-	<0.1
Buses	0.6	<0.1	0.3	-	<0.1
Heavy Diesel Trucks	108.0	3.5	42.3	-	1.4
Fugitive Dust from Roadways	-	-	-	-	43.4
Fugitive Construction Emissions	-	-	-	-	97.4
Coating Emissions	-	262.5	-	-	-
Total Construction Emissions	**928.2**	**356.4**	**524.4**	**38.8**	**172.8**
Carson Terminal Construction					
Construction Equipment	107.5	20.4	244.8	24.7	14.8
Construction Worker Vehicles	25.4	2.9	2.4	-	0.1
Light Duty Trucks	12.7	0.4	0.4	-	<0.1
Heavy Diesel Trucks	65.0	2.1	25.5	-	0.8
Fugitive Dust from Roadways	-	-	-	-	30.9
Fugitive Construction Emissions	-	-	-	-	97.4
Total Construction Emissions	**210.6**	**25.8**	**273.1**	**24.7**	**144.1**
Mormon Island Construction					
Construction Equipment	21.6	3.4	47.6	5.0	2.8
Construction Worker Vehicles	3.1	0.3	0.3	-	<0.1
Light Duty Trucks	2.5	0.1	0.1	-	<0.1
Heavy Diesel Trucks	11.0	0.4	4.3	-	0.1
Fugitive Dust from Roadways	-	-	-	-	8.2
Fugitive Construction Emissions	-	-	-	-	35.8
Total Construction Emissions	**38.2**	**4.2**	**52.3**	**5.0**	**47.1**
Wilmington, Signal Hill, Van Nuys, Colton and Rialto[(1)]					
Construction Equipment	50.6	6.7	121.5	12.8	8.0
Construction Worker Vehicles	6.1	0.7	0.6	-	<0.1
Light Duty Trucks	2.5	0.1	0.1	-	<0.1
Heavy Diesel Trucks	64.7	2.1	25.3	-	0.8
Fugitive Dust from Roadways	-	-	-	-	12.8
Fugitive Construction Emissions	-	-	-	-	35.8
Coating Emissions	-	175.0	-	-	-
Construction Emissions at Each Terminal	**123.9**	**184.6**	**147.5**	**12.8**	**57.6**

(1) The construction activities at these terminals are expected to be identical. The construction emissions are for one terminal and these emissions would occur at each terminal site. See Table 4-4 for an estimate of the peak day construction emissions.

Heavy Diesel Trucks

Heavy diesel trucks include water trucks, dump trucks and other trucks that will be watering, or delivering and removing materials from the site. Primary emissions generated will include exhaust emissions from diesel engines while operating. Emission calculations were estimated using the projected peak truck traffic for each site. Emissions are based on the estimated number of trips per day and the round trip travel distances. Emission factors, their sources, and other assumptions used to estimate emissions from trucks are provided in Appendix B. Estimated construction emissions for heavy trucks at each site are provided in Table 4-3.

Construction Workers Commuting

Construction emissions also include emissions from construction worker vehicles traveling to and from the work site. Emission calculations were estimated assuming the maximum projected workers at each location traveling to/from the sites each weekday. Each vehicle is assumed to travel 11.5 miles (SCAQMD Guidance 1993, Table A9-5-D) to and from work each day, making two one-way trips per day. Emissions from employee vehicles are presented in Table 4-3. Emissions from employee vehicles were calculated using the EMFAC2000 emission factors developed by CARB.

Fugitive Dust Associated with Site Construction Activities

Fugitive dust sources include grading, excavation, demolition and clearing of the site to construct necessary foundations. During construction activities, water used as a dust suppressant will be applied, or other best available control measures will be implemented, in the construction area during grading, excavation, and earth-moving activities to control or reduce fugitive dust emissions. Application of water reduces emissions by a factor of approximately 34 to 68 percent (SCAQMD, 1993). It is assumed herein that water application one time per day reduces emissions by 34 percent and watering two times per day reduces emissions by 50 percent (SCAQMD, 1993). Fugitive dust suppression, often using water, is a standard operating practice and is one method of complying with SCAQMD Rule 403. The fugitive dust emissions are provided in Table 4-3 and detailed emission calculations are provided in Appendix B.

Fugitive Dust Associated with Travel on Paved and Unpaved Roads

Vehicles and trucks traveling on paved and unpaved roads are also a source of fugitive emissions during the construction period. The emissions estimates for travel on paved roads assumed that construction worker vehicles and light duty trucks will travel on paved roads. The fugitive emissions for trucks assumes travel on both paved and unpaved roads. Water trucks are assumed to travel on unpaved roads. Emissions of dust caused by travel on paved roads were calculated using the EPA's, AP-42 emission factor for travel on paved roads. Emissions of dust caused by travel on unpaved roads were calculated using the SCAQMD CEQA Air Quality Handbook (SCAQMD, 1993). The estimated PM10 emissions from trucks and passenger autos for fugitive dust are provided in Table 4-3 and detailed emission calculations are provided in Appendix B.

Miscellaneous Emissions

Emissions associated with painting the new pentane sphere are included in the construction emission calculations, assuming a VOC content of 3.5 pounds of VOC per gallon of paint (see Appendix B).

In addition to the construction-related emissions already identified for the proposed project, the project could generate emissions of VOC if contaminated soil is found and soil remediation activities are necessary. Emission estimates for VOC would be speculative at this time, however, because the amount of contaminated soil, if any, and the levels of contamination are currently unknown. VOC contaminated soil is defined as soil which registers 50 parts per million or greater per the requirements of SCAQMD Rule 1166 – Volatile Organic Compound Emissions from Decontamination of Soil. If VOC contamination is found, soil remediation must occur under an SCAQMD approved Rule 1166 Plan to assure the control of fugitive emissions which generally includes covering soil piles with heavy plastic sheeting and watering activities to assure the soil remains moist. Soil remediation activities are under the jurisdiction of the RWQCB and it may be necessary for the RWQCB and SCAQMD to coordinate in order to assure air quality impacts are adequately mitigated.

Construction Emission Summary

The peak construction emissions for the proposed project are summarized in Table 4-4, together with the SCAQMD's daily construction threshold levels. The peak construction period assumes that construction activities will occur simultaneously at the Refinery, Carson Terminal, Mormon Island Terminal and at two other terminals. The peak construction emissions are expected to exceed the significance thresholds for CO, VOC, NOx, and PM10. Therefore, the air quality impacts associated with construction activities are considered significant. The significance threshold for SOx is not expected to be exceeded during the construction phase, and the air quality impacts of SOx are less than significant. A large portion of the total emissions is associated with on-site construction equipment and mobile sources (trucks and worker vehicles). Mitigation measures for construction emissions are identified on page 4-23.

TABLE 4-4
EQUILON CARB PHASE 3 PROPOSED PROJECT
PEAK DAY CONSTRUCTION EMISSIONS
(pounds per day)

Construction Activities	CO	VOC	NOx	SOx	PM10
Refinery Construction	928.2	356.4	524.4	38.8	172.8
Carson Terminal	210.6	25.8	273.1	24.7	144.1
Mormon Island	38.2	4.2	52.3	5.0	47.1
Two Terminals	247.8	369.2	295.0	25.6	115.2
Total Construction Emissions	**1,424.8**	**755.6**	**1,144.8**	**94.1**	**479.2**
SCAQMD Threshold	550	75	100	150	150
Significant?	YES	YES	YES	NO	YES

OPERATIONAL IMPACTS

Modifications associated with the Equilon CARB Phase 3 Proposed Project will add equipment to the Refinery and terminals that will generate additional emissions. The proposed project will also generate additional traffic and emissions related to mobile sources due to the transport of materials (mostly ethanol). Emissions are expected from the following activities:

Fugitive emissions from process equipment
Combustion of natural/refinery fuel gas
Material transport

The proposed project operational emissions are evaluated in this section. More detailed emission calculations are provided in Appendix B.

Refinery Emissions

Direct operational emission sources are stationary sources located at the Refinery that are generally subject to regulation. The emissions associated with the proposed project modifications are shown in Table 4-5. Stationary emission sources include combustion sources and fugitive emissions. Fugitive emission sources are associated with process equipment components such as valves, flanges, vents, pumps, drains, and compressors. Fugitive emissions at the Refinery will be associated with the Alkylation Unit, FCC Debutanizer, HTU-2, HTU-4, CRU-2, CRU-3 Depentanizer, HCU Fractionator, C4 Isomerization Unit, Pentane Sphere, and HTU-1. The emissions calculations herein are based on emission factors that are outlined in a Memorandum from Jay Chen of the SCAQMD dated April 2, 1999. That Memorandum provides the appropriate emission factors to use for fugitive sources that include best available control technology (BACT) and lowest achievable emission rate (LAER). As required by SCAQMD regulations, modifications to existing equipment and new equipment are required to comply with BACT requirements in SCAQMD Rules 1303 or 2005.

The proposed project includes modifications to existing storage tanks. The modifications to existing storage tanks include changing the throughput and/or the material stored within some of the tanks. Emission increases associated with the changes to the product storage at the Refinery were calculated using the U.S. EPA assumptions and are shown in Table 4-5.

As discussed in Chapter 3, the CEQA analysis is based on a maximum worst-case daily emission rate. However, maximum average emission increases of NOx and SOx for the combustion units affected by the CARB Phase 3 project will be limited by permit conditions to less than 40 tons per year (about 216 pounds per day) above the actual operating baseline.

TABLE 4-5
EQUILON CARB PHASE 3 PROPOSED PROJECT
STATIONARY SOURCE OPERATIONAL EMISSIONS[(1)]
(pound per day)

SOURCE	CO	VOC	NOx	SOx	PM10
Refinery Stationary Source Emissions					
Fugitive Emissions (e.g., pumps)	-	180.0	-	-	-
Storage Tank Modifications	-	82.1	-	-	-
Increased Firing Rates at Boilers	193.0	25.3	652.9	32.2	17.2
Refinery Emission Summary	**193.0**	**287.4**	**652.9[(2)]**	**32.2**	**17.2**
Carson Terminal Stationary Source Emissions					
Fugitive Emissions	-	23.1	-	-	-
Storage Tank Modifications	-	0.0	-	-	-
Ethanol Truck Loading	-	2.8	-	-	-
Thermal Oxidizer Emissions	2.5	0.1	4.0	0.03	0.8
Carson Terminal Indirect Emissions					
New Workers Commuting	1.0	0.1	0.1	-	<0.1
Ethanol Truck Transport	1,876.7	59.5	734.8	-	23.5
Railcar Emissions	60.2	22.6	610.8	38.5	15.2
Carson Terminal Emission Sum.	**1,940.4**	**108.2**	**1,349.7**	**38.5**	**39.6**
Morman Island Terminal Stationary Source Emissions					
Fugitive Emissions	-	6.8	-	-	-
Storage Tank Modifications	-	11.8	-	-	-
Mormon Island Terminal Sum.	**-**	**18.6**	**-**	**-**	**-**
Wilmington Terminal Stationary Source Emissions					
Fugitive Emissions	-	6.3	-	-	-
Storage Tank Modifications	-	1.5	-	-	-
Wilmington Terminal Summary	-	**7.8**	-	-	-
Signal Hill Terminal Stationary Source Emissions					
Fugitive Emissions	-	6.3	-	-	-
Storage Tank Modifications	-	9.4	-	-	-
Signal Hill Terminal Summary	-	**15.7**	-	-	-
Van Nuys Terminal Stationary Source Emissions					
Fugitive Emissions	-	6.3	-	-	-
Storage Tank Modifications	-	1.2	-	-	-
Van Nuys Terminal Summary	-	**7.5**	-	-	-

(1) See Appendix B for detailed emission calculations.
(2) The emission increases assume a worst-case analysis. The actual project emissions will be limited to less than 40 tons per year (about 216 pounds per day) and permit conditions will be imposed.

TABLE 4-5 (Concluded)

SOURCE	CO	VOC	NOx	SOx	PM10
Colton Terminal Stationary Source Emissions					
Fugitive Emissions	-	6.3	-	-	-
Storage Tank Modifications	-	8.7	-	-	-
Colton Terminal Summary	-	**15.0**	-	-	-
Rialto Terminal Stationary Source Emissions					
Fugitive Emissions	-	6.3	-	-	-
Storage Tank Modifications	-	1.0	-	-	-
Rialto Terminal Summary	-	**7.3**	-	-	-
TOTAL PROJECT EMISSIONS	**2,133.4**	**467.5**	**2,002.6**	**70.7**	**56.8**

Additional documentation of the procedures used to calculate the emissions estimates is provided in Appendix B. All new process components will conform to the SCAQMD's BACT Guidelines. The criteria pollutant emission rates associated with all project components assumed the use of BACT. The BACT associated with each of the major project components is discussed below.

Process Pumps: Sealless pumps will be used, to the extent feasible, for BACT for pumps in gas or light hydrocarbon service. Sealless pumps will be evaluated for use as BACT in New Source Performance Standards (NSPS) Subpart GGG and SCAQMD Rule 1173 services and determined if they are suitable given the design and safety considerations of each unit. For those instances where sealless pumps are deemed unacceptable, two types of double or tandem mechanical seals will be evaluated for use: (1) tandem mechanical seals that use a barrier fluid and a seal pot vented to a closed system; and (2) dry-running tandem mechanical seals vented to a closed system. The dry-running tandem mechanical seals are considered to be equivalent control technology (to tandem mechanical seals that use a barrier fluid and seal pot vented to a closed system) since they control fugitive VOC emissions as well as the tandem mechanical seals with the barrier system. All pumps will be subject to an SCAQMD approved inspection and maintenance program.

Process Valves: Leakless valves will be installed on project components to reduce fugitive VOC emissions. The SCAQMD BACT/LAER guidelines indicate that leakless valves must be used, except for the following applications:

- Heavy hydrocarbon liquid service
- Control valves
- Instrument tubing/piping
- Installations where valve failure could pose a safety hazard
- Retrofit/special applications with space limitations
- Applications requiring torsional valve stem motion
- Drain valves with stems in a horizontal position.

- Valves not commercially available (e.g., non-standard size, material, or special connection requirements)

For heavy hydrocarbon liquids and for applications where leakless valves cannot be used, valves of standard API/ANSI design will be used. Fugitive VOC emissions from these valves will be monitored and controlled in accordance with an SCAQMD-approved inspection and maintenance program. Valves in gas/vapor and in light liquid service initially will be monitored on a monthly basis, in compliance with the Federal Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries (40 CFR Part 60, Subpart GGG). Valves that do not leak during two successive monthly inspections will revert to a quarterly inspection interval. New valves will be subject to a 500 ppm performance limit.

Process Drains: New process drain lines will be provided with two normally closed block valves in series, or a single block valve in series with a cap or plug. New drain hubs (funnels) will be equipped with P-Traps and/or seal pots along with an SCAQMD-approved inspection and maintenance program.

Flanges: The use of flanged connections will be minimized to the extent practicable. Where required for maintenance or other routine operations, flanged connections will be designed in accordance with ANSI B16.5-1988, Pipe Flanges and Flanged Fittings. Fugitive emissions will be monitored and controlled in accordance with an approved inspection and maintenance program.

Pressure Relief Devices (PRDs): PRDs will be routed to the existing Refinery fuel gas system, to the extent feasible, to control VOC emissions. In the fuel gas system, VOCs are recovered, treated, and used as fuel in various combustion sources.

Emission offsets are typically required for new and modified emission sources by SCAQMD Regulation XIII and/or Rule 2005. Per the requirements of SCAQMD Rule 1304(c)(4), offsets are not required for projects undertaken to comply with state and federal regulations. The reformulated fuels projects are required to comply with new state reformulated fuels requirements. Therefore, emission offsets are not required for the reformulated fuels projects identified in this EIR. SCAQMD rules require that offset emission reductions occur within the Basin and specifically from the SCAQMD Zone 1 (coastal). Therefore, the overall emissions within the Basin are not expected to increase. The emissions within the Wilmington area and adjacent to the Terminals may increase due to the operation of the proposed project.

Indirect emissions at the Refinery are generally related to emissions from mobile sources that transport petroleum products. The proposed project is expected to result in a reduction in the number of trucks and railcars used to transport butane and isobutane to/from the Refinery. The proposed project is expected to result in a reduction of about eight trucks per day and 26 railcars per year. The emission reductions associated with the reduced number of trucks and railcars are included in Table 4-5.

Carson Terminal Emissions

The proposed project will result in modifications to the Carson Terminal that include the addition of fugitive components (such as valves, flanges, vents, pumps, drains, and compressors), railcar unloading of ethanol, truck loading of ethanol, installation of a new thermal oxidizer, and modifications to existing storage tanks to allow the storage of ethanol. As required by SCAQMD regulations, modifications to existing equipment and new equipment are required to comply with BACT requirements. The emissions from these stationary sources are included in Table 4-5. Detailed emission calculations are provided in Appendix B.

The proposed project is also expected to result in an increase in the number of railcars and trucks that visit the Carson Terminal to deliver and transport ethanol. An additional 35-40 railcars per day are expected at the Terminal. A maximum of about 150 additional trucks per day is expected to be required to transport the ethanol from the Carson Terminal to other terminals. An additional two workers are also expected at the Carson Terminal. The emission calculations for these mobile sources are included in Table 4-5.

Mormon Island Terminal Emissions

The proposed project will result in modifications to the Mormon Island Terminal that include the addition of fugitive components and the change of service of an existing tank to store ethanol instead of MTBE. Shipment of MTBE to the marine terminal will be eliminated following completion of the proposed project. It is expected that the increase in ethanol transport of about two vessels per month will be offset by a decrease in MTBE to the Terminal by about two vessels per month. The proposed project is expected to result in a maximum increase of about six ships per year to deliver alkylate and/or ethanol. The increase in marine traffic is not expected to increase the maximum daily emissions at the marine terminal since no increase in the number of vessels that visit the marine terminal on a daily basis is expected. However, the proposed project will increase the number of vessels that visit the terminal on an annual basis and will increase the annual ship emissions within the port area. The emissions from these stationary sources are included in Table 4-6. Detailed emission calculations are provided in Appendix B.

Wilmington Terminal Emissions

The proposed project will result in modifications to the Wilmington Terminal that include the addition of fugitive components and the construction of a new 12,800 barrel ethanol storage tank. The emissions from these stationary sources are included in Table 4-5. Detailed emission calculations are provided in Appendix B.

Signal Hill Terminal Emissions

The proposed project will result in modifications to the Signal Hill Terminal that include the addition of fugitive components, the construction of a new 30,000 barrel storage tank and conversion of an existing storage tank to ethanol service. The emissions from these stationary sources are included in Table 4-5. Detailed emission calculations are provided in Appendix B.

TABLE 4-6

EQUILON CARB PHASE 3 PROPOSED PROJECT
MARINE VESSEL EMISSION INCREASES
(pounds per year)

SOURCE	CO	VOC	NOx	SOx	PM10
Cruising	670	213	7,406	11,290	1,773
Maneuvering	191	60	2,225	3,474	299
Tugboats	58	19	426	76	9
Auxiliary Power	133	133	1,332	1,285	130
Total Annual Emissions	**1,052**	**425**	**11,390**	**16,125**	**2,211**

Van Nuys Terminal Emissions

The proposed project will result in modifications to the Van Nuys Terminal that include the addition of fugitive components and the construction of a new 7,400 barrel ethanol storage tank. The emissions from these stationary sources are included in Table 4-5. Detailed emission calculations are provided in Appendix B.

Colton Terminal Emissions

The proposed project will result in modifications to the Colton Terminal that include the addition of fugitive components and the construction of a new 7,150 barrel ethanol storage tank. The emissions from these stationary sources are included in Table 4-5. Detailed emission calculations are provided in Appendix B.

Rialto Terminal Emissions

The proposed project will result in modifications to the Rialto Terminal that include the addition of fugitive components and the construction of a new 7,150 barrel ethanol storage tank. The emissions from these stationary sources are included in Table 4-5. Detailed emission calculations are provided in Appendix B.

Operational Emission Summary

Operation emissions are summarized in Table 4-7, together with the SCAQMD's daily operational threshold levels. The operation of the proposed project will not exceed the NOx and SOx significance thresholds for RECLAIM sources at the Refinery. The operation of the proposed project will exceed the significance thresholds for the CO, VOC, and NOx for non-RECLAIM sources and pollutants. Therefore, the air quality impacts associated with operation emissions from the proposed project are significant. Mitigation measures for the operation of the proposed project are provided on page 4-27.

TABLE 4-7

EQUILON CARB PHASE 3 PROPOSED PROJECT
OPERATIONAL EMISSIONS SUMMARY
(pounds per day)

	CO	VOC	NOx	SOx	PM10
Background Data:					
2003 Refinery RECLAIM Allocation	--	--	2,710	1,046	--
Refinery Stationary Sources (see Table 4-5)	--	--	652.9[1]	32.2	
2003 Carson Terminal RECLAIM Alloc.	--	--	109.6	100	--
Carson Terminal Stationary Sources	--	--	4.0	0.03	
Significance Determination for Direct Refinery Sources of RECLAIM Pollutants:					
Project + 2003 Allocation	--	--	3,362.9	1,078.2	
Significance Threshold for RECLAIM Pollutants[2]	--	--	8,486	4,505	--
SIGNIFICANT?	--	--	**NO**	**NO**	--
Significance Determination for Direct Carson Terminal Sources of RECLAIM Pollutants:					
Project +2003 Allocation	--	--	113.6	100.03	--
Significance Threshold For RECLAIM Pollutants[2]	--	--	4,236	3,618	--
SIGNIFICANT?	--	--	**NO**	**NO**	--
Significance Determination for Indirect Sources of RECLAIM Pollutants:					
Project Emissions (see Table 4-5)	--	--	1,345.7	38.5	
Significance Threshold	-	-	55	150	-
SIGNIFICANT?	-	-	**YES**	**NO**	-
Significance Determination for All Project Emissions of Non-RECLAIM Pollutants:					
Project Emissions	2,130.9	441.5	-	-	56.0
Significance Threshold	550	55	-	-	150
SIGNIFICANT	**YES**	**YES**	-	-	**NO**

[1] The emission increases assume a worst-case analysis. The actual project emissions will be limited to less than 40 tons per year (about 216 pounds per day) and permit conditions will be imposed.

[2] See Table 4-2 for CEQA significance threshold for RECLAIM pollutants.

IMPACTS TO AMBIENT AIR QUALITY

Air dispersion modeling is not required for the proposed project since it will not result in an increase in NOx, PM10 or CO from new combustion sources at the Refinery. The proposed project will only result in an incremental increase in these pollutants from increased firing at existing combustion boilers. The existing boilers are permitted and have previously demonstrated that the emissions of criteria pollutants would be less than air quality impact thresholds outlined in SCAQMD Rule 1303. Therefore, no significant impacts are expected for air quality or attainment of ambient air quality standards.

CO HOT SPOTS

The potential for high concentrations of CO emissions associated with truck/vehicle traffic was considered and evaluated per the requirements of the SCAQMD CEQA Air Quality Handbook (SCAQMD, 1993). The Handbook indicates that any project that could negatively impact levels of service at local intersections may create a CO hot spot and should be evaluated.

Increases in traffic from a project might lead to impacts of CO emissions on sensitive receptors if the traffic increase worsens congestion on roadways or at intersections. An analysis of these impacts is required if:

- The project is anticipated to reduce the level of service (LOS) on an intersection rated C or worse by one full level; or

- The project is anticipated to increase the volume-to-capacity ratio of an intersection rated D or worse by two percent.

As evaluated in the Transportation/Traffic impact analysis (see Chapter 4, Section F), the LOS at the Wilmington Avenue/ I-405 SB Ramp will be reduced from LOS C to D. This increase in traffic is a result of the increased ethanol truck traffic leaving the Carson Terminal. This is the only intersection that meets either of the above criteria during either construction or operation of the proposed project.

The SCAQMD CEQA Handbook (1993) defines sensitive receptors as long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, child care centers, and athletic facilities. The area in the vicinity of the Wilmington Avenue/I-405 SB Ramp is manufacturing, which precludes the presence of any sensitive receptors. Further, the contribution of the proposed project traffic to this intersection would be less than one percent. A mitigation measure has been added so that truck traffic avoids this intersection during evening peak traffic hours. Therefore, the potential impacts from the proposed project is not anticipated to lead to adverse CO impacts on sensitive receptors.

CONSISTENCY WITH THE AIR QUALITY MANAGEMENT PLAN

Existing emissions from the industrial facilities are included in the SCAQMD Air Quality Management Plan (AQMP). The SCAQMD identifies emission reductions from existing sources and air pollution control measures that are necessary in order to comply with the state and federal ambient air quality standards (SCAQMD, 1993). New emission sources associated with the proposed project are required to comply with the SCAQMD's New Source Review regulations that include the use of BACT and the requirement that all new emissions be offset. Pursuant to SCAQMD Rule 1304(c)(4), offsets are not required for projects required to comply with state and federal regulations if these projects are being undertaken to comply with air pollution control rules, regulations, orders, e.g., the reformulated fuels projects. The control strategies in the AQMP are based on projections from the local general Plans from various cities in Southern California (including the City of Los Angeles). Projects that are consistent with the local General Plans are consistent with the air quality related regional plans. Therefore, the proposed project is considered to be consistent with the air quality related regional plans since it is consistent with the City of Los Angeles' General Plan.

TOXIC AIR CONTAMINANTS

A health risk assessment (HRA) was performed to determine if emissions of toxic air contaminants generated by the proposed project would exceed the SCAQMD thresholds of significance for cancer risk and is included as Volume II to this EIR. The results of the HRA will be used to evaluate the proposed project. A detailed HRA was completed for the Equilon Refinery and Wilmington Terminal. The emissions from the two facilities were combined in the HRA because they are located adjacent to each other. A detailed HRA was also completed for the Equilon Carson Terminal because a number of changes are proposed as part of the proposed project. Screening risk calculations were completed for the Mormon Island, Signal Hill, Van Nuys, Colton and Rialto Terminals because of the relatively minor changes and small emission increases at these facilities. Screening health risk calculations were below the significance criteria so that complete HRAs were not required for these sites. See Table 4-1 for the SCAQMD significance thresholds for toxic air contaminants.

Refinery HRA

Hazard Identification

The list of potentially-emitted substances considered in the preparation of the HRA for the Equilon Wilmington Refinery is contained in Appendix A-I of the CARB AB2588 requirements. The emissions of any pollutants contained on the AB2588 list were included in the HRA; however, health effects data are not available for all compounds. The most recent health effects data available from the Office of Environmental Health Hazards Analysis (OEHHA) were used in the HRA. For carcinogens, unit risk factors were used for computing cancer risk through inhalation. If the carcinogen is a multi-pathway pollutant, a potency slope was used for the estimation of risk from non-inhalation pathways. For non-cancer health effects, reference exposure levels (REL) and acceptable oral doses (for multi-

pathway pollutants) were used. The non-carcinogenic hazard indices were computed for chronic and acute exposures with their respective toxicological endpoints shown.

Emission Estimations and Sources

The estimated mass emissions of toxic air contaminants were based on a combination of the most recent AB2588 Air Toxics Inventory Report (ATIR) and engineering estimates that reflect operation of the proposed project.

VOC emission factors for fugitive components installed in conjunction with the reformulated fuels program were based on the SCAQMD's latest guidelines for fugitive components, assuming the use of BACT and an inspection and monitoring program (Jay Chen memo, SCAQMD, April 2, 1999). Speciation of VOC emissions was derived from speciation data contained in the most recent Refinery HRA (April 2000).

HRA Methodology

The proposed project is expected to result in increases in toxic air contaminants including benzene, hydrogen sulfide, lead, mercury, and xylenes. The impacts associated with the proposed project were determined by preparing the HRA for the Refinery as it exists prior to the operation of the proposed project. This baseline HRA is the most recent AB2588 HRA submitted to the SCAQMD (April 2000). The HRA was then prepared for the operation of the Refinery as it is predicted to operate following installation of the proposed project (referred to as the cumulative analysis). The proposed project impacts are the difference between the baseline HRA and the cumulative HRA. The total toxic air contaminants associated with the proposed project are listed in Volume II of the EIR.

Proposed Project HRA Results - Carcinogenic Health Impacts

Maximum Exposed Individual Resident (MEIR): The predicted maximum cancer risk at the MEIR area due to exposure to proposed project emissions was calculated to be 5.2×10^{-7} or 0.5 per million (see Table 4-8) which is below the significance criteria of 10 per million. The location of the project MEIR is shown in Figure 4-1.

Maximum Exposed Individual Worker (MEIW): The cancer risk estimates are shown in Table 4-8. Based on the air quality modeling and related assumptions, the cancer risk to the MEIW associated with the proposed CARB RFG Phase 3 project at the Wilmington Refinery was calculated to be 6.7×10^{-7} or 0.7 in a million, which is below the significance criteria of 10 per million. The MEIW is based on a 46-year exposure period. The maximum value was multiplied by 0.14 to account for an occupational exposure period (five days per week, 50 weeks per year for 46 years). The project MEIW location is shown in Figure 4-1.

Sensitive Receptors: The maximum cancer risk from the proposed project alone to a sensitive receptor was estimated to be a maximum of about 4×10^{-6} or approximately four

Figure 4-1 goes here

per million at the high school recently built adjacent to the Dominguez Channel. This risk estimate is overly conservative as it is based on a 70-year continuous exposure period and high school students usually attend high school for a four-year period. The cancer risk estimate at the closest sensitive receptor is below the significance criteria of 10 per million.

TABLE 4-8

SUMMARY OF PROPOSED PROJECT CANCER RISK
Equilon Wilmington Refinery/Terminal

EXPOSURE PATHWAY	Proposed Project	
	Maximum Exposed Individual Resident	Maximum Exposed Individual Worker
Inhalation	4.98E-07	6.59E-07
Dermal	7.33E-10	8.45E-10
Soil Ingestion	1.63E-08	6.40E-09
Water Ingestion	0.00E+00	0.00E+00
Ingestion of Home Grown Produce	5.28E-09	4.62E-09
Ingestion of Animal Products	0.00E+00	0.00E+00
Ingestion of Mother's Milk	0.00E+00	0.00E+00
Total Cancer Risk	**5.20E-07**	**6.71E-07**

Cancer Burden: 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 within the area of influence for the proposed project (only) was predicted to be 0.063 and 0.004 for the residential and occupational populations, respectively (see Table 6 in Volume II for further details), which is below the significance criteria of 1.0.

Proposed Project HRA Results - Non-Carcinogenic Health Impacts

Acute Hazard Index: The highest acute hazard index for the proposed project is estimated to be 0.4, which is below the significance criteria of 1.0. The acute health effects are based on maximum hourly emissions of toxic air contaminants that have acute target endpoints.

Chronic Hazard Index: The highest chronic hazard index for the proposed project is estimated to be 0.074, which is below the significance criteria of 1.0.

The detailed HRA calculations and data are provided in Volume II of this EIR.

Carson Terminal HRA

Emission estimates were calculated for the modifications to the stationary sources at the Carson Terminal. Emissions increases include fugitive components, storage tank modifications, and

loading emissions. The speciation of VOCs was based on the assumption that ethanol would be denatured using five to ten percent gasoline. Detailed emission calculations for toxic air contaminants are included in Volume II of the EIR.

Air quality modeling using the ISCST3 model was conducted for all proposed project emission sources at the Carson Terminal using the same general approach as used for the Refinery modeling. No building downwash was considered as no point emission sources are part of the proposed project at the Carson Terminal. Some of these area emission sources were grouped together for the purposes of modeling. The 1981 meteorological data for the Long Beach station were used for wind and surface data along with mixing height data from the Los Angeles Airport station. The Long Beach station is the closest to the Carson Terminal for which meteorological data are available. The receptors used in the ISCST3 model included fenceline, coarse receptor grids, and fine receptor grids. All source and receptor locations were modeled with a UTM-type coordinate system.

The cancer health risks for the Carson Terminal were calculated using the ACE2588 model in the same manner as for the Equilon Refinery. The cancer risks associated with the Equilon Carson Terminal are summarized in Table 4-9.

Maximum Exposed Individual Resident: The predicted maximum cancer risk at the MEIR assuming exposure to emissions from the proposed project modifications was estimated to be 2.67×10^{-7} or about 0.3 in a million, which is below the significance criteria of 10 per million. The MEIR is located in the residential area west of the northwest corner of the terminal. The inhalation pathway is the only pathway that contributes to the MEIR.

TABLE 4-9

SUMMARY OF PROPOSED PROJECT CANCER RISK
Equilon Carson Terminal

EXPOSURE PATHWAY	Proposed Project	
	Maximum Exposed Individual Resident	**Maximum Exposed Individual Worker**
Inhalation	2.67E-07	6.00E-08
Dermal	0.00E+00	0.00E+00
Soil Ingestion	0.00E+00	0.00E+00
Water Ingestion	0.00E+00	0.00E+00
Ingestion of Home Grown Produce	0.00E+00	0.00E+00
Ingestion of Animal Products	0.00E+00	0.00E+00
Ingestion of Mother's Milk	0.00E+00	0.00E+00
Total Cancer Risk	**2.67E-07**	**6.00E-08**

Maximum Exposed Individual Worker: Based on the air quality modeling and related assumptions, the cancer risk to the MEIW associated with the modifications to the Carson Terminal is 6.00×10^{-8} or about 0.06 in a million for all project sources, which is below the significance criteria of 10 per million. The MEIW is based on a 46-year exposure period. The MEIW location is just west of the southwest corner of the Terminal. The inhalation pathway is the only pathway that contributes to the MEIW.

Sensitive Receptors: The peak cancer risk at the MEIR is 0.3 per million for a residential area located immediately west of the Terminal. The cancer risk estimate of 0.3 is below the significance criteria of 10 per million so that project impacts are less than significant. The risk to any sensitive receptor would also be less than 0.3 per million. Therefore, no additional modeling was completed for sensitive receptors.

Acute Hazard Index: The Equilon Carson Terminal also emits pollutants that may have acute health effects. Therefore, the total hazard indices for acute health effects were computed. The reproductive system (REPRO) has been predicted as the maximum toxicological endpoint for acute exposure with a hazard index of 0.0017, which is below the significance criteria of 1.0. Benzene contributes the most (97 percent) to the acute hazard index. The location of the maximum acute hazard index is at the facility fenceline.

Chronic Health Effects: The Equilon Carson Terminal emits pollutants that may have chronic health effects. The central nervous system (CNS) has been predicted as the maximum toxicological endpoint for chronic exposure with a hazard index of 0.0005, which is below the significance criteria of 1.0. Naphthalene is the only contributor (100 percent) to the CNS chronic hazard index. The location of the maximum chronic hazard index is at the facility fenceline.

HRA for Other Equilon Terminals

The health risks associated with the Equilon Mormon Island, Signal Hills, Van Nuys, Colton and Rialto Terminals are related to the change in service of storage tanks to store ethanol, new tanks, and fugitive emissions associated with fugitive components. The emissions of toxic air contaminants were calculated as described above for the Carson Terminal (see Volume II, Appendix F). Because the toxic air contaminant emission estimates were small, the SCAQMD's screening health risk assessment was conducted for each facility as described in the Risk Assessment Procedures for Rules 1401 and 212. The screening risk calculations provided "worst-case", conservative estimates of the maximum cancer risk, and acute and chronic hazard indices and are summarized in Table 4-10.

Cancer Risk: The results of the screening health risk calculations are provided in Volume II, Appendix F and summarized in Table 4-10. The maximum cancer risk calculations for the five terminals ranged from a low of 9.94×10^{-8} (about 0.1 per million) to a high of 7.52×10^{-7} or about 0.8 per million. The cancer risk estimates at all terminals are below the ten per million significance threshold.

Chronic Health Effects: The results of the screening health risk calculations are provided in Volume II, Appendix F and summarized in Table 4-10. The maximum hazard index for the five terminals ranged from a low of 5.94×10^{-4} (0.00059) to a high of 4.59×10^{-3} (0.0046). The chronic hazard index at all facilities is well below the 1.0 significance threshold.

Acute Health Effects: The results of the screening health risk calculations are summarized in Table 4-10. The maximum hazard index for the five terminals ranged from a low of 3.13×10^{-4} (0.00031) to a high of 1.01×10^{-3} (0.001). The acute hazard index at all facilities is well below the 1.0 significance threshold.

TABLE 4-10

HRA SUMMARY
EQUILON MORMON ISLAND, SIGNAL HILL, VAN NUYS,
COLTON AND RIALTO TERMINALS

TERMINAL	Maximum Cancer Risk	Chronic Hazard Index	Acute Hazard Index
Mormon Island	7.52×10^{-7}	4.59×10^{-3}	1.01×10^{-3}
Signal Hill	3.97×10^{-7}	2.32×10^{-3}	5.28×10^{-4}
Van Nuys	9.94×10^{-8}	5.94×10^{-4}	3.13×10^{-4}
Colton	1.15×10^{-6}	8.98×10^{-3}	1.63×10^{-3}
Rialto	3.65×10^{-7}	2.17×10^{-3}	3.95×10^{-4}
SIGNIFICANCE CRITERIA	**10×10^{-6}**	**1.0**	**1.0**

The detailed HRA calculations and data are provided in Volume II of this EIR.

The impacts associated with the proposed project would be below the significance criteria for cancer risk of 10×10^{-6} and below the significance criteria for hazard indices of 1.0 for chronic and acute non-cancer health effects. Therefore, the proposed project is not expected to have significant impacts due to toxic air contaminants.

Health Risks from Diesel Exhaust Particulate Matter: The proposed project will lead to increased emissions of diesel exhaust particulate matter from onsite construction equipment and diesel-fueled truck exhaust and from off-site diesel truck exhaust during construction. In 1998, the CARB listed particulate matter in the exhaust from diesel-fueled engines (diesel particulate) as a toxic air contaminant and concluded that it is probably carcinogenic to humans. An Advisory Committee was formed to advise the CARB staff in its preparation of an assessment of the need to further control toxic air pollutants from diesel-fueled engines. The Risk Management Subcommittee was formed to identify the: (1) operating parameters; (2) emission factors; and (3)

modeling methodologies recommended for estimating human health risks from diesel-fueled engines. This information will be used by the Subcommittee to develop the scenarios to evaluate the risks associated with exposure to diesel particulate emissions. The SCAQMD is waiting for this guidance before initiating a quantitative risk analysis for diesel particulate emissions.

Significant impacts associated with exposure to diesel particulate emissions are not expected during construction activities. As listed in Table 4-3 above, the highest construction related on-site and off-site diesel exhaust particulate matter emissions are estimated to be 29 and two pounds per day, respectively, at the Refinery. However, these emissions are temporary and are expected to cease within about one year. The emissions associated with construction at the terminals would be less than emissions associated with construction at the Refinery (see Table 4-3). Therefore, long-term exposure to construction-related diesel exhaust particulate matter that could result in significant health affects to sensitive populations is not expected.

Significant impacts associated with exposure to diesel particulate emissions are not expected during operation of the proposed project. Total truck exhaust PM10 emissions from the 150 trucks are estimated to be only 23 pounds per day, which would occur aver a total distance of about 7,770 miles. The maximum emissions at any single location will occur in the vicinity of the Carson Terminal, because all of the trucks will leave that location. The emission rate for one truck at a speed of 25 mph is about 0.6 grams per mile. Therefore, the total emissions from 150 trucks per day (300 truck trips) travelling over the one-quarter mile into and out of the terminal would be about 45 grams per day or about 0.1 pounds per day.

ODORS

Fugitive emissions or leaks from project equipment at the Refinery or terminals could result in potential odor impacts. Fugitive emission components are under the purview of formal regulatory inspection and maintenance programs required under federal New Source Performance Standards and SCAQMD Rule 1173. These programs ensure correction of conditions that may cause odor events. The Refinery maintains a 24-hour environmental surveillance effort. This activity also has the effect of minimizing the frequency and magnitude of odor events. In addition, the use of BACT (e.g., leakless valves) also reduces the emissions of compounds that could produce odor impacts. The proposed project will remove older fugitive components and replace them with newer components that must comply with the BACT requirements, thus reducing emissions and the potential for odors. The proposed project will not introduce new conditions (new processes) that could potentially generate odors. The proposed project will introduce ethanol at the terminals, but the odors associated with ethanol are minimal and high concentrations of ethanol generally do not cause odors. Further, ethanol will be stored within storage tanks that comply with BACT requirements so that emissions and odors are expected to be minimal (see Table 4-4). Potential odor impacts from the proposed project are not expected to be significant.

MITIGATION MEASURES

Mitigation measures are required to minimize the significant air quality impacts associated with the construction phase of the proposed project. Mitigation measures focus on the construction

emissions of CO, VOC, NOx, and PM10 emissions. Significant impacts also are expected from the operational emissions. Indirect operational emissions of NOx and SOx are expected to be significant. Operational emissions of CO, VOC and PM10 are also expected to be significant. The direct operational emissions of NOx and SOx (i.e., emissions from RECLAIM sources) are expected to be less than significant. Therefore, feasible mitigation measures associated with the operational emissions are also required.

Construction Mitigation Measures

Mitigation measures to reduce emissions associated with Refinery construction activities are necessary primarily to control emissions from heavy construction equipment and worker travel. The following mitigation measures are required:

On-Road Mobile Sources:

A-1 Develop a Construction Traffic Emission Management Plan for the proposed project. The Plan shall include measures to minimize emissions from vehicles including, but not limited to: scheduling truck deliveries to avoid peak hour traffic conditions, consolidating truck deliveries, and prohibiting truck idling in excess of 10 minutes.

Off-Road Mobile Sources:

A-2 Suspend use of all construction equipment during first-stage smog alerts.

A-3 Prohibit trucks from idling longer than 10 minutes.

A-4 Use electricity or alternate fuels for on-site mobile equipment instead of diesel equipment to the extent feasible.

A-5 Maintain construction equipment tuned up and retard diesel engine timing.

A-6 Use electric welders to avoid emissions from gas or diesel welders in portions of the project sites where electricity is available.

A-7 Use on-site electricity rather than temporary power generators in portions of the project sites where electricity is available.

A-8 Diesel powered construction equipment shall use low sulfur diesel, as defined in SCAQMD Rule 431.2, to the maximum extent feasible.

A-9 Prior to use in construction, the project applicant will evaluate the feasibility of retrofitting the large off-road construction equipment that will be operating for significant periods. Retrofit technologies such as selective catalytic reduction, oxidation catalysts, air enhancement technologies, etc., will be evaluated. These

technologies will be required if they are commercially available and can feasibly be retrofitted onto construction equipment.

PM10 Emissions from Grading, Open Storage Piles, and Unpaved Roads:

A-10 Develop a fugitive dust emission control plan. Measures to be included in the plan include, but are not limited to the following: (1) water active construction sites three times per day, except during periods of rainfall. Watering construction sites two times per day is required by SCAQMD Rule 403 and provides about a 50 percent emission reduction. Watering construction sites three times per day will reduce PM10 emissions by an additional 18 percent (total control of 68 percent); (2) enclose, cover, water twice daily, or apply approved soil binders according to manufacturer's specifications to exposed piles (i.e., gravel, dirt and sand) with a five percent or greater silt content. Implementation of this mitigation measure would reduce PM10 emissions 30 to 74 percent (SCAQMD, 1993); (3) suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 mph. The emission reductions associated with this mitigation measure cannot be quantified (SCAQMD, 1993); (4) apply water three times daily, except during periods of rainfall, to all unpaved road surfaces. This mitigation measure would reduce PM10 emissions by a minimum of 45 percent (SCAQMD, 1993); and (5) limit traffic speeds on unpaved roads to 15 mph or less. The emission benefits of this mitigation measure are estimated to be 40 to 70 percent (SCAQMD, 1993). With the exception of watering the site three times, these control efficiencies were reflected in the project emission calculations so no further emission reduction credit has been taken into account herein.

Other mitigation measures listed in the SCAQMD CEQA Air Quality Handbook (SCAQMD, 1993), were considered but were rejected because they would not further mitigate the potential significant impacts. These mitigation measures included: (1) provide temporary traffic control during all phases of construction activities (traffic safety hazards have not been identified); (2) implement a shuttle service to and from retail services during lunch hours (most workers eat lunch on-site and lunch trucks will visit the construction site); (3) use methanol, natural gas, propane or butane powered construction equipment (equipment is not commercially available); and (4) pave unpaved roads (unpaved roads will be watered on a regular basis to reduce emissions) (SCAQMD, 1993).

Operational Mitigation Measures

Mitigation measures to reduce emissions associated with the operational phase of the proposed project are necessary to control CO, and VOC emissions and non-RECLAIM emission sources of NOx.

The proposed project requires the installation of fugitive components (e.g., valves, flanges, and pumps) which is a large source of VOC emissions from the proposed project. VOC emissions from fugitive components are controlled through the use of BACT. BACT, by definition, is control equipment with the lowest achievable emission rate. The use of BACT controls emissions to the

greatest extent feasible for the modified emission sources. In addition, the fugitive components will be required to be included in an inspection and maintenance program to ensure that the equipment is properly maintained. Therefore, additional VOC emission reductions (through mitigation measures) from fugitive components associated with the proposed project equipment are not feasible.

The major portion of the emissions from the proposed project is from indirect emission sources, including trucks, railcars, and marine vessels, primarily used to transport ethanol. The emissions from railcars, trucks and marine vessels are expected to be significant. Since railcars and marine vessels are large contributors to significant air quality impacts, the SCAQMD evaluated whether or not it had jurisdictional authority to regulate these emissions through mitigation measures pursuant to CEQA. The SCAQMD has no authority to regulate railcar and marine vessel emissions. The U.S. EPA controls emissions from railcars and marine vessels.

Because railcars travel through various states, only the U.S. EPA has the authority to regulate emissions from locomotive engines. The U.S. EPA has established emission standards for NOx, VOCs, CO, particulate matter, and smoke for newly manufactured and remanufactured diesel-powered locomotives and locomotive engines which have been previously unregulated. The U.S. EPA estimates that the NOx emissions will be reduced by about 62 percent from their current levels to levels for locomotives manufactured after 2004 (U.S. EPA, 1997). This would reduce project-related NOx emissions from railcars from 610.8 pounds per day to about 379 pounds per day. The actual emission reductions are a function of the date that new locomotives come into service and are used to transport materials to/from the Refinery and Carson Terminal. Since the date at which this conversion actually happens is uncertain and not guaranteed, the NOx emissions from project-related railcars are expected to remain significant.

The regulation of marine vessels registered in the United States has been traditionally undertaken by the United States Coast Guard (USCG) and the International Maritime Organization (IMO) for ships registered outside the United States. The Clean Air Act refers to the regulation of marine vessels under Sections 209 and 213 which indicate that the U.S. EPA can establish controls for non-road engines which includes marine vessels. However, the U.S. EPA has not yet developed such controls and has acknowledged the international implications of a regulatory program.

Section 209(e) of the federal Clean Air Act (42 U.S.C Section 7543(e)(2)) preempts the SCAQMD from developing and imposing emissions limits on a class of marine engines at this time. Under Section 209(e) of the Act (42 U.S.C. Section 7543(e)(2)), the U.S. EPA may authorize California (and thus the local air districts) to adopt and enforce emission standards for certain non-road engines only after the adoption of U.S. EPA regulations, notice and opportunity for public comment, and presentation of information and data supporting certain findings. Marine diesel engines are internal combustion engines which fall within the definition of non-road engines. Thus, California and the local air districts may not adopt emission standards for marine diesel engines unless the requirements of Section 209(e) are met. At this time, the U.S. EPA has not authorized California or its local air districts to adopt emission standards for this class of marine diesel engines. For this reason, any emission limit based on design or retrofit of marine diesel engines is legally infeasible under the federal Clean Air Act (SCAQMD, 1998).

Based on the above there are no other feasible mitigation measures to minimize or eliminate the significant emissions from mobile sources related to the proposed project.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Construction

Construction emissions are expected to remain significant following mitigation. Table 4-11 estimates the emission reductions that may be expected due to implementation of the construction mitigation measures. The emission reductions from some mitigation measures are not quantifiable and have not been included in Table 4-11. Implementation of these mitigation measures is still expected to provide some air quality benefit, even if the emission reductions cannot be quantified. The emission benefits associated with the mitigation measures are based on estimates provided in Table A11-1 of the SCAQMD CEQA Air Quality Handbook (SCAQMD, 1993).

TABLE 4-11

PEAK DAY CONSTRUCTION EMISSIONS FOLLOWING MITIGATION
(pounds per day)

ACTIVITY	CO	VOC	NOx	SOx	PM10
Unmitigated Emissions[1]	1,425	756	1,145	94	479
SCAQMD Threshold Level	550	75	100	150	150
SIGNIFICANT?	**YES**	**YES**	**YES**	**NO**	**YES**
Amount Needed to Reduce Emissions Below Significance Level	875	681	1,045	--	329
MITIGATION MEASURES[2]					
Use Electric Welders	-35	-6	-57	-6	-3
Water Active Construction Sites[3]	--	--	--	--	-89
Total Emission Reductions	-35	-6	-57	-6	-92
Total Emissions After Mitigation	1,390	750	1,088	88	387
SIGNIFICANT AFTER MITIGATION?	**YES**	**YES**	**YES**	**NO**	**YES**

(1) See Tables 4-3 and 4-4.
(2) Emission reductions were estimated from the SCAQMD (1993) CEQA Handbook.
(3) A 50 percent emission reduction for watering active construction sites was included in the project emission calculations. These emission calculations assume an additional 18 percent emission reduction associated with watering the site three times per day (instead of two times per day).

Operations

Operation emissions of CO, VOCs, and NOx primarily from indirect (mobile) sources, are expected to remain significant.

The proposed project impact's on ambient air concentrations of NOx, CO, and PM10 are expected to be less than the ambient air quality criteria thresholds (see Table 4-1) since no new combustion sources are proposed. Therefore, the ambient concentrations of NOx, CO, and PM10 due to emissions from the proposed project are expected to be less than significant.

The proposed project's impacts on toxic air contaminants are expected to be less than significant. The carcinogenic health impacts to the MEIR, MEIW, sensitive populations and all other receptors are expected to be less than 10 per million and, therefore, less than significant.

The proposed project's impacts associated with exposure to non-carcinogenic compounds are expected to be less than significant. The chronic hazard index and the acute hazard index are both below 1.0. Therefore, no significant non-carcinogenic health impacts are expected.

The contribution of the proposed project traffic at any intersection would be less than one percent. The area in the vicinity of the Wilmington Avenue/I-405 SB Ramp is manufacturing, which precludes the presence of any sensitive receptors. Therefore, the potential impacts from the proposed project is not anticipated to lead to adverse CO impacts on sensitive receptors.

B. GEOLOGY/SOILS

SIGNIFICANCE CRITERIA

The impacts on geology/soils will be considered significant if any of the following criteria apply:

Topographic alterations would result in significant changes, disruptions, displacement, excavation, compaction or over covering of large amounts of soil.

Substantial alteration of topography can result in changes, which would accelerate wind or water erosion of soils.

Unique geological resources (paleontological resources or unique outcrops) are present that could be disturbed by the construction of the proposed project.

Generate soil contamination due to site activities, which may cause significant health impacts or which will not be handled in accordance with applicable regulations.

Exposure of people or structures to major geologic hazards such as earthquake surface rupture, ground shaking, seiche or tsunami.

Secondary seismic effects could occur which could damage facility structures, e.g., liquefaction.

Other geological hazards exist which could adversely affect the facility, e.g., landslides, mudslides.

CONSTRUCTION IMPACTS

No significant topographic changes are expected at the Refinery or Terminal sites. The Refinery and Terminals have already been graded as part of existing industrial operations. The Refinery and Terminals are essentially flat so that grading will be limited to that required to construct building pads, foundations, and underground utilities. No substantial topographic changes are proposed for the Refinery or the Terminals. Therefore, the topographic changes at the project sites are less than significant.

Soil erosion from wind or water could occur during construction as a result of earthmoving activities. These activities are expected to be minor since the proposed project will be constructed within already developed areas and the storm water is controlled. As part of the proposed project, standard construction practices will be employed to minimize wind erosion. Construction sites will be watered twice daily (except during periods of rain) to minimize the potential for wind erosion. Water erosion at the project sites would be limited to periods of rain. Therefore, water erosion that could occur during construction activities will be controlled through the Refinery's and Terminals' existing Storm Water Pollution Prevention Plans. Storm water is controlled, collected, treated if necessary, and discharged under existing National Pollutant Discharge Eliminate System (NPDES) permits. Implementing these practices is expected to prevent the proposed project from generating significant impacts due to wind or water erosion. Significant water erosion is not expected as the project sites are flat which limits the potential for erosion due to water runoff. Construction mitigation measures for potential air quality impacts due to wind erosion are identified in Chapter 4, Section A, Air Quality.

No unique geological resources (rock formations, hillsides, mountains, etc.) are present at the Refinery or Terminal sites, so no significant project impacts to these types of resources are expected.

About 500 tons of demolition wastes are expected to be required for the proposed project. Assuming that about 10 percent of the material is contaminated, an estimated 50 tons of soil is expected to be contaminated. Soil which is found to be contaminated will be analyzed by a state certified laboratory to determine the concentration and type of contamination. To the extent feasible, all excavated non-contaminated soil will be used for backfill and/or grading at the project site. Contaminated soils or water may require remediation (cleanup and safe removal and disposal) if detected above certain concentrations during construction. Even if soils or ground water at a contaminated area do not have the characteristics required to be defined as hazardous wastes, remediation of the area may be required by regulatory agencies. Excavated soil determined to contain contamination will be disposed of at an approved facility or as otherwise allowed under

state and federal regulations. Contaminated soil may be treated on-site, as required, or taken to an approved off-site treatment/disposal facility.

Excavated soils which contain concentrations of certain substances including heavy metals and hydrocarbons generally are regulated under California hazardous waste regulations. No significant impacts are expected as a result of the potential for contaminated soils to be excavated during construction of the proposed project since there are numerous local, state (Title 22 of the California Code of Regulations) and federal rules which regulate the handling, transportation, and ultimate disposition of these soils. Title 22 of the California Code of Regulations establishes many requirements for hazardous waste handling, transport and disposal including requirements to use approved disposal/treatment facilities, use certified hazardous waste transporters, and use manifests to track hazardous materials, among many other requirements. However, under a worst-case scenario, remediation would require the removal and truck transport of the contaminated soils to an off-site treatment facility, thus generating short-term additional truck traffic. Numerous state and federal rules and regulations govern the discovery, testing, and ultimate fate of hazardous materials so that compliance with these requirements is expected to minimize the potential for significant impacts.

There are plugged and abandoned wells located within the Refinery boundaries. These plugged and abandoned wells may be impacted during project construction. Sufficient data are not available to determine the precise location of construction activities with respect to the wells. If during construction it is determined that development is proposed directly over or within 10 feet of an abandoned/re-abandoned well, then the existing regulations will require an approved well-vent system designed to vent natural gases to the atmosphere. If during the construction process, any previously unknown well is discovered, the Department of Conservation Division of Oil, Gas and Geothermal Resources must be notified immediately, so plugging and abandonment requirements can be determined.

OPERATIONAL IMPACTS

No faults or fault-related features are known to exist within the confines of the Refinery or the Terminals. The project sites are not located in any Alquist-Priolo Earthquake fault zone and are not expected to be subject to significant surface fault displacement. The Mormon Island Marine Terminal is located the closest to a fault zone, i.e., within about one mile of the Palos Verdes fault zone. All other terminals and the Refinery are located a greater distance from a fault zone. Therefore, no significant impacts to the proposed Refinery or Terminal facilities are expected from seismically induced ground rupture. No known damage has ever occurred to the Refinery or Terminals as a result of previous earthquakes in southern California.

Based on the historical record, it is highly probable that the Los Angeles region will be affected by future earthquakes. Research shows that damaging earthquakes will be likely to occur on or near recognized faults showing evidence of recent geologic activity. The proximity of major faults to the Refinery and Terminals (see discussion in Chapter 3, Section B, Geology/Soils) increases the probability that an earthquake may affect the proposed project. There is the potential for damage to the new Refinery structures in the event of an earthquake. The impacts of an earthquake on the

project sites are considered to be greater than the current conditions since additional structures will be constructed. Impacts of an earthquake could include structural failure, spills, etc. The hazards of a release during an earthquake are addressed in Chapter 4, Section C, Hazards and Hazardous Materials.

New structures must be designed to comply with the Uniform Building Code Zone 4 requirements since the project is located in a seismically active area. The City of Los Angeles is responsible for assuring that the proposed project complies with the Uniform Building Code as part of the issuance of the building permits and can conduct inspections to ensure compliance. The Uniform Building Code is considered to be a standard safeguard against major structural failures and loss of life. The goal of the code is to provide structures that will: (1) resist minor earthquakes without damage; (2) resist moderate earthquakes without structural damage but with some non-structural damage; and (3) resist major earthquakes without collapse but with some structural and non-structural damage.

The Uniform Building Code basis seismic design on minimum lateral seismic forces ("ground shaking"). The Uniform Building Code requirements operate on the principle that providing appropriate foundations, among other aspects, helps to protect buildings from failure during earthquakes. The basic formulas used for the Uniform Building Code seismic design require determination of the seismic zone and site coefficient, which represents the foundation conditions at the site.

Equilon shall obtain building permits, as applicable, for all new proposed project structures. Equilon shall submit building plans to the local cities for review. Equilon must receive approval of all building plans and building permits to assure compliance with the latest Building Code adopted by the local cities prior to commencing construction activities.

The Marine Terminal and portions of the Refinery are located within an area where there has been historic occurrence of liquefaction or existing conditions indicate a potential for liquefaction (California Division of Mines and Geology, 1999). Therefore, there is the potential for liquefaction induced impacts at the project sites since the appropriate parameters for liquefaction exist at the site, including unconsolidated granular soils and a high water table. The Uniform Building Code requirements consider liquefaction potential and establishes more stringent requirements for building foundations in areas potentially subject to liquefaction. Therefore, compliance with the Uniform Building Code requirements should minimize the potential impacts associated with liquefaction. The issuance of building permits from the City will assure compliance with the Uniform Building Code requirements. Therefore, no significant impacts from liquefaction are expected.

There are no other known geological hazards (e.g., landslide, mudflow, seiche, tsunami or volcanic hazards) at the Refinery or Terminals so that no other significant geological impacts are expected. Tsunamis at the marine terminal are not expected because the ports of Long Beach and Los Angeles are surrounded by breakwaters that protect the area from wave action.

MITIGATION MEASURES

Mitigation measures are recommended to minimize the impacts related to soil contamination and earthquake hazards.

B-1 If contaminated soils or ground water are encountered during construction, soil removal and remediation shall be addressed pursuant to federal, State and local regulations and requirements, including the requirements of the California Environmental Protection Agency, Department of Toxic Substances Control, SCAQMD, and RWQCB, and in consultation with appropriate landowners.

B-2 A structural engineer or civil engineer experienced with earthquake-resistant design, shall approve all building plans to determine the adequacy of seismic criteria for project structures, and to require appropriate design changes, if needed prior to issuance of building permits.

B-3 All accessible abandoned wells within 10 feet of construction activities will be tested for gas leakage and inspected for oil leakage. If there is any indication of oil or gas leakage, the well shall be re-abandoned, as required by the Department of Conservation.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

Although no significant adverse geology/soils were identified as a result of implementing the proposed project, three mitigation measures were identified and will be implemented. Implementing these mitigation measures should ensure that geology/soils impacts remain insignificant.

C. HAZARDS & HAZARDOUS MATERIALS

SIGNIFICANCE CRITERIA

Hazard impacts will be considered significant if any of the following criteria are met:

Non-compliance with any applicable design code or regulation.

Non-conformance to National Fire Protection Association standards.

Non-conformance to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection.

Exposure to hazardous chemicals in concentrations equal to or greater than the Emergency Response Planning Guideline (ERPG) 2 levels.

Increased risk of off-site fatality or serious injury.

PROPOSED PROJECT IMPACTS

Process Units

A hazard analysis was conducted for the proposed project modifications. The details of the analysis are included in Volume III of this EIR. The potential hazards associated with the proposed project were evaluated. The proposed project included the new and modified units listed in Table 4-12.

The hazard methodology included a review of the hazard scenarios for the existing units that are a part of the proposed project and for the units following the proposed modifications.

Hazard Identification

The potential hazards associated with Equilon's existing Refinery and Terminals and those associated with the proposed project are a function of the materials being processed, processing systems, procedures used for operating and maintaining the sites, and hazard detection and mitigation systems. Common hazards include toxic gas clouds (gas with hydrogen sulfide, sulfuric acid, etc.), torch fires (gas and liquefied gas releases), flash fires (liquefied gas releases), pool fires (flammable/combustible liquid releases), vapor cloud explosions (gas and liquefied gas releases), and boiling liquid expanding vapor explosions (BLEVEs) (major failures of liquefied gas storage tanks). The hazards specifically found at the Equilon Refinery and terminals, related to those units that are part of the proposed project, are shown in Table 3-14.

In order to compare the hazards of toxic gases, fires and explosions on humans, equivalent levels of hazards must be defined. The endpoint hazard criterion defined in this study corresponds to a hazard level that might cause an injury. Table 4-13 provides the endpoint hazard criteria used in this study. The endpoint hazard criteria were used in the modeling to determine the extent of impacts due to an upset condition.

Methodology

A hazard analysis for each unit that is part of the proposed project was completed in order to define the maximum credible hazard scenario. In addition, hazard analyses were completed for new and modified storage tanks and transfer operations. The hazard analysis was developed in seven increments that include:

- Initial review of available documentation
- Detailed review of process flow diagrams
- Review of process material balances
- Review of available safety studies
- Development of hazard scenarios
- Screening of hazard scenarios via hazards analysis
- Final selection of hazards cases

After the potential hazard scenarios were determined, they were screened to determine which scenario could adversely affect any off-site areas (i.e., areas outside of the Refinery or Terminal boundaries). The scenarios resulting in potential off-site consequences were also identified. The maximum potential consequences were then used to identify the number of people that could possibly be affected in the event of an upset.

The procedures identified above were applied to the existing units and processes to identify the existing hazard conditions. In addition, the same procedures were applied to all unit modifications and new facilities that are a part of the proposed project.

TABLE 4-12

PROCESS UNITS AND FACILITIES INVOLVED IN THE PROPOSED PROJECT

Designation	Description	Existing/New	Modified
Process Units			
ALKY	Alkylation Unit	Existing	Yes
HCU	Hydrocracking Unit Plant	Existing	Yes
CRU2	Catalytic Reformer 2	Existing	Yes
CRU3	Catalytic Reformer 3	Existing	Yes
HTU1	Hydrotreating Unit 1	Existing	Yes
HTU2	Hydrotreating Unit 2	Existing	Yes
HTU4	Hydrotreating Unit 4	Existing	Yes
C4ISO	C4 Isomerization Unit	Existing	Yes
FCCU	Fluid Catalytic Cracking Unit	Existing	Yes
Storage			
TANK	Atmospheric and Pressurized Storage	Existing and New	Yes
Product Transfer			
TT	Tank Trucks	Existing and New	Yes
RC	Railcars	Existing and New	Yes
MARINE	Marine Transfer Systems	Existing	Yes

Modeling

The hazard zones resulting from the "worst-case" releases are evaluated to determine the process areas that could release material with a potential for public (off-site) impacts. When performing site-specific consequence analysis studies, the ability to accurately model the release, dilution, and dispersion for gases and aerosols is important if an accurate assessment of potential public exposure is to be determined. Therefore, a set of models was used to calculate release conditions, initial dilution of the vapor, and the subsequent dispersion of the vapor introduced into the atmosphere. The models contain algorithms that account for thermodynamics, mixture, behavior, transient release rates, gas cloud density relative to air, initial velocity of the release gas, and heat transfer effects from the surrounding atmosphere and the substrate. See Volume III for details on the risk of upset modeling and for further discussions on the model algorithms.

TABLE 4-13

ENDPOINT CRITERIA FOR CONSEQUENCE ANALYSIS

Hazard Type	Injury Threshold		
	Exposure Duration	Hazard Level	Reference
Ammonia Inhalation	Up to 60 min.	200 ppm	ERPG-2[(1)]
Hydrogen Sulfide Inhalation	Up to 60 min.	30 ppm	ERPG-2[(1)]
Perchloroethylene Inhalation	Up to 60 min.	200 ppm	ERPG-2[(1)]
Sulfuric Acid Inhalation	Up to 60 min.	10 mg/m^3	ERPG-2[(1)]
Radiant Heat Exposure	40 sec.	1,600 $Btu/(hr\text{-}ft^2)$	40 CFR Part 68
Explosion Overpressure	Instantaneous	1.0 psig	40 CFR Part 68
Flash fires (fireballs)	40 sec.	1,600 $Btu/(hr\text{-}ft^2)$	40 CFR Part 68
Flash fires (flammable vapor clouds)	Instantaneous	LFL	40 CFR Part 68

(1) 40 CFR Part 68 – U.S. EPA RMP endpoints.

Results

With the completion of the hazard identification and consequence modeling calculations for both the existing and proposed Plant configurations, the release which generates the largest hazard zone can be defined. Table 4-14 lists the potential release scenarios as a result of the proposed project. Most of the proposed modifications do not affect the size of the largest potential release. In other words, the potential releases, which would result in the largest hazard zones, already exist at the site.

Table 4-14 presents a listing of the type and size of potential hazards that dominate each of the units evaluated. The largest hazards are listed for releases from the existing units and the units after the proposed modifications. The proposed modifications and additions do not result in substantially larger potential hazard zones than those posed by the existing configuration of the facility, with one exception. This result is primarily due to the nature of many of the modifications, which are described as follows:

- Slight modification of a unit such that the vessel generating the largest potential hazard is unchanged (e.g., CRU2).

- Addition of equivalent equipment such that the potential hazards added are the same as those which already exist (e.g., railcar and truck unloading). However, the probability of an accident involving a release increases because the project will add equipment to the Refinery and terminals.

TABLE 4-14

MAXIMUM HAZARD DISTANCES

PROCESS UNIT/RELEASE		Status of Potential Hazard	Maximum Distance (ft) from Center of Unit to			
			Flash Fire	Explosion Overpressure (1.0 psig)	Pool/Torch Fire Thermal Radiation (1,600 Btu/hr-ft^2)	H_2S Gas Concentration (30 ppm for 60 min.)
ALKY	Rupture of liquid line leaving refrigerant accumulator	Existing	940	825	330	-
		Modified	860	795	320	-
	Rupture of liquid line leaving third-stage acid/alkylate contactor	Existing	950	790	475	3,440 (10mg/m^3 H_2SO_4)
		Modified	885	790	480	3,085 (10mg/m^3 H_2SO_4)
	Rupture of liquid line leaving deisobutanizer overhead	Existing	1,115	1,050	745	-
		Modified	1,120	1,025	735	-
HCU	Rupture of liquid line leaving high pressure separator.	Existing	1,760	885	1,150	2,985
		Modified	1,760	885	1,150	2,985
	Rupture of feed line to depropanizer.	Existing	605	710	500	1,430
		Modified	620	690	495	1,130
CRU2	Rupture of line leaving reactor products separator.	Existing	1,020	900	750	-
		Modified	650	835	625	-
	Rupture of liquid line leaving debutanizer overhead accumulator	Existing	520	480	280	-
		Modified	520	480	280	-
CRU3	Rupture of platformer feed line (modified to depentanizer feed line)	Existing	775	585	355	-
		Modified	430	275	140	-
	Rupture of liquid line leaving depentanizer overhead accumulator	Existing	NA	NA	NA	-
		Modified	860	720	500	
HTU1	Rupture of liquid line leaving high pressure separator	Existing	560	600	620	1,145
		Modified	515	550	445	1,055
	Rupture of line leaving reactors	Existing	285	225	355	725
		Modified	275	210	350	180
HTU2	Rupture of line leaving high pressure separator	Existing	650	675	500	1,020
		Modified	465	690	485	1,140
	Rupture of line leaving reactor	Existing	275	215	340	1,210
		Modified	245	190	360	1,655*
HTU4	Rupture of liquid line leaving stripper overhead accumulator.	Existing	330	245	185	960
		Modified	395	310	195	1,190
	Rupture of liquid line leaving high pressure separator	Existing	2,900	920	750	4,450
		Modified	1,080	1,010	855	4,245

TABLE 4-14 (Concluded)

PROCESS UNIT/RELEASE		Status of Potential Hazard	Maximum Distance (ft) from Center of Unit to			
			Flash Fire	Explosion Overpressure (1.0 psig)	Pool/Torch Fire Thermal Radiation (1,600 Btu/hr-ft^2)	H_2S Gas Concentration (30 ppm for 60 min.)
C4ISOM	Rupture of liquid line leaving stabilizer overhead accumulator	New	470	425	240	-
	Rupture of liquid line leaving stabilizer column bottoms	New	535	690	440	-
	Rupture of liquid line leaving deisobutanizer column bottoms	New	910	1,095	990	-
	Rupture of liquid line leaving deisobutanizer overhead accumulator	New	915	845	590	-
FCCU	Rupture of liquid line leaving debutanizer overhead accumulator	Existing	725	750	435	1,300
		Modified	670	610	445	1,120
	Rupture of liquid line leaving debutanizer bottoms	Existing	620	740	615	-
		Modified	585	710	580	-
TANKS	Carson Terminal Tank TK-513 (gasoline)	Existing	-	-	345	-
	Tank TK-513 (ethanol)	Modified	-	-	275	-
	Wilmington Terminal Tank 260000 (HC & water)	Existing	-	-	120	-
	Tank 260000 (HC & water)	Modified	-	-	120	-
	Signal Hill Terminal Tank 380-S1 (gasoline)	Existing	-	-	200	-
	Tank 380-S1 (gasoline)	Modified	-	-	200	-
	Van Nuys Terminal Tank 250 (gasoline)	Existing	-	-	200	-
	Tank 250 (gasoline)	Modified	-	-	200	-
	Colton Terminal Tank C-20 (gasoline)	Existing	-	-	215	-
	Tank C-20 (gasoline)	Modified	-	-	215	-
	Rialto Terminal Tank C-23 (gasoline)	Existing	-	-	185	-
	Tank C-23 (gasoline)	Modified	-	-	185	-
	Mormon Island Terminal Tank M-27 (gasoline)	Existing	-	-	295	-
	Tank M-27 (gasoline)	Modified	-	-	295	-
	Wilmington Refinery pentane sphere	New	-	-	715	-

* These hazards have the potential to migrate off-site and would be considered potentially significant.

- Exchanging products of equivalent hazard in storage (e.g., for the atmospheric storage tanks, the hazards associated with atmospheric storage of liquid hydrocarbons are basically equal).

The exception is that the modifications to HTU2 will result in an increase in the potential public exposure under "worst-case" consequence analysis conditions. The increased hydrogen sulfide content in the HTU2 reactor products and changing the piping from eight inches to10 inches will allow the 30 ppm concentration level to extend an additional 200 feet west of Alameda, under a "worst-case" release scenario. The current design (eight-inch piping and lower hydrogen sulfide concentration level in the liquid) prevents the 30 ppm hydrogen sulfide concentration level from extending off-site. Therefore, the potential for off-site impacts could result in an exposure to a hazardous chemical in concentrations equal to or greater than the ERPG 2 levels; therefore, the proposed project has the potential for significant impacts.

None of the modified or new units creates a hazard that could extend into residential areas; all off-site hazards are confined to heavy industrial areas surrounding the facility. Releases from new or modified equipment that result in an increase in the potential off-site exposures (based on the consequence modeling and the given hazard endpoints), do so only under "worst-case" conditions. The "worst-case" consequence condition can only be achieved if the following occurs: (1) a full rupture of the 10-inch line leaving the reactors; (2) the release does not ignite within minutes of the rupture; (3) the wind is blowing toward the west (note that the dominant wind direction is east); (4) the wind speed is low (less than three miles per hour); and (5) the atmosphere is calm. The land just west of Alameda Street that could be affected is primarily industrial. If either release were to occur, the potential hazard would be short-term (momentary) exposure to hydrogen sulfide concentrations in the 30 ppm range. The short-term exposure would not produce the health effects defined by the ERPG-2 Guidelines that are based on exposure up to 60 minutes. Nonetheless, the potential hazard impacts associated with the proposed project are considered to be significant because there is the potential for a few individuals to be exposed to the potential hazard.

The hazards associated with the loading/unloading of trucks, railcars and marine vessels also was evaluated. However, it was determined that there would be no change in these hazards. Petroleum products are currently loaded/unloaded to/from trucks, railcars, and marine vessels. The only change in the proposed project is that ethanol will be unloaded and loaded at the various terminals. The vapor pressure associated with ethanol is less than the vapor pressure associated with MTBE (which is currently handled at the terminals but will no longer be used). In the event of a release of ethanol, the material would be expected to travel and impact a smaller area than when MTBE was handled. In addition, the toxicity of ethanol is less than the toxicity of MTBE as shown in Table 4-15 below. Therefore, the health impacts in the event of a release of ethanol also are expected to be less than the health impacts associated with an MTBE release.

Transportation of Hazardous Materials

The transportation of hazardous materials also can result in offsite releases through accidents or equipment failure. The proposed project will increase the amount of hazardous materials transported to the Refinery and/or Terminals. The impacts due to transportation of hazardous

materials are addressed in this section. For more details on the transportation of hazardous materials, see Volume III of this EIR.

Ethanol/MTBE

The proposed project would eliminate the use of MTBE and would eliminate the transport of MTBE to the Marine Terminal and Refinery via marine vessel. Ethanol, instead of MTBE, would be transported to the Equilon Terminals via marine vessels, railcars, and/or trucks. The use of ethanol is expected to provide an environmental benefit over the use of MTBE. In the event of a leak or spill, ethanol breaks down in the environment more rapidly than MTBE (CARB, 1999).

The proposed project will increase the truck transport of ethanol by about 150 trucks per day. The distance traveled by all ethanol trucks was estimated to be about 17,056 miles per day. The estimated accidental release rate for all ethanol truck deliveries is about 1.7 accidents per year. Ethanol is not an acutely hazardous material and the hazards related to the transport of ethanol are expected to be less than significant.

The overall hazards associated with the handling and transport of ethanol are expected to be less than those associated with MTBE. Ethanol has a lower vapor pressure than MTBE (49-56.5 mmHg for ethanol as compared to 245-256 mmHg for MTBE) (API, 2000). Therefore, a release of ethanol would travel a smaller distance than a release of MTBE and persist in the environment for less time, given the same conditions. In addition, the toxicity of ethanol is less than the toxicity of MTBE as shown in Table 4-15 below. Therefore, the health impacts in the event of a release of ethanol also are expected to be less than the health impacts associated with an MTBE release.

The proposed project is expected to require the delivery of ethanol via railcars. A maximum of about 30 railcars per day may be required to deliver ethanol. These railcars are expected to arrive on one train per day. The proposed project is not expected to change the probability of a train accident, derailment, or potential release of material in the event of an accident. Rail accidents are generally weather or mechanical-related. The proposed project will not change the average number of railcars that would derail and/or rupture in the event of an accident. Further, in the event of an ethanol release, the health effects are expected to be less than significant, for the same reasons identified in the preceding paragraphs.

The proposed project is expected to result in the delivery of ethanol to the Marine Terminal and elimination of MTBE deliveries to the Terminal. It is expected that the increase in ethanol transport of about two vessels per month will be offset by a decrease in MTBE delivered to the Terminal by about two vessels per month. Therefore, no increase in marine vessel visits is expected at the Marine Terminal associated with the transport of oxygenates. (The hazards associated with the increased marine transport of alkylate are addressed below). As discussed above, the overall hazards associated with the handling and transport of ethanol are expected to be less than those associated with MTBE, for the same reasons

identified in the preceding paragraphs and Table 4-15). Therefore, a release of ethanol would travel a smaller distance and result in fewer health impacts than a release of MTBE, given the same conditions. The hazards related to the transport of ethanol instead of MTBE are expected to be less than significant.

TABLE 4-15

HEALTH ASSESSMENT VALUES AND HEALTH PROTECTIVE CONCENTRATIONS

	Non-Cancer		Cancer
	1-Hour (ug/m^3)	**Annual Average (ug/m^3)**	**Unit Risk Factor $(ug/m^3)^{-1}$**
Ethanol	100,000 (53,000 ppb)	100,000 (53,000 ppb)	No evidence of carcinogencity by inhalation.
MTBE	25,000 (7,000 ppb)	3000 (800 ppb)	2.6×10^{-7} (9.3×10^{-7} ppb^{-1})

Source: OEHHA, 2000.

The Marine Terminal is located within the Port of Los Angeles and subjected to review under the risk management portion of the Port's Master Plan (Los Angeles Harbor Department, 1983). This Plan identifies hazards within the Port, provides land use goals, and identifies emergency response procedures for facilities within the Port. The Plan contains policies to guide the future development of the Port in an effort to eliminate the danger of accidents to vulnerable resources. This will be achieved mainly through physical separation, as well as through facility design factors, fire protection, and other risk mitigation measures. The Marine Terminal Operations Manual, in compliance with Coast Guard requirements, details procedures for preventing and controlling drips and spills during marine activities including ship offloading.

The Refinery, Marine Terminal and truck terminals have spill containment systems in place to reduce the impacts of petroleum product spills. The Marine Terminal uses a water collection and treatment system to prevent discharges of petroleum products to the Los Angeles Harbor. Drip pans and funnels drain to collection areas to contain leaks. Ship washings and ballast water are stored in two tanks for further treatment and disposal. Spills that would reach the water are controlled by deploying the oil booms available at the Marine Terminal. Additional spill equipment is available through commercial contracts with suppliers that specialize in spill cleanup. Commercial contractors that specialize in oil cleanup are employed to place any additional booms or equipment, and to remove oil from the water and adjacent areas. *The proposed project is not expected to result in an increase in ballast water or wastewater generated or treated at the marine terminal.*

All Equilon facilities have a Spill Prevention Containment and Countermeasures (SPCC) Plan per the requirements of 40 CFR, Section 112. The SPCC Plan is designed to prevent

spills from on-site facilities and includes requirements for secondary containment, provides emergency response procedures, establishes training requirements, and so forth.

Alkylate

The proposed project would increase the delivery of alkylate at the Marine Terminal by about six vessels per year. Alkylate is currently shipped and stored at the Marine Terminal and the proposed project will increase the amount of alkylate shipped to the Terminal by about six vessels per year. No new hazards or increased risk will be introduced to the Marine Terminal.

Ammonia

The use of anhydrous ammonia at the Refinery could increase due to an increased firing rate of the existing boilers at the Refinery. The proposed project will not increase the magnitude of the consequences of a release from an ammonia truck and the impacts would be the same as the existing conditions. The magnitude of the release would not change because there would be no increase in the amount of ammonia transported in each truck; therefore, no increase in the amount of material potentially released would be expected. The truck route used to transport ammonia to the Refinery would remain the same as it currently is so that no new areas would be potentially impacted by a release. Based on the fact that the consequences (exposures) of an accidental release of anhydrous ammonia would not change and no new areas would be exposed to an accidental release, potential hazard impacts from transporting anhydrous ammonia are considered insignificant. Further, the probability of an accident involving an ammonia truck will slightly increase. The increased probability is estimated to be about 0.000168 or about one accident every 5,952 (using an accident rate of 0.28 accidents per million miles traveled, see Table 3-15, and a travel distance of 50 miles) because the project requires additional ammonia truck trips to the Refinery. The increase in probability of 0.000168 for an ammonia truck accident is small and considered to be less than significant.

Pentane

The proposed project will increase the transport of pentane and decrease the amount of butane transported to/from the Equilon Refinery. It is estimated that up to 45,000 additional barrels per month (about 60 railcars per month) of pentane could be transported as part of the proposed project. The proposed project is expected to reduce the amount of butane transported to the Refinery by about 55,000 barrels per month (about 73 railcars per month). Therefore, the number of railcars transporting materials to/from the Refinery is expected to decrease. In the event of a release, the hazards related to butane are expected to be greater (result in higher exposures) than the hazards associated with pentane because the vapor pressure associated with butane is higher (i.e., the material is more flammable) than the vapor pressure associated with pentane. The proposed project would not transport any other additional materials via railcars to the Refinery that are not currently transported. Therefore, the proposed project is not expected to change the consequence of a train accident. The

proposed project would slightly reduce the probability of a railcar accident as fewer (about 13 fewer railcars per month) would transport materials to/from the Refinery.

Sulfuric Acid

The proposed project includes modifying the existing alkylation unit and increasing the flow rate of sulfuric acid used as a catalyst in this unit. The proposed project will expand the alkylation unit, increase the amount of sulfuric acid needed by the Refinery, and increase the amount of spent sulfuric acid generated by the Refinery. An increase of about one to two trucks per day associated with sulfuric acid transport are expected. Truck accidents could result in a release of liquid sulfuric acid that can be hazardous due to ingestion or skin contact. The vapor pressure of sulfuric acid is negligible so a fire is very unlikely. Sulfuric acid would continue to be shipped by truck and no increase in the volume transported per truck is expected, so the severity of transportation accidents involving sulfuric acid would not change with implementation of the proposed project. (Note that sulfuric acid is non-volatile at standard temperature and pressure so that a release during the transport of the material would not result in a vapor cloud or exposure of individuals to sulfuric acid vapors. Only direct contact with the material would result in a potential for exposure.) "Worst-case" modeling results indicate that less than one person would be exposed to sulfuric acid concentrations at the injury or irritation level in the event of a truck accident. Therefore, the consequence of a sulfuric acid release during transport and the increased transport of sulfuric acid from the Refinery are not expected to result in significant adverse hazard impacts.

Perchloroethylene

The use of perchloroethylene in the C4 Isomerization Unit is expected to increase by about three truck trips per year. Perchloroethylene is currently used at the Refinery but the proposed project would result in an increase of about 15,000 gallons per year in use of the material. The proposed project will not increase the magnitude of the consequences of a release from a perchloroethylene truck and the impacts would be the same as the existing conditions. The amount of perchloroethylene per trip will not increase. Based on the fact that the consequences (exposures) of an accidental release of perchloroethylene would not change and no new areas would be exposed to an accidental release, potential hazard impacts from transporting perchloroethylene are considered insignificant. Further, the probability of an accident involving an perchloroethylene truck will increase by about 0.000042 or about one accident every 23,810 years (using an accident rate of 0.28 accident per million miles traveled, see Table 3-15 and a travel distance of 50 miles) because the project requires additional perchloroethylene truck trips to the Refinery. The increase in probability of 0.000042 for a perchloroethylene truck accident is small and considered to be less than significant.

Compliance Issues

The proposed project modifications will require compliance with various regulations, including OSHA regulations (29 CFR Part 1910) that require the preparation of a fire prevention plan, and 20 CFR Part 1910 and Title 8 of California Code of Regulations that require prevention programs to protect workers that handle toxic, flammable, reactive, or explosive materials.

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. The Hazardous Materials Transportation Act is the federal legislation that regulates transportation of hazardous materials.

The Equilon Refinery and Terminals are expected to comply with all applicable design codes and regulations, conform to National Fire Protection Association standards, and conform to policies and procedures concerning leak detection containment and fire protection. Therefore, no significant adverse impacts are expected due to non-compliance with applicable design or industrial standards.

Impacts on Water Quality

A spill of the hazardous materials (generally petroleum products and by-products from the refining process) used and stored at the Refinery and any of the Terminals could occur under upset conditions, e.g., earthquake, tank rupture, and tank overflow, resulting in a potential impact to water quality (e.g., at the Port and Dominguez Channel). Spills also could occur from corrosion of containers, piping and process equipment; and leaks from seals or gaskets at pumps and flanges. A major earthquake would be a potential cause of a large spill. Other causes could include human or mechanical error. Construction of the vessels, and foundations in accordance with the Uniform Building Code Zone 4 requirements helps structures to resist major earthquakes without collapse, but result in some structural and non-structural damage following a major earthquake. Equilon has emergency spill containment equipment and would implement the spill control measures in the event of an earthquake. Storage tanks have secondary containment. Therefore, the rupture of a tank would be collected within the containment system and pumped to an appropriate leakless tank for storage.

Spills at the facilities would generally be collected within containment facilities. Large spills outside of containment areas are expected to be captured by the process water system where it could be controlled. Spilled material would be immediately collected and pumped to an appropriate tank, or sent off-site if the materials cannot be used on-site. *Further, under Title 2 of the CCR §2563, any repairs, alternations or modifications to existing transfer pipeline systems shall meet the design and construction criteria specified in Subparts C and D, Part 195, Title 49 of the Code of Federal Regulations and undergo Static Liquid Pressure testing as described in Title CCR §2565.* Because of the containment system, spills are not expected to migrate from the facility and impacts are considered to be less than significant.

MITIGATION MEASURES

The proposed project could result in significant impacts related to the "worst-case" hazards associated with modifications to HTU2. The increased hydrogen sulfide content in the HTU2 reactor products and changing the piping from eight inches to 10 inches will allow the 30 ppm concentration level to extend an additional 200 feet west of Alameda, resulting in potentially significant impacts. Therefore, mitigation measures are required. There are a number of rules and regulations that Equilon has been or must comply with that serve to minimize the potential impacts associated with hazards at the facility. Under federal OSHA, regulations have been promulgated that require the preparation and implementation of a PSM Program (29 CFR Part 1910, Section 119, and Title 8 of the California Code of Regulations, Section 5189). RMPs are covered under the California Health and Safety Code Section 25534 and 40 CFR Part 68, and Title 1 §112(r)(7), by the Clean Air Act.

A PSM that meets the requirements of the regulations and is appropriately implemented is intended to prevent or minimize the consequences of a release involving a toxic, reactive, flammable, or explosive chemical. A PSM review will be required as part of the proposed project. The primary components of a PSM include the following:

- Compilation of written process safety information to enable the employer and employees to identify and understand the hazards posed by the process;

- Performance of a process safety analysis to determine and evaluate the hazard of the process being analyzed;

- Development of operating procedures that provide clear instructions for safely conducting activities involved in each process identified for analysis;

- Training in the overview of the process and in the operating procedures is required for facility personnel and contractors. The training should emphasize the specific safety and health hazards, procedures, and safe practices; and

- A pre-start up safety review for new facilities and for modified facilities where a change is made in the process safety information.

An RMP is required for certain chemicals at the Refinery. The RMP consists of four main parts: hazard assessment that includes an off-site consequence analysis, five-year accident history, prevention program, and emergency response program. The Refinery's existing RMP will need to be reviewed and revised to include the proposed project modifications, including the modifications to HTU2.

No additional feasible mitigation measures have been identified, over and above the extensive safety regulations that currently apply to the Refinery.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

The impacts of the proposed project on hazards are expected to be significant prior to mitigation. Compliance with existing regulations and implementation of the recommended safety measures would further minimize the potential impacts associated with a release but are not expected to eliminate the potential hazard impacts. Therefore, the impacts of the proposed project on hazards and hazardous materials are expected to remain significant.

D. NOISE

SIGNIFICANCE CRITERIA

Impacts on noise will be considered significant if:

> Construction noise levels exceed the City noise ordinance or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three dBA at the site boundary.
>
> Construction activities would exceed the ambient noise level by three dBA at a noise sensitive use between the hours of 9:00 p.m. and 7:00 a.m. Monday through Friday, before 8:00 a.m. or after 6:00 p.m. Saturday, or anytime on Sunday.
>
> The project operational noise levels exceed the local noise ordinance at the site boundary or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three dBA at the site boundary.

CONSTRUCTION IMPACTS

Heavy construction equipment is required during construction activities associated with the proposed project. The highest noise impacts from construction will be during equipment installation. Examples of noise levels from construction equipment are presented in Table 4-16. These noise sources will operate primarily during daylight hours and will be a temporary noise source over the approximate one-year construction period.

The estimated noise level during equipment installation at the Refinery is expected to be an average of about 85 dBA at 50 feet from the center of construction activity. The major portions of the construction activities will occur near the central portion of the Refinery. Using an estimated six dBA reduction for every doubling of distance, the noise levels at various locations surrounding the facility are estimated in Table 4-17. Most of the construction noise sources will be located near ground level, so the noise levels are expected to attenuate further than analyzed herein. Noise attenuation due to existing structures has not been included in the analysis in order to provide a conservative estimate of the proposed project's noise impacts.

TABLE 4-16

CONSTRUCTION NOISE SOURCES

EQUIPMENT	TYPICAL RANGE (decibels)[1]	ANALYSIS VALUE (decibels)[2]
Truck	82-95	82
Front Loader	73-86	82
Backhoe	73-95	80
Vibrator	68-82	80
Air Compressor	85-91	85
Saws	72-82	82
Jackhammers	81-98	85
Pumps	68-72	70
Generators	71-83	85
Compressors	75-87	80
Concrete Mixers	75-88	75
Concrete Pumps	81-85	81
Tractor	77-98	85
Scrapers, Graders	80-93	80
Pavers	85-88	75
Cranes	75-89	85

(1) City of Los Angeles, 1998. Levels are in dBA at 50-foot reference distance. These values are based on a range of equipment and operating conditions.

(2) Analysis values are intended to reflect noise levels from equipment in good conditions, with appropriate mufflers, air intake silencers, etc. In addition, these values assume averaging of sound level over all directions from the listed piece of equipment.

The construction activities at the Refinery will normally be carried out during daytime from Monday to Friday, or as permitted by the City of Los Angeles. Because of the nature of the construction activities, the types, number, operation time and loudness of construction equipment will vary throughout the construction period. As a result, the sound level associated with construction will change as construction progresses. Construction noise sources will be temporary and will cease following construction activities. Noise levels at the closest residential area (see Table 4-17, Location 4) are not expected to noticeably increase during construction activities. Noise levels during construction activities at other locations are not expected to exceed two dBA increase.

The noise levels from the construction equipment are expected to be within the allowable noise levels established by the Los Angeles noise ordinance (see Table 3-18). The project is not expected to increase the noise levels at residential areas. The noise level at the closest residential area is expected to be 48 dBA (Location 4), which is within the normally acceptable noise range (see Figure 3-7). The noise levels at the other noise monitoring locations are within industrial areas

and no significant (audible) increase in noise levels is expected. Therefore, the proposed project noise impacts during the construction phase are expected to be less than significant.

TABLE 4-17

PROJECT CONSTRUCTION NOISE LEVELS

Location[(1)]	Baseline Noise Levels (dBA)[(2)]	Distance from Construction (feet)	Construction Sound Level at Location (dBA)	Total Sound Level at Location (dBA)[(3)]	Increased Noise Levels due to Construction (dBA)
1	61.8	4,000	47.5	62.0	0.2
2	64.4	2,800	50.5	64.6	0.2
3	67.4	600	64	69.0	1.6
4	57.8	3,600	48	58.2	0.4
5	68.7	700	64	70.0	1.3
6	61.1	2,400	52	61.6	0.5
7	67.4	1,800	55	67.6	0.2

(1) Refers to the sampling locations identified in Figure 3-6.
(2) Includes all ambient noise sources. Noise levels are from Table 3-17.
(3) The total sound level was calculated using the following formula: $T_{sl}=10\log_{10}(10^{Bsl/10} + 10^{Csl/10})$ where T_{sl} = the total sound level (dBA); B_{sl} = baseline sound level (dBA); and C_{sl} = construction sound level (dBA)

The construction noise levels at the terminals are expected to be less than the Refinery because less construction equipment will be used. The noise level at the Carson Terminal is estimated to be about 80 dBA at 50 feet. The closest receptor to the construction equipment is about 450 feet away. The estimated noise level at this receptor is estimated to be about 62 dBA. The noise levels from the construction equipment are expected to be within the allowable noise levels established by the City of Carson noise ordinance (see Table 3-19). Construction would be limited to daytime hours so that the proposed project is not expected to increase the noise levels at residential areas. Therefore, no significant adverse noise impacts related to project construction at the Carson Terminal are expected.

The noise level at the other terminals is estimated to be about 75 dBA at 50 feet. The closest off-site receptor to the construction equipment at the other terminals is about 160 feet away. The estimated maximum noise levels are estimated to be about 65 dBA at the closest off-site receptor location. In all cases, the maximum off-site receptor location is a commercial/industrial area so that the construction noise levels are expected to be within the allowable noise levels established by the local city. Construction would be limited to daytime hours so that the project is not expected to increase the noise levels at residential areas. Therefore, no significant adverse noise impacts related to project construction at the various Equilon Terminals are expected.

Workers exposed to noise sources in excess of 90 dBA for an eight hour period will be required to wear hearing protection devices that conform to Occupational Safety and Health Administration/National Institute for Occupational Safety and Health (NIOSH) standards. Since the maximum noise levels during construction activities are expected to be 85 decibels or less, no significant impacts to workers during construction activities are expected.

OPERATION NOISE

The proposed project will add equipment to the existing Refinery and Terminals so that there will be additional noise sources at the facility. Additional noise sources associated with the proposed project generally include process equipment components such as valves, flanges, vents, pumps, drains, compressors, cooling tower, and heaters. Refinery operations are continuous over a 24-hour period. The maximum noise level of new equipment added to the Refinery is expected to be limited to 85 dBA at three feet in order to comply with OSHA and City noise standards. These noise specifications will be enforced and included as part of the equipment purchase agreement for all new and modified equipment. Given the 85 dBA criteria for Refinery equipment, it is expected that the maximum noise level from new equipment operating concurrently would be a maximum of about 90 dBA (at three feet). The estimated noise levels associated with the proposed project operation at the Refinery are summarized in Table 4-18. Assuming an operational "worst-case" noise level of 90 dBA and a six dBA noise attenuation, noise levels would drop off to 60 dBA or less at about 100 feet from the sources. Noise generated by project equipment, therefore, would not increase the overall noise levels at the Refinery (when compared to baseline conditions). Therefore, no significant adverse noise impacts related to project operation at the Refinery are expected. The noise levels in the area are expected to comply with the City of Los Angeles' Noise Ordinance.

TABLE 4-18
EQUILON REFINERY OPERATION NOISE LEVELS

Location[(1)]	Baseline Noise Levels (dBA)[(2)]	Distance from New Equipment (feet)	Operation Sound Level at Location (dBA)	Total Sound Level at Location (dBA)[(3)]	Increased Noise Levels due to Operation (dBA)
1	61.8	4,000	30	61.8	<1
2	64.4	2,800	36	64.4	<1
3	67.4	600	45	67.4	<1
4	57.8	3,600	30	57.8	<1
5	68.7	700	42	68.7	<1
6	61.1	2,400	33	61.1	<1
7	67.4	1,800	36	67.4	<1

(1) Refers to the sampling locations identified in Figure 3-6.
(2) Includes all predicted noise sources.
(3) The total sound level was calculated using the following formula: $T_{sl}=10\log_{10}(10^{Bsl/10} + 10^{Osl/10})$ where T_{sl} = the total sound level (dBA); B_{sl} = baseline sound level (dBA); and O_{sl} = operational construction sound level (dBA)

In general, the noise level in the Wilmington area near the Refinery is compatible with the industrial nature of the immediately surrounding area with noise levels of about, or less than, 70 decibels.

Emergency/non-routine activities, such as excess/purge-gas flaring, steam/gas venting, etc., that are not part of normal operational procedures would have a disturbing intrusive noise impact on the area surrounding the Refinery. The proposed project is not expected to increase the occurrence of non-routine events or increase the need for purging/venting/flaring.

The overall noise impact on residential areas is expected to be minimal since the nearest residential areas are located approximately one-half mile west of the Refinery's noise-generating equipment (west of Alameda Street). The estimated noise level at the closest residential area is 57.8 dBA (Location 4), of which the Refinery is a minor contributor. The Refinery operations are not expected to change or increase the noise level at the closest residential areas. The noise levels within residential areas are expected to be within the allowable range established by the City's noise ordinance. In addition, the typical noise reduction provided by buildings is 12 to 18 decibels (with windows partially open) (State of California, 1987). Therefore, the estimated noise levels inside the homes are expected to comply with general noise ordinance guidelines.

The noise increases at the Terminals are limited since limited modifications are required. The maximum noise level of new equipment added to the Terminals is expected to be limited to 85 dBA at three feet in order to comply with OSHA and City noise standards. Given the 85 dBA criteria for new equipment, it is expected that the maximum noise level from new equipment would be about 85 dBA (at three feet). Assuming a six dBA noise attenuation, noise levels would drop off to 55 dBA or less at about 100 feet from the sources. Noise generated by project equipment, therefore, would not increase the overall noise levels in areas surrounding the Terminals. The closest receptor to new equipment at the terminals is about 160 feet. Therefore, no significant adverse noise impacts related to project operation are expected at the Equilon Terminals.

Traffic Noise

The proposed project will increase the number of truck trips to the Carson Plant by about 150 trucks per day. The trucks are expected to be evenly distributed throughout the day (about 6-7 per hour). The noise from the six additional truck trips per hour is expected to be less than significant as it will be a very small increase in the current total traffic noise in the area. The noise level associated with the additional trucks is expected to be about 80 dBA at 50 feet. The closest receptor to the truck noise is about 450 feet away. The estimated noise level at this receptor is estimated to be about 62 dBA. The noise levels from the trucks are expected to be within the existing CNELs for the area and within the allowable noise levels established by the City of Carson noise ordinance. Therefore, no significant adverse noise impacts related to additional truck traffic at the Carson Terminal is expected.

The noise impacts at other terminals associated with increased truck traffic are expected to be less than significant as the proposed project would result in less than one truck trip per hour. The

terminals are located in predominantly industrial/commercial areas so that no significant adverse noise impacts associated with truck traffic are expected.

The proposed project is expected to increase the number of railcars that are received at the Carson Terminal by about 30 railcars per day. The project is expected to result in one additional train per day to deliver the required ethanol to the Terminal. The increase in railroad traffic is not expected to create noticeable noise impacts due to the industrial nature of the Carson Terminal. No significant adverse noise impact due to railroad trips associated with the proposed project is expected.

The proposed project is expected to increase the number of marine vessel visits at the port by about six ships per year. The Mormon Island Marine Terminal is governed by the Port Master Plan. The Marine Terminal is located in heavy industrial areas with few sensitive receptors so that significant noise impacts would not be expected.

MITIGATION MEASURES

No significant adverse impacts on noise have been identified so that no mitigation measures are required.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

The proposed project impacts on noise are less than significant prior to mitigation.

E. SOLID/HAZARDOUS WASTE

SIGNIFICANCE CRITERIA

The proposed project impacts on solid/hazardous waste will be considered significant if the following occurs:

> The generation and disposal of hazardous and non-hazardous waste exceeds the capacity of designated landfills.

CONSTRUCTION IMPACTS

The demolition of existing structures during construction of the proposed project would result in the generation of solid waste. Much of this material would be salvaged or recycled. Material that cannot be salvaged would be taken to a landfill for disposal and contribute to the ongoing reduction of available landfill volumes. It is estimated that the demolition wastes would be less than 500 tons, disposed of over a 1.5-year period. This represents a small portion of the total solid waste received at the Puente Hills and Bradley West Class III landfills (a total of 16,769 tons per day). Therefore, no significant adverse impacts are expected to the existing landfill capacity due to the proposed project.

The preparation of the site and construction activities, including excavation and grading, and demolition of existing structures, has the potential to generate hazardous materials and wastes. The potential for discovery of soil contamination is discussed in Chapter 4, Section B – Geology and Soils. About 500 tons of demolition wastes are expected to be required for the proposed project. Assuming that about 10 percent of the material is contaminated, an estimated 50 tons of soil is expected to be contaminated. If hazardous materials were encountered during demolition or excavation activities, it would be treated on-site or disposed of off-site at an approved facility. Options available for off-site disposal include non-hazardous and hazardous landfills. If hydrocarbons are encountered during installation of piping or foundations, the contaminated soils would be returned to storage or to other process units for conversion into products.

Construction activities also will generate hazardous wastes, e.g., paint cans and cleaning agents. Paint cans and cleaning agents would be transported to a permitted hazardous waste facility or recycling facility.

The disposal of demolition waste and contaminated soils would contribute to the diminishing availability of landfill capacity. However, sufficient landfill capacity currently exists to handle these materials. Therefore the adverse construction impacts of the proposed project on solid/hazardous wastes are expected to be less than significant.

OPERATIONAL IMPACTS

Solid waste generated at the Refinery and Terminals is generally from administrative offices. The proposed project is not expected to result in an increase in administrative staff or solid waste; therefore, no significant adverse impacts are expected.

The proposed project is expected to increase the waste generated by the Refinery. Table 4-19 shows the expected increase in materials that will be used as part of the proposed project. The proposed project will primarily increase the spent catalyst from the Refinery, including sulfuric acid and catalysts from the C4 Isomerization and Hydrotreating units. These waste streams are regenerated (sulfuric acid) or recycled (metal-based catalysts) at approved off-site facilities. The proposed project is not expected to result in a substantial increase in hazardous waste disposal. Therefore, no adverse significant impacts on solid/hazardous waste are expected.

MITIGATION MEASURES

No mitigation measures are proposed during construction or operation since no significant impacts are expected.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

The proposed project impacts on solid/hazardous waste are less than significant.

TABLE 4-19

ESTIMATED WASTE STREAMS
GENERATED BY THE CARB PHASE 3 PROPOSED PROJECT

Catalyst or Chemical	Amount Used	Disposition/Fate
Sulfuric Acid	20 tons per day	Same as present – regenerated offsite
C4 Isomerization catalyst	350 ft^3 replaced every 4 years	Recycled for metals recovery
HTU2 Hydrotreating catalyst	2700 ft^3 replaced every 9 mos.	Recycled for metals recovery
CRU2 Sulfur Guard	430 ft^3 replaced every 2 years	Recycled for metals recovery
Sodium Hydroxide	1,500 gals/week	Regenerated offsite

F. TRANSPORTATION/TRAFFIC

SIGNIFICANCE CRITERIA

The impacts on transportation and traffic will be considered significant if any of the following criteria apply:

Peak period levels on major arterials within the vicinity of the proposed project site are disrupted to a point where intersections with a LOS of C or worse are reduced to the next lower LOS, as a result of the project for more than one month.

An intersection's volume to capacity ratio increases by 0.02 (two percent) or more when the LOS is already D, E or F for more than one month.

A major roadway is closed to all through traffic, and no alternate route is available.

There is an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system.

The demand for parking facilities is substantially increased.

Substantial alterations to current circulation or movement patterns of people and goods are induced.

Water borne, rail car or air traffic is substantially altered.

Traffic hazards to motor vehicles, bicyclists or pedestrians are substantially increased.

CONSTRUCTION IMPACTS

Detailed traffic analyses were completed for construction activities at the Equilon Refinery, Carson Terminal and Wilmington Terminal due to proximity of the construction activities to each other and the level of construction activities (projected number of workers and construction equipment). Construction and modification of the proposed project at the Refinery is expected to take about 1.5 years. During that time, the LOS analysis assumes 436 construction workers will be commuting to the site (Refinery and Wilmington Terminal), during peak construction activities. It is estimated that 16 construction trucks will travel to the site each day to transport the construction equipment, process equipment, and construction materials to the site. The traffic analysis for the Carson Terminal estimates that about 55 construction workers will be required plus about six trucks per day will be required for the proposed project. It is anticipated that project construction will include one shift per day for five days per week, Monday through Friday, with shifts running from 7:00 am to 5:30 p.m. The LOS for the construction traffic impacts did not include the a.m. peak hour because construction workers would be travelling prior to the a.m. peak hour (7:00 to 9:00 a.m.). Therefore, the construction traffic associated with the Refinery and Terminal modifications will avoid the peak hour traffic conditions minimizing the potential for traffic impacts during the morning. Construction traffic is expected to leave the sites during the evening peak hour.

Table 4-20 shows the predicted proposed project LOS analysis and volume to capacity ratios due to peak construction activities. This table indicates that two intersections show changes in the LOS due to the construction phase of the proposed project. The Alameda Street/Anaheim Street and the Santa Fe/Pacific Coast Highway intersections will change from LOS B to LOS C during the construction phase. The traffic changes at these two intersections are not considered to be significant since free-flowing traffic would continue and no significance criteria are exceeded. Therefore, the proposed project impacts on traffic during the construction phase would be considered less than significant.

Any transport of heavy construction equipment or oversized Refinery equipment that will require oversized transport vehicles on state highways will require a Caltrans Transportation permit.

Construction will require contractor parking areas, equipment laydown and materials stockpiling areas. Parking for project construction will be in areas currently used for contractor parking and sufficient parking is expected to be available so no significant impacts on parking are expected.

LOS analyses for the construction phase at the other Equilon terminals was not conducted due to the relatively minor nature of the construction activities. About six construction workers are expected at the Mormon Island Terminal and a maximum of 12 workers is expected during the construction phase at the other Terminals (Signal Hill, Van Nuys, Colton, and Rialto). The construction phase at each terminal is only expected to last about three to four months. The maximum number of workers (12) is only expected to be at the site for about one month. Construction workers are expected to begin work by 7 a.m. thus avoiding the morning peak traffic hour. The construction workers are expected to work until about 5:30 p.m. so that they would be leaving the site during the evening peak hour. The construction traffic is not expected to be significant in the vicinity of the terminals because of the: (1) relatively low volume of contruction

traffic that is required at the terminal; (2) the location of the terminals in generally industrial areas; and (3) the short term nature of the construction activities.

TABLE 4-20

EQUILON
CONSTRUCTION TRAFFIC IMPACTS
LEVEL OF SERVICE ANALYSIS AND VOLUME-TO-CAPACITY RATIOS

INTERSECTION	BASELINE (1)				IMPACTS			
	A.M LOS	Peak Hour V/C	P.M LOS	Peak Hour V/C	A.M LOS	Peak Hour V/C	P.M LOS	Peak Hour V/C
Alameda Street/I-405	A	0.362	A	0.385	n/a	n/a	A	0.392
Alameda Street/223rd Ramp	A	0.294	A	0.330	n/a	n/a	A	0.339
ICTF entry/I-405 Ramps/ Wardlow Road/223rd Street	A	0.497	A	0.554	n/a	n/a	A	0.554
Alameda Street/Sepulveda Boulevard	A	0.395	A	0.436	n/a	n/a	A	0.464
Alameda Street/Pacific Coast Highway	A	0.497	B	0.622	n/a	n/a	B	0.622
Alameda Street/Anaheim Street	B	0.623	B	0.697	n/a	n/a	C	0.711
Wilmington Avenue/223rd Street	E	0.924	E	0.997	n/a	n/a	E	0.997
Wilmington Avenue/Sepulveda Boulevard	A	0.563	B	0.601	n/a	n/a	B	0.601
Santa Fe Avenue/Pacific Coast Highway	B	0.648	B	0.700	n/a	n/a	C	0.706
Wilmington Avenue/Carson Street	B	0.668	B	0.681	n/a	n/a	B	0.690
Wilmington Avenue/ Dominguez Street	A	0.425	A	0.526	n/a	n/a	A	0.532
Wilmington Avenue/I-405 NB Ramp	B	0.601	B	0.620	n/a	n/a	B	0.624
Wilmington Avenue/I-405 SB Ramp	A	0.594	C	0.781	n/a	n/a	C	0.790

Notes: (1) = based on 2000 traffic data, projected to 2001assuming 1% per year growth.
V/C = Volume to capacity ratio (capacity utilization ratio)
LOS = Level of Service

The construction phase is not expected to result in an increase or decrease in marine or rail traffic so no significant impacts are expected.

OPERATIONAL IMPACTS

The proposed project is not expected to increase the permanent number of workers at the Refinery or Terminal. The number of trucks traveling to/from the Refinery/Wilmington Terminal is estimated to be about five to six per day. The proposed project is expected to result in an increase of two permanent workers and a maximum of about 150 trucks per day at the Carson Terminal. Table 4-21 shows the projected LOS analysis and volume to capacity ratios due to operation phase impacts. These ratios were calculated assuming an ambient traffic growth of one percent per year, plus operational phase related traffic.

Table 4-21 indicates that the LOS analysis for the morning peak hour will not change at any intersection. No significant traffic impacts are expected during the morning peak hour.

The LOS analysis for the evening peak hours shows a change at two intersections. A change from LOS B to LOS C at the Wilmington Avenue/Carson Street intersection is projected. The second change in LOS is expected to occur at the Wilmington Avenue/I-405 SB Ramp from C to D. The contribution of the proposed project to the Wilmington Avenue/I-405 SB Ramp would be less than one percent. This intersection is impacted by traffic from other refineries and industrial facilities located closer to the intersection. The proposed project impacts on traffic during the operational phase would be considered significant at the Wilmington Avenue/I-405 SB Ramp.

The project has the potential to increase traffic delays on Del Amo Boulevard if significant numbers of railcars are delivered to the terminal at one time. The Carson Terminal currently receives about five to eight rail cars per day. The Carson Terminal currently has an agreement with the local residents to avoid rail traffic between 10 pm and 6 am to avoid noise impacts. Further, the Carson Terminal currently requests that the railroad company deliver materials during non peak traffic hours.

As part of the proposed project, Equilon will continue to require delivery of railcars between 7 pm and 10 pm so that peak traffic conditions are avoided. Further, Equilon expects that about 15-20 railcars would arrive at one time minimizing the time delay at Del Amo Boulevard.

LOS analyses for the operational phase at the other Equilon terminals (Signal Hill, Van Nuys, Rialto, and Colton) was not conducted due to the small increase in traffic that would be generated by the proposed project. No increase in workers at these terminals is expected. The truck traffic increases at these terminals are estimated as follows: eight trucks per day at Van Nuys, three trucks per day at Rialto, five trucks per day at Colton, and 18 trucks per day at Signal Hill. The truck trips are expected to be spread throughout the day so that only one truck per hour would be expected at the terminals. Therefore, no significant impacts on traffic is expected at the terminals due to the minor level of traffic that will be generated at each terminal.

The proposed project will increase the rail traffic to/from the Refinery associated with the delivery of ethanol to the Refinery. The proposed project is expected to require a maximum of about 35-40

railroad tank cars per day. It is expected that the additional railcars will be delivered on one to two trips so the number of railroad trips is not expected to be significant.

TABLE 4-21

EQUILON
OPERATIONAL TRAFFIC IMPACTS
LEVEL OF SERVICE ANALYSIS AND VOLUME-TO-CAPACITY RATIOS

INTERSECTION	BASELINE (1)				IMPACTS			
	A.M LOS	Peak Hour V/C	P.M LOS	Peak Hour V/C	A.M LOS	Peak Hour V/C	P.M LOS	Peak Hour V/C
Alameda Street/I-405	A	0.372	A	0.392	A	0.372	A	0.392
Alameda Street/223rd Ramp	A	0.301	A	0.336	A	0.301	A	0.336
ICTF entry/I-405 Ramps/ Wardlow Road/223rd Street	A	0.510	A	0.564	A	0.510	A	0.564
Alameda Street/Sepulveda Boulevard	A	0.405	A	0.444	A	0.405	A	0.444
Alameda Street/Pacific Coast Highway	A	0.511	B	0.634	A	0.511	B	0.634
Alameda Street/Anaheim Street	B	0.640	C	0.710	B	0.640	C	0.710
Wilmington Avenue/223rd Street	E	0.950	F	1.016	E	0.950	F	1.016
Wilmington Avenue/ Sepulveda Boulevard	A	0.579	B	0.612	A	0.579	B	0.612
Santa Fe Avenue/Pacific Coast Highway	B	0.666	C	0.712	B	0.666	C	0.712
Wilmington Avenue/Carson Street	B	0.686	B	0.693	B	0.687	C	0.702
Wilmington Avenue/ Dominguez Street	A	0.436	A	0.535	A	0.449	A	0.542
Wilmington Avenue/I-405 NB Ramp	B	0.618	B	0.631	B	0.624	B	0.635
Wilmington Avenue/I-405 SB Ramp	B	0.610	C	0.795	B	0.610	D	0.804

Notes: (1) = based on 2000 traffic data, projected to 2003 assuming 1% growth per year.
V/C = Volume to capacity ratio (capacity utilization ratio)
LOS = Level of Service

The proposed project is expected to increase the number of tanker calls to the Port by about six tankers per year. This will result in a small incremental increase in ship calls to the San Pedro Ports which are estimated to be about 7,000 vessel arrivals per year (ACE, 1990). Therefore, no significant impact to the Long Beach/Los Angeles Harbor system is expected. Commodities

received at the port will be transported to the Refinery via pipeline so no other traffic impacts are expected due to material delivery.

MITIGATION MEASURES

Significant traffic impacts were identified at the Wilmington Avenue/I-405 SB Ramp. The following mitigation measure is required:

F-1 Truck traffic from the Carson Terminal shall be schedule to avoid the Wilmington Avenue/I-405 SB Ramp during the evening peak hour (4 pm to 5 pm).

The scheduling of truck deliveries throughout the off-peak hours will minimize the proposed project impacts on traffic. It should be noted that the proposed project is a small contributor (less than one percent) to traffic at this intersection.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

The proposed mitigation measure is expected to reduce traffic at the Wilmington Avenue/I-405 SB Ramp during peak hours so that the project impacts on transportation/traffic would be considered less than significant following mitigation.

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