SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

FINAL ENVIRONMENTAL IMPACT REPORT

APPENDICES B THROUGH F

MOBIL CALIFORNIA AIR RESOURCES BOARD (CARB)
PHASE 3 – REFORMULATED GASOLINE PROJECT

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APPENDIX B

AIR QUALITY ANALYSIS METHODOLOGIES

This appendix provides the methodologies that were used to analyze potential air quality impacts associated with the Mobil CARB Phase 3 Clean Fuels Project. This appendix begins with a discussion of the methodologies used to estimate construction and operational emissions, followed by emissions summaries. The appendix continues with discussions of mitigation measures and emissions remaining after mitigation. The health risk assessment and evaluations prepared for the refinery and the terminals are then presented. It concludes with a discussion of emissions from the project alternatives. Spreadsheets that provide details of the emissions calculations are attached as well as detailed inputs and outputs from the health risk assessment and the CO "Hot Spots" analysis.

B.1 CONSTRUCTION EMISSIONS

Construction emissions can be distinguished as either onsite or offsite. Onsite emissions generated during construction principally consist of exhaust emissions (CO, VOC, NO_X, SO_X, and PM_{10}) from construction equipment, fugitive dust (PM_{10}) from grading and excavation, and VOC from painting. Offsite emissions during the construction phase normally consist of exhaust emissions and entrained paved road dust from worker commute trips and material delivery trips.

Chapter 2 describes the modifications and new equipment that will require construction at the refinery and at each of the terminals (see Tables 2.4-1 and 2.4-2). To estimate the peak daily emissions associated with the construction activities, estimates were made of the duration, number and types of construction equipment to be used, peak daily operating hours for each piece of construction equipment, and onsite motor vehicle usage. These estimates were made for each of the following construction elements at the Torrance Refinery:

1. C4/C5 Splitter, Demolition
2. C4/C5 Splitter, Earthwork
3. C4/C5 Splitter, Concrete and Steel
4. C4/C5 Splitter, Equipment Vessels and Exchangers
5. C4/C5 Splitter, Piping
6. C4/C5 Splitter, Electrical
7. C4/C5 Splitter, Painting
8. Ethanol Unloading and Storage, Track Fill Earthwork
9. Ethanol Unloading and Storage, Track Lay

10. Ethanol Unloading and Storage, Concrete and Steel
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28. Merox, Electrical
29. Merox, Painting
30. Interconnecting Pipeway, Demolition
31. Interconnecting Pipeway, Earthwork
32. Interconnecting Pipeway, Concrete and Steel
33. Interconnecting Pipeway, Piping
34. Interconnecting Pipeway, Electrical
35. Rerun Tower Sidestripper, Demolition
36. Rerun Tower Sidestripper, Earthwork
37. Rerun Tower Sidestripper, Concrete and Steel

38. Rerun Tower Sidestripper, Equipment Vessels and Exchangers

39. Rerun Tower Sidestripper, Piping

40. Rerun Tower Sidestripper, Electrical

41. Rerun Tower Sidestripper, Painting

Similar estimates were also made for construction activities at each terminal, but the estimates were not broken out by construction element. Estimates were also made of peak daily offsite motor vehicle trips and trip lengths during refinery construction and construction at each of the terminals. All of these estimates are listed in the construction emission calculation spreadsheets in Attachment B.1 to this Appendix.

Construction of the proposed project at the refinery is scheduled to begin in September 2001 and be completed in December 2003. Construction activities at the refinery will occur during one 8-hour shift per day, Monday through Friday, from 7:15 a.m. to 3:45 p.m.

The construction activities at the terminals are scheduled to begin in December 2001**,** and are expected to last for eight to 10 months at each site. Construction activities will occur during one 8-hour shift per day, Monday through Friday, from 7:15 a.m. to 3:45 p.m.

B.1.1 Exhaust Emissions from Construction Equipment.

The combustion of fuel to provide power for the operation of various construction activities and equipment results in the generation of NO_X, SO_X, CO, VOC, and PM_{10} emissions. The following predictive emission equation was used to estimate exhaust emissions from each construction activity:

Exhaust Emissions (lb/day) = EF x BHP x LF x T_H x N (EQ. B.1-1)

where:

EF = Emission factor for specific air contaminant (lb/bhp-hr)

BHP = Equipment bhp

LF = Equipment load factor

T_H = Equipment operating hours/day

N = Number of pieces of equipment

Table B.1-1 provides the emission factors and horsepower used to estimate peak daily exhaust emissions from construction equipment. Equipment horsepower ratings are based on contractor experience. Similarly, contractor experience was used to estimate equipment load factors during each construction phase at the refinery, while load factors used for construction equipment at the terminals were taken from the South Coast Air Quality Management District (SCAQMD) CEQA Air Quality Handbook (SCAQMD, 1993). The emission factors were also taken from the SCAQMD CEQA Handbook. These emission factors were applied to the construction equipment operating data to calculate peak daily construction equipment exhaust emissions during construction for each process unit at the refinery and at each terminal.

Table B.1-1
Construction Equipment Horsepower, and Emission Factors

Equipment	Horse-power	Emission Factors				
		CO (lb/bhp-hr)	VOC (lb/bhp-hr)	NO_X (lb/bhp-hr)	SO_X (lb/bhp-hr)	PM_{10} (lb/bhp-hr)
100 Ton Truck Crane/Diesel	300	0.009	0.003	0.023	0.002	0.0015
175 Ton Truck Crane/Diesel	250	0.009	0.003	0.023	0.002	0.0015
2 Ton Truck Crane/Gasoline	225	0.57	0.025	0.011	0.0005	0.00005
20 Ton Grove Hydraulic Crane/Diesel	200	0.009	0.003	0.023	0.002	0.0015
225 Ton Crawler Crane/Diesel	500	0.009	0.003	0.023	0.002	0.0015
25-35 Ton Crane/Diesel	275	0.009	0.003	0.023	0.002	0.0015

Table B.1-1 (Concluded)
Construction Equipment Horsepower, and Emission Factors

Equipment	Horse-Power	Emission Factors				
		CO (lb/bhp-hr)	VOC (lb/bhp-hr)	NO_X (lb/bhp-hr)	SO_X (lb/bhp-hr)	PM_{10} (lb/bhp-hr)
30 Ton Hydraulic Crane - Self Prop/Diesel	250	0.009	0.003	0.023	0.002	0.0015
6 CY Front End Loader - Wheel Type/Diesel	300	0.011	0.002	0.023	0.002	0.0015
75 Ton Truck Crane/Diesel	300	0.009	0.003	0.023	0.002	0.0015
75-100 Ton Crane/Diesel	375	0.009	0.003	0.023	0.002	0.0015
Air Compressor/Diesel	150	0.011	0.002	0.018	0.002	0.001
Air Compressor/Gasoline	90	1.479	0.054	0.002	0.0006	0.00025
Compactor/Gasoline	95	0.83	0.043	0.004	0.0005	0.00025
Concrete Pump/Diesel	120	0.02	0.003	0.024	0.002	0.0015
Concrete Saw/Diesel	30	0.02	0.002	0.024	0.002	0.001
Crawler Mounted Hydraulic Shear/Diesel	275	0.011	0.002	0.023	0.002	0.001
Dual Self Propelled Vib Drum Roller/Diesel	200	0.007	0.002	0.02	0.002	0.001
Excavator/Diesel	275	0.011	0.001	0.024	0.002	0.0015
Loader w/Backhoe/Diesel	250	0.015	0.003	0.022	0.002	0.0015
Loader w/Backhoe Auger Attach/Diesel	200	0.015	0.003	0.022	0.002	0.0015
Motor Grader/Diesel	300	0.008	0.003	0.021	0.002	0.001

Rig Welder/Diesel	120	0.011	0.002	0.018	0.002	0.001
Self Propelled Plate Compactor/Diesel	6	0.007	0.002	0.02	0.002	0.001
Self Propelled Plate Compactor/Gasoline	95	0.83	0.043	0.004	0.0005	0.00025
Six Pack Welder/Diesel	300	0.011	0.002	0.018	0.002	0.001
Tractor Loader/Diesel	100	0.015	0.003	0.022	0.002	0.0015
Vacuum Truck/Diesel	400	0.02	0.003	0.024	0.002	0.0015
Welding Machine/Gasoline	60	1.479	0.054	0.002	0.0006	0.00025

B.1.2 Fugitive Dust (PM_{10}) Emissions

Fugitive dust emissions are generated during the construction phase from the following operations:

- Material handling (i.e., dropping soil onto the ground or into trucks during excavation)
- Grading
- Storage pile wind erosion
- Vehicle travel on unpaved surfaces
- Vehicle travel on paved roads

Although fugitive dust emissions from construction activities are temporary, they may have an impact on local air quality. Fugitive dust emissions often vary substantially from day to day, depending on the level of activity, the specific operations, and the prevailing meteorological conditions. The following methodologies provide the predictive emission equations, emission factors, and default values used to calculate fugitive dust emissions for the project.

The following equations were used to calculate uncontrolled fugitive dust PM_{10} emissions. Construction contractors will comply with SCAQMD Rule 403 – Fugitive Dust, by watering the site two times per day, reducing the uncontrolled onsite fugitive dust emissions by 50 percent.

<u>Emissions from Material Handling</u>

Fugitive PM_{10} emissions are generated during excavation when excavated material is dropped onto the ground at the side of the excavation location or dropped into trucks for removal from the site. The following equation was used to estimate these emissions:

$$\text{Emissions (lb/day)} = 0.0011 \times (U/5)^{1.3} / (M/2)^{1.4} \times V \times D \times N_D \qquad \text{(EQ. B.1-2)}$$

where:

U = Mean wind speed (mph)
M = Soil moisture content (percent)
V = Volume of soil handled (yd^3/day)

D = Soil density (tons/yd^3)
N_D = Number of times soil is dropped

Source: Equation 1, Section 13.2.4, US EPA Compilation of Air Pollutant Emission Factors (AP-42), January 1995.

Values that were used for the variables in this equation are listed in Table B.1-2.

Table B.1-2
Parameters Used to Calculate Fugitive Dust PM_{10} Emissions from Material Handling

Parameter	Value	Basis
Mean wind speed	12 mph	SCAQMD 1993 CEQA Air Quality Handbook, Default
Soil moisture content	5.9 percent	"Open Fugitive Dust PM10 Control Strategies Study," Midwest Research Institute, October 12, 1990.
Volume of soil handled	C4/C5 Splitter Earthwork: 74 yd^3/day Ethanol Unloading and Storage Earthwork: 584 yd^3/day Pentane Storage Earthwork: 422 yd^3/day Merox Earthwork: 104 yd^3/day Atwood Terminal Construction: 350 yd^3/day Southwestern Terminal Construction: 240 yd^3/day Torrance Terminal Construction: 220 yd^3/day Vernon Terminal Construction: 400 yd^3/day	Excavation areas and depths and anticipated excavation schedule
Soil density	1.215 ton/yd^3	Table 2.46, Handbook of Solid Waste Management
Number of soil drops	2	Once onto ground and once into haul truck

<u>Emissions from Grading</u>

Fine grading by graders prior to pouring foundations will also generate fugitive PM_{10} emissions. These emissions were estimated using the following equation:

$$\text{Emissions (lb/day)} = 0.0306 \times S^{2.0} \times VMT \times N \qquad \text{(EQ. B.1-4)}$$

where:

S = Grader speed (mph)

VMT = Vehicle distance traveled (miles/vehicle-day)

N = Number of graders

Source: Table 11.9-1, US EPA Compilation of Air Pollutant Emission Factors (AP-42), July 1998.

Values of the variables used in this equation to calculate fugitive dust PM_{10} emissions are listed in Table B.1-3.

Table B.1-3
Parameters Used to Calculate Fugitive Dust PM_{10} Emissions from Grading

Parameter	Value	Basis

Grader speed	5 mph	Assumption
VMT	5 mph x peak daily hours of operation	Assumed average vehicle speed
Hours of operation	Ethanol Unloading and Storage Earthwork: 6 hrs/day Pentane Storage Earthwork: 6 hrs/day	Anticipated construction schedule
Number of pieces of equipment	Ethanol Unloading and Storage Earthwork: 1 Pentane Storage Earthwork: 1	Anticipated construction equipment requirements

Emissions from Storage Pile Wind Erosion:

Wind erosion of temporary soil storage piles during excavation generates fugitive PM_{10} emissions. The following equation was used to estimate these emissions:

Emissions (lb/day) = 0.85 x (s/1.5) x (365-p/235) x (U_{12}/15) x A (EQ. B.1-5)

where:

s = Soil silt content (percent)

p = Number of days per year with precipitation of 0.01 inches or more

U_{12} = Percentage of time unobstructed wind speed exceeds 12 miles/hour

A = Storage pile area (acres)

Source: US EPA Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, 1992

Table B.1-4 lists the values used in this equation to estimate emissions.

Table B.1-4
Parameters Used to Calculate Fugitive Dust PM_{10} Emissions from Storage Pile Wind Erosion

Parameter	Value	Basis
Soil silt content	7.5 percent	SCAQMD 1993 CEQA Air Quality Handbook, Overburden
Number of days per year with precipitation of 0.01 inches or more	0	Conservative assumption based on construction not occurring during rain
Percentage of time unobstructed wind speed exceeds 12 miles per hour	100 percent	Conservative estimate
Storage pile area	C4/C5 Splitter Earthwork: 0.008 acres/day Ethanol Unloading and Storage Earthwork: 0.054 acres/day Pentane Storage Earthwork: 0.044 acres/day Merox Earthwork: 0.011 acres/day Atwood Terminal Construction: 0.034 acres/day Southwestern Terminal Construction: 0.003 acres/day Torrance Loading Rack Construction: 0.003 acres/day Vernon Terminal Construction: 0.149 acres/day	Excavation areas and anticipated excavation schedule

<u>Emissions from Vehicle Travel on Unpaved Surfaces</u>

Travel on unpaved surfaces by onsite watering trucks will generate fugitive PM_{10} emissions. These emissions were estimated using the following equation:

Emissions (lb/day) = $2.6 \times (S/15) \times (s/12)^{0.8} \times (W/3)^{0.4} / (M/0.2)^{0.3} \times VMT \times N$ (EQ. B.1-6)

where:

S = Motor vehicle speed (miles/hour) (set to 15 mph for speeds above 15 mph)

s = Soil silt content (percent)

W = Vehicle weight (tons)

M = Soil moisture (percent)

VMT = Vehicle distance traveled (miles/vehicle-day)

N = Number of vehicles

Source: Equation 1, Section 13.2.3, U.S. EPA Compilation of Air Pollutant Emission Factors (AP-42), September 1998.

Note that emissions from grader travel on unpaved surfaces are included in the bulldozing and grading emissions equations above.

Table B.1-5 lists the values used in this equation to estimate emissions.

Table B.1-5
Parameters Used to Calculate Fugitive Dust PM_{10} Emissions from Vehicle Travel on Unpaved Surfaces

Parameter	Value	Basis
Vehicle speed	5 mph	Assumption
Soil silt content	7.5 percent	SCAQMD 1993 CEQA Air Quality Handbook, Overburden
Vehicle weight	40 tons	Assumption
Soil moisture content	5.9 percent	"Open Fugitive Dust PM10 Control Strategies Study," Midwest Research Institute, October 12, 1990.
VMT	5 mph x peak daily hours of operation	Assumed average vehicle speed
Hours of operation	Ethanol Unloading and Storage Earthwork: 6 hrs/day Pentane Storage Earthwork: 6 hrs/day	Anticipated construction schedule
Number of pieces of equipment	Ethanol Unloading and Storage Earthwork: 1 Pentane Storage Earthwork: 1	Anticipated construction equipment requirements

<u>Emissions from Paved Road Dust Entrainment:</u>

Vehicles travelling on paved roads entrain dust that has deposited on the roads, which produces PM_{10} emissions. These emissions were estimated using the following equation:

Emissions (lb/day) = $7.26\ (sL/2)^{0.65} \times (WF/3)^{1.5} \times VMT$ (EQ. B.1-8)

where:

sL = Road surface silt loading (g/m^2)

WF = mileage-weighted average of vehicles on the roadway (tons)

VMT = vehicle-miles-traveled

Source: California Air Resources Board Emission Inventory Methodology 7.9, Entrained Paved Road Dust (1997)

Table B.1-6 lists the values used in this equation to estimate entrained paved road dust PM_{10} emissions. Although the vehicle weight used in the calculation should be the mileage-weighted average of all vehicles on the road, weights for the various types of vehicles, estimated from the weight-ranges for the vehicle classes in which they belong, have been conservatively used. The silt loading values are the default values assigned to the various road types in the California Air Resources Board Emission Inventory Methodology 7.9, Entrained Paved Road Dust (1997). The number of vehicles of each type and the mileage for each vehicle per day are listed in the spreadsheets in Attachment B.1.

Table B.1-6
Parameters Used to Calculate Entrained Paved Road Dust PM_{10} Emissions

Vehicle Type	Vehicle Weight (tons)	Road Type	Silt Loading (g/m^2)
Onsite 10 CY Dump Truck	20	Local	0.320
Onsite 20 CY Dual Truck and Trailer	40	Local	0.320
Onsite 3 Ton Flat Bed Truck	5	Local	0.320
Onsite Truck w/Low Boy Trailer	20	Local	0.320
Onsite Pickup Truck	3	Local	0.320
Offsite construction commuter	3	Collector	0.037
Offsite heavy-duty delivery vehicle	40	Collector	0.037
Offsite Demolition Waste Haul Truck	40	Freeway	0.020
Offsite Hazardous Waste Haul Truck	40	Freeway	0.020
Offsite Dump Truck	40	Freeway	0.020
Offsite Concrete Truck	40	Collector	0.037
Offsite Electrician Truck	3	Collector	0.037

B.1.3 Architectural Coating (Painting) Emissions

Architectural coating generates VOC emissions from the evaporation of solvents contained in the surface coatings applied to buildings. The following equation was used to estimate VOC emissions from architectural coatings:

Emissions (lb/day) = C x V (EQ. B.1-10)

where:

C = VOC content of coating (lb/gal)

V = Amount of coating applied (gal/day)

A VOC content of 2.1 lb/gal (250 g/l) was assumed, based on the VOC limit specified in SCAQMD Rule 1113 for an industrial maintenance coating in use after July 1, 2002. The maximum daily volume of coating anticipated to be applied at the refinery and at each of the three distribution terminals was estimated based on the total surface area to be painted, the anticipated coverage per gallon of coating, and the schedule for painting. These anticipated peak daily usages are listed in Table B.1-7.

Table B.1-7
Estimated Peak Daily Paint Usage During Construction

Location	Peak Daily Paint Usage (gal)
C4/C5 Splitter	27
Ethanol Storage and Unloading	27
Pentane Storage	80
Merox	27
Rerun Sidestripper	27
Atwood Terminal	100
Southwestern Terminal	50
Torrance Loading Rack	50
Vernon Terminal	120

B.1.4 Motor Vehicle Emissions During Construction

The following equations were used to calculate emissions from motor vehicles:

<u>CO and NO_X</u>

Emissions (lb/vehicle-day) = $[(EF_{Run} \times VMT) + (EF_{Start} \times Start)] / 453.6$ (EQ. B.1-11)

where:

EF_{Run} = Running exhaust emission factor (g/mi)

EF_{Start} = Start-up emission factor (g/start)

VMT = Distance traveled (mi/vehicle-day)

Start = Number of starts/vehicle-day

<u>VOC</u>

Emissions (lb/vehicle-day) = $[(EF_{Run} \times VMT) + (EF_{Start} \times Start) + (EF_{Soak} \times Trip)$
$+ (EF_{Rest} \times Rest) + EF_{Runevap} \times VMT) + (EF_{Diurnal} \times Diurnal)] / 453.6$

(EQ. B.1-12)

where:

EF_{Soak} = Hot-soak emission factor (g/trip)

Trip = One-way trips/vehicle-day

EF_{Rest} = Resting loss evaporative emission factor (g/hr)

Rest = Resting time with constant or decreasing ambient temperature (hours/vehicle-day)

$EF_{Runevap}$ = Running evaporative emission factor (g/mi)

$EF_{Diurnal}$ = Diurnal evaporative emission factor (g/hr)

Diurnal = Time with increasing ambient temperature (hours/vehicle-day)

$\underline{PM_{10}}$

Emissions (lb/vehicle-day) = $[(EF_{Run} + EF_{Tire} + EF_{Brake}) \times VMT + EF_{Start} \times Start)] / 453.6$(EQ. B.1-13)

where:

EFTire = Tire wear emission factor (g/mi)

EFBrake = Break wear emission factor (g/mi)

The motor vehicle emission factors generally depend on the vehicle class, and the running exhaust emission factors depend on vehicle speed. Table B.1-8 lists the vehicle class for each type of vehicle and the assumed vehicle speed.

Table B.1-8
Motor Vehicle Classes and Speeds During Construction

Vehicle Type	Vehicle Class	Speed (mph)
Onsite 10 CY Dump Truck	Heavy heavy-duty truck, diesel	15
Onsite 20 CY Dual Truck and Trailer	Heavy heavy-duty truck, diesel	15
Onsite 3 Ton Flat Bed Truck	Medium-duty truck, cat	15
Onsite Truck w/Low Boy Trailer	Heavy heavy-duty truck, diesel	15
Onsite Pickup Truck	Light duty truck, cat	15
Offsite construction commuter	Light duty truck, cat	35
Offsite heavy-duty delivery vehicle	Heavy heavy-duty truck, diesel	25
Offsite Demolition Waste Haul Truck	Heavy heavy-duty truck, diesel	55
Offsite Hazardous Waste Haul Truck	Heavy heavy-duty truck, diesel	55
Offsite Dump Truck	Heavy heavy-duty truck, diesel	55
Offsite Concrete Truck	Heavy heavy-duty truck, diesel	25
Offsite Electrician Truck	Light duty truck, cat	35

Tables B.1-9 through B.1-11 list the emission factors. Note, start-up and evaporative emission factors are currently only available for gasoline-fueled vehicles and are not available for diesel-fueled vehicles.

Table B.1-9
Motor Vehicle CO and NO_X Emission Factors During Construction

	CO		NO_X	
Vehicle Type	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]
On-Site 10 CY Dump Truck	8.13	N/A	20.94	N/A
On-Site 20 CY Dual Truck and Trailer	8.13	N/A	20.94	N/A
On-Site 2,500 Gallon Water Truck	2.37	N/A	2.56	N/A
On-Site 3 Ton Flat Bed Truck	15.33	33.94	1.85	1.46
On-Site Truck w/Low Boy Trailer	8.13	N/A	20.94	N/A
On-Site Pickup Truck	20.31	35.49	1.67	1.09
Offsite construction commuter	13.02	35.49	1.24	1.09
Offsite heavy-duty delivery vehicle	4.85	N/A	17.21	N/A
Offsite Demolition Waste Haul Truck	3.08	N/A	22.41	N/A
Offsite Hazardous Waste Haul Truck	3.08	N/A	22.41	N/A
Offsite Dump Truck	3.08	N/A	22.41	N/A
Offsite Concrete Truck	4.85	N/A	17.21	N/A
Offsite Electrician Truck	13.02	35.49	1.24	1.09

[a] Assumed to be after 720 minutes with engine off.
Source: ARB EMFAC2000 motor vehicle emission factor model, Version 2.02, for calendar year 2001, summertime.

Table B.1-10
Motor Vehicle VOC Emission Factors During Construction

Vehicle Type	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Hot Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)
Onsite 10 CY Dump Truck	1.67	N/A	N/A	N/A	N/A	N/A
Onsite 20 CY Dual Truck and Trailer	1.67	N/A	N/A	N/A	N/A	N/A
On-Site 2,500 Gallon Water Truck	1.38	N/A	N/A	N/A	N/A	N/A
Onsite 3 Ton Flat Bed Truck	0.98	3.42	0.33	0.13	2.41	0.33
Onsite Truck w/Low Boy Trailer	1.67	N/A	N/A	N/A	N/A	N/A
Onsite Pickup Truck	0.97	2.93	0.46	0.17	3.09	0.45
Offsite construction commuter	0.40	2.93	0.46	0.17	1.32	0.45
Offsite heavy-duty delivery vehicle	1.15	N/A	N/A	N/A	N/A	N/A
Offsite Demolition Waste Haul Truck	0.64	N/A	N/A	N/A	N/A	N/A
Offsite Hazardous Waste Haul Truck	0.64	N/A	N/A	N/A	N/A	N/A
Offsite Dump Truck	0.64	N/A	N/A	N/A	N/A	N/A
Offsite Concrete Truck	1.15	N/A	N/A	N/A	N/A	N/A
Offsite Electrician Truck	0.40	2.93	0.46	0.17	1.32	0.45

[a] Assumed to be after 720 minutes with engine off.
Source: ARB EMFAC2000 motor vehicle emission factor model, Version 2.02, for calendar year 2001, summertime.

Table B.1-11
Motor Vehicle PM_{10} Emission Factors During Construction

Vehicle Type	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)
On-Site 10 CY Dump Truck	0.96	N/A	0.04	0.01
On-Site 20 CY Dual Truck and Trailer	0.96	N/A	0.04	0.01
On-Site 2,500 Gallon Water Truck	0.27	N/A	0.01	0.01
On-Site 3 Ton Flat Bed Truck	0.04	0.03	0.02	0.03
On-Site Truck w/Low Boy Trailer	0.96	N/A	0.04	0.01
On-Site Pickup Truck	0.03	0.02	0.01	0.01
Off-site construction commuter	0.01	0.02	0.01	0.01
Off-site heavy-duty delivery vehicle	0.66	0.00	0.04	0.01
Off-Site Demolition Waste Haul Truck	0.37	N/A	0.04	0.01
Off-Site Hazardous Waste Haul Truck	0.37	N/A	0.04	0.01
Off-Site Dump Truck	0.37	N/A	0.04	0.01
Off-Site Concrete Truck	0.66	N/A	0.04	0.01
Off-Site Electrician Truck	0.01	0.02	0.01	0.01

[a] Assumed to be after 720 minutes with engine off.
Source: ARB EMFAC2000 motor vehicle emission factor model, Version 2.02, for calendar year 2001, summertime.

To calculate start-up emissions it was assumed that each gasoline-fueled vehicle (i.e., onsite pickup truck, offsite pickup truck and worker commuter vehicle) would be started twice each day, once at the beginning of the day and once at the end of the day. Start-up emissions are not applicable to diesel-fueled vehicles. Additionally, to calculate VOC resting loss and diurnal evaporative emissions, it was assumed that each vehicle would experience 12 hours of constant or decreasing ambient temperature (for resting losses) and 12 hours of increasing ambient temperature (for diurnal emissions).

B.2 OPERATIONAL EMISSIONS

The sources of potential emissions resulting from new equipment and modifications to existing units proposed for the project are discussed below.

Torrance Refinery

At the refinery, the following equipment changes result in sources of emissions from fugitive components:

- Butane/Pentane (C4/C5) Splitter
- C5/LSR Storage
- Rail Loading and Unloading Facilities
- Fuel Ethanol Storage and Railcar Unloading Facilities
- Unsaturated Gas Plant Sidestripper
- Light Ends Component Segregation
- Merox Unit

In addition to these new and modified units, a new 40,000-bbl internal floating roof tank will be constructed for fuel ethanol storage and two new 10,000-bbl spheres will be constructed for pentane storage. Two 20,000-bbl tanks, which are currently out-of-service, will be converted to internal floating roof tanks for fuel ethanol storage. A new vapor combustor will also be installed to handle the additional vapors from ethanol tanker truck loading.

Southwestern Terminal

Fuel ethanol will be brought to SWT by marine tanker and unloaded into six existing domed external floating roof storage tanks (four 80,000-bbl tanks that currently store gasoline and two 40,000-bbl tanks that currently store MTBE).

New truck loading facilities will be constructed and used to transfer the fuel ethanol from the storage tanks to tanker trucks for shipment to the Vernon and Atwood distribution terminals, as well as the Torrance Loading Rack. Modifications associated with fuel ethanol unloading and blending will result in fugitive emissions from various components.

The change in service of a tank to fuel ethanol is anticipated to lead to a reduction in emissions, because of differences in the vapor pressures between fuel ethanol and the materials currently stored. This potential reduction has been estimated, but is not included in the evaluation of the project's significance, since the current maximum potential to emit permit condition will not be changed. This means that the terminal will not be required to limit emissions to the new lower levels, but could theoretically continue to emit up to the maximum potential to emit. Therefore, no credit for reduction emissions due to the lower vapor pressure of CARB Phase 3 reformulated gasoline will be allowed for the proposed project.

A new vapor combustor will be installed to handle the additional ethanol vapors from tanker truck loading.

Vernon Terminal

Fuel ethanol will be brought to the Vernon Terminal by railcar and tanker truck, and unloaded into two existing floating roof tanks (Tank 3 - 20,000 bbl and Tank 4 - 60,000 bbl). To replace the lost gasoline storage capacity from the two converted tanks, a new 50,000-bbl cone roof tank (internal floating roof) will be constructed. A new tanker truck unloading rack and a new railcar unloading rack will be installed. A second four-position truck loading rack will be modified to blend fuel ethanol as the tanker trucks are being loaded.

The change in service of a tank to fuel ethanol is anticipated to lead to a reduction in emissions because of differences in the vapor pressures between ethanol and the materials currently stored. This potential reduction has been estimated, but is not included in the evaluation of the project's significance since the current maximum potential to emit permit condition will not be changed. This means that the terminal will not be required to limit emissions to the new lower levels, but could theoretically continue to emit up to the maximum potential to emit. Therefore, no credit for reduction emissions due to the lower vapor pressure of CARB Phase 3 reformulated gasoline will be allowed for the proposed project. .

Modifications associated with fuel ethanol unloading and blending will result in fugitive emissions from various components.

Atwood Terminal

Fuel ethanol will be brought to the Atwood Terminal by tanker truck from the SWT or the Vernon Terminal and unloaded into a new 15,000-bbl cone roof tank. A new two-lane tanker truck unloading rack will be constructed and the existing tank truck loading rack will be modified to allow fuel ethanol blending.

Modifications associated with ethanol unloading and blending will result in fugitive emissions from various components.

Torrance Loading Rack

Fuel ethanol will be brought to the Torrance facilities by railcar and tanker truck. The rail delivery unloading and fuel ethanol storage facilities are addressed as part of the discussion of air quality impacts at the Torrance Refinery. A new truck unloading rack will be constructed at the Torrance Loading Rack, which will allow two trucks to unload simultaneously. A new fuel ethanol truck loading lane and canopy will also be added.

Modifications associated with ethanol unloading and blending will result in fugitive emissions from various components.

The following methodologies were used to estimate emissions from these sources. Details of the operational emission calculations for criteria and toxic pollutants are contained in Attachment B.2.

Emissions from Process Components

The following equation was used to calculate fugitive VOC emissions from process components:

Emissions (lb/day) = (EF / 365) x N (EQ. B.2-1)

where:

EF = VOC emission factor for type of component and type of service (lb/year-component)

N = Number of components

The emission factors that were used are listed in Table B.2-1.

Table B.2-1
Fugitive VOC Emission Factors for Process Components

Type of Component – Service	VOC Emission Factor (lb/year-component)
Refinery	
Bellows valves – All	0
Non-Bellows valves - HC gas/vapor	23
Non-Bellows valves - Light liquid	19
Pumps, sealess – All	0
Pumps, non-sealess – Light liquid	104
Compressors – Vapor	514
Flanges/Connectors – All	1.5
Pressure relief valves (no rupture disc) - All	1135
Process drains – All	80
Terminals	
Valves - Light liquid	47
Pumps - Light liquid	432
Flanges – All	4.9

Light liquid streams are liquid streams with a vapor pressure greater than that of kerosene (>0.1 psia @ 100 °F or 689 Pa @ 38 °C), based on the most volatile class of liquid at >20% by volume.
Source: SCAQMD Memo dated April 2, 1999, with Attachment dated July 2, 1993

Emissions of toxic air contaminants (TACs) from process components were also estimated using the following equation:

Emissions (lb/day) = VOC x Wt / 100 (EQ. B.2-2)

where:

VOC = VOC emissions from the process component (lb/day)

Wt = Weight percent of toxic compound in stream passing through the component

The emission factors in Table B.2-1 were used to calculate increases in emissions from new process components. Mobil provided expected fugitive component counts, stream types, and composition of process fluids to be utilized or produced as intermediates or end products as a result of the project. These composition data, as well as Mobil-provided fugitive emission factors, were used to calculate fugitive VOC and air toxic emissions associated with each of the new and modified units and tanks at the Torrance Refinery and terminals. Emissions were calculated for the new components.

Although modifications will be made to the existing equipment and some equipment will be demolished and removed from service, emission reductions from components removed to make these changes were not deducted from the operational emission estimates for the proposed project. This is a conservative approach. Mobil estimated the numbers and types of service for components to be added for each Torrance Refinery process unit and at the terminals. It was conservatively assumed that only 50 percent of the new valves less than eight inches in size would be bellow seal valves, and that it would be technically infeasible to apply BACT to the other 50 percent of the new valves. The estimated total number of new components at the refinery and the terminals are listed in Table B.2-2. The compositions of the streams for the new process components are listed in the attached spreadsheets.

Table B.2-2
Project Net Components

Component Type	Service	Number				
		Torrance Refinery	Southwestern Terminal	Vernon Terminal	Atwood Terminal	Torrance Loading Rack
Connections	All	1,691	331	598	184	400
Valve, bellow seal	Hvy Liquid	53	0	0	0	0
Valve	Hvy Liquid	53	0	0	0	0
Valve, bellow seal	Lt Liquid	194	0	0	0	0
Valve	Lt Liquid	202	51	156	48	78
Valve, bellow seal	Vapor	76	0	0	0	0

Table B.2-2 (Concluded)
Project Net Components

Component Type	Service	Number				
		Torrance Refinery	Southwestern Terminal	Vernon Terminal	Atwood Terminal	Torrance Loading Rack
Valve	Vapor	85	0	0	0	0
Compressor	All	0	0	0	0	0
Pump, non-sealess	Hvy Liquid	0	0	0	0	0
Pump, non-sealess	Lt Liquid	6	3	4	3	3
Process relief device	All	4	8	14	4	5
Process drains	All	56	0	0	0	0

Mobil has in place an SCAQMD-approved inspection and maintenance program to detect and remedy leaks from process components. This program has allowed Mobil to estimate emissions from process components with emission factors that are more accurate than the SCAQMD default factors. Therefore, we used the values summarized in Table B.2-1.

Emissions from Loading Operations

VOC emissions will be generated by loading fuel ethanol into tanker trucks at SWT, the Vernon Terminal and Torrance Loading Rack. It was assumed that the emissions would be at the 0.08 lb/1,000-gallon limit specified in SCAQMD Rule 462 for the Vernon Terminal.

A new vapor combustor with a 99-percent control efficiency, one each at the Torrance Refinery and SWT, will handle the additional vapors from fuel ethanol tanker truck loading at the Torrance Refinery and SWT facilities, respectively. The fuel ethanol that will be loaded into tanker trucks at the terminals contains five percent gasoline as a denaturant. Emissions of TACs during tanker truck loading were estimated by applying Equation B.2-2 to the estimated total VOC emissions.

VOC emissions will be generated by non-CARB Phase 3 gasoline loading of marine tankers at the SWT. It was assumed, based on SCAQMD guidance, that the emissions would have an uncontrolled emission factor of 75.6 lb/1,000 bbl, and the vapors would be sent to a vapor control unit with an 99 percent efficiency. The gasoline that will be loaded into marine tankers at the terminal contain TACs. Emissions of TACs during marine tanker loading were estimated by applying Equation B.2-2 to the estimated total VOC emissions.

Pentanes will be loaded into railcars for transport out of the refinery. The quantity of butanes loaded into railcars for export out of the refinery will also increase. Since the displaced vapors from these railcar-loading operations will be collected by the refinery's vapor recovery system, only emissions from fugitive components are expected.

Emissions from Boilers

The project will require additional steam that will be generated by two existing boilers. Projected emissions for the two boilers were calculated by assuming a 27 percent increase in firing rate. Based on flow rates of the two stacks, nine percent of the emissions were assigned to the first boiler, and 91 percent of the emissions were assigned to the second boiler.

Emissions from Sulfur Recovery

Additional sulfur will be removed in order to meet the CARB Phase 3 specifications for gasoline sulfur content. Most of this sulfur will be recovered by the Torrance Refinery's sulfur plant, but a small fraction will be emitted as sulfur oxides. These emissions were estimated using the following equation:

Emissions (lb/day) = EF x S (EQ. B.2-4)

where:

EF = Emission factor (lb SO_x/LT sulfur)

S = Weight of additional sulfur removed (LT/day)

The additional sulfur to be removed is estimated to be 0.9 long tons (2,200 pounds per long ton) per day, based on expected production rates and feed sulfur content. Based on historical data, the sulfur oxide emission rate is 0.84 lb SO_x per long ton of sulfur recovered.

Emissions from Storage Tanks

VOC emissions from the new fuel ethanol storage tank at the Torrance Refinery and the emissions from the new fuel ethanol storage tanks at the terminals (one each at Vernon and Atwood) were estimated using version 4.09 of the U.S. EPA TANKS program. The changes in VOC emissions that are anticipated from changes in service of the two existing tanks at the Torrance Refinery, six existing tanks at SWT and two existing tanks at the Vernon Terminal were also estimated using version 4.09 of the TANKS program. The TANKS runs are included as Attachment B.3 to this Appendix. Additionally, emissions of TACs from new tanks and tanks changing service were estimated by applying Equation B.2-2 to the VOC emissions from each storage tank.

B.2.1 Indirect Operational Emissions

In addition to the process related changes in emissions that will result from the modifications at the refinery and terminals, emissions from indirect sources will increase. The indirect sources that were evaluated include:

- Tanker truck trips to deliver fuel ethanol to distribution terminals on a daily basis
- Tanker truck trips to deliver spent alumina to third party facility
- Additional daily locomotive activity moving the additional rail cars transporting ethanol, pentane and butane

- Additional annual marine vessel activity delivering fuel ethanol and exporting non-CARB Phase 3 gasoline

Emissions from On-Road Motor Vehicles

Equations B.1-11 through B.1-13 were used to calculate exhaust emissions from tanker truck ethanol and spent alumina delivery trips. Equation B.1-8 was used to calculate entrained road dust PM_{10} emissions from these vehicles. Table B.2-3 lists the assignment of these vehicles to vehicle classes and speeds, and Tables B.2-4 through B.2-6 list the emission factors. Note, the ethanol tanker trucks are assumed to be diesel-fueled; only VOC exhaust emission factors (Table B.2-5) are available for diesel trucks. Table B.2-7 lists the parameters used to calculate entrained paved road dust PM_{10} emissions.

Table B.2-3
Motor Vehicle Classes and Speeds During Operations

Vehicle Type	Vehicle Class	Speed (mph)
Tanker or alumina truck, full, freeway	Heavy heavy-duty truck, diesel	40
Tanker or alumina truck, full, surface street	Heavy heavy-duty truck, diesel	25
Tanker or alumina truck, empty, freeway	Heavy heavy-duty truck, diesel	40
Tanker or alumina truck, empty, surface street	Heavy heavy-duty truck, diesel	25

Table B.2-4
Motor Vehicle CO and NO_X Emission Factors During Operation

Vehicle Type	CO Running Exhaust (g/mi)	NO_x Running Exhaust (g/mi)
Tanker or alumina truck, full, freeway	3.15	16.74
Tanker or alumina truck, full, surface street	4.85	17.21
Tanker or alumina truck, empty, freeway	3.15	16.74
Tanker or alumina truck, empty, surface street	4.85	17.21
Source: ARB EMFAC7G motor vehicle emission factor model, 2/10/2000 version, for calendar year 2001, summertime.		

Table B.2-5
Diesel Motor Vehicle VOC Emission Factors During Operation

Vehicle Type	Running Exhaust (g/mi)
Tanker or alumina truck, full, freeway	0.77
Tanker or alumina truck, full, surface street	1.15
Tanker or alumina truck, empty, freeway	0.77
Tanker or alumina truck, empty, surface street	1.15
Source: ARB EMFAC7G motor vehicle emission factor model, 2/10/2000 version, for calendar year 2001, summertime.	

Table B.2-6
Motor Vehicle PM_{10} Emission Factors During Operation

Vehicle Type	Running Exhaust (g/mi)	Tire Wear (g/mi)	Brake Wear (g/mi)
Tanker or alumina truck, full, freeway	0.45	0.04	0.01
Tanker or alumina truck, full, surface street	0.66	0.04	0.01
Tanker or alumina truck, empty, freeway	0.45	0.04	0.01
Tanker or alumina truck, empty, surface street	0.66	0.04	0.01
Source: ARB EMFAC7G motor vehicle emission factor model, 2/10/2000 version, for calendar year 2001, summertime.			

Table B.2-7
Parameters Used to Calculate Entrained Paved Road Dust PM_{10} Emissions

Vehicle Type	Vehicle Weight (tons)	Road Type	Silt Loading (g/m^2)
Tanker truck, full, freeway	40	Freeway	0.020
Tanker truck, full, surface street	40	Collector	0.037
Tanker truck, empty, freeway	11	Freeway	0.020
Tanker truck, empty, surface street	11	Collector	0.037

It was assumed that the fuel ethanol received at the Torrance Loading Rack, Vernon Terminal, Atwood Terminal, and at third party terminal(s) is delivered from Southwestern Terminal by tanker truck. It was assumed that the spent alumina is received at a third party facility and delivered from the Torrance Refinery. The estimated daily travel distances for fuel ethanol and spent alumina delivery tanker trucks are listed in Table B.2-8. These distances are based on anticipated routing patterns.

Table B.2-8
Daily Mileage for Ethanol Tanker Trucks from Southwestern Marine Terminal

Destination	Number/Day	Surface Street (One-Way Miles/Truck per Day)	Freeway (One-Way Miles/Truck per Day)
Torrance Loading Rack	10	5	10
Vernon Terminal	19	10	14
Atwood Terminal	8	8	26
Colton/San Diego Terminals	9	8	44

Emissions from Locomotives

Pentane and fuel ethanol will be transported into the Torrance Refinery by rail car during the winter and year-round, respectively. Butane and pentane will be transported out of the Torrance facilities by rail car during the summer. The maximum increase in daily number of rail car shipments would be 13. The increased railcar movement will require additional switch engine operating time at the refinery. The following equation was used to estimate the increased switch engine exhaust emissions:

Exhaust Emissions (lb/day) = EF x FU (EQ. B.2-5)

where:

EF = Emission factor for specific air contaminant (lb/gal)

FU = Daily fuel use associated with increased switch engine operations (gal/day)

Table B.2-9 provides the emission factors and estimated emissions. The emission factors for CO, VOC, NO_X and PM10 were taken from "Technical Highlights: Emission Factors for Locomotives" (USEPA, 1997). The emission factor for SO_X was calculated from a 0.05 weight percent limit for sulfur in diesel fuel and a diesel fuel density of 7.1 lb/gal:

EF for SO_X (lb/gal) = 0.0005 lb sulfur/gal x 7.1 lb fuel/gal x 2 lb SO_2/lb sulfur / 453.6 g/lb

= 3.2 g SO_X/gal (EQ. B.2-6)

Table B.2-9
Switch Engine Emission Factors and Emissions

	CO	**VOC**	**NO_x**	**SO_x**	**PM_{10}**
G/gal	38.1	21	362	3.2	9.2
Lb/day	1.6	0.9	14.8	0.1	0.4
Source: "Technical Highlights: Emission Factors for Locomotives," EPA420-F-97-051, except SO_X. SO_X estimated from 0.05 wt. percent sulfur in diesel fuel and fuel density of 7.1 lb/gal.					

Based on current operating times and number of railcar movements, the switch engine fuel use averages 1.43 gal per rail car.

Emissions from Marine Vessels

There will be a net increase of 28 marine tanker calls per year, since the existing MTBE marine tanker deliveries will be replaced by fuel ethanol deliveries and non-CARB Phase 3 gasoline exports. However, the berth at SWT can only accommodate one marine tanker at a time. The marine tankers transporting fuel ethanol are anticipated to the same size as the marine tankers currently used to import MTBE. Therefore, there will not be an increase in the peak daily emissions from marine tankers.

B.3 EMISSIONS SUMMARIES (PRE-MITIGATION)

B.3.1 Construction Emissions Summary

Table B.3-1 lists estimated peak daily emissions during the construction phases at each refinery process unit process unit and at the terminals.

Table B.3-1
Peak Daily Construction Emissions by Location and Activity

Location/Activity	CO (lb/day)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	Exhaust PM_{10} (lb/day)	Fugitive PM_{10} (lb/day)	Total PM_{10} (lb/day)
C4/C5 Splitter, Demolition	58.7	11.1	83.1	6.9	5.2	8.5	13.7
C4/C5 Splitter, Earthwork	121.8	10.1	33.5	2.4	2.0	24.7	26.7
C4/C5 Splitter, Concrete and Steel	42.5	9.5	69.0	6.2	4.4	0.8	5.2
C4/C5 Splitter, Equipment Vessels and Exchangers	53.1	15.7	120.1	10.6	7.6	8.3	15.9
C4/C5 Splitter, Piping	85.3	19.0	146.8	14.9	8.6	2.4	11.0
C4/C5 Splitter, Electrical	13.2	2.5	17.5	1.9	1.0	0.8	1.8
C4/C5 Splitter, Painting	0.0	56.7	0.0	0.0	0.0	0.0	0.0
Ethanol Unloading and Storage, Track Fill Earthwork	75.4	16.7	142.8	12.0	8.1	197.8	205.8
Ethanol Unloading and Storage, Track Lay	32.3	6.5	54.3	5.2	3.3	1.3	4.6
Ethanol Unloading and Storage, Concrete and Steel	34.4	6.8	48.3	4.4	3.1	0.8	3.9
Ethanol Unloading and Storage, Tank Installation	46.4	11.2	89.2	8.5	5.3	8.3	13.7
Ethanol Unloading and Storage, Piping	71.0	15.2	115.9	12.0	6.7	2.4	9.1
Ethanol Unloading and Storage, Electrical	13.2	2.5	17.5	1.9	1.0	0.8	1.8
Ethanol Unloading and Storage, Painting	0.0	56.7	0.0	0.0	0.0	0.0	0.0
6K-2 and 7K-2 Compressor Trains, All	25.0	64.0	52.7	4.8	3.3	0.8	4.1
LPG Load Rack Expansion for C5/LSR, Demolition	202.0	31.2	258.3	21.3	15.3	18.5	33.9
LPG Load Rack Expansion for C5/LSR, Earthwork	71.8	15.9	130.9	11.6	7.6	112.2	119.9
LPG Load Rack Expansion for C5/LSR, Concrete and Steel	34.4	6.8	48.3	4.4	3.1	0.8	3.9

Table B.3-1 (Cont.)
Peak Daily Construction Emissions by Location and Activity

Location/Activity	CO (lb/day)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	Exhaust PM_{10} (lb/day)	Fugitive PM_{10} (lb/day)	Total PM_{10} (lb/day)
LPG Load Rack Expansion for C5/LSR, Tank Installation	70.7	16.5	133.4	13.1	7.9	8.5	16.4
LPG Load Rack Expansion for C5/LSR, Piping	48.0	11.2	71.1	7.0	4.2	3.8	8.0
LPG Load Rack Expansion for C5/LSR, Electrical	13.2	2.5	17.5	1.9	1.0	0.8	1.8
LPG Load Rack Expansion for C5/LSR, Painting	0.0	168.0	0.0	0.0	0.0	0.0	0.0
Merox, Demolition	60.4	11.4	87.3	7.1	5.4	16.0	21.4
Merox, Earthwork	121.8	10.1	33.5	2.4	2.0	24.8	26.8
Merox, Concrete and Steel	73.4	17.2	124.2	11.2	8.0	1.6	9.6
Merox, Equipment Vessels and Exchangers	70.2	20.3	152.7	13.7	9.6	9.1	18.7
Merox, Piping	107.6	23.1	183.2	19.0	10.7	2.4	13.0
Merox, Electrical	23.7	4.4	34.7	3.8	1.9	0.8	2.7
Merox, Painting	0.0	56.7	0.0	0.0	0.0	0.0	0.0
Interconnecting Pipeway, Demolition	12.4	2.5	20.0	1.6	1.3	7.5	8.8
Interconnecting Pipeway, Earthwork	31.0	6.4	44.2	3.2	2.6	32.1	34.7
Interconnecting Pipeway, Concrete and Steel	38.3	7.5	54.8	5.1	3.5	0.8	4.2
Interconnecting Pipeway, Piping	89.8	18.6	146.6	15.4	8.4	2.4	10.8
Interconnecting Pipeway, Electrical	13.2	2.5	17.5	1.9	1.0	0.8	1.8
Rerun Tower Sidestripper, Demolition	60.4	11.4	87.3	7.1	5.4	16.0	21.4
Rerun Tower Sidestripper, Earthwork	66.9	6.2	24.6	2.0	1.6	8.5	10.1
Rerun Tower Sidestripper, Concrete and Steel	42.5	9.5	69.0	6.2	4.4	0.8	5.2
Rerun Tower Sidestripper, Equipment Vessels and Exchangers	48.2	14.8	112.0	9.7	7.1	8.3	15.5
Rerun Tower Sidestripper, Piping	45.1	10.5	83.1	8.3	5.0	0.8	5.8
Rerun Tower Sidestripper, Electrical	13.2	2.5	17.5	1.9	1.0	0.8	1.8
Rerun Tower Sidestripper, Painting	0.0	56.7	0.0	0.0	0.0	0.0	0.0
General Refinery Equipment	34.7	6.8	2.7	0.0	0.0	3.5	3.6
Atwood Terminal, All	2,415.8	313.7	127.5	10.4	7.6	36.7	44.3
Southwestern Terminal, All	2,096.2	194.8	77.5	6.7	4.7	8.3	13.0
Torrance Loading Rack, All	2,793.1	220.1	87.3	6.9	5.0	44.6	49.6
Vernon Terminal, All	3,675.3	404.6	183.3	15.3	11.1	49.2	60.3
Refinery, Off-Site Vehicles	171.9	25.2	121.7	0.0	2.3	105.7	108.0
Atwood Terminal, Off-Site Vehicles	42.3	6.4	29.5	0.0	0.8	33.0	33.8
Southwestern Terminal, Off-Site Vehicles	33.8	5.2	28.8	0.0	0.8	32.7	33.4

Table B.3-1 (Concluded)
Peak Daily Construction Emissions by Location and Activity

Location/Activity	CO (lb/day)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	Exhaust PM_{10} (lb/day)	Fugitive PM_{10} (lb/day)	Total PM_{10} (lb/day)
Torrance Loading Rack, Off-Site Vehicles	33.7	5.1	23.6	0.0	0.6	26.8	27.5
Vernon Terminal, Off-Site Vehicles	72.0	10.5	32.2	0.0	0.8	34.2	35.0

Because these construction activities will not all occur simultaneously, the overall peak daily construction emissions will not be equal to the sum of the peak daily emissions listed in the preceding table. Therefore, the anticipated overlap of construction activities was evaluated to determine overall peak daily emissions. First, it was conservatively assumed that the peak daily emissions during each overlapping construction activity would occur at the same time. Next, the construction activities anticipated be taking place were identified for the entire construction period based on the anticipated starting and ending dates of the activities listed in Table B.3-2. It was conservatively assumed that emissions from offsite motor vehicles would be at peak daily levels throughout the construction duration. The peak daily emissions from the construction activities taking each day were then added together to estimate the total peak daily emissions during each day. Finally, the days with the highest peak daily emissions were identified.

Table B.3-2
Anticipated Starting and Ending Dates of Construction Activities

Location/Activity	Starting Date	Ending Date
C4/C5 Splitter, Demolition	9/20/01	1/7/02
C4/C5 Splitter, Earthwork	9/20/01	1/7/02
C4/C5 Splitter, Concrete and Steel	9/27/01	2/9/02
C4/C5 Splitter, Equipment Vessels and Exchangers	2/10/02	8/22/02
C4/C5 Splitter, Piping	3/28/02	12/30/02
C4/C5 Splitter, Electrical	5/23/02	3/15/03
C4/C5 Splitter, Painting	2/1/03	3/15/03
Ethanol Unloading and Storage, Track Fill Earthwork	9/23/01	10/27/01
Ethanol Unloading and Storage, Track Lay	10/28/01	3/18/02
Ethanol Unloading and Storage, Concrete and Steel	2/23/02	10/4/02
Ethanol Unloading and Storage, Tank Installation	9/20/01	12/20/02
Ethanol Unloading and Storage, Piping	5/2/02	1/6/03
Ethanol Unloading and Storage, Electrical	6/27/02	3/8/03
Ethanol Unloading and Storage, Painting	1/25/03	3/8/03

Table B.3-2 (Cont.)
Anticipated Starting and Ending Dates of Construction Activities

Location/Activity	Starting Date	Ending Date
6K-2 and 7K-2 Compressor Trains, All	8/22/02	2/7/03
LPG Load Rack Expansion for LSR, Demolition	11/8/01	12/17/01
LPG Load Rack Expansion for LSR, Earthwork	11/8/01	12/17/01
LPG Load Rack Expansion for LSR, Concrete and Steel	12/20/01	10/7/02
LPG Load Rack Expansion for LSR, Tank Installation	9/20/01	8/12/02
LPG Load Rack Expansion for LSR, Piping	8/1/02	12/16/02
LPG Load Rack Expansion for LSR, Electrical	8/1/02	3/15/03
LPG Load Rack Expansion for LSR, Painting	8/15/02	3/15/03
Merox, Demolition	10/24/02	1/27/03
Merox, Earthwork	10/24/02	1/27/03
Merox, Concrete and Steel	11/21/02	4/13/03
Merox, Equipment Vessels and Exchangers	12/7/02	2/22/03
Merox, Piping	12/26/02	10/4/03
Merox, Electrical	2/23/03	12/13/03
Merox, Painting	11/2/03	12/13/03
Interconnecting Pipeway, Demolition	9/20/01	2/7/02
Interconnecting Pipeway, Earthwork	9/20/01	2/7/02
Interconnecting Pipeway, Concrete and Steel	10/18/01	5/25/02
Interconnecting Pipeway, Piping	2/23/02	11/15/02
Interconnecting Pipeway, Electrical	2/23/02	11/15/02
Rerun Tower Sidestripper, Demolition	10/24/02	12/20/02
Rerun Tower Sidestripper, Earthwork	10/24/02	12/20/02
Rerun Tower Sidestripper, Concrete and Steel	10/31/02	1/10/03
Rerun Tower Sidestripper, Equipment Vessels and Exchangers	11/16/02	1/19/03
Rerun Tower Sidestripper, Piping	2/6/03	11/13/03
Rerun Tower Sidestripper, Electrical	4/4/03	12/31/03
Rerun Tower Sidestripper, Painting	12/12/03	12/31/03
General Refinery Equipment	9/20/01	12/31/03
Atwood Terminal, All	2/14/02	10/31/02
Southwestern Terminal, All	3/1/02	10/31/02
Torrance Loading Rack, All	12/19/01	10/31/02
Vernon Terminal, All	12/17/01	10/31/02
Refinery, Off-Site Vehicles	9/20/01	12/31/03
Atwood Terminal, Off-Site Vehicles	2/14/02	10/31/02
Southwestern Terminal, Off-Site Vehicles	3/1/02	10/31/02
Torrance Loading Rack, Off-Site Vehicles	12/19/01	10/31/02
Vernon Terminal, Off-Site Vehicles	12/17/01	10/31/02

Overall peak daily CO, VOC and PM_{10} emissions are anticipated to occur during a period that includes:

- C4/C5 Splitter piping and electrical work
- Ethanol Storage and Unloading tank construction and piping and electrical work
- Compressor Train modifications
- Pentane Storage and Shipping piping and electrical work and painting
- Merox demolition and earthwork
- Interconnecting Pipeway piping and electrical work
- Rerun Tower Sidestripper demolition, earthwork and concrete and steel work
- Construction at all of the terminals

Overall peak daily NO_X and SO_X emissions are anticipated to occur during a period that includes:

- C4/C5 Splitter equipment installation and piping and electrical work
- Ethanol Storage and Shipping concrete and steel work, tank construction, and piping and electrical work
- Pentane Storage and Shipping concrete and steel work, tank construction, and piping and electrical work
- Interconnecting Pipeway piping and electrical work
- Construction at all of the terminals.

The estimated emissions during these period are summarized in Table B.3-3 along with the SCAQMD's significance level for each pollutant. As shown in the table, significance thresholds are exceeded for all pollutants except SO_X during construction. The emissions estimates represent a "worst-case," because they incorporate the assumption that construction activities at each location occur at the peak daily levels throughout the construction period. It is unlikely that the peak daily levels would actually occur at all locations where construction is taking place at the same time.

Table B.3-3
Overall Peak Daily Construction Emissions Summary (Pre-mitigation)

Source	CO (lb/day)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	Exhaust PM_{10} (lb/day)	Fugitive PM_{10} (lb/day)	Total PM_{10} (lb/day)

Table B.3-3
Overall Peak Daily Construction Emissions Summary (Pre-mitigation)

Source	**CO (lb/day)**	**VOC (lb/day)**	**NO_X (lb/day)**	**SO_X (lb/day)**	**Exhaust PM_{10} (lb/day)**	**Fugitive PM_{10} (lb/day)**	**Total PM_{10} (lb/day)**
Construction Equipment Exhaust	11,614.8	573.6	1,371.4	133.2	82.4	N/A	82.4
Onsite Motor Vehicles	170.5	35.5	96.7	4.2	5.3	226.7	232.0
Onsite Fugitive PM_{10}	N/A	N/A	N/A	N/A	N/A	5.0	5.0
Architectural Coating	N/A	896.7	N/A	N/A	N/A	N/A	N/A
Total Onsite	**11,785.2**	**1,505.8**	**1,468.1**	**137.3**	**87.7**	**231.7**	**319.4**
Offsite Motor Vehicles	**353.7**	**52.4**	**235.8**	**0.0**	**5.3**	**232.3**	**237.6**
TOTAL	**12,139.0**	**1,558.2**	**1,703.8**	**137.3**	**93.0**	**464.0**	**557.1**
CEQA Significance Level	*550*	*75*	*100*	*150*			*150*
Significant? (Yes/No)	**Yes**	**Yes**	**Yes**	No			**Yes**
Note: Sums of individual values may not equal totals because of rounding. NA: Not Applicable							

B.3.2 Operational Emissions Summary

Table B.3-4 lists the estimated peak daily direct operational emissions at the refinery and at each of the terminals, as well as the indirect emissions from the refinery switch engine and ethanol tanker truck deliveries. Tables B.3-5 and B.3-6 compare the operational emissions with the CEQA significance levels for sources subject to RECLAIM and for non-RECLAIM sources, respectively. As seen in Table B.3-5, neither the NO_x nor SO_x SCAQMD CEQA thresholds for sources subject to RECLAIM will be exceeded with this project. As seen in Table B.3-6, the significance level is exceeded for VOC and NO_x emissions from non-RECLAIM sources.

Table B.3-4
Peak Daily Operational Emissions Summary (Pre-Mitigation)

Source	**CO (lb/day)**	**VOC (lb/day)**	**NO_X (lb/day)**	**SO_X (lb/day)**	**PM_{10} (lb/day)**
Direct Emissions					
Torrance Refinery					
Fugitive VOC from components	0.0	37.3	0.0	0.0	0.0
Fuel ethanol tanks	0.0	3.8	0.0	0.0	0.0
Sulfur recovery plant	0.0	0.0	0.0	0.8	0.0
Boilers	6.1	10.2	22.5	11.2	30.7
New vapor combustor	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total	**6.2**	**51.4**	**22.6**	**12.1**	**30.7**
Torrance Loading Rack					
Fugitive VOC from components	0.0	21.8	0.0	0.0	0.0
Fuel ethanol tanker trucks	0.0	1.5	0.0	0.0	0.0
Total	**0.0**	**23.4**	**0.0**	**0.0**	**0.0**
Southwestern Terminal					
Fugitive VOC from components	0.0	18.8	0.0	0.0	0.0
Marine tanker gasoline loading	0.0	113.4	0.0	0.0	0.0
Fuel ethanol tanker trucks	0.0	4.2	0.0	0.0	0.0
New vapor combustor	< 0.1	< 0.1	0.1	< 0.1	< 0.1
Total	**0.0**	**136.4**	**0.1**	**0.0**	**0.0**
Vernon Terminal					
Fugitive VOC from components	0.0	40.3	0.0	0.0	0.0
New gasoline storage tank	0.0	14.5	0.0	0.0	0.0
Fuel ethanol tanker trucks	0.0	0.8	0.0	0.0	0.0
Total	**0.0**	**55.6**	**0.0**	**0.0**	**0.0**
Atwood Terminal					
Fugitive VOC from components	0.0	14.3	0.0	0.0	0.0
New fuel storage tank	0.0	1.2	0.0	0.0	0.0
Total	**0.0**	**15.5**	**0.0**	**0.0**	**0.0**
Total Direct Emissions	**6.2**	**282.2**	**22.7**	**12.1**	**30.8**
Indirect Emissions					
Tanker trucks	21.5	5.2	100.1	0.0	71.7
Switch engine for railcars	1.6	0.9	14.8	0.1	0.4
Total Indirect Emissions	**23.1**	**6.1**	**115.0**	**0.1**	**72.1**
Note: Sums of individual values may not equal totals because of rounding.					

Table B.3-5
Project Operational Criteria Pollutant Emissions Summary for RECLAIM Sources

Pollutant	Direct Emissions (lb/day)	RECLAIM Allocations[a] (lb/day)	Total (lb/day)	SCAQMD CEQA Threshold (lb/day)	Significant?
NO_X	23	2,453	2,476	10,589	No
SO_2	12	2,462	2,474	8,172	No

[a] The 2003 facility Allocation for NO_x and SO_x includes purchased RTCs and is converted to pounds per day by dividing 365 days per year.

Table B.3-6
Project Operational Criteria Pollutant Emissions Summary for Non-RECLAIM Sources

Pollutant	Direct Emissions (lb/day)	Indirect Emissions (lb/day)	Total (lb/day)	SCAQMD CEQA Threshold (lb/day)	Significant?
CO	6.2	23.1	29.3	550	No
VOC [a]	282.2	6.1	288.3	55	**Yes**
NO_X	0.1	115.0	115.1	55	**Yes**
SO_X	0.0	0.1	0.1	150	No
PM_{10}	30.8	72.1	102.9	150	No

[a] Does not include emission changes from changes in tank service.

Anticipated changes in direct operational emissions of TACs at the refinery and the terminals are listed in Table B.3-7. All of the toxic compounds listed are SCAQMD Rule 1402 carcinogenic contaminants.

Table B.3-7
Changes in Direct Operational Toxic Air Contaminant Emissions

Species	Emissions (lbs/year)				
	Torrance Refinery	Torrance Loading Rack	Southwestern Terminal	Vernon Terminal	Atwood Terminal
Toxic Air Contaminants for Which Health Risk Factors Exist					
Acetaldehyde	0.9	0.0	0.0	0.0	0.0
Ammonia	0.0	0.0	0.0	0.0	0.0
Benzene	3.7	3.5	-28.4	18.1	3.4
1,3-Butadiene	0.5	0.0	0.1	0.2	0.0
Cresols	0.0	0.0	0.0	0.0	0.0
Formaldehyde	7.9	0.0	0.0	0.0	0.0
Hydrogen Sulfide	0.0	0.0	0.0	0.0	0.0
Lead	0.4	0.0	0.0	0.0	0.0
Manganese	1.2	0.0	0.0	0.0	0.0
Mercury	55.0	0.0	0.0	0.0	0.0
MTBE	0.0	0.0	-4,113.0	-376.0	0.0
Naphthalene	3.0	0.0	0.0	0.0	0.0
Nickel	1.8	0.0	0.0	0.0	0.0
Phenol	2.6	0.0	0.0	0.0	0.0
PAHs	0.0	0.0	0.0	0.0	0.0
Propylene	58.5	0.0	0.0	0.0	0.0
Styrene	0.0	0.0	0.0	0.0	0.0
Toluene	49.7	5.7	-92.9	12.7	5.5
Xylene	25.0	2.3	-33.1	6.5	2.2
Zinc	0.8	0.0	0.0	0.0	0.0
Other Toxic Air Contaminants					
Acenaphthene	0.2	0.0	0.0	0.0	0.0
Acenaphthylene	0.4	0.0	0.0	0.0	0.0
Anthracene	1.0	0.0	0.0	0.0	0.0
Carbon Disulfide	0.0	0.0	0.0	0.0	0.0
Chromium, Total	0.3	0.0	0.0	0.0	0.0
Cyclohexane	0.6	0.0	0.0	0.0	0.0
Ethyl Benzene	4.8	0.3	-8.2	0.5	0.4
Fluorene	0.2	0.0	0.0	0.0	0.0
Glycol Ethers	0.0	0.0	0.0	0.0	0.0
Hexane	29.4	2.0	-77.9	129.0	8.9
Phenanthrene	1.0	0.0	0.0	0.0	0.0
1,2,4-Trimethylbenzene	2.3	21.2	19.2	34.8	13.1

B.4 EMISSIONS SUMMARIES (MITIGATED)

B.4.1 Construction Emissions

As indicated in the previous summary tables, construction activities may have significant unmitigated air quality impacts for CO, VOC, NO_X, and PM_{10}. The emissions from construction are primarily from four main sources: 1) onsite fugitive dust, 2) off-road mobile source equipment, 3) architectural coating, and 4) on-road motor vehicles. The mitigation measures listed below are intended to minimize the emissions associated with these sources.

Table B.4-1 lists mitigation measures for each construction emission source and identifies the estimated control efficiency of each measure. As shown in the table, no feasible mitigation has been identified for the emissions from architectural coating or from on-road vehicle trips. Additionally, no other feasible mitigation measures have been identified to further reduce emissions. CEQA Guidelines §15364 defines feasible as ". . . capable of being accomplished in a successful manner within a reasonable period if time, taking into account economic, environmental, legal, social, and technological factors."

Table B.4-2 presents a summary of overall peak daily mitigated construction emissions. The table includes the emissions associated with each source and an estimate of the reductions associated with mitigation. The implementation of mitigation measures, while reducing emissions, does not reduce the construction-related CO, VOC, NO_X, or PM_{10} impacts below significance.

B.4.2 Operational Emissions

The project operational CO, SO_x and PM_{10} emission increase is below the emissions significance criteria threshold applied to this project. However, operational VOC and NO_x emissions from sources that are not subject to RECLAIM are anticipated to exceed the significance criterion. The increased VOC emissions are primarily due to gasoline marine tanker loading, ethanol tanker truck loading and component fugitive emissions. The increased NO_x emissions are primarily due to ethanol tanker truck deliveries to terminals and increased usage of the switch engine for the railcars.

Project operational VOC emissions at the refinery will be substantially reduced through the application of BACT, which, by definition, is the best available control technology. For example, except for the valves exempt from BACT, the new valves to be installed will be of the bellow-seals (leakless) variety.

Table B.4-1
Construction-Related Mitigation Measures and Control Efficiency

Mitigation Measure	Mitigation	Source	Pollutant	Control Efficiency

Number				(%)
AQ-1	Increase watering of active site by one time per day[a]	Onsite Fugitive Dust PM_{10}	PM_{10}	16
AQ-2	Wash wheels of all vehicles leaving unimproved areas	Onsite Fugitive Dust PM_{10}	PM_{10}	Not Quantified
AQ-3	Remove all visible roadway dust tracked out onto paved surfaces from unimproved areas at the end of the workday	Onsite Fugitive Dust PM_{10}	PM_{10}	Not Quantified
AQ-4	Prior to use in construction, the project proponent 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.	Construction Equipment Exhaust	CO VOC NO_X SO_X PM_{10}	Unknown Unknown Unknown Unknown Unknown
AQ-5	Use low sulfur diesel (as defined in SCAQMD Rule 431.2) where feasible.	Construction Equipment	SO_X PM_{10}	Unknown
AQ-6	Proper equipment maintenance	Construction Equipment Exhaust	CO VOC NO_X SO_X PM_{10}	5 5 5 5 0
	No feasible measures identified	Architectural Coating	VOC	N/A
	No feasible measures identified[b]	On-Road Motor Vehicles	CO VOC NO_X PM_{10}	N/A N/A N/A N/A

[a] It is assumed that construction activities will comply with SCAQMD Rule 403 – Fugitive Dust, by watering the site two times per day, reducing fugitive dust by 50 percent. This mitigation measure assumes an incremental increase in the number of times per day the site is watered (i.e., from two to three times per day).

[b] Health and Safety Code §40929 prohibits the air districts and other public agencies from requiring an employee trip reduction program making such mitigation infeasible. No feasible measures have been identified to reduce emissions from this source.

Table B.4-2
Overall Peak Daily Construction Emissions (Mitigated)

Source	CO (lb/day)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	Exhaust PM_{10} (lb/day)	Fugitive PM_{10} (lb/day)	Total PM_{10} (lb/day)
Onsite Construction Equipment Exhaust	11,614.8	573.6	1,371.4	133.2	82.4	N/A	82.4
Mitigation Reduction (%)	0%	5%	5%	5%	5%		
Mitigation Reduction (lb/day)	0.0	-28.7	-68.6	-6.7	-4.1		-4.1
Remaining Emissions	**11,614.8**	**545.0**	**1,302.8**	**126.5**	**78.3**		**78.3**
Onsite Motor Vehicles	170.5	35.5	96.7	4.2	5.3	226.7	232.0
Mitigation Reduction (%)	0%	0%	0%	0%	0%	0%	
Mitigation Reduction (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Remaining Emissions	**170.5**	**35.5**	**96.7**	**4.2**	**5.3**	**226.7**	**232.0**
Onsite Fugitive PM_{10}	N/A	N/A	N/A	N/A	N/A	5.0	5.0
Mitigation Reduction (%)	---	---	---	---	---	16%	
Mitigation Reduction (lb/day)	---	---	---	---	---	-0.8	-0.8
Remaining Emissions	**---**	**---**	**---**	**---**	**---**	**4.2**	**4.2**
Architectural Coating	N/A	896.7	N/A	N/A	N/A	N/A	N/A
Mitigation Reduction (%)	---	0%	---	---	---	---	---
Mitigation Reduction (lb/day)	---	0.0	---	---	---	---	---
Remaining Emissions	**---**	**896.7**	**---**	**---**	**---**	**---**	**---**
Total Onsite	**11,785.2**	**1,477.1**	**1,399.5**	**130.7**	**83.6**	**230.9**	**314.5**
Offsite Motor Vehicles	353.7	52.4	235.8	0.0	5.3	232.3	237.6
Mitigation Reduction (%)	0%	0%	0%	0%	0%	0%	
Mitigation Reduction (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Remaining Emissions	**353.7**	**52.4**	**235.8**	**0.0**	**5.3**	**232.3**	**237.6**
TOTAL	**12,139.0**	**1,529.5**	**1,635.2**	**130.7**	**88.9**	**463.2**	**552.1**
Significance Threshold	*550*	*75*	*100*	*150*	---	---	*150*
Significant? (Yes/No)	**Yes**	**Yes**	**Yes**	No	---	---	**Yes**
Note: Sums of individual values may not equal totals because of rounding.							

The VOC exceedance does not include the actual emission reductions that will result from the storage of lower vapor pressure gasoline at the Torrance Refinery and terminals or the emission reductions that will result from removing components from service due to modifying and demolishing equipment. Although the actual reductions will occur, the potential emissions that could occur, based on current permit levels are greater and will not be modified; therefore, the reductions are not considered in this CEQA analysis. It also should be noted that the specific VOCs that increase as a result of the project were evaluated as part of a health risk assessment (Section B.5) and, based on that analysis, are not anticipated to create significant localized human health risks.

Because the proposed project is being implemented specifically in response to air quality regulatory requirements, additional mitigation (i.e., emission offsets) are not required.

As seen from the summary in Table B.3-4, anticipated peak daily NO_x emissions are primarily associated with tanker trucks to deliver fuel ethanol to the terminals and Torrance Refinery switch engine operations.

No feasible mitigation measures have been identified for NO_x emissions from the switch engine or the tanker trucks. Technologies do not exist to reduce NO_x emissions from these sources to levels that would reduce operational emissions below the significance thresholds. Additionally, the U.S. EPA has the authority to regulate emissions from locomotives, and the U.S. EPA and CARB have the authority to regulate emissions from motor vehicles. The SCAQMD has limited authority to regulate emissions from on-road mobile sources.

Importing fuel ethanol from the Midwestern states by pipeline which would avoid project rail emissions, is not feasible because there are no dedicated ethanol pipelines, and dedicated pipelines are considered the only proven way to avoid the risk of contamination with water. The only alternative to tanker trucks for fuel ethanol delivery within the South Coast Air Basin to the terminals would be delivery by pipeline. Mobil does not have available pipelines to its Southern California terminals that could be dedicated to ethanol service, and thus, is not proposing this approach. However, Mobil is evaluating the possibility of using an existing pipeline to transport fuel ethanol from SWT to the Vernon Terminal, from where it would be trucked to the other terminals. The potential environmental impacts of this pipeline transport approach is evaluated as an alternative in Chapter 5 of the EIR.

In summary, operational NO_X emissions cannot be mitigated to levels below the significance thresholds. However, it should be noted that total NO_X emissions from stationary sources at the Torrance Refinery, including sources subject to RECLAIM, are anticipated to increase by about 23 pounds per day. The majority of NO_X emissions are expected to be generated by mobile sources.

B.5 RISK ASSESSMENTS

Risk assessment procedures for SCAQMD Rule 1401 were followed for the Torrance Refinery, Southwestern Terminal, Vernon Terminal, Atwood Terminal, and for the Torrance Loading Rack. SCAQMD Rule 1401 risk assessment procedures consist of four tiers for preparing a risk assessment from a quick look-up table (Tier 1) to a detailed risk assessment involving air quality modeling analysis (Tier 4). For the Torrance Refinery, including the Torrance Loading Rack, a health risk assessment (Tier 4) was prepared and is described in detail below. The emissions of TACs at the remaining terminals exceeded the Tier 1 thresholds. Therefore, a Tier 2 analysis was performed for the SWT, Vernon Terminal, and Atwood Terminal. Results are presented in Tables B.5-1, B.5-2, and B.5-3 below.

The Tier 2 screening risk assessment consists of calculating the maximum individual cancer risk (MICR), as well as the acute and chronic hazard index (HIA and HIC) due to all TACs at the facility. Table B.5-1 summarizes the calculated values for the MICR and compares them to the thresholds for each equipment item at each terminal.

Table B.5-1
Tier 2 Analysis Results and Comparison to Threshold for MICR

Terminal	MICR	Significance Threshold	Exceeds
Southwestern	0.023	1.0	NO
Vernon	0.053	1.0	NO
Atwood	0.040	1.0	NO

Table B.5-2 presents the HIA by target organ and compares this result to the threshold for each terminal.

Table B.5-2
Tier 2 Analysis Results and Comparison to Threshold for HIA

Target Organ	SWT Terminal	Vernon Terminal	Atwood Terminal	Threshold	Exceeds Threshold
Cardiovascular	8.20E-06	2.06E-05	1.17E-05	1.0	No
Central nervous system	5.31E-07	1.34E-06	7.55E-07	1.0	No
Endocrine	0.00E+00	0.00E+00	0.00E+00	1.0	No
Eye	8.88E-07	2.24E-06	1.26E-06	1.0	No
Immune	8.20E-06	2.06E-05	1.17E-05	1.0	No
Kidney	0.00E+00	0.00E+00	0.00E+00	1.0	No
Gastrointestinal system/liver	0.00E+00	0.00E+00	0.00E+00	1.0	No
Reproductive	8.73E-06	2.20E-05	1.24E-05	1.0	No
Respiratory	8.88E-07	2.24E-06	1.26E-06	1.0	No
Skin	0.00E+00	0.00E+00	0.00E+00	1.0	No

Table B.5-3 presents the HIC by target organ and compares this result to the threshold for each terminal.

Table B.5-3
Tier 2 Analysis Results and Comparison to Threshold for HIC

Target Organ	SWT Terminal	Vernon Terminal	Atwood Terminal	Threshold	Exceeds Threshold
Cardiovascular	1.28E-05	2.96E-05	2.26E-05	1.0	No
Central nervous system	1.82E-05	4.23E-05	3.17E-05	1.0	No
Endocrine	5.06E-08	1.20E-07	7.62E-08	1.0	No
Eye	0.00E+00	0.00E+00	0.00E+00	1.0	No
Immune	0.00E+00	0.00E+00	0.00E+00	1.0	No
Kidney	5.06E-08	1.20E-07	7.62E-08	1.0	No
Gastrointestinal system/liver	5.06E-08	1.20-07	7.62E-08	1.0	No
Reproductive	1.70E-05	3.93E-05	3.00E-05	1.0	No
Respiratory	4.90E-06	1.13E-05	8.59E-06	1.0	No
Skin	0.00E+00	0.00E+00	0.00E+00	1.0	No

An estimate of the cancer burden is required when the MICR exceeds one in one million. As shown in Table B.5-1, the Rule 1401 cancer burden threshold value for the MICR is not exceeded at any of the terminals. Thus, the cancer burden has not been estimated. Additionally, the Rule 1401 threshold values of the HIA and the HIC have not been exceeded at any of the terminals as shown in Tables B.5-2 and B.5-3, respectively. Therefore, further analysis was not required for the terminals.

Atmospheric dispersion modeling was conducted to determine the localized ambient air quality impacts at the Torrance Refinery including the Torrance Loading Rack from the proposed project. The health risk assessment modeling was prepared based on the most recent (1995) Health Risk Assessment (HRA) for the Torrance Refinery including the Torrance Loading Rack. The atmospheric dispersion modeling methodology used for the project follows generally accepted modeling practice and the modeling guidelines of both the U.S. EPA and the SCAQMD. All dispersion modeling was performed using the Industrial Source Complex Short-Term 3 (ISCST3) dispersion model (Version 00101) (EPA, 2000). The outputs of the dispersion model were used as input to a risk assessment using the ACE2588 (Assessment of Chemical Exposure for AB2588) risk assessment model (Version 93288) (CAPCOA, 1993). The updates to the ACE2588 model are consistent with those found on the OEHHA web site.

Model Selection

The dispersion modeling methodology used follows EPA and SCAQMD guidelines. The ISCST3 model (Version 00101) is an EPA model used for simulating the transport and dispersion of emission sources in areas of both simple, complex, and intermediate terrain. Simple terrain, for air quality modeling purposes, is defined as a region where the heights of release of all emission sources are above the elevation of surrounding terrain. Complex terrain is defined as those areas where nearby terrain elevations exceed the release height of emissions from one or more sources. Intermediate terrain is that which falls between simple and complex terrain. Simple terrain exists in the vicinity of the refinery.

Modeling Options

The options used in the ISCST3 dispersion modeling are summarized in Table B.5-5. EPA regulatory default modeling options were selected except for the calm processing option. Since the meteorological data set developed by the SCAQMD is based on hourly average wind measurements, rather than airport observations that represent averages of just a few minutes, the SCAQMD's modeling guidance requires that this modeling option not be used.

Meteorological Data

The SCAQMD has established a standard set of meteorological data files for use in air quality modeling in the Basin. For the vicinity of the Torrance Refinery, the SCAQMD requires the use of its King Harbor 1981 meteorological data file. This is the meteorological data file used for recent air quality and HRA modeling studies at the Torrance Refinery including the Torrance Loading

Rack. To maintain consistency with this prior modeling, and following SCAQMD modeling guidance, the 1981 King Harbor meteorological data set was used for this modeling study. A wind rose for the King Harbor station is shown in Figure 3.1-4.

In the King Harbor data set, the surface wind speeds and directions were collected at the SCAQMD's King Harbor monitoring station, while the upper air sounding data used to estimate hourly mixing heights were gathered at Los Angeles International Airport. Temperatures and sky observation (used for stability classification) were taken from Los Angeles Airport data.

Receptors

Appropriate model receptors must be selected to determine the worst-case modeling impacts. For this modeling, a fine grid of commercial and residential receptors was used. No receptors were placed within the Torrance Refinery property boundary. Terrain heights for all receptors were consistent with the existing Torrance Refinery including Torrance Loading Rack HRA.

Table B.5-5
Dispersion Modeling Options for ISCST3

Feature	Option Selected
Terrain processing selected	Yes
Meteorological data input method	Card Image
Rural-urban option	Urban
Wind profile exponents values	Defaults
Vertical potential temperature gradient values	Defaults
Program calculates final plume rise only	Yes
Program adjusts all stack heights for downwash	Yes
Concentrations during calm period set = 0	No
Aboveground (flagpole) receptors used	No
Buoyancy-induced dispersion used	Yes
Surface station number	53012
Year of surface data	1981
Upper air station number	91919
Year of upper air data	1981

Source Parameters

Tables B.5-6 and B.5-7 summarize the source parameter inputs to the dispersion model. The source parameters presented are based upon the parameters of the existing and proposed equipment at the facility. Fourteen sources comprised of nine sources of components with fugitive emissions, two converted storage tanks, one new storage tank and two combustion source stacks were modeled. The nine sources comprised of components with fugitive emissions were modeled as rectangular area sources. The tanks were modeled as area sources. The emission rate used in the ISCST3 model run for the area sources is in units of grams/second-meter squared (g/s-m^2). A unit emission rate of 1.0 gram/second (g/s) was used, so that the emission rate is the inverse of the area in units of g/s-m^2. Table B.5-6 details modeling parameters for the area sources, and Table B.5-7 details modeling parameters for the point sources. The coordinates listed in Tables B.5-6 and B.5-7 are the first vertex of the rectangle, the center of the tank, or the location of the point source.

Table B.5-6
Area Source Locations and Parameters Used in Modeling the Proposed Project

Model ID/Equipment	UTM X [m]	UTM Y [m]	Elevation Z [m]	Area [m^2]	Q [g/s-m^2]
FUG07/C4/C5 Splitter	376958	3746435	0	2,362	4.23 E-04
FUG08/Unsaturated Gas Plant Sidestripper	376953	3746530	0	3,156	3.17 E-04
FUG09/Merox Unit	377053	3746468	0	934	1.07 E-03
FUG10/C4/C5 Splitter	377068	3746530	0	1,530	6.54 E-04
FUG56A/LPG Rack	375828	3746382	0	177,615	5.63 E-06
FUG56F/Light Ends Component Segregation	377469	3745979	0	162,640	6.15 E-06
EIR1/LPG Spheres	376721	3746245	0	2,184	4.58 E-04
EIR2/Ethanol Rack	375562	3746628	0	8,284	1.21 E-04
EIR3/Ethanol Loading	375562	3746625	0	9	1.11E-01
200x35/Converted Tank	375648	3746686	0	206	4.85 E-03
200x36/Converted Tank	375648	3746665	0	206	4.85 E-03
400xNN/New Tank	375604	3746685	0	263	3.80 E-03
30F_1/Boiler	376799	3746618	0.0	30.5	1.00E+00
30F_2/Boiler	376811	3746618	0.0	30.5	1.00E+00
Note: MSL = mean sea level					

<u>Emissions</u>

The modeling was performed using only direct operational emissions associated with the proposed project. These consist of toxic emissions resulting from the addition of components with fugitive emissions in various process streams at the Torrance Refinery, as well as the two converted storage tanks, the proposed new storage tank, and increased usage of the two boilers.

With respect to the components with fugitive emissions, the annual emission rate was based on the calculated annual emissions, and the peak hourly emission rate was derived from the annual emission rate assuming continuous operations at 8,760 hours per year. The emission rates used in the ACE model run were in units of g/s.

Proposed emissions for the two boilers were calculated by assuming a 27 percent increase in firing rate. Based on flow rates of the two stacks, nine percent of the emissions were assigned to the first boiler (Model ID 30F_1) and 91 percent of the emissions were assigned to the second boiler (Model ID 30F_2).

<u>Health Risks</u>

The potential health risks impacts that are addressed are carcinogenic, chronic noncarcinogenic, and acute noncarcinogenic.

The ACE2588 model was used to evaluate the potential health risks from TACs. The ACE2588 model, which is accepted by the California Air Pollution Control Officers Association (CAPCOA), has been widely used for required health risk assessments under the CARB AB2588 Toxic Hot Spots reporting program. The model provides conservative algorithms to predict relative health risks from exposure to carcinogenic, chronic noncarcinogenic, and acute noncarcinogenic pollutants. This multipathway model was used to evaluate the following routes of exposure: inhalation, soil ingestion, dermal absorption, mother's milk ingestion, and plant product ingestion. Exposure routes from animal product ingestion and water ingestion were not assumed for this analysis.

The 93288 version of ACE2588 incorporates revised toxicity and pathway data recommended in the October 1993 CAPCOA HRA guidance. The toxicity data has been updated to reflect the latest values as shown on the OEHHA web site (updated October 2000). The pathway data in ACE2588 were modified to include site-specific fractions of homegrown root, leafy, and vine plants. These site-specific fractions were used to maintain consistency with assumptions previously accepted for this particular site location by SCAQMD.

The results obtained based on the CAPCOA HRA guidance are considered to be consistent with those which would be obtained following SCAQMD's Risk Assessment Procedures for Rules 1401 (SCAQMD, 2000) and 212 (SCAQMD, 1997).

Only TACs identified in the CAPCOA HRA guidance with potency values or reference exposure levels have been included in the HRA. The 19 TACs emitted from the proposed project consist of acetaldehyde, ammonia, benzene, 1,3-butadiene, cresol, formaldehyde, hydrogen sulfide, lead, manganese, mercury, naphthalene, nickel, phenol, polyaromatic hydrocarbons, propylene, styrene, toluene, xylenes, and zinc.

The dose-response data used in the HRA were extracted from the October 1993 CAPCOA HRA Guidelines. The pertinent data are located in Tables III-5 through III-10 of the CAPCOA guidance. These values were updated, as necessary, with values from the OEHHA website (October 2000).

Following CAPCOA guidance, the inhalation, dermal absorption, soil ingestion, and mother's milk pathways were included in a multipathway analysis. Pathways not included in the analysis are water ingestion, fish, crops, and animal and dairy products that were not identified as a potential concern for the project setting.

Inhalation pathway exposure conditions were characterized by the use of the ISCST3 dispersion model as previously discussed.

Significance criteria for this EIR include an increased cancer risk of 10 in one million or greater. The established SCAQMD Rule 1401 limits are 1.0 in one million cancer risk for sources without best available control technology for toxics (T-BACT), and 10 in one million for those with T-BACT. The significance criteria for noncarcinogenic acute and chronic hazard are indices of 1.0 for any endpoint.

The maximum increase at any receptor is 0.14 per million. The peak receptor is a commercial receptor and is located on the northwestern side of the property at UTM 375517E, 3746717N. Applying the worker adjustment factor of 0.14, the risk at the peak worker receptor becomes 0.02 per million. The peak residential receptor has a risk of 0.012 per million. The results of the health risk assessment indicate that the potential impact of the project is well below the significance level of 10 per million.

The maximum noncarcinogenic acute and chronic hazard indices are 0.001 and 0.005, respectively. These values are well below the significance level of 1.0. Thus, the HRA results indicate that impacts are not only below the SCAQMD significance criteria, but they indicate that there are minimal impacts as a result of the project.

The outputs from the HRA are contained in Attachment B.4.

B.6 CARBON MONOXIDE IMPACTS ANALYSIS

As discussed in Section 4.1-5 in the Draft EIR, a CO hot spot analysis was conducted to determine if increased construction traffic would lead to localized exceedances of the CO ambient air quality standards at major intersections near the Refinery. The CALINE4 model was used for this analysis. The outputs from the CALINE4 model are contained in Attachment B.5.

B.7 PROJECT ALTERNATIVES

Three project alternatives and a total of four sub-alternatives have been identified for the proposed project. The alternatives and sub-alternatives involve a different location at the Torrance Refinery for a new rail spur and fuel ethanol unloading facilities; three different fuel ethanol tank storage alternatives at the refinery; two different approaches to achieving the removal of pentane from the base gasoline pool at the refinery in order to reduce its Reid Vapor Pressure; and use of an existing Mobil pipeline rather than tanker trucks to transport marine tanker-delivered ethanol from the Southwestern Terminal

B.7.1 Alternative 1 – Alternative Ethanol Receiving Location at Torrance Refinery

The proposed project includes installing a new rail spur west of Prairie Avenue for fuel ethanol unloading, which will include a six-spot unloading area and railcar unloading pumps. Under this alternative, the new spur and unloading facilities would be developed at a location east of Prairie Avenue, roughly 1,000 feet east of the proposed location. The unloading facilities (unloading spots and unloading pumps) themselves would be the same as in the proposed project. Fuel ethanol rail cars would use a portion of the existing LPG track and then move onto the new adjacent spur. Fuel ethanol storage would remain at the proposed location west of Prairie Avenue.

This alternative would require relocating a storage pad used for short-term hazardous waste storage. A replacement short-term hazardous waste storage pad would be constructed about 700 feet north of its current location. The spent caustic loading station would be relocated south of its current location, and would use the existing tanks and pumps. The diesel fuel additive storage tanks would be demolished. A 300-bbl replacement diesel fuel additive tank would be installed on a new 40' x20' pad (with containment) at a location in the eastern portion of the refinery.

Thee would be a slight increase in overall construction activities due to the relocation of the spent caustic loading station and the installation of the replacement diesel fuel additive tank. However, peak daily construction emissions would be anticipated to be the same as for the proposed project. Operational emissions under this alternative would be the same as under the proposed project, because the same or very facilities, equipment, and activities would be required at different locations within the refinery.

B.7.2 Alternative 2A – Construction of Second New 40,000 – Barrel Storage Tank for Fuel Ethanol Storage at Torrance Refinery

Under the proposed project, fuel ethanol will be stored in a new 40,000-bbl internal floating roof storage tank constructed for this project, and in two adjacent, existing out-of-service 20,000-bbl tanks that will be converted from fixed roofs to internal floating roofs. This alternative would involve demolishing the two existing 20,000-bbl tanks and constructing a second 40,000-bbl internal floating roof tank at the site of the two demolished 20,000–bbl tanks. Slightly more construction work would be required under this alternative, because constructing a new tank and the various associated pumps, piping, pads, etc. would involve somewhat more effort than merely converting two existing tanks. There would be no differences in operational activities under this alternative, compared to the proposed project.

More construction work would be required under this alternative, because constructing a new tank and the various associated pumps, piping, pads, etc. would involve more effort than merely converting two existing tanks. Construction emissions associated with this alternative were estimated by doubling the emissions associated with construction of the single 40,000-bbl tank under the proposed project. Mitigated overall peak daily construction emissions for this alternative are listed in Table B.7-1.

Table B.7-1
Overall Peak Daily Construction Emissions - Alternative 2A (Mitigated)

Source	CO (lb/day)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	Exhaust PM_{10} (lb/day)	Fugitive PM_{10} (lb/day)	Total PM_{10} (lb/day)
Onsite Construction Equipment Exhaust	11,656.8	583.9	1,456.1	141.5	87.5	N/A	87.5
Mitigation Reduction (%)	0%	5%	5%	5%	5%	--	
Mitigation Reduction (lb/day)	0.0	-29.2	-72.8	-7.1	-4.4	--	-4.4
Remaining Emissions	**11,656.8**	**554.7**	**1,383.3**	**134.4**	**83.1**	--	**83.1**
Onsite Motor Vehicles	174.8	36.4	101.1	4.4	5.5	235.0	240.5
Mitigation Reduction (%)	0%	0%	0%	0%	0%	0%	
Mitigation Reduction (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Remaining Emissions	**174.8**	**36.4**	**101.1**	**4.4**	**5.5**	**235.0**	**240.5**
Onsite Fugitive PM_{10}	N/A	N/A	N/A	N/A	N/A	5.0	5.0
Mitigation Reduction (%)	--	--	--	--	--	16%	
Mitigation Reduction (lb/day)	--	--	--	--	--	-0.8	-0.8
Remaining Emissions	--	--	--	--	--	**4.2**	**4.2**
Architectural Coating	N/A	896.7	N/A	N/A	N/A	N/A	N/A
Mitigation Reduction (%)	--	0%	--	--	--	--	--
Mitigation Reduction (lb/day)	--	0.0	--	--	--	--	--
Remaining Emissions	--	**896.7**	--	--	--	--	--
Total Onsite	**11,831.6**	**1,487.8**	**1,484.5**	**138.8**	**88.7**	**239.2**	**327.9**
Offsite Motor Vehicles	353.7	52.4	235.8	0.0	5.3	232.3	237.6
Mitigation Reduction (%)	0%	0%	0%	0%	0%	0%	
Mitigation Reduction (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Remaining Emissions	**353.7**	**52.4**	**235.8**	**0.0**	**5.3**	**232.3**	**237.6**
TOTAL	**12,185.3**	**1,540.2**	**1,720.2**	**138.8**	**94.0**	**471.6**	**565.6**
Significance Threshold	*550*	*75*	*100*	*150*	---	---	*150*
Significant? (Yes/No)	**Yes**	**Yes**	**Yes**	No	---	---	**Yes**
Note: Sums of individual values may not equal totals because of rounding.							

There would be a 0.1 lb/day decrease in direct VOC emissions at the Refinery under this alternative, compared to the proposed project. There will be no change in indirect emissions for this alternative, as compared to the proposed project.

B.7.3 Alternative 2B – Conversion of Two Existing 20,000 – Barrel Tanks and No New Tank Construction for Fuel Ethanol Storage at Torrance Refinery

This alternative would involve converting the two existing 20,000-bbl tanks to internal floating roofs (which is the same as under the proposed project), and not constructing the proposed new 40,000–bbl tank for fuel ethanol storage. The location of fuel ethanol storage at the refinery would be the same as under the proposed project.

Less construction work would be required under this alternative, because the construction activities associated with the proposed new 40,000-bbl tank would not occur, which would eliminate the emissions associated with tank construction and painting. Mitigated overall peak daily construction emissions for this alternative are listed in Table B.7-2.

Table B.7-2
Overall Peak Daily Construction Emissions - Alternative 2B (Mitigated)

Source	CO (lb/day)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	Exhaust PM_{10} (lb/day)	Fugitive PM_{10} (lb/day)	Total PM_{10} (lb/day)
Onsite Construction Equipment Exhaust	11,572.7	563.4	1,286.6	124.8	77.2	N/A	77.2
Mitigation Reduction (%)	0%	5%	5%	5%	5%	---	
Mitigation Reduction (lb/day)	0.0	-28.2	-64.3	-6.2	-3.9	---	-3.9
Remaining Emissions	**11,572.7**	**535.2**	**1,222.3**	**118.6**	**73.4**	---	**73.4**
Onsite Motor Vehicles	166.2	34.5	92.2	4.0	5.1	218.3	223.5
Mitigation Reduction (%)	0%	0%	0%	0%	0%	0%	
Mitigation Reduction (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Remaining Emissions	**166.2**	**34.5**	**92.2**	**4.0**	**5.1**	**218.3**	**223.5**
Onsite Fugitive PM_{10}	N/A	N/A	N/A	N/A	N/A	5.0	5.0
Mitigation Reduction (%)	---	---	---	---	---	16%	
Mitigation Reduction (lb/day)	---	---	---	---	---	-0.8	-0.8
Remaining Emissions	---	---	---	---	---	**4.2**	**4.2**
Architectural Coating	N/A	896.7	N/A	N/A	N/A	N/A	N/A
Mitigation Reduction (%)	---	0%	---	---	---	---	---
Mitigation Reduction (lb/day)	---	0.0	---	---	---	---	---
Remaining Emissions	---	**896.7**	---	---	---	---	---
Total Onsite	**11,738.9**	**1,466.4**	**1,314.5**	**122.5**	**78.5**	**222.6**	**301.1**
Offsite Motor Vehicles	353.7	52.4	235.8	0.0	5.3	232.3	237.6
Mitigation Reduction (%)	0%	0%	0%	0%	0%	0%	
Mitigation Reduction (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Remaining Emissions	**353.7**	**52.4**	**235.8**	**0.0**	**5.3**	**232.3**	**237.6**
TOTAL	**12,092.6**	**1,518.8**	**1,550.2**	**122.5**	**83.8**	**454.9**	**538.7**
Significance Threshold	*550*	*75*	*100*	*150*	---	---	*150*
Significant? (Yes/No)	**Yes**	**Yes**	**Yes**	No	---	---	**Yes**

Direct operational emissions for this alternative would decrease by 1.8 lb/day at the Refinery since there will not be a new 40,000-bbl tank. Decreased fuel ethanol storage capacity at Torrance might mean that less fuel ethanol would be trucked from Torrance to other distribution terminals (i.e., Atwood and remote, third-party terminals), and more would be trucked to these sites directly from Southwestern Terminal and/or from the Vernon Terminal. However, the estimated peak daily operational emissions for the proposed project assume, as a “worst case,” that all fuel ethanol is transported by tanker truck from Southwestern Terminal. Thus, indirect emissions for this alternative are the same as for the project.

B.7.4 Alternative 2C - Conversion of Two Existing 1,500 – Barrel Storage Tanks and No New Ethanol Tank Construction for Fuel Ethanol Storage at Torrance Refinery

This alternative would involve converting two existing 1,500-bbl tanks for fuel ethanol storage; these two tanks are currently used for storing a diesel fuel additive (octylnitrate). These two tanks are located east of Prairie Avenue, adjacent to the existing LPG rail tracks and less than 300 feet north of the truck racks at the Torrance Loading Rack. This alternative location is less than 1,000 feet east of the proposed project's ethanol storage location.

This alternative would require less construction than the proposed project, primarily because the proposed new 40,000-bbl tank for fuel ethanol storage would not be built, and the proposed conversion of two 20,000-bbl tanks to fuel ethanol service would not occur. However, converting the two 1,500-bbl tanks to fuel ethanol storage would require similar activities to the proposed project's conversion of the two 20,000-bbl tanks. No additional diesel fuel additive tanks would be constructed, compared to the proposed project; one 300-bbl replacement tank would be installed in both cases. Peak daily construction emissions associated with this alternative would be the same as for Alternative 2B. Mitigated overall peak daily construction emissions for this alternative are listed in Table B.7-3.

Table B.7-3
Overall Peak Daily Construction Emissions - Alternative 2C (Mitigated)

Source	CO (lb/day)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	Exhaust PM_{10} (lb/day)	Fugitive PM_{10} (lb/day)	Total PM_{10} (lb/day)
Onsite Construction Equipment Exhaust	11,572.7	563.4	1,286.6	124.8	77.2	N/A	77.2
Mitigation Reduction (%)	0%	5%	5%	5%	5%	---	
Mitigation Reduction (lb/day)	0.0	-28.2	-64.3	-6.2	-3.9	---	-3.9
Remaining Emissions	**11,572.7**	**535.2**	**1,222.3**	**118.6**	**73.4**	---	**73.4**
Onsite Motor Vehicles	166.2	34.5	92.2	4.0	5.1	218.3	223.5
Mitigation Reduction (%)	0%	0%	0%	0%	0%	0%	
Mitigation Reduction (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Remaining Emissions	**166.2**	**34.5**	**92.2**	**4.0**	**5.1**	**218.3**	**223.5**
Onsite Fugitive PM_{10}	N/A	N/A	N/A	N/A	N/A	5.0	5.0
Mitigation Reduction (%)	---	---	---	---	---	16%	
Mitigation Reduction (lb/day)	---	---	---	---	---	-0.8	-0.8
Remaining Emissions	---	---	---	---	---	**4.2**	**4.2**
Architectural Coating	N/A	896.7	N/A	N/A	N/A	N/A	N/A
Mitigation Reduction (%)	---	0%	---	---	---	---	---
Mitigation Reduction (lb/day)	---	0.0	---	---	---	---	---
Remaining Emissions	---	**896.7**	---	---	---	---	---
Total Onsite	**11,738.9**	**1,466.4**	**1,314.5**	**122.5**	**78.5**	**222.6**	**301.1**
Offsite Motor Vehicles	353.7	52.4	235.8	0.0	5.3	232.3	237.6
Mitigation Reduction (%)	0%	0%	0%	0%	0%	0%	
Mitigation Reduction (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Remaining Emissions	**353.7**	**52.4**	**235.8**	**0.0**	**5.3**	**232.3**	**237.6**
TOTAL	**12,092.6**	**1,518.8**	**1,550.2**	**122.5**	**83.8**	**454.9**	**538.7**
Significance Threshold	*550*	*75*	*100*	*150*	---	---	*150*
Significant? (Yes/No)	**Yes**	**Yes**	**Yes**	No	---	---	**Yes**
Note: Sums of individual values may not equal totals because of rounding.							

Direct operational emissions for this alternative would decrease by 1.8 lb/day VOC at the Torrance Refinery since there will not be a new 40,000-bbl tank, but would increase by 7.8 lb/day VOC due to the additional fuel ethanol storage in the two converted 1,500-bbl tanks. Thus the alternative is anticipated to have 6.0 lb/day more direct VOC emissions than the proposed project.

Operationally, the primary differences compared to the proposed project would relate to the significantly decreased fuel ethanol storage capacity at the Torrance site. There would be no truck deliveries of fuel ethanol to other terminals from Torrance. However, the estimated peak daily operational emissions for the proposed project assume, as a “worst case,” that all fuel ethanol is transported by tanker truck from Southwestern Terminal. Thus, indirect emissions for this alternative are the same as for the project.

B.7.5 Alternative 3A – Conversion of Existing Stabilizer at Torrance Refinery instead of Constructing New C4/C5 Splitter

To comply with CARB Phase 3 gasoline specifications requires reducing the RVP of the base gasoline pool during the summer months by removing butanes and pentanes. Under the proposed project, Mobil will construct a new C4/C5 splitter to remove the C5 and then pump the C5 to two new 10,000-bbl spheroid storage tanks. In the summer, the material will be loaded onto railcars for shipment off-site, and eventual return in the winter when they can be used for blending. Four new rail car loading/unloading spots will be required at the LPG rack; they will be equipped with pressurizing and relief lines, vapor recovery and spill containment.

This alternative would involve conversion of an idle, existing stabilizer at the Torrance Refinery to serve as a C4/C5 splitter. Refurbishing the idle stabilizer would involve similar construction activities as a new splitter, because of the extensive modifications to the stabilizer that would be required. These would include replacing existing bubble cap trays on the stabilizer with new valve trays, replacing the tube bundle in the existing reboiler, and installing a new feed heater, overhead condenser, accumulator, and pumps. Approximately 600 feet of additional piping runs would be required for this alternative, compared to the proposed new splitter. However, there would be no need to demolish an existing Bender Tower and associated support equipment, as would be the case under the proposed project.

Operation of the refurbished splitter and the associated emissions would be essentially the same as for a new splitter. Modifications to the debutanizer and upgrades to the deisobutanizer would be the same as for the proposed new C5/LSR splitter. The same new tank spheres for temporary storage would be required as for the proposed project, as well as the same additional rail car loading/unloading spots at the LPG rack. Thus, both direct and indirect emissions are anticipated to be the same for this alternative as the proposed project.

B.7.6 Alternative 3B – Routing C5/LSR Stream at the Refinery Directly to Storage instead of Constructing New C4/C5 Splitter

Under this alternative, the C5/LSR stream, which is composed primarily of C5, would be sent directly to storage at the refinery for subsequent rail shipment off the site.

This alternative would involve less construction than the proposed project, as a splitter would not be required. Thus, the heaters, pumps, and condensers associated with the new splitter would not be needed, and there would be a reduction in the amount of project steam and cooling water demand. The same modifications to the debutanizer and deisobutanizer would occur as with the proposed new splitter, however. The same new storage tanks and rail car loading/unloading facilities would be needed as under the proposed project for handling the C5/LSR that will be removed to meet RVP requirements. This alternative would require an additional 5,000 feet of new piping at the Torrance Refinery to transfer the C5/LSR. Emissions associated with demolition and earthwork activities would be eliminated, and peak daily emissions associated with the other activities for construction of a new C4/C5 splitter, with the exception of painting, would be reduced by about 50 percent under this alternative. Mitigated overall peak daily construction emissions for this alternative are listed in Table B.7-4.

Table B.7-4 (Cont.)
Overall Peak Daily Construction Emissions - Alternative 3B (Mitigated)

Source	CO (lb/day)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	Exhaust PM_{10} (lb/day)	Fugitive PM_{10} (lb/day)	Total PM_{10} (lb/day)
Onsite Construction Equipment Exhaust	11,570.9	564.1	1,267.9	120.8	77.6	N/A	77.6
Mitigation Reduction (%)	0%	5%	5%	5%	5%	---	
Mitigation Reduction (lb/day)	0.0	-28.2	-63.4	-6.0	-3.9	---	-3.9
Remaining Emissions	**11,570.9**	**535.9**	**1,204.5**	**114.7**	**73.7**	**---**	**73.7**
Onsite Motor Vehicles	165.1	34.3	122.2	5.3	5.3	225.1	230.4
Mitigation Reduction (%)	0%	0%	0%	0%	0%	0%	
Mitigation Reduction (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Remaining Emissions	**165.1**	**34.3**	**122.2**	**5.3**	**5.3**	**225.1**	**230.4**
Onsite Fugitive PM_{10}	N/A	N/A	N/A	N/A	N/A	5.0	5.0
Mitigation Reduction (%)	---	---	---	---	---	16%	
Mitigation Reduction (lb/day)	---	---	---	---	---	-0.8	-0.8
Remaining Emissions	**---**	**---**	**---**	**---**	**---**	**4.2**	**4.2**
Architectural Coating	N/A	896.7	N/A	N/A	N/A	N/A	N/A
Mitigation Reduction (%)	---	0%	---	---	---	---	---
Mitigation Reduction (lb/day)	---	0.0	---	---	---	---	---
Remaining Emissions	---	**896.7**	---	---	---	---	---
Total Onsite	**11,736.0**	**1,466.8**	**1,326.7**	**120.1**	**79.0**	**229.3**	**308.4**
Offsite Motor Vehicles	353.7	52.4	235.8	0.0	5.3	232.3	237.6
Mitigation Reduction (%)	0%	0%	0%	0%	0%	0%	
Mitigation Reduction (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Remaining Emissions	**353.7**	**52.4**	**235.8**	**0.0**	**5.3**	**232.3**	**237.6**
TOTAL	**12,089.7**	**1,519.2**	**1,562.4**	**120.1**	**84.4**	**461.6**	**546.0**
Significance Threshold	*550*	*75*	*100*	*150*	---	---	*150*
Significant? (Yes/No)	**Yes**	**Yes**	**Yes**	No	---	---	**Yes**
Note: Sums of individual values may not equal totals because of rounding.							

Direct operational emissions would decrease by 8.5 lb/day VOC, since the new C4/C5 splitter will not be constructed. The two boilers will have a decrease in CO, VOC, NO_x, SO_x, and PM_{10} emissions since less steam will be required for this alternative, as compared to the proposed project. Indirect emissions are not anticipated to change for this alternative, as compared to the proposed project.

B.7.7 Alternative 4 – Transport Fuel Ethanol from Southwestern Terminal Through Existing Pipeline instead of by Truck

The proposed project involves importing ethanol by marine tanker to Mobil's Southwestern Terminal (SWT) in the Port of Los Angeles, where it will be stored and loaded aboard tanker trucks for transport to the various distribution terminals for blending with base gasoline stock. This alternative would involve use of an existing Mobil pipeline to transfer fuel ethanol from SWT to the Vernon Terminal. From Vernon, the fuel ethanol would be transported by truck to the other distribution terminals for blending.

The proposed import of ethanol by rail would be unaffected by this alternative. The SWT-Vernon pipeline alternative would eliminate the construction of the proposed new truck loading racks and vapor destruction unit at SWT. The same existing storage tanks at SWT would be converted for fuel ethanol storage as under the proposed project. The existing pipeline that would be used for ethanol transport would require no significant modifications.

This alternative would not require any construction at SWT. Mitigated overall peak daily construction emissions for this alternative are listed in Table B.7-5.

Table B.7-5
Overall Peak Daily Construction Emissions - Alternative 4 (Mitigated)

Source	CO (lb/day)	VOC (lb/day)	NO_X (lb/day)	SO_X (lb/day)	Exhaust PM_{10} (lb/day)	Fugitive PM_{10} (lb/day)	Total PM_{10} (lb/day)
Onsite Construction Equipment Exhaust	9,526.2	485.3	1,298.4	126.7	77.9	N/A	77.9
Mitigation Reduction (%)	0%	5%	5%	5%	5%	---	
Mitigation Reduction (lb/day)	0.0	-24.3	-64.9	-6.3	-3.9	---	-3.9
Remaining Emissions	**9,526.2**	**461.0**	**1,233.5**	**120.3**	**74.0**	**---**	**74.0**
Onsite Motor Vehicles	162.9	34.0	92.1	4.0	5.1	218.5	223.7
Mitigation Reduction (%)	0%	0%	0%	0%	0%	0%	
Mitigation Reduction (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Remaining Emissions	**162.9**	**34.0**	**92.1**	**4.0**	**5.1**	**218.5**	**223.7**
Onsite Fugitive PM_{10}	N/A	N/A	N/A	N/A	N/A	4.9	4.9
Mitigation Reduction (%)	---	---	---	---	---	16%	
Mitigation Reduction (lb/day)	---	---	---	---	---	-0.8	-0.8
Remaining Emissions	**---**	**---**	**---**	**---**	**---**	**4.1**	**4.1**
Architectural Coating	N/A	791.7	N/A	N/A	N/A	N/A	N/A
Mitigation Reduction (%)	---	0%	---	---	---	---	---
Mitigation Reduction (lb/day)	---	0.0	---	---	---	---	---
Remaining Emissions	**---**	**791.7**	**---**	**---**	**---**	**---**	**---**
Total Onsite	**9,689.1**	**1,286.7**	**1,325.6**	**124.3**	**79.2**	**222.6**	**301.8**
Offsite Motor Vehicles	319.9	47.2	207.0	0.0	4.5	199.7	204.2
Mitigation Reduction (%)	0%	0%	0%	0%	0%	0%	
Mitigation Reduction (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Remaining Emissions	**319.9**	**47.2**	**207.0**	**0.0**	**4.5**	**199.7**	**204.2**
TOTAL	**10,009.0**	**1,333.9**	**1,532.6**	**124.3**	**83.7**	**422.3**	**506.0**
Significance Threshold	*550*	*75*	*100*	*150*	---	---	*150*
Significant? (Yes/No)	**Yes**	**Yes**	**Yes**	No	---	---	**Yes**
Note: Sums of individual values may not equal totals because of rounding.							

Direct operational emissions would decrease by 4.2 lb/day VOC and 0.1 lb/day $NO_{x,}$ since there will not be a new vapor combustor, and decrease by 9.4 lb/day VOC since there will not be new truck loading racks. There would be no truck transport of fuel ethanol from SWT to any distribution terminals. Once the fuel ethanol arrived at Vernon via pipeline, its storage, use, and distribution to other terminals would be the same as under the proposed project. However, the estimated peak daily operational emissions for the proposed project assume, as a “worst case,” that all fuel ethanol is transported by tanker truck from Southwestern Terminal. Thus, indirect emissions for this alternative are the same as for the project.