South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

SUBJECT: **NOTICE OF INTENT TO ADOPT A DRAFT NEGATIVE DECLARATION**

PROJECT TITLE: **PHILLIPS 66 LOS ANGELES REFINERY CARSON PLANT – CRUDE OIL STORAGE CAPACITY PROJECT**

In accordance with the California Environmental Quality Act (CEQA), the South Coast Air Quality Management District (SCAQMD) is the Lead Agency and has prepared a Draft Negative Declaration for the project identified above. The purpose of this Notice of Intent (NOI) is to solicit comments on the environmental analysis contained in the Negative Declaration.

This letter, the attached Notice of Intent (NOI), and the Negative Declaration do not require any action or response from you. The purpose of these documents is simply to provide information to you on the above project. If the proposed project has no bearing on you or your organization, no action on your part is necessary.

Copies of the Negative Declaration can be obtained at the SCAQMD's Public Information Center located at SCAQMD Headquarters: 21865 Copley Drive, Diamond Bar, CA 91765. Copies can also be obtained by calling (909) 396-2039 or accessing the SCAQMD's CEQA website at http://www.aqmd.gov/ceqa/nonaqmd.html. Comments focusing on your area of expertise, your agency's area of jurisdiction, or issues relative to the environmental analysis should be addressed to Ms. Barbara Radlein (c/o Planning/CEQA) at the address shown above, or sent by FAX to (909) 396-3324 or by email to bradlein@aqmd.gov. Comments must be received no later than 5:00 p.m. on October 9, 2013. Please include the name and phone number of the contact person for your agency.

Project Applicant: Phillips 66

Date: September 6, 2013 **Signature:** 

Michael Krause
Program Supervisor, CEQA
Planning, Rules, and Area Sources

Telephone: (909) 396-2706

Reference: California Code of Regulations, Title 14, §§15072, 15073, 15105, and 15371

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Drive, Diamond Bar, CA 91765-4182

NOTICE OF INTENT TO ADOPT A DRAFT NEGATIVE DECLARATION (ND)

Project Title:
Phillips 66 Los Angeles Refinery Carson Plant - Crude Oil Storage Capacity Project

Project Applicant: Phillips 66 **SCH No:** TBD

Project Location: The proposed project will be located at Phillips 66 Los Angeles Refinery Carson Plant at 1520 East Sepulveda Boulevard, Carson, CA, 90745.

Description of Nature, Purpose, and Beneficiaries of Project: Phillips 66 is proposing to increase crude oil storage capacity at its Los Angeles Refinery Carson Plant by installing one new 615,000 barrel crude oil storage tank with a geodesic dome, increasing the annual permit throughput limit of two existing 320,000 barrel crude oil storage tanks, and installing geodesic domes on the same two existing 320,000 barrel crude oil storage tanks. Two new feed/transfer pumps and one 14,000 barrel water draw surge tank with associated pumps and pipelines would also be installed. Tie-ins to the Pier "T" crude oil delivery pipeline from Berth 121 would be installed and one new electrical power substation would be constructed. The following environmental topic areas were identified as having the potential to be affected by the proposed project: air quality and greenhouse gas emissions; energy; geology and soils; hazards and hazardous materials; hydrology and water quality; noise; solid and hazardous waste; and, transportation and traffic. However, the analysis of these environmental topic areas in the Draft ND concluded that the proposed project would not generate any significant adverse environmental impacts.

Lead Agency:	**Division:**
South Coast Air Quality Management District	Planning, Rule Development and Area Sources

Draft ND and all supporting documentation are available at:	**or by calling**	**The Draft ND is available by accessing the SCAQMD's website at:**
SCAQMD Headquarters 21865 Copley Drive Diamond Bar, CA 91765	(909) 396-2039	http://www.aqmd.gov/ceqa/nonaqmd.html

The Public Notice of Intent is provided through the following:

☑ Los Angeles Times (September 10, 2013) ☑ Daily Breeze (September 10, 2013) ☑ SCAQMD Website
☑ SCAQMD Public Information Center ☑ Interested Parties ☑ SCAQMD Mailing List

Draft Negative Declaration 30-day Review Period:
September 10, 2013 through October 9, 2013

The proposed project would not have a statewide, regional or area-wide significance, therefore, a CEQA scoping meeting is not required (pursuant to Public Resources Code §21083.9(a)(2)) and, thus, will not be held for the proposed project.

Send CEQA Comments to:	**Phone:**	**Email:**	**Fax:**
Ms. Barbara Radlein	(909) 396-2716	bradlein@aqmd.gov	(909) 396-3324

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

DRAFT NEGATIVE DECLARATION FOR:
PHILLIPS 66 LOS ANGELES REFINERY CARSON PLANT - CRUDE OIL STORAGE CAPACITY PROJECT

SCH No. TBD

September 2013

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Submitted to:
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Prepared by:
ENVIRONMENTAL AUDIT, INC.

Reviewed by: Barbara Baird – Deputy Chief Counsel
Mike Krause - Program Supervisor, CEQA
Barbara Radlein- Air Quality Specialist, CEQA
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Janice West – Air Quality Engineer II

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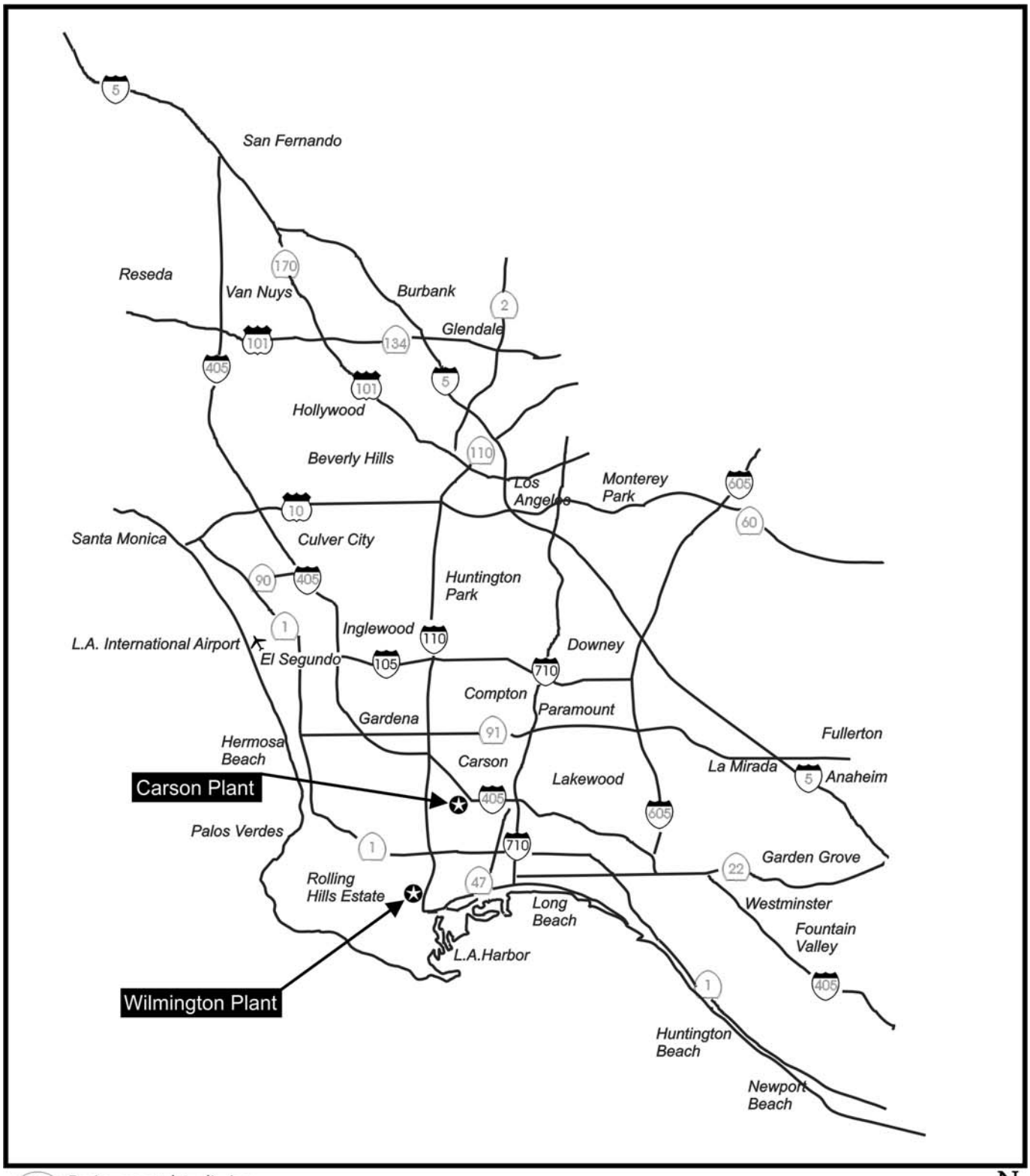
1.1 INTRODUCTION

The Phillips 66 Los Angeles Refinery (Refinery) has two plants, one located in Wilmington, a community under the jurisdiction of the City of Los Angeles, and the other located in the City of Carson (see Figure 1-1). These two plants operate as one refinery and the Carson Plant is referred to herein as the LARC. The LARC operates bulk crude oil supply storage facilities to handle incoming crude oil supplies from domestic sources primarily via onshore pipelines, and various vessels arriving at the Port of Long Beach at Berth 121. LARC currently has four existing 320,000 barrel[1] (bbl) (nominal capacity[2]) receiving tanks for crude oil. Crude oils from up to three different sources are segregated using the four existing 320,000 bbl tanks. The current capacity of the existing storage tanks limits vessel delivery volumes to Panamax vessels (400,000 bbl capacity), which are the size limits of vessels that can travel through the Panama Canal. For larger vessels, such as Aframax (720,000 bbl capacity) or Suezmax (1,000,000 bbl capacity), the current capacities of the existing storage tanks require two ship calls to unload the entire volume of a larger vessel, resulting in seven to 10 days when the ship remains in the port area. When a ship larger than Panamax calls, LARC accepts delivery of the first portion of the crude oil into the existing tanks then processes the crude oil through LARC to make room in the receiving tanks to accommodate the second discharge from the larger vessel. In order to avoid the extra wait time, which increases costs and creates additional vessel hoteling emissions, LARC needs more crude oil tankage storage capacity to accommodate the larger vessels so the entire volume of crude oil can be unloaded in one ship call.

Phillips 66 is proposing to increase crude oil storage capacity at the LARC by installing one new domed, 615,000 bbl crude oil tank[3] (Tank 2640) and associated support facilities at the LARC. In addition, the throughput (i.e., the frequency of filling and emptying of the tank) of two existing 320,000 bbl nominal capacity storage tanks (Tanks 510 and 511) would be increased. The proposed project also includes the construction of geodesic domes on the same two existing crude oil (Tanks 510 and 511) to control fugitive emissions. The proposed project also includes the construction of one 14,000 bbl water draw surge tank (Tank 2643). In addition, to provide power to the western boundary of the LARC, one new electrical substation will be installed. The proposed project would comply with the South Coast Air Quality Management District's (SCAQMD) best available control technology (BACT) requirements, as applicable, for control of volatile organic compounds (VOCs) emissions from refinery storage tanks.

Crude oil storage capacity is not a limiting factor for the throughput and production at the LARC. LARC operations fluctuate and are controlled by many factors, including but not limited to, equipment design parameters, market demand, equipment maintenance schedules, equipment permit limit conditions, and crude oil characteristics (e.g., sulfur content, acidity, specific gravity, etc.). LARC refining processes have operated at maximum capacity in the past and are expected to continue to operate at maximum capacity in the future due to constraints. No changes to refining processes are included in the proposed project and the current refining

[1] One barrel equals 42 gallons.
[2] Nominal capacity is the physical maximum capacity of the storage tank. Working capacity is less than the physical capacity.
[3] The new crude oil tank would have a nominal (maximum) capacity of 614,656 barrels and a working capacity of 500,141 barrels. Herein the new crude oil storage tank will be referred to as 615,000 barrel capacity storage tanks.



Environmental Audit, Inc.

FIGURE 1-1
REGIONAL MAP
Phillips 66 Los Angeles Refinery

Project No. 2778

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processes are limited by permit conditions that would not be modified as part of the proposed project. Therefore, the baseline crude throughput rate and output of the LARC would not change as a result of implementing the proposed project.

The proposal to increase crude oil storage capacity would streamline the movement of ships' future deliveries of crude oil to the LARC storage facilities without changing the overall volume of crude oil processed by the LARC. The increase in permitted throughput of the two existing storage tanks would provide flexibility for LARC to be able to blend multiple types of crude oil in order to obtain the optimal crude oil properties for refining. Therefore, the proposed project would only increase the crude oil storage capacity and the frequency of filling and emptying of the tanks at the LARC.

1.2 AGENCY AUTHORITY

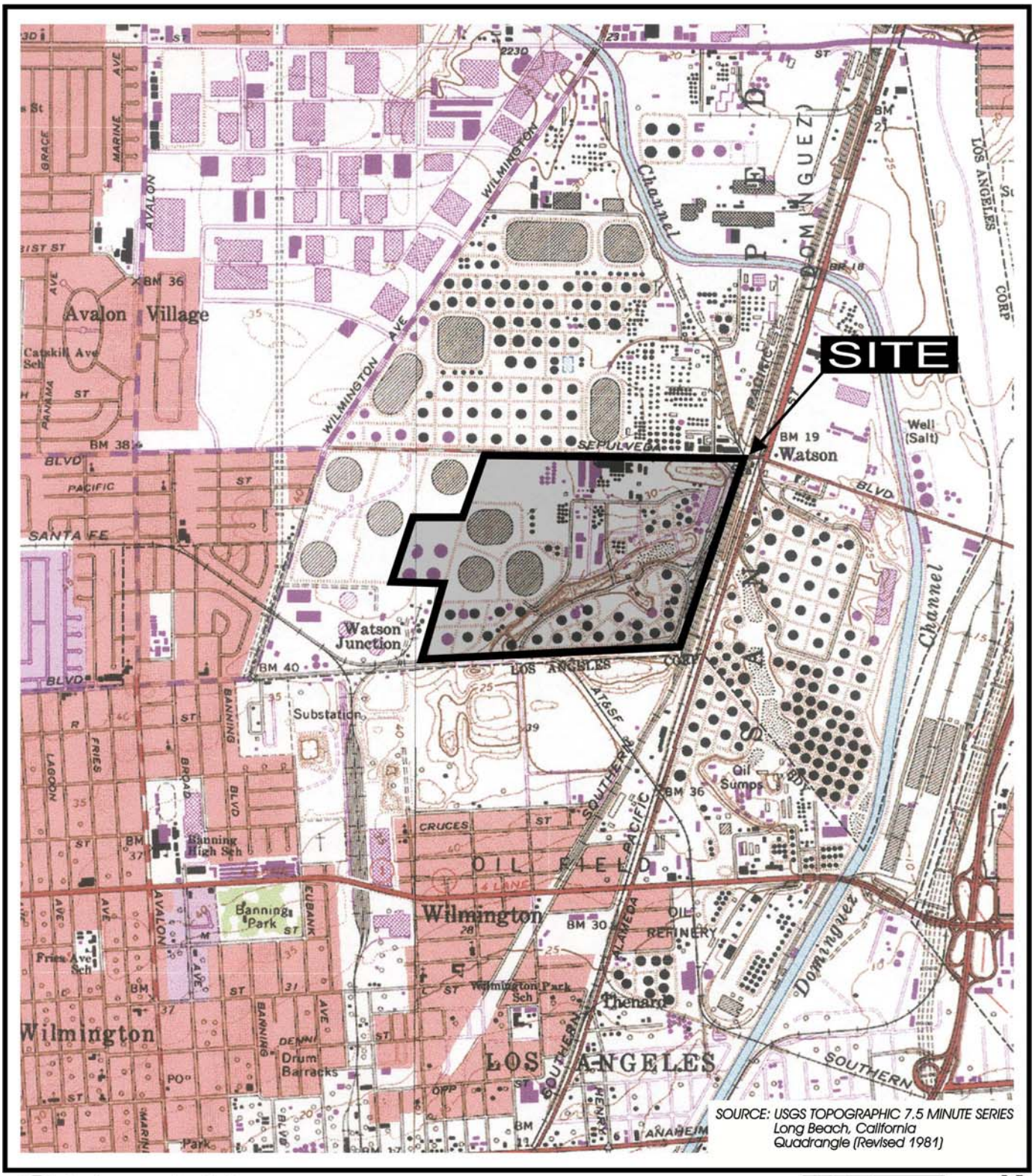
The California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., requires that the environmental impacts of proposed projects be evaluated and that feasible methods to reduce, avoid or eliminate significant adverse impacts of these projects be identified and implemented. The proposed modifications constitute a "project" as defined by CEQA. To fulfill the purpose and intent of CEQA, the SCAQMD is the "lead agency" for this project and has prepared this Negative Declaration to address the potential adverse environmental impacts associated with the proposed project.

The lead agency is the public agency that has the principal responsibility for carrying out or approving a project that may have a significant adverse effect upon the environment (Public Resources Code §21067). Since the proposed project requires discretionary approval from the SCAQMD and the SCAQMD has the greatest responsibility for supervising or approving the project as a whole, the SCAQMD has been determined to be the most appropriate public agency to act as lead agency (CEQA Guidelines §15051(b)).

To fulfill the purpose and intent of CEQA, the SCAQMD has prepared this Negative Declaration to address the potential adverse environmental impacts associated with the proposed project. A Negative Declaration for a project subject to CEQA is prepared when the lead agency determines, as supported by an environmental analysis of the project, that there is no substantial evidence that the project may have a significant effect on the environment (CEQA Guidelines §15064(f)(3) and §15070). As discussed in Chapter 2, the proposed project is not expected to result in any significant adverse environmental impacts; therefore, a Negative Declaration is the appropriate document.

1.3 PROJECT LOCATION

The Refinery is located in the South Coast Air Basin (Basin), within the jurisdiction of the SCAQMD. The LARC is located at 1520 East Sepulveda Boulevard, Carson, Los Angeles County, California and consists of about 224 acres of real property (see Figure 1-2). Land use at the LARC is designated by the City of Carson as heavy industrial zoning. The LARC is bounded on the north by Sepulveda Boulevard, on the west by Wilmington Avenue, on the south by a branch of the Burlington Northern and Santa Fe Railroad, and on the east by the Alameda rail



Environmental Audit, Inc.

FIGURE 1-2
SITE LOCATION MAP
Phillips 66 Los Angeles Refinery
Carson Plant

Project No. 2778

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corridor and Alameda Boulevard. Property to the north of the LARC is occupied by the Tesoro Los Angeles Refinery-Carson Operations (formerly BP Los Angeles Refinery). The western boundary of the LARC property borders the Container Transportation Services shipping and container storage facility. Property across Wilmington Avenue includes a residential neighborhood to the northwest and commercial uses to the southwest. Land uses to the south of the LARC are used as heavy industrial. Land to the south of Lomita Avenue is dominated by port-related activities. Land to the east of Alameda Street is occupied by the Kinder Morgan storage tank farm and the Tesoro Los Angeles Refinery – Wilmington Operations (formerly Shell/Equilon/Texaco Refinery).

1.4 OVERVIEW OF CURRENT OPERATIONS

Crude oil is a mixture of hydrocarbon compounds and relatively small amounts of other materials, such as oxygen, nitrogen, sulfur, salt, and water. Petroleum refining is a coordinated arrangement of manufacturing processes designed to produce physical and chemical changes in the crude oil to remove most of the non-hydrocarbon substances, separate the crude oil into its various components, and blend them into various useful products. The overall refining process uses four kinds of techniques: (1) separation, including distilling hydrocarbon liquids into gases, gasoline, diesel fuel, fuel oil, and heavier residual materials; (2) cracking or breaking large hydrocarbon molecules into smaller ones by thermal or catalytic processes; (3) reforming using heat and catalysts to rearrange the chemical structure of a particular oil stream to improve its quality; and (4) combining by chemically combining two or more hydrocarbons to produce high-grade gasoline.

Crude oil and distillates and other raw materials are delivered to the Refinery by pipelines, ships, and trains. Crude oil is processed in the crude oil unit where it is heated and distilled into various hydrocarbon components (at the LARC), which are further processed in downstream Refinery units (primarily located at the Wilmington Plant). The Refinery produces a variety of products including unleaded gasoline, jet fuel, diesel fuel, petroleum gases, sulfuric acid, and sulfur at the Wilmington Plant. Elemental sulfur and petroleum coke are produced as co-products of the refining process at the LARC. Major processing units at the Refinery include the crude oil unit, vacuum flasher, coker unit, hydrotreating units, reforming units, fluid catalytic cracking unit, alkylation unit, sulfur recovery units, hydrogen plant, acid plant, and the cogeneration unit. No changes are proposed at the Wilmington Plant.

1.5 PROPOSED PROJECT DESCRIPTION

The Refinery is proposing to increase the crude oil storage capacity at the LARC and throughput (i.e., frequency of filling and emptying) of two existing tanks. The proposed project consists of the following activities that will occur within the LARC near the western boundary (see Figure 1-3 and Figure 1-4):

- One new, 615,000 bbl nominal capacity (500,000 bbl working capacity) crude oil storage tank (Tank 2640) with a geodesic dome would be installed.
- The permitted throughput limit of two 320,000 bbl nominal capacity existing external floating roof crude oil storage tanks, Tanks 510 and 511, would be increased from 4.562


EQUIPMENT PREFIX AND UNIT DESIGNATION
ZONE CODE
DESCRIPTION
AR 360 CRUDE TANKS
BA 332 BOILER AREA, UTILITIES
BU 360 WATER TREATMENT
CH 424 COKE BARN, COKE HANDLING
CK 415 COKER
CU 418 CRUDE UNIT NO.1, SULFUR PLANT
DA 418 CRUDE UNIT NO.2, SULFUR PLANT
DH 415 DESULFURIZER
DK 412 DISTILLATE HYDROTREATER
DT 418 GAS TREATER
DU 418 HOT FCC FEED PRETREATER
FG 360 CRUDE UNIT & OFFICE BUILDINGS
FH 360 TANK FARM SOUTHWEST
FJ 360 TANK FARM NORTHWEST
FK 360 TANK FARM SOUTH
FM 360 FLARE
FR 422 VACUUM FLASHER PLANT
HP 414 HYDROGEN PLANT
LA 360 CONTRACTOR PARKING
LP 360 LOADING PLANTHOUSE
NG 360 STORMWATER TANK & LPG AREA
OK 360 CONTRACTOR PARKING
QU 429 QUENCH UNIT
SA 360 SULFUR STORAGE & LOADING
SG 360 SAND AREA
SS 360 STAGING AREA
ST 091 WASTE WATER TREATMENT & GRIT BLASTING
SU 418 CONTRACTOR PARKING AREA
TL 360 SLO TRUCK LOADING AREA
LEGEND:
13 NUMBERS IN AND AROUND OBJECTS REPRESENT INDIVIDUAL TANK NUMBERS
PROPOSED PROJECT AREA
NORTH
0
400'
SCALE
ENVIRONMENTAL AUDIT, INC.
1000-A ORTEGA WAY • PLACENTIA, CA 92870-7125
714/632-8521 • FAX:714/632-6754
FIGURE 1-3
SITE PLAN - PHILLIPS 66 LOS ANGELES REFINERY
DRAWN BY M.B.
DATE CREATED 11/19/03
CHECKED DBS
LAST REV 06/11/12
SIZE 17x11
FILE NAME I:\2779\Site Plan Carson Plant (rev.1a)
CARSON PLANT
1520 E. SEPULVEDA BLVD.
Carson, California

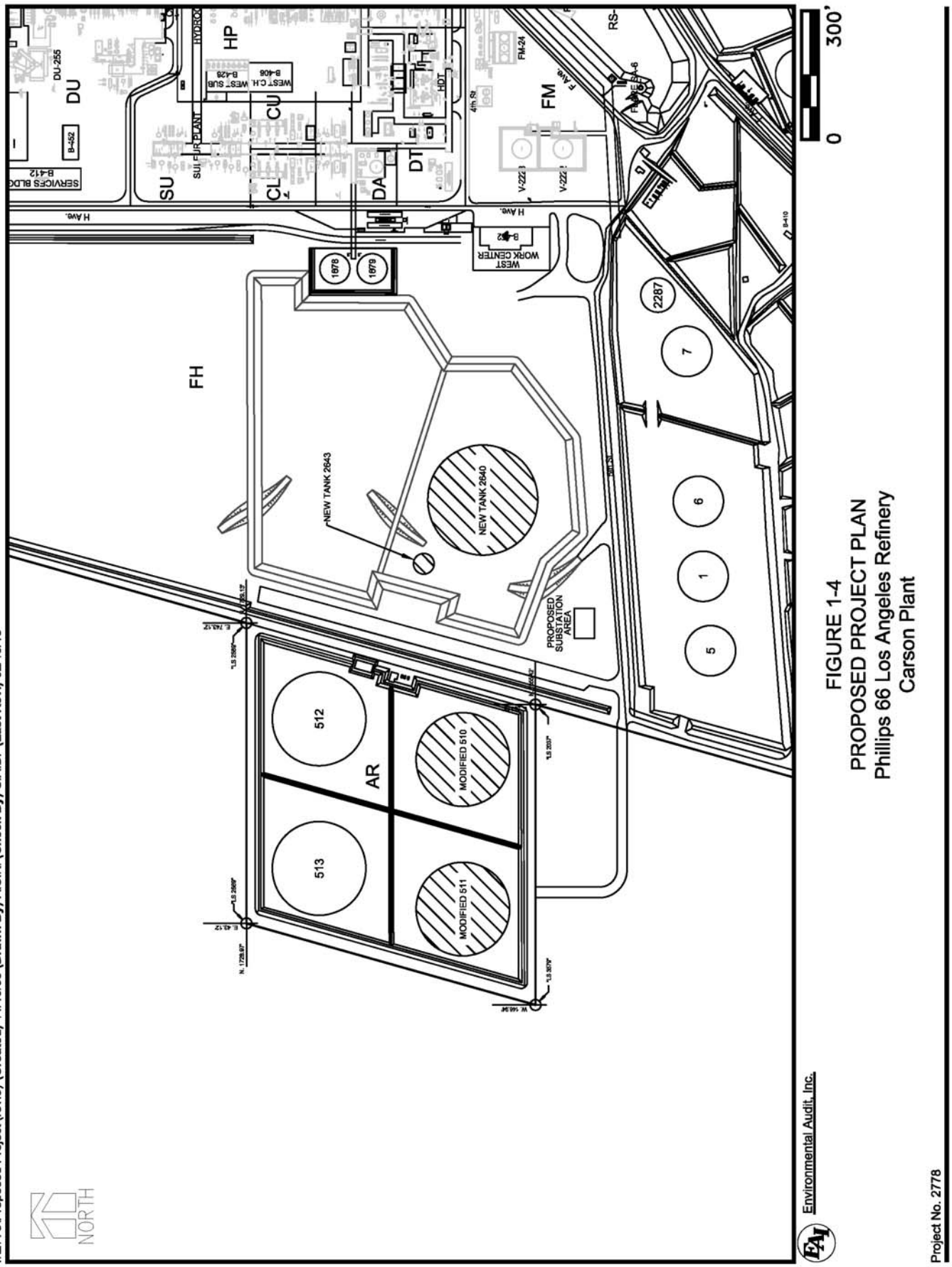


FIGURE 1-4
PROPOSED PROJECT PLAN
Phillips 66 Los Angeles Refinery
Carson Plant

Project No. 2778

million bbl per year to 18 million bbl per year for each tank and geodesic domes would be installed on each tank to control fugitive emissions.

- Two new, 2,100 gallons per minute (gpm) crude oil feed/transfer pumps would be installed to transfer crude oil into and out of the new tank (Tank 2640).One new, 14,000 bbl nominal capacity (10,000 bbl working capacity) water draw surge tank (Tank 2643), including geodesic dome, pumps, and pipelines would be installed.
- Three new heat exchangers and one steam trap to assist in water treatment would be installed.
- Tie-ins to the manifold of the Pier "T" crude oil delivery pipeline from Berth 121 would be installed.
- One new electrical power substation would be installed.

Table 1-1 shows the specifications of the existing and proposed storage tanks associated with the proposed project.

TABLE 1-1

Tank Specifications

Tank Number	Roof Type	Commodity Type	Working Volume (bbl)	Nominal Volume (bbl)	Diameter (ft)	Height w/o Dome (ft)	Additional Dome Height(ft)
Existing 510	FPR	Crude Oil	285,000	320,000	218	50	N/A
Existing 511	FPR	Crude Oil	285,000	320,000	218	50	N/A
Modified 510	Domed FPR	Crude Oil RVP 11	285,000	320,000	218	50	42
Modified 511	Domed FPR	Crude Oil RVP 11	285,000	320,000	218	50	42
New Tank 2640	Domed FPR	Crude Oil RVP 11	500,000	615,000	260	65	53
New Tank 2643	Domed FDR	Water/Crude	10,000	14,000	44	52	7

FPR = Floating Pontoon Roof; FDR = Floating Double-Deck Roof

Crude oil received at the LARC contains small amounts of water, which are separated from the crude oil and accumulate in the bottom of the crude oil storage tanks. The accumulated water, referred to as water draw, is transferred from the crude oil storage tanks into a smaller water draw surge tank for processing prior to disposal. Currently, the water draw from all existing crude oil tanks is processed in the Sour Water Stripper, which mostly operates at maximum capacity. In order to consolidate and more efficiently manage water draw from crude oil tanks, the water draw from all existing crude oil tanks and new crude oil Tank 2640 is proposed to be routed to the new water draw surge Tank 2643. The new 14,000 bbl water draw surge tank would allow LARC to treat the water in the Brine Stripper, which performs the same function as the Sour Water Stripper but has excess capacity. No modifications are required to the Brine Stripper, but new equipment would be added to adjust the temperature of the water from Tank 2643 prior to entering the Brine Stripper. The new equipment would consist of three new heat exchangers designed to raise the temperature of the water before entering the Brine Stripper, and a steam trap to remove condensed steam after the heat exchangers. The water draw surge tank

would contain water with minute amounts of crude oil that get carried over from the crude oil storage tanks during transfer. Over time, a thin layer of crude oil is expected to form in the water draw surge tank. Accumulated crude oil from the water draw surge tank would be collected and transferred back to the new crude oil storage tank.

Most of the new equipment will be installed in an area near the western boundary of the LARC that is presently vacant, but formerly the site of two below ground level crude oil storage reservoirs. These reservoirs were closed in 1995 under authorization from the California Regional Water Quality Control Board, Los Angeles Region (RWQCB) and are currently capped with a one-foot thick impermeable clay layer. During construction, the clay cap would be partially removed, replaced, and recompacted to support the concrete foundations for the new storage tanks (Tanks 2640 and 2643). The impermeable clay would be reused during the recompaction along with imported clean fill as needed. These ground disturbing activities will take place during the site preparation phase of the proposed project. The integrity and function of the clay cap would be maintained following completion of the proposed project. Because the proposed project site has been identified as having soil containing VOC materials, excavation at this location is subject to the requirements of SCAQMD Rule 1166 - Volatile Organic Compound Emissions From Decontamination of Soil, which requires the Refinery to obtain a SCAQMD-approved Rule 1166 Mitigation Plan to assure the control of fugitive emissions prior to the start of excavation activities. As a result, operators of the LARC have submitted an application to the SCAQMD for approval of a site-specific Rule 1166 Mitigation Plan as part of the proposed project. In addition, the clay cap removal will be subject to approval by the RWQCB, which is a responsible agency for this proposed project.

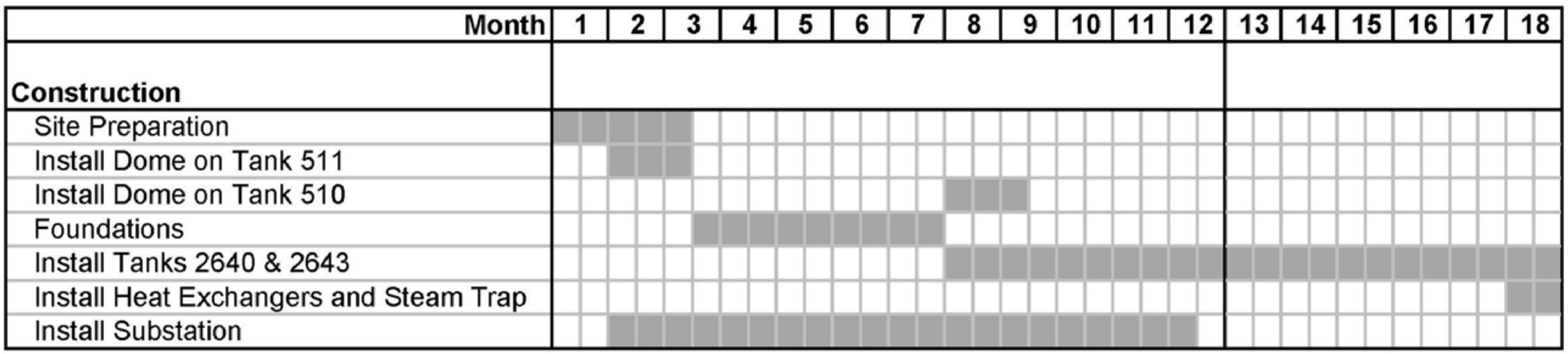
While onsite storage capacity and tank throughputs (i.e., frequency of filling and emptying the tanks) would increase as a result of implementing the proposed project, the baseline refining capacity of the LARC will not change as explained below. The refining capacity of the LARC is constrained by a number of factors including equipment design parameters, market demand, equipment maintenance schedules, equipment permit limit conditions, and crude oil characteristics (e.g., sulfur content, acidity, specific gravity, etc.). The Refinery (both Carson and Wilmington Plants combined) has a nominal refining capacity of 139,000 bbl per day (CEC, 2013). The refining capacity is based on the overall design of the refining processes within the Refinery. The heat required to first separate crude oil into various intermediate products, which are later refined further, dictates the amount of crude oil that can be processed overall by the Refinery. Specifically, the Crude Unit, the first step in the refining process, receives the crude oil directly from storage (e.g. from both the existing and proposed storage tanks), has operating crude throughput limits on the heater. The Crude Unit operations fluctuate based on conditions of other process units within the Refinery, market demand, and crude oil characteristics. The Crude Unit heater routinely operates at various firing rates and normally operates at or near the permit limit. The current operations of the Crude Unit, including the heater firing rate at or near the permit limit, is considered to be the baseline at the Refinery and the proposed project does not include modifications to the Crude Unit throughput or heater firing rate. Therefore, current operations of the Crude Unit would not be expected to change as a result of the proposed project. Additionally, for the same reasons, the proposed project will not modify operations of process units located downstream of the Crude Unit. Therefore, the proposed project would not change

the baseline operations of the refining processes or capacity at the LARC or the crude throughput of the Refinery.

1.6 CONSTRUCTION SCHEDULE

The preliminary construction schedule is provided in Figure 1-5. Construction activities are expected to take place over one and a half years. Early construction activities would include site preparation for the new crude oil tank including the removal and replacement of the clay cap in the existing reservoirs, and construction of the domes on the two existing crude oil storage Tanks 510 and 511. The crude oil storage tank 2640, along with the water draw surge tank 2643, would be constructed after the geodesic domes are installed on Tanks 510 and 511. Tie-in to the manifold from Pier B would occur toward the end of construction of Tank 2640. Heat exchangers and the steam trap would be installed during completion of Tank 2643 (Months 17 and 18). The electrical power substation would be installed concurrently with the tank construction. Peak construction activities are expected to occur during site preparation in Months 4, and 5, and would require approximately 100 to 115 construction workers.

Figure 1-5
Phillips 66 Los Angeles Refinery Carson Plant
Crude Storage Capacity Project
Construction Schedule



1.7 REQUIRED PERMITS AND APPROVALS

The proposed project would require permits to construct/operate from the SCAQMD, building permits from the City of Carson, and U.S. EPA approval of Title V air permit. Once these permits are issued, the removal, refilling, and recompaction of the clay cap to ensure soil stability of the former reservoir sites will be subject to RWQCB approval. Table 1-2 contains a summary of the various permits and approvals that will be required in order to implement the proposed project.

TABLE 1-2

Required Federal, State and Local Agency Permits and Approvals

Agency Permit or Approval	Requirement	Applicability to Project
Federal		
Environmental Protection Agency (U.S. EPA)	Title V of the 1990 Clean Air Act, 40 CFR Part 70	Permit revision required to contain air quality requirements for new and modified major stationary sources in attainment areas (SCAQMD to implement and U.S. EPA to approve).
	Resource Conservation and Recovery Act (RCRA), 40 CFR Parts 260 – 279	Requires proper handling of hazardous waste material.
Regional		
Regional Water Quality Control Board, Los Angeles Region (RWQCB)	Soil Management Plan Approval	Requires Soil Management Plan to be approved for oil reservoir cap activities.
	General Construction Stormwater Permit	Construction sites larger than one-acre are required to comply with the Statewide General Construction Permit
South Coast Air Quality Management District (SCAQMD)	SCAQMD Rule 201: Permit to Construct	Applications are required to construct or modify stationary emissions sources.
	SCAQMD Rule 203: Permit to Operate	Applications are required to operate stationary source emissions.
	SCAQMD Rule 212: Standards for Approving Permits	Requires public notification for a "significant project."
	SCAQMD Rule 219: Equipment Not Requiring a Written Permit Pursuant to Regulation II	Equipment with minimal emissions does not need to be permitted.
	SCAQMD Rule 301 : Permitting and Associated Fees	Requires fees to be paid for new or modified sources and evaluation of projects.
	SCAQMD Rule 401: Visible Emissions	Prohibits visible emissions from single emission sources.
	SCAQMD Rule 402: Nuisance	Discharges which cause a nuisance to the public are prohibited.
	SCAQMD Rule 403: Fugitive Dust	Contains best available control measure requirements for operations or activities that cause or allow emissions of fugitive dust.
	SCAQMD Rule 463: Oragnic Liquid Storage	Establishes vapor control requirements for storage tanks.
	SCAQMD Rule 466: Pumps and Compressors	Establish leak monitoring and repair requirements for fugitive VOC emission components.
	SCAQMD Rule 466.1: Valves and Flanges	Establish leak monitoring and repair requirements for fugitive VOC emission components.

TABLE 1-2 (Concluded)

Required Federal, State and Local Agency Permits and Approvals

Agency Permit or Approval	Requirement	Applicability to Project
SCAQMD (concluded)	SCAQMD Rule 467: Pressure Relief Devices	Establish leak monitoring and repair requirements for fugitive VOC emission components.
	SCAQMD Regulation IX: Standards of Performance for New Stationary Sources	Incorporates Federal regulations by reference.
	SCAQMD Rule 1166: Volatile Organic Compound Emissions From Decontamination of Soil	Application for a plan is required when soils to be excavated are impacted by hydrocarbons.
	SCAQMD Rule 1173: Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants	Contains requirements for inspection and maintenance of fugitive VOC emitting components.
	SCAQMD Rule 1176: VOC Emissions from Wastewater Systems	Contains requirements for inspection and maintenance of fugitive VOC emitting components.
	SCAQMD Rule 1178: Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities	Establishes equipment requirements for storage tanks.
	SCAQMD Regulation XIII: New Source Review (NSR) including key rules Rule 1303: Requirements Rule 1304: Exemptions Rule 1306: Emission Calculations Rule 1309: Emission Reduction Credits	New source review requirements for non-RECLAIM pollutant emissions sources, including need for best available control technology (BACT), modeling for significant impacts, and providing offsets for emission increases.
	SCAQMD Rule 1401: New Source Review of Toxic Air Contaminants	New sources emitting toxic air contaminants must limit emissions to the extent that the health risks to the maximum exposed individual are within allowable limits. Best Available Control Technology for Toxics (T-BACT) is generally required when cancer risk is greater than one in one million (1×10^{-6}).
	SCAQMD Regulations XXX: Title V Permits	Application for permit revision is required to construct, operate, or modify air emission sources. (SCAQMD to implement and U.S. EPA to approve).
Local		
City of Carson	Building permit	Required for foundations, building, etc.
	Grading permit	Required prior to grading land.
	Plumbing and electrical permits	General construction permit.

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CHAPTER 2
ENVIRONMENTAL CHECKLIST

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2.1 INTRODUCTION

The environmental checklist provides a standard evaluation tool to identify a project's adverse environmental impacts. This checklist identifies and evaluates potential adverse environmental impacts that may be created by the proposed project.

2.2 GENERAL INFORMATION

Project Title:	Phillips 66 Los Angeles Refinery Carson Plant – Crude Oil Storage Capacity Project
Lead Agency Name:	South Coast Air Quality Management District
Lead Agency Address:	21865 Copley Drive, Diamond Bar, CA 91765
Lead Agency Contact Person and Phone Number:	Barbara Radlein, Air Quality Specialist (909) 396-2716
Project Sponsor's Name:	Phillips 66 Los Angeles Refinery Carson Plant (LARC)
Project Sponsor's Address:	1520 East Sepulveda Boulevard, Carson, CA 90745
Project Sponsor's Contact Person and Phone Number:	Marshall Waller, Environmental Manager, (310) 952-6210
General Plan Designation:	Heavy Industrial
Zoning:	MH
Description of Project:	Phillips 66 is proposing to increase crude oil storage capacity at its Los Angeles Refinery Carson Plant by installing one new 615,000 bbl crude oil storage tank with a geodesic dome, increasing the annual permit throughput limit of two existing 320,000 bbl crude oil storage tanks, and installing geodesic domes on the same two existing 320,000 bbl crude oil storage tanks. Two new feed/transfer pumps and one 14,000 bbl water draw surge tank with associated pumps and pipelines would also be installed. Tie-ins to the Pier "T" crude oil delivery pipeline from Berth 121 would be installed and one new electrical power substation would be constructed. The following environmental topic areas were identified as having the potential to be affected by the proposed project: air quality and greenhouse gas emissions; energy; geology and soils; hazards and hazardous materials; hydrology and water quality; noise; solid and hazardous waste; and, transportation and traffic. However, the analysis of these environmental topic areas in the Draft ND concluded that the proposed project would not generate any significant adverse environmental impacts.
Surrounding Land Uses and Setting:	The LARC is bounded on the north by Sepulveda Boulevard, on the west by Wilmington Avenue, on the south by a branch of the Burlington Northern and Santa Fe Railroad, and on the east by Alameda Boulevard. Property to the north of the LARC is occupied by the BP Los Angeles Refinery (as of June 1, 2013 is

	owned by Tesoro). The western boundary of the LARC borders a shipping and container storage facility. Property across Wilmington Avenue includes a residential neighborhood to the northwest and commercial uses to the southwest. Land uses to the south of the LARC are heavy industrial. Land south of Lomita Avenue is dominated by port-related activities. Land east of Alameda Street is occupied by a storage tank farm and the Tesoro Refinery.
Other Public Agencies Whose Approval is Required:	City of Carson RWQCB

2.3 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The following environmental impact areas have been assessed to determine their potential to be affected by the proposed project. As indicated by the checklist on the following pages, environmental topics marked with an "✓" may be adversely affected by the proposed project. An explanation relative to the determination of impacts can be found following the checklist for each area.

☐ Aesthetics	☐ Geology and Soils	☐ Population and Housing
☐ Agriculture and Forestry Resources	☐ Hazards and Hazardous Materials	☐ Public Services
☐ Air Quality and Greenhouse Gas Emissions	☐ Hydrology and Water Quality	☐ Recreation
☐ Biological Resources	☐ Land Use and Planning	☐ Solid and Hazardous Waste
☐ Cultural Resources	☐ Mineral Resources	☐ Transportation and Traffic
☐ Energy	☐ Noise	☐ Mandatory Findings of Significance

2.4 DETERMINATION

On the basis of this initial evaluation:

☑ I find the proposed project COULD NOT have a significant effect on the environment, and that a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be significant effects in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect(s) on the environment, and an ENVIRONMENTAL IMPACT REPORT (EIR) is required.

☐ I find that the proposed project MAY have a "potentially significant impact" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Date: September 6, 2013 **Signature:** 

Michael Krause
Program Supervisor, CEQA
Planning, Rules, and Area Sources
Telephone: (909) 396-2706

2.5 ENVIRONMENTAL CHECKLIST AND DISCUSSION

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
I.	**AESTHETICS.** Would the project:				
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☑
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☑
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☑
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☑	☐

Significance Criteria

The proposed project impacts on aesthetics will be considered significant if:

- The project will block views from a scenic highway or corridor.
- The project will adversely affect the visual continuity of the surrounding area.
- The impacts on light and glare will be considered significant if the project adds lighting which would add glare to residential areas or sensitive receptors.

Discussion

I. a), b), and c) The nearest officially designated Scenic Highway to the LARC would be Route 2 (Angeles Crest Scenic Byway) near La Canada/Flintridge, in the northeastern portion of Los Angeles County. It is approximately 24 miles north from the LARC to the most southern portion of Route 2. Therefore, the City of Carson is not visible from Route 2 due to the distance as well as the presence of numerous large buildings of downtown Los Angeles, and the intervening topography (hills and mountains) between downtown Los Angeles and the beginning of Route 2 near La Canada/Flintridge (Caltrans, 2012).

The nearest roadway, which is eligible for State Scenic Highway Designation, to the LARC is Route 1 (Pacific Coast Highway at State Route 19 – Lakewood Boulevard, in Long Beach) in the southernmost portion of Los Angeles County. At approximately five miles from the LARC to the intersection of State Route 19, Route 1 becomes eligible to become a State Scenic Highway.

The LARC is not visible to Route 1 at State Route 19 due to the numerous structures and topography between the two locations. There are no officially designated Scenic Highways or highways eligible for State Scenic Highway Designation in the vicinity of the LARC. Because of the substantial distance between the proposed project and the aforementioned scenic highways, no significant adverse impacts to scenic highways are expected.

The proposed project includes installing one new 615,000 barrel crude oil tank (with a net working capacity of 500,000 barrels) with a geodesic dome; installing geodesic domes on two existing crude oil storage tanks (Tanks 510 and 511); installing one new electrical power substation; installing new piping and two transfer pumps; and installing one new 14,000 barrel water draw surge tank. The two existing crude oil storage (Tanks 510 and 511) are each 320,000 barrel tanks that are 218 feet in diameter and with the addition of new 42 foot domes, a total of 92 feet high. The new 615,000 barrel crude oil storage tank would be 260 feet in diameter and 118 feet high. Thus, with the installation of the geodesic domes on the two existing storage tanks, the new heights would vary between about 92 feet (existing Tanks 510 and 511) to about 118 feet for the new crude oil tank. However, other existing equipment within the boundary of the LARC, e.g., vessels and flares, are at heights of up to 250 feet high and exceed the highest height of the new tank to be installed as part of the proposed project.

The LARC is surrounded by other industrial land uses with similar aesthetic qualities. Land uses adjacent to the LARC are all heavy industrial and include the Alameda rail corridor and the related rail activity, Kinder Morgan Terminal, and Tesoro Los Angeles Refinery- Wilmington Operations to the east; the Tesoro Los Angeles Refinery – Carson Operations to the north; Container Transportation Services shipping and container storage facility to the west; and other heavy industrial uses (e.g., container storage yards) to the south.

The views of the LARC from adjacent properties are not expected to significantly change because the proposed project facilities would blend in with the existing site facilities and operations. The closest residential areas are located one-third of a mile to the west of the western boundary of the LARC with other heavy industrial facilities between the site and residential properties. The new tanks and the domes on the existing tanks would be visible from Sepulveda Boulevard, which is located in an industrial area, and the views of the new/modified tanks would be consistent with the other industrial facilities. No significant change in visual characteristics and no damage to scenic resources in the vicinity of the LARC are expected to occur from implementing the proposed project.

I. d) In general, construction activities are not anticipated to require additional lighting because they are scheduled to take place during daylight hours. However, when daylight hours are limited (i.e., winter months), temporary lighting may be required. Since the proposed project would be located within the boundaries of the existing LARC facility, additional temporary lighting, if needed, is not expected to be discernible from the existing permanent night lighting already associated with the LARC. Any temporary lighting would be required to point toward the interior of the LARC to limit the potential for offsite glare in accordance with the City of Carson Municipal Code §9147.1. The closest residential areas are located over one-third of mile to the west of western boundary of the LARC with other heavy industrial facilities between the construction site and residential properties; therefore, no significant adverse light and glare impacts to residential properties would be expected.

If additional permanent light sources are necessary for operation of the new storage tank and water draw surge tank, they would be installed on the new equipment to provide illumination for operations personnel at night in accordance with applicable safety standards including the Cal-OSHA (Title 8, California Code of Regulations (CCR), §3317). These additional light sources, if needed, are not expected to create an offsite glare impact because the proposed project components would be located within existing industrial facilities, which are already lighted at night for nighttime operations. Further, adjacent industrial facilities are also brightly lit and residential areas are located about one-third of a mile away from the LARC, so additional lighting at the site is not expected to be noticeable in residential areas. Therefore, no significant adverse light and glare impacts, either during construction or operation, are anticipated from implementing the proposed project.

Based upon these considerations, significant adverse aesthetics impacts are not expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse aesthetic impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
II.	**AGRICULTURE AND FORESTRY RESOURCES.** Would the project:				
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland mapping and Monitoring Program of the California Resources Agency, to non- agricultural use?	☐	☐	☐	☑
b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☑
c)	Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code §12220(g)), timberland (as defined by Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code §51104 (g))?	☐	☐	☐	☑
d)	Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☑

Significance Criteria

Project-related impacts on agricultural and forestry resources will be considered significant if any of the following conditions are met:

- The proposed project conflicts with existing zoning or agricultural use or Williamson Act contracts.
- The proposed project will convert prime farmland, unique farmland or farmland of statewide importance as shown on the maps prepared pursuant to the farmland mapping and monitoring program of the California Resources Agency, to non-agricultural use.
- The proposed project conflicts with existing zoning for, or causes rezoning of, forest land (as defined in Public Resources Code §12220(g)), timberland (as defined in Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code §51104(g)).

- The proposed project would involve changes in the existing environment, which due to their location or nature, could result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use.

Discussion

II. a), b), c), and d) The proposed project would not involve construction outside of the existing boundaries of the LARC. The proposed project would be consistent with the heavy industrial zoning requirements for the LARC and there are no agriculture or forestry resources or operations on or near the LARC. No agricultural resources including Williamson Act contracts are located within or would be impacted by construction activities at the LARC because the new tanks are being installed on existing established property. Therefore, the proposed project would not result in any new construction of buildings or other structures that would convert farmland to non-agricultural use of conflict with zoning for agricultural use or a Williamson Act contract.

Since the proposed project would not substantially change any facility or process at the LARC, there are no provisions in the proposed project that would affect land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments and no land use or planning requirements relative to agricultural resources would be altered by the proposed project. For these same reasons, the proposed project would not result in the loss of forest land or conversion of forest land to non-forest uses.

Based upon these considerations, significant adverse agricultural and forestry resources impacts are not expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse agriculture and forestry resources impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
III.	**AIR QUALITY AND GREENHOUSE GAS EMISSIONS.** Would the project:				
a)	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☑
b)	Violate any air quality standard or contribute to an existing or projected air quality violation?	☐	☐	☑	☐
c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☐	☑	☐
d)	Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☑	☐
e)	Create objectionable odors affecting a substantial number of people?	☐	☐	☑	☐
f)	Diminish an existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s)?	☐	☐	☑	☐
g)	Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☑	☐
h)	Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☑	☐

Significance Criteria

To determine whether or not air quality and greenhouse gas (GHG) emission impacts from implementing the proposed project are significant, impacts will be evaluated and compared to the criteria in Table 2-1. The proposed project will be considered to have significant adverse impacts if any one of the thresholds in Table 2-1 are equaled or exceeded.

TABLE 2-1

Air Quality and Greenhouse Gas (GHG) Significance Thresholds

Mass Daily Thresholds[a]		
Pollutant	**Construction[b]**	**Operation[c]**
NO_x	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
PM2.5	55 lbs/day	55 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Toxic Air Contaminants, Odor, and GHG Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Chronic and Acute Hazard Index ≥ 1.0 (project increment) Cancer Burden ≥ 0.5 excess cancer cases (in areas ≥ 1 in 1 million)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
GHG	10,000MT/yr CO_2eq for industrial facilities	
Ambient Air Quality for Criteria Pollutants[d]		
NO_2 1-hour average annual average	In attainment; significant if project causes or contributes to an exceedance of any standard: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 ppm (federal)	
PM10 24-hour annual average	10.4 μg/m^3 (construction)[e] and 2.5 μg/m^3 (operation) 1.0 μg/m^3	
PM2.5 24-hour average	10.4 μg/m^3 (construction)[e] and 2.5 μg/m^3 (operation)	
SO_2 1-hour average 24-hour average	0.255 ppm (state) and 0.075 ppm (federal – 99th percentile) 0.04 ppm (state)	
Sulfate 24-hour average	25 μg/m^3 (state)	
CO 1-hour average 8-hour average	In attainment; significant if project causes or contributes to an exceedance of any standard: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)	
Lead 30-day average Rolling 3-month average Quarterly average	1.5 μg/m^3 (state) 0.15μg/m^3 (federal) 1.5μg/m^3 (federal)	

a) Source: SCAQMD Air Quality Significance Thresholds, www.aqmd.gov/ceqa/handbook/signthres.pdf.
b) Construction thresholds apply to both the SCAB and Coachella Valley (Salton Sea and Mojave Desert Air Basin)
c) For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.
d) Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
e) Ambient air quality threshold based on SCAQMD Rule 403.

KEY: ppm = parts per million; μg/m^3 = microgram per cubic meter; lbs/day = pounds per day; MT/yr CO_2eq = metric tons per year of CO_2 equivalents, ≥ greater than or equal to, > = greater than

Discussion

III. a) The 2012 Air Quality Management Plan (AQMP) demonstrates that the applicable ambient air quality standards can be achieved within the timeframes required under federal law. Growth projections from local general plans adopted by cities in the district are provided to the Southern California Association of Governments (SCAG), the agency that develops regional growth forecasts. These forecasts were then used to develop future air quality emissions inventory forecasts for the 2012 AQMP. Development consistent with the growth projections in the City of Carson General Plan is considered to be consistent with the 2012 AQMP. The General Plan designates the LARC as heavy industrial so the proposed project is consistent with this land use. Since the proposed project does not change that designation and would be consistent with the City of Carson General Plan, it would be consistent with the 2012 AQMP. The proposed project would be consistent with the Carson General Plan for the following reasons:

- As indicated in the Population and Housing and Transportation/Traffic sections, the estimated 100 to 115 construction workers are expected to be drawn from the existing labor pool in the southern California area.

- As indicated in the Population and Housing and Transportation and Traffic sections, the proposed project is not expected to require additional Refinery employees during operations, so no additional worker-related traffic during operation would be generated.

- Because the proposed project would not require additional workers during operations, it would not increase the demand for additional housing, and thus, would not require changes to local use designations.

Therefore, because the proposed project is consistent with existing zoning and would not exceed the growth projections in the City of Carson General Plan that would require a General Plan amendment, the proposed project is considered to be consistent with the Carson General Plan.

Additionally, the proposed project would be required to comply with applicable SCAQMD requirements for new stationary sources. Compliance with established rules ensures the integrity of the emission inventories in the 2012 AQMP. For example, new and modified emission sources associated with the proposed project would be subject to SCAQMD Regulation XIII - New Source Review, would be required to be equipped with Best Available Control Technology (BACT), and would require emission reduction credits to offset any emission increases greater than one pound per day. The proposed project would also be required to comply with prohibitory rules, such as SCAQMD Rule 403 - Fugitive Dust and SCAQMD Rule 1173 - Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants.

III. b), c) and f) For a discussion of these items, refer to the following analysis.

Construction Air Quality Impacts

The SCAQMD makes significance determinations for construction impacts based on the maximum or peak daily emissions during the construction period, which provides a "worst-case" analysis of the construction emissions. Construction activities will not all occur at the same time but rather over time as depicted in Figure 1-5. Construction emissions are expected from the following equipment and processes:

- Onsite Construction Equipment (dump trucks, backhoes, graders, etc.);
- Onsite and Offsite Vehicle Emissions, including Delivery Trucks and Worker Vehicles;
- Onsite Fugitive Dust Associated with Site Construction Activities; and,
- Onsite and Offsite Fugitive Dust Associated with Travel on Unpaved and Paved Roads.

Construction activities are expected to occur near the western boundary of the LARC (see Figure 1-3) and would be focused in an area of approximately 12 acres. Construction emissions were calculated for peak daily construction activities in each month construction is expected to occur and are presented in Table 2-2. Peak daily emissions are the sum of the highest daily emissions for each criteria pollutant from employee vehicles, fugitive dust sources, construction equipment, and transport activities occurring during the particular construction phase. Total peak construction emissions occur in Month 1 for nitrogen oxides (NOx); in Month 4 for carbon monoxide (CO), sulfur oxides (SOx), and particulate matter less than 2.5 micron (PM2.5); in Month 5 for particulate matter less than 10 micron (PM10); and in Month 17 for volatile organic compounds (VOC). Detailed construction emissions calculations are provided in Appendix A.

Construction Equipment

Onsite construction equipment would be one source of combustion emissions. Construction equipment may include backhoes, compressors, cranes, excavators, loaders, generators, graders, roll-off trucks, scrappers, trenchers, water truck, and welding machines necessary to accomplish the particular tasks from the construction phase. The equipment is assumed to be operational for no more than ten hours per day. Construction workers are expected to be at the site for longer than eight hours per day, including time for lunch and breaks, organization meetings, and other administrative tasks. A conservative estimate of actual construction activities is ten hours per day. Emission factors for construction equipment were taken from the CEQA Air Quality Handbook Construction Equipment Emissions tables available on the SCAQMD webpage (http://www.aqmd.gov/ceqa/hdbk.html) and are based on CARB EMFAC. Estimated peak daily emissions from construction equipment used during the different construction phases are included in Table 2-2. Thus, these peak daily values are occurring during different months of different construction phases.

TABLE 2-2

Peak Daily Construction Emissions[(a)]

PEAK CONSTRUCTION ACTIVITY	VOC (lbs/day)	CO (lbs/day)	NOx (lbs/day)	SOx (lbs/day)	PM10 (lbs/day)	PM2.5[(b)] (lbs/day)
Construction Equipment	2.57	55.64	83.06	0.13	3.65	4.02
Vehicle Emissions	0.77	15.42	2.69	0.03	11.22	1.96
Fugitive Dust From Construction[(c)]	--	--	--	--	20.32	11.79
Fugitive Road Dust[(c)]	--	--	--	--	11.36	2.39
Architectural Coating	62.25	--	--	--	--	--
Total Emissions[(d)]	**65.30**	**71.06**	**85.75**	**0.16**	**46.56**	**20.15**
Significance Threshold	75	550	100	150	150	55
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

(a) Peak emissions for VOC predicted to occur in Month 17. Peak emissions for CO, SOx and PM2.5 predicted to occur during Month 4. Peak emissions for NOx predicted to occur during Month 1. Peak emissions for PM10 predicted to occur in Month 5.

(b) PM2.5 is determined using SCAQMD, 2006. Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 CEQA Significance Thresholds, SCAQMD, October 2006, https://www.aqmd.gov/ceqa/handbook/PM2_5/finalAppA.doc

(c) Application of water three times per day to comply with SCAQMD Rule 402 (d)(2).

(d) The total emissions in this table may differ slightly from those in Appendix A due to rounding.

Vehicle Emissions

Vehicle emissions include construction worker commute vehicles, pick-up trucks, flatbed trucks dump trucks, water trucks, semi-tractors, concrete trucks, and delivery trucks. Primary emissions generated would include combustion emissions from engines during idling and while operating. Emissions are based on the estimated number of trips per day and the round trip travel distances.

Construction emissions include emissions from construction worker vehicles traveling to and from the work site. The peak manpower needed during the construction period is expected to be 115 workers. Each worker commute vehicle is assumed to travel 14.7 miles (CalEEMod, 2011) to and from work each day, making two one-way trips per day. Emissions from employee vehicles are presented in Table 2-2. Emissions from employee vehicles were calculated using the EMFAC2011 Emission Inventory model.

Cars and pickup trucks used for short trips within and near the LARC are assumed to travel five miles or less per trip.

Medium-duty and heavy-duty diesel trucks used during construction include dump trucks, haul trucks, water trucks, and delivery trucks. Heavy heavy-duty semi-trucks and concrete trucks were also included in the project construction analysis. Primary emissions generated would include exhaust emissions from diesel engines while operating. Emissions from trucks (both

medium-duty and heavy-duty) are calculated using the CARB EMFAC2011 model. Estimated emissions for all trucks are included in Table 2-2.

Fugitive Dust Associated with Site Construction Activities

Activities that may generate fugitive dust at the site include grading, trenching, wind erosion, and truck filling/dumping, which occur primarily during site preparation and when constructing necessary foundations. During construction activities, water used as a dust suppressant would be applied in the construction area during grading, trenching, and earth-moving activities to control or reduce fugitive dust emissions pursuant to SCAQMD Rule 403 (d)(2). Application of water reduces PM emissions by a factor of up to 61 percent (SCAQMD, 2011). It is assumed that one water application per day reduces PM emissions by 34 percent, two applications per day reduce emissions by 50 percent, and three applications per day reduce emissions by 61 percent (SCAQMD, 2011). Fugitive dust suppression, often using water, is a standard operating practice and is one method of complying with SCAQMD Rule 403. Estimated peak controlled PM10 and PM2.5 emissions during peak construction activities for fugitive dust sources are 20.32 pounds per day and 11.79 pounds per day using the PM10 to PM2.5 fraction ratio of 0.58 (Profile 391), respectively, which assumes watering three times per day (see Table 2-2) to comply with SCAQMD Rule 402 (d)(2). The detailed emission calculations are provided in Appendix A.

Fugitive Dust Associated with Travel on Paved and Unpaved Roads

Vehicles and trucks traveling on paved and unpaved roads including public roads and onsite roads are also a source of fugitive emissions during the construction period. Fugitive road dust emissions were calculated for vehicles traveling to the LARC, onsite cars, light-duty trucks, and buses. The fugitive emissions for trucks assume delivery trucks would travel on paved roads (both public and onsite) and water trucks and off-road construction equipment would travel on unpaved roads. Emissions of dust caused by travel on paved roads were calculated using the U.S. EPA's, AP-42, Section 13.2.1 emission factor for travel on paved roads. Emissions of dust caused by travel on unpaved roads were calculated using the U.S. EPA's, AP-42, Section 13.2.2 emission factor for travel on unpaved roads. CARB's Methodology 7.9 was used to determine the appropriate silt loading for calculating fugitive dust emissions. The estimated fugitive PM10 and PM2.5 emissions on paved roads during peak construction activities (Month 5 and Month 4 respectively) from vehicles for fugitive dust on paved roads are 10.88 pounds per day and 1.65 pounds per day, respectively (see Table 2-2 and Appendix A). The estimated fugitive PM10 and PM2.5 emissions during peak construction activities (Month 5 and Month 4 respectively) from vehicles for fugitive dust on unpaved roads are 11.36 pounds per day and 2.39 pounds per day, respectively (see Table 2-2 and Appendix A).

Architectural Coatings

The proposed project would include the application of some architectural coating. An estimated 75 gallons of industrial maintenance coating are expected to be applied on the peak day. The proposed project would use coatings that comply with SCAQMD Rule 1113 - Architectural Coatings, which limits the VOC emissions of the industrial maintenance coating to 100 grams per liter (0.83 pounds per gallon). The estimated architectural coating VOC emissions during

peak construction activities (Months 17 and 18) are 62 pounds per day (see Table 2-2 and Appendix A).

Miscellaneous Emissions

The proposed project would be constructed in the area of the former crude oil reservoir, which has a clay cap. During construction the clay cap would be removed, replaced, and recompacted to support the concrete foundations for the new Tanks 2640 and 2643. Pre-project soil sampling and analysis have identified hydrocarbon concentrations that may be encountered during construction. Therefore, in addition to the construction-related emissions already identified, the proposed project could generate emissions of VOC if contaminated soil is found and soil remediation activities are necessary. Since the proposed project site has been identified as having soil containing VOC materials, excavation at this site is subject to the requirements of SCAQMD Rule 1166. The facility must obtain a SCAQMD-approved Rule 1166 Mitigation Plan to assure the control of fugitive emissions prior to the start of excavation activities. Rule 1166 includes requirements for SCAQMD notification at least 24 hours prior of the start of excavation, monitoring (at least once every 15 minutes, within 3 inches of the excavated soil surface), as well as implementation of a mitigation plan when VOC-contaminated soil is detected. Rule 1166 defines VOC contaminated soil as soil which registers a concentration of 50 ppmv or greater of VOC. An approved mitigation plan generally includes covering contaminated soil piles with heavy plastic sheeting and watering activities to assure the soil remains moist. In addition, VOC-contaminated soils shall be treated or removed within 30 days from the time of excavation. The facility has submitted an application for a site-specific SCAQMD Rule 1166 Mitigation Plan, and it is anticipated approval of the plan will be issued along with the permit to construct for the project. Soil remediation activities are also under the jurisdiction of the RWQCB. Following SCAQMD approval of the proposed project, a Soil Management Plan will be submitted to the RWQCB for approval. The RWQCB, when considering the Soil Management Plan, relies on the analysis in this Negative Declaration and the SCAQMD Rule 1166 Mitigation Plan. The quantification of VOC emissions from soil contamination are estimated to be 3.26 pounds per day (see Appendix A for detailed calculations).

CO Hot Spots During Construction

The potential for high concentration of CO emissions associated with truck/vehicle traffic was considered and evaluated per the requirements of the SCAQMD CEQA Air Quality Handbook (SCAQMD, 1993). The Handbook indicates that any project that could negatively impact levels of service at local intersections may create a CO hot spot and should be evaluated. As discussed in Section XVII – Transportation and Traffic, no changes in level of service are expected from the proposed project during construction.

Construction Emission Summary

Construction activities associated with the modifications to the LARC would result in emissions of CO, VOC, NOx, SOx, PM10, and PM2.5. Construction emissions for the proposed project are summarized in Table 2-2, together with the SCAQMD's daily construction significance

thresholds. Emissions generated during the construction phase of the proposed project are expected to be below the significance thresholds for criteria pollutants. Therefore, less than significant potential adverse construction air quality impacts are expected to occur as a result of implementing the proposed project.

Localized Construction Impacts

The SCAQMD has developed a Localized Significance Threshold (LST) Methodology to evaluate the potential localized impacts of criteria pollutants from construction activities (SCAQMD, 2008). The LST Methodology requires that the emissions of CO, NO_2, PM10, and PM2.5 associated with the proposed project be evaluated for impacts on ambient air quality standards at the local receptor. Impacts from other criteria pollutants are regional in nature and, therefore, are not included as part of the localized air quality analysis. Only onsite construction emissions sources were included in the LST analysis. The closest sensitive receptor is located in the residential area, which is about one-third mile west of the LARC.

The LST Methodology includes lookup tables for screening emission rates for significance for projects with an area of five acres or less. The total construction area for the proposed project is approximately 12 acres; however, because of the phased nature of the construction schedule, no more than one acre is expected to be disturbed at any time. Therefore, the lookup tables were used for a one-acre area.

If the calculated construction emissions are less than the emission levels found in the LST lookup tables, localized air quality impacts from the construction activities are not considered significant. The screening tables were developed using conservative assumptions, including the worst-case meteorological conditions. If localized emissions exceed the values in the lookup tables dispersion modeling, which is more precise, may be performed. The CO, NOx, PM10, and PM2.5 emissions from the construction activities for the proposed project are less than the LST emission levels found in the LST lookup tables and, therefore, are expected to be less than significant (see Table 2-3).

TABLE 2-3

LST Evaluation for Construction Emissions

Criteria Pollutant	CO (lbs/day)	NOx (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)
Peak Construction Emissions	55.64	83.06	46.56	20.15
Screening Value[(a)]	7,558	142	158	93
Significant?	No	No	No	No

(a) Appendix B of the SCAQMD Final LST Methodology (Oct. 2009). 1 acre site in SRA #4 at 500 meters.

Federal ambient air quality standards were not analyzed because the federal standards are based on a three-year period and the proposed project construction period would be less than three years.

Based on the above analysis, the proposed project would not be expected to create any localized significant impacts on air quality during construction.

Operational Air Quality Impacts

Stationary Sources

The proposed project would add one new crude tank, one new water draw surge tank, and modify two existing tanks in the LARC. Operation of the new storage tank and water draw surge tank would increase fugitive VOC emissions at the LARC. No other criteria pollutants would be affected.

Combustion Sources

The proposed project would not require new combustion sources or increase emissions of any existing combustion sources. Crude oil processing is constrained by many factors including equipment design capacity, permit conditions, such as firing rates for combustion sources, and maintenance schedules of various operating units within the LARC. The processing rates are not influenced by storage capacity. The refining processes rates fluctuate and have achieved maximum capacity periodically in the past and are expected periodically in the future. However, no changes are being proposed for the operating refining units that would affect the maximum capacity of the refining units including combustion sources.

Fugitive Emissions

Fugitive emissions are emissions released directly into the atmosphere that do not pass through a stack, vent etc., and are not typically permitted (e.g. valves, flanges, and pumps). The new and existing storage tanks would be sources of fugitive VOC emissions during the filling and emptying operation and they would need new and modified permits to operate. The proposed project would also increase fugitive VOC emissions from fugitive components associated with the piping to the new tanks, and these emissions would be monitored in accordance with the requirements in SCAQMD Rule 1173. The VOC emission estimates for the proposed new tanks and tank modifications are based on U.S. EPA TANKS 4.0.9d. VOC emissions from the new water draw surge tank have been calculated assuming a thin crude oil layer is present in the tank, using crude oil properties to determine the emissions. All peak daily tank emissions are based on June emissions, which show the highest daily fugitive VOC tank emissions in the TANKS model. All speciated tank emissions for the health risk analysis are based on annualized emission rates from the TANKS model. Fugitive emissions from components are based on the Method 2 of the *SCAQMD Guide for Fugitive Emissions Calculations* (SCAQMD, 2003). The fugitive VOC emissions from the proposed project are summarized in Table 2-4 (see also Appendix A for more detailed emission calculations).

TABLE 2-4

Operational Emissions Summary

Sources	VOC (lbs/day)	CO (lbs/day)	NOx (lbs/day)	SOx (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)
Baseline Emissions[(a)]	**16.74**	**0**	**0**	**0**	**0**	**0**
Proposed Project Emissions[(b)]						
Modified Crude Tank 510	17.04	0	0	0	0	0
Modified Crude Tank 511	17.04	0	0	0	0	0
New Crude Tank 2640	19.54	0	0	0	0	0
New Water Tank 2643	4.27	0	0	0	0	0
New Fugitive Component Emissions	9.67	0	0	0	0	0
Total Proposed Project Emissions	**67.57**	**0**	**0**	**0**	**0**	**0**
Overall Project Emissions[(c)]	**50.83**	**0**	**0**	**0**	**0**	**0**
Significance Thresholds	**55**	**550**	**55**	**150**	**150**	**55**
Significant?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

(a) Based on TANKS 4.0 model of 2010 throughputs for Tanks 510 and 511.
(b) See Appendix A for detailed emission calculations.
(c) Overall Project Emissions = Proposed Project Emissions – Baseline Emissions
(d) The emissions in the table may differ slightly from those in Appendix A due to rounding.

Ship Emissions

The current capacity of the existing storage tanks at the LARC limits vessel delivery volumes to Panamax vessels (400,000 bbl capacity), which are the size limits of vessels that can travel through the Panama Canal. For larger vessels, such as Aframax (720,000 bbl capacity) or Suezmax (1,000,000 bbl capacity), the current capacities of the existing storage tanks at the LARC require two ship calls to unload the full volume of the vessels, resulting in seven to 10 days when the ship remains in the port area. When a ship larger than Panamax calls, the LARC can only accept a delivery of the first portion of the crude oil to be stored in the existing storage tanks until such time when the LARC processes enough crude oil such that there is enough available storage capacity to accommodate a second delivery of the remaining crude oil from the same, larger vessel. This results in the large ships leaving berth and going out to anchorage to wait until the LARC has enough available capacity to store the remaining product. While at anchorage, ships continue to produce emissions as the ship engines need to operate in order to hotel the ship workers and to maneuver the ship to and from the berth. The proposed project is designed to reduce or eliminate the need for large ships to go out to anchorage, which would reduce the time ships remain in the port and the associated ship emissions for each large ship visit.

Under the proposed project, ship emissions would not change for any small ship visits (less than 400,000 bbl) since the ships can complete their delivery during one visit. Emissions for various

larger-sized ships would decrease with the elimination of the anchorage and additional maneuvering to and from the berth. A comparison of ship emissions per 100,000 bbl delivered has been calculated (see Table 2-5). The analysis compares the emissions from delivery activities associated with the various size ships that currently deliver crude oil with the emissions from delivery activities following implementation of the proposed project. For most pollutants, emissions reductions from the current ship activities to post-project ship activities are expected (see Table 2-5 and Appendix A for more detailed calculations). The potential increase in CO_2e emissions for two scenarios are analyzed in the GHG discussion (Section III g. and h).

TABLE 2-5

Comparison of Current and Post-Project Ship Emissions
(lbs/100,000 bbl delivered)

Comparison (Existing/Post-Project)[(a)]	Emissions Difference (lbs/100,00 bbl delivered)						Emissions Difference (MT/100,000 bbl delivered)
	VOC	CO	NOx	SOx	PM10	PM2.5	CO_2e
Panamax/Panamax	NC	NC	NC	NC	NC	NC	NC
Aframax/Panamax	-0.5	-1.2	-13.2	-0.3	-0.2	-0.2	0.1
Aframax/Aframax	-0.2	-0.5	-5.2	-0.3	-0.1	-0.1	-0.1
Aframax/Suezmax	-0.1	-0.4	-4.3	-0.2	-0.1	-0.1	-0.2
Suezmax/Panamax	-0.5	-1.2	-13.4	-0.3	-0.2	-0.2	0.1
Suezmax/Aframax	-0.2	-0.5	-5.4	-0.3	-0.1	-0.1	-0.1
Suezmax/Suezmaz	-0.2	-0.4	-4.5	-0.2	-0.1	-0.1	-0.2

Negative numbers represent emission reductions.
MT = metric tons; NC = no change.
(a) Existing/Post Project is the difference in the ship emissions for the specified size from current activities compared to the expected emissions from ship activities once the proposed project is implemented.

Operational Emissions Summary

Daily operational emissions would be generated by stationary sources only, so no change in daily emissions from mobile sources other than ships would be expected from implementing the proposed project. Stationary source emissions include only fugitive VOCs. The primary source of fugitive VOC emissions from the proposed project would be from the operation (e.g., filling and emptying) of the crude oil storage tanks, and secondary sources of fugitive emissions would be from the piping and supporting connections to the crude tanks. Since the existing tanks (Tanks 510 and 511) would each require a permit modification and the new tanks (Tanks 2640 and 2643) would each require a new SCAQMD Permit to Operate, any increase in VOC emissions would require offsets to comply with SCAQMD Regulation XIII - New Source Review, specifically SCAQMD Rule 1303 - Requirements. The peak daily operational emissions from the new crude oil storage tank, water draw surge tank, and two modified storage tanks are expected to remain below the CEQA significance threshold during operations of 55 pounds of VOC emissions per day as demonstrated in Table 2-4, which summarizes the expected

peak daily operational emissions for the proposed project. Detailed operational emission calculations are also provided in Appendix A.

Equipment potentially impacted by the proposed project (upstream or downstream) were evaluated to determine if the proposed project would result in an emissions increase, even though the equipment is operating within permit limits and no permit modification would be required. Due to the nature of Refinery operations, all equipment fluctuates in activity levels. However, no other units, beyond the crude oil storage tanks, water draw surge tank, and the associated piping evaluated in this Negative Declaration, were identified that would result in an increase in emissions.

The two new tanks and the modifications to the two existing tanks would be subject to the requirements in SCAQMD Rule 1303; therefore, all VOC emissions increases from the proposed project are required to be offset. Peak daily operational emissions are summarized in Table 2-4, together with the SCAQMD daily operational threshold levels. The operation of the proposed project is not expected to exceed any significance thresholds. Therefore, the air quality impacts associated with operational emissions from the proposed project are considered less than significant.

Operational Impacts to Localized Ambient Air Quality

The proposed project would only affect regional VOC emissions, which are not chemicals of concern for localized air quality. Therefore, no significant adverse localized air quality impacts are anticipated to occur from the proposed project. VOCs that may be toxic air contaminants are discussed below.

CO Hot Spots During Operation

As mentioned earlier, the operation of proposed project would be expected to only increase fugitive VOC emissions from the new crude oil storage tank, water draw surge tank, the two modified storage tanks, and associated piping. In addition, no additional permanent employees are necessary, so traffic level of service will not change from existing levels. Thus, there is no potential for a high concentration of CO emissions to occur, so the proposed project would not contribute to CO Hot Spots.

Cumulative Impacts

In general, the preceding analysis concluded that air quality impacts from the construction and operational activities associated with implementing the proposed project would result in less than significant air quality impacts because the analysis demonstrates that the SCAQMD's significance thresholds for construction and operation would not be exceeded for any pollutant. For this reason, air quality impacts are not considered to be cumulatively considerable pursuant to CEQA Guidelines §15064 (h)(1) and therefore, no significant adverse cumulative construction and operational air quality impacts are expected to occur.

The analysis also indicates that the proposed project would result in a less than significant increase in overall fugitive VOC emissions during the operational phase of the proposed project. Also, the proposed project is not considered to result in a significant increase in daily VOC emission during operation because the emission increases from the new crude oil storage tank, water draw surge tank, and two modified storage tanks would be offset in compliance with SCAQMD Rule 1303 prior to the issuance of the permits to construct. Because anticipated operational emissions would not exceed the project-specific air quality significance thresholds, which also serve as the cumulative significance threshold, they are not considered to be cumulatively considerable (CEQA Guidelines §15064 (h)(1)).

Therefore, the construction and operational emissions from the proposed project are not considered to contribute to the cumulative construction and operational impacts. This conclusion is consistent with CEQA Guidelines §15064 (h)(4), which states, "The mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable."

Toxic Air Contaminants

A health risk assessment (HRA) was performed to determine if emissions of toxic air contaminants (TACs) generated by the proposed project would exceed the SCAQMD thresholds of significance for cancer risk and non-cancer health risks. The following discussion outlines the risk associated with emissions increases from the new crude oil storage tank, water draw surge tank, storage tank modifications, and associated fugitive emissions.

HRA Methodology

The HRA for the proposed project has been prepared in accordance with the August 2003 Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments (OEHHA, 2003) and the October 2003 Air Resources Board Recommended Interim Risk Management Policy for Inhalation-based Residential Cancer Risk memo (CARB/OEHHA, 2003). The HRA includes a comprehensive analysis of the dispersion of certain AB2588-listed compounds into the environment, the potential for human exposure, and a quantitative assessment of individual health risks associated with the predicted levels of exposure. CARB Hotspots Analysis Reporting Program (HARP) model is the most appropriate model for determining the air quality impacts from the proposed project (CARB, 2008) because it is well suited for refinery modeling since it can accommodate multiple sources and receptors. The HARP model combines the U.S. EPA Industrial Source Complex dispersion model with a risk calculation model based on the Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA, 2003). The model default values were modified to conform to the SCAQMD Supplemental Guidelines for Preparing Risk Assessment for AB2588 (SCAQMD, 2011a).

Hazard Identification

The operation of the proposed project is expected to generate various TACs. Some of these chemical compounds are potentially carcinogenic, toxic, or hazardous, depending on

concentration or duration of exposure. Numerous federal, state, and local regulatory agencies have developed lists of TACs. The list of potentially-emitted substances considered in the preparation of the HRA for the proposed project is identified in Appendix A-I of the CARB AB2588 requirements and by OEHHA in the consolidated list of TACs. The AB2588 TACs emitted from the proposed project are identified in Appendix B of this Negative Declaration. While health effects data are not available for all compounds, a total of nine TACs expected to be emitted by the proposed project were included in the air dispersion modeling (see Appendix B). For carcinogens, slope factors were used to compute cancer risk through inhalation. If the carcinogen is a multi-pathway pollutant, a potency slope was used for estimating risk from non-inhalation pathways. For non-cancer health effects, reference exposure levels (REL) and acceptable oral doses (for multi-pathway pollutants) were used. The non-carcinogenic hazard indices were computed for chronic and acute exposures with their respective toxicological endpoints shown.

TAC Emission Estimates and Sources

The emission estimates of TACs for the proposed new crude oil storage tank, water draw surge tank, and storage tank modifications are based on U.S. EPA TANKS 4.0.9d with a hybrid liquid speciation of crude oils at the Refinery. The hybrid liquid speciation was created by selecting the maximum TAC present in each speciation of crude oil at the LARC and combining them into one speciation. This combination assures that the speciation is conservative when estimating TAC emissions from any type of crude oil. All tank emission rates are based on annualized emission rates from the TANKS model. Fugitive emissions are based on the Method 2 of the *SCAQMD Guide for Fugitive Emissions Calculations* (SCAQMD, 2003) with the hybrid speciation. The calculated emissions are presented in Appendix B.

Cancer Risk Analysis

The maximum cancer risk for an exposed individual resident (MEIR) located 650 meters south of the LARC boundary was analyzed for the proposed project. The incremental cancer risk is 1.25×10^{-7} or 0.1 in one million at the MEIR. Benzene contributes approximately 90.4 percent of the calculated cancer risk at the MEIR. The inhalation pathway accounts for 99.2 percent of the cancer risk. The cancer risk at the MEIR is less than the significance threshold of ten cancer cases in one million. Therefore, the cancer risk at the MEIR is less than significant. Detailed cancer risk contributions by pathway and pollutants are presented in Appendix B.

The maximum exposed incremental cancer risk at an occupational exposure (MEIW) is at a location approximately 50 meters west of the LARC boundary. The incremental cancer risk is 1.33×10^{-7} or 0.1 in one million at the MEIW. Benzene contributes approximately 85.7 percent of the calculated cancer risk at the MEIW. The inhalation pathway accounts for 98.5 percent of the cancer risk. The cancer risk at the MEIW is less than the significance threshold of ten cancer cases in one million. Therefore, the cancer risk at the MEIW is less than significant. Detailed cancer risk contributions by pathway and pollutants are presented in Appendix B.

Non-Cancer Risk Analysis

The maximum chronic hazard index (MCHI) total for the proposed project for the central nervous system, located at the same receptor as the MEIW, was calculated to be 0.0005. Benzene contributes approximately 72.4 percent of the calculated MCHI. Because the MCHI is less than the significance threshold of 1.0, the MCHI is less than significant. Detailed contribution by pollutant to the chronic hazard index for the maximum receptor location is presented in Appendix B.

The maximum acute hazard index (MAHI) total for the developmental and reproductive systems, located on the northwestern boundary of the LARC, was calculated to be 0.0015. Benzene contributes approximately 98.0 percent of the calculated MAHI. Because the MAHI is less than the significance threshold of 1.0, the MAHI is less than significant. Detailed contribution by pollutant to the acute hazard index for the maximum receptor location is presented in Appendix B.

Summary of Health Impacts

The health impacts as related to air quality impacts have been evaluated in several ways. First, the short-term air quality impacts from construction emissions were evaluated by comparing the peak day construction emissions to the SCAQMD mass daily significance thresholds for construction. In the short-term, the construction air quality emissions would not exceed the SCAQMD significance thresholds for all criteria and VOC pollutants analyzed and, as such, are considered to have a less than significant air quality impact. In order to evaluate the localized air quality impacts from construction emissions to nearby sensitive receptors, a LST analysis was also completed. The results of the LST analysis indicated that the short-term construction emissions would be below the applicable LST significance criteria. The LST significance criteria are based on the most stringent ambient air quality standard for NO_2 and CO, which are based on health effects. The LSTs for PM10 and PM2.5 are based on requirements in SCAQMD Rule 403, which are indirectly based on the state PM10 standard. Since construction of the proposed project is short-term and would not exceed the LST significance criteria for local air quality, no significant adverse health impacts associated with construction emissions are expected. The impacts from operation would not exceed the SCAQMD significance thresholds for all criteria and VOC pollutants analyzed and are considered to have a less than significant air quality impact. The primarily health effects associated with exposure to NO_2, CO, PM10, and PM2.5 are respiratory impacts including decreased lung function, aggravation of chronic respiratory condition, and aggravation of heart disease conditions. No such significant adverse health impacts are expected during the construction or operation of the proposed project.

Epidemiological analyses have consistently linked air pollution, especially TACs, with excess mortality and morbidity. Health studies have shown both short-term and long-term exposures of ambient concentrations are directly associated with increased mortality and morbidity. To estimate potential air quality impacts from a particular facility, the AERMOD air dispersion model can be used to provide PM10 concentration levels at a set of receptor points. A concentration-response equation can be calculated on the modeled air quality impacts and changes in mortality to determine the relative change in mortality associated with the estimated

changes in annual PM levels and estimate the potential for health impacts. For this calculation, it is assumed that all the PM10 is PM2.5. The log-linear form of the concentration response equation is:

$$\Delta \text{ Mortality} = y_0 (e^{\beta \Delta PM} - 1) * \text{population}$$

where

y_0 = county level all cause annual death rate per person for ages 30 and older,

β = PM2.5 coefficient from health study,

ΔPM = change in annual mean PM2.5 concentration, and

Population = population of ages 30 and older.

The resulting change in cases of mortality in a population age group living in a specific location with a given change in PM can then be calculated. By applying the census tract level for all census tracts within the modeling domain, the overall estimate in the change in mortality from PM emission of the facility is determined. However, since the air quality analysis shows that the onsite PM emissions during construction of the proposed project do not have offsite consequences (i.e., no concentrations above the ambient air quality standards), the aforementioned modeling procedure is not required or necessary. For these reasons, no increase in morbidity or mortality rates or related health effects are anticipated.

No additional PM emissions would be generated from operation of the proposed project. Therefore, no significant air quality or related health impacts are expected due to the proposed project.

The long-term air quality impacts from exposure to toxics were evaluated through the preparation of an HRA. The HRA evaluated the emissions associated with the operation of the proposed project and compared them to carcinogenic and non-carcinogenic significance thresholds to determine potential health impacts. As demonstrated in the HRA, the carcinogenic and non-carcinogenic impacts for all receptors are expected to be less than the significance thresholds. Therefore, no significant adverse carcinogenic or non-carcinogenic health impacts associated with the operation of the proposed project are expected.

III. d) The proposed project is not expected to increase exposure to substantial pollutant concentrations by sensitive receptors for the following reasons: 1) the LARC is an existing facility located in an industrial area; 2) the closest sensitive receptors are more than one-third mile away; 3) the limited construction activities would be short-term and the emission increases of criteria pollutants during construction are less than significant; 3) the operational emission increases of fugitive VOC emissions associated with the proposed installation of the new crude oil storage tank, water draw surge tank, two existing storage tank modifications, and associated piping are expected to be offset in compliance with SCAQMD Rule 1303. Therefore, no significant adverse air quality impacts to sensitive receptors are expected from implementing the proposed project.

III. e) The proposed project is not expected to create new significant objectionable odors, either during construction or during operation. Sulfur compounds (e.g., hydrogen sulfide) are the primary sources of odors at a refinery. While crude oil contains trace amounts of sulfur compounds such as hydrogen sulfide, significant new objectionable odors are not expected from the new crude oil storage tank, water draw surge tank, existing storage tank modifications, and associated piping because they are to be designed and constructed in accordance with BACT requirements, which controls emissions and related odors to the maximum extent feasible. The new equipment will be state-of the art and more efficient than older equipment. Thus, no new odors are expected from the new crude oil storage tank, water draw surge tank, existing storage tank modifications, and associated piping. In addition, no increase in odors is expected because the proposed project would not increase the crude throughput of the Refinery. Furthermore, the LARC is located in an industrial area with residences located at least one-third of a mile away, so odors are not anticipated to be noticeable in residential areas. The Refinery also follows a process that would deal with any odor issue, including a 24-hour environmental surveillance system where operators are trained to identify and report the source of odors so that the odors can be remedied promptly, and the frequency and magnitude of odor events can be minimized. Lastly, all new or modified components would be required to comply with existing SCAQMD rules and regulations, including SCAQMD Rule 402 - Prohibition of Nuisances. Therefore, no significant odor impacts are expected from constructing and operating the proposed project.

III. g and h) Changes in global climate patterns have been associated with global warming, an average increase in the temperature of the atmosphere near the Earth's surface, recently attributed to accumulation of GHG emissions in the atmosphere. GHGs trap heat in the atmosphere, which in turn heats the surface of the Earth. Some GHGs occur naturally and are emitted solely through human activities. The emission of GHGs through the combustion of fossil fuels (i.e., fuels containing carbon) in conjunction with other human activities, appears to be closely associated with global warming (Solomon et al., 2007). State law defines GHG to include the following: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) (HSC §38505 (g)). The most common GHG that results from human activity is CO_2, followed by CH_4 and N_2O.

GHGs and other global warming pollutants are perceived as global in their impacts and that increasing emissions anywhere in the world contributes to climate change anywhere in the world. However, a study conducted on the health impacts of CO_2 "domes" that form over urban areas concludes that they can cause increases in local temperatures and local criteria pollutants, which have adverse health effects (Jacobson, 2010).

The analysis of GHG emissions is a different analysis than for criteria pollutants for the following reasons. For criteria pollutant, significance thresholds are based on daily emissions because attainment or non-attainment is primarily based on daily exceedances of applicable ambient air quality standards. Further, several ambient air quality standards are based on relatively short-term exposure effects to human health (one-hour and eight-hour standards). Since the half-life of CO_2 is approximately 100 years, for example, the effects of GHGs occur over a longer timeframe than a single day (e.g., annual emissions). GHG emissions are typically considered to be cumulative impacts because they contribute to global climate change.

On December 5, 2008, the SCAQMD adopted an interim CEQA GHG Significance Threshold for project where the SCAQMD is the lead agency (SCAQMD, 2008). This interim threshold is set at 10,000 metric tons of CO_2 equivalent emissions ($MTCO_2eq$) per year. Projects with incremental increases below this threshold will not be cumulatively considerable.

GHG emissions impacts from implementing the proposed project were calculated at the project-specific level for construction and operation as explained in the following paragraphs.

Sources of GHG emissions from construction equipment were assumed to include backhoes, compressors, cranes, front-end loaders, graders, trenchers, and water trucks. In addition, the equipment is assumed to be operational up to ten hours per day during most of the construction period. Construction workers are expected to be at the site for longer than eight hours per day, but including time for lunch and breaks, organization meetings, and other administrative tasks, a conservative estimate of actual construction activities is ten hours per day, five days per week. Emissions for construction equipment were calculated based on fuel use derived from the CARB Off-Road 2011 model and CARB default GHG emission factors for diesel fuel. The SCAQMD significance threshold for GHG emissions amortized over 30 years with operational emissions.

The total GHG construction emissions associated with the proposed project are estimated to be 1,264 metric tons over the entire construction period, or 43 metric tons per year amortized over 30 years. The operation of the proposed project includes the installation of one new substation to deliver more reliable energy from Southern California Edison (SCE). An additional 25 kW is expected to be needed to provide the power required to operate the new substation. The operational GHG emissions associated with the new substation is 63 metric tons per year. The estimated GHG emissions from proposed project are shown in Table 2-6 with more detailed calculations in Appendix A.

TABLE 2-6

Estimated GHG Emissions for the Proposed Project
(metric tons/year)

Source	CO_2e
Third-Party Power(1)	63
30-Year Amortized Construction	43
Total GHG w/ Construction	**106**
Significance Threshold	**10,000**
Significant?	**No**

(1) Anticipate less than 25 kW increase in purchased power from SCE.

SF_6 has historically been used as an insulator and interrupter in gas insulated switchgear and circuit breakers. Because of the high global warming potential, (23,900 times that of CO_2), in February 2010, CARB adopted regulations to reduce SF_6 emissions from gas insulated switchgear (17 CCR §95350 through 95359). Therefore, the proposed project has been designed

to use electrical switchgear and circuit breakers in the proposed new substation that do not use SF_6.

The operation of the new tanks, as noted earlier, generates potential fugitive VOC emissions and no GHG emissions.

Thus, the total GHG emissions associated with the proposed project, including the 30-year amortized construction GHG emission, is 106 metric tons per year, which is below the significance threshold. Therefore, the GHG impacts associated with the proposed project are considered less than significant.

The Refinery is subject to GHG emission reductions pursuant to AB32, the state-wide GHG reduction plan. In December 2010, CARB adopted regulations establishing a cap and trade program for the largest sources of GHG emissions in the state that altogether are responsible for about 85 percent of California's GHGs. Among these are fossil-fuel fired power plants, including both plants that generate power within California's borders, and those located outside of California that generate power imported to the state. GHG emissions from this universe of sources were capped for 2013 at a level approximately two percent below the emissions level forecast for 2012, and the cap will steadily decrease at a rate of two to three percent annually from now to 2020. Sources regulated by the cap must reduce their GHG emissions or buy credits from others who have done so. This means that the additional power utilized at the LARC as a result of the proposed project cannot result in an increase in GHG emissions from the increased use of third-party power, compared to GHG emissions at the time of issuance of the NOP. The proposed project does not affect compliance with the requirements of AB32, since no change in GHG emissions at LARC from operation of the proposed project are expected. Therefore, the proposed project would not conflict with AB32, the applicable GHG reduction plan, policy, and regulations that have been adopted to implement AB32.

Thus, the SCAQMD's GHG significance threshold for industrial sources would not be exceeded. Based on the preceding analysis, implementing the proposed project is not expected to generate significant adverse cumulative GHG air quality impacts.

In summation, based on the preceding analysis, implementing the proposed project is not expected to generate significant adverse air quality and GHG emission impacts, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse air quality and GHG emission impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
IV.	**BIOLOGICAL RESOURCES.** Would the project:				
a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☑
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☑
c)	Have a substantial adverse effect on federally protected wetlands as defined by §404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☑
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☑
e)	Conflicting with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☑
f)	Conflict with the provisions of an adopted Habitat Conservation plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☑

Significance Criteria

The impacts on biological resources will be considered significant if any of the following criteria apply:

- The project results in a loss of plant communities or animal habitat considered to be rare, threatened or endangered by federal, state or local agencies.
- The project interferes substantially with the movement of any resident or migratory wildlife species.
- The project adversely affects aquatic communities through construction or operation of the project.

Discussion

IV. a), b), c), and d) The proposed project would be located in a heavy industrial area, entirely within the existing boundaries of the LARC. The LARC has been fully developed for over 90 years and is essentially void of vegetation with the exception of some decorative landscape vegetation near the administration building. Landscape plants and growth of vegetation onsite are limited for fire prevention purposes.

A review of the California Natural Diversity Data Base Map for the Long Beach Quadrangle available online did not reveal records of special status species at or in the near vicinity of the LARC. Based on the disturbed nature of the site, the industrial nature of the proposed and existing activities at the LARC, the industrial nature of the surrounding property, and the absence of records of special status species, no specific wildlife surveys were considered necessary and none were conducted. No native vegetation is located at the proposed location of the new storage tank and water draw surge tank and this area was used historically for refinery uses. For these reasons, the proposed project is not expected to have a significant adverse effect, either directly or through habitat modifications, on any species identified as a special status species. Further, the proposed project would not have an adverse effect, either directly or indirectly or through habitat modifications, on any sensitive biological species, riparian habitat, or other sensitive natural habitat since no such habitat exists at the LARC due to the developed and industrial nature of the site.

The proposed project would not result in the addition or elimination of water ponds that could be used by animals or migratory fowl. Further, the proposed project would not adversely affect federally protected wetlands as defined in §404 of the Clean Water Act as no such wetlands are located at or adjacent to the LARC. As discussed in Section IX – Hydrology and Water Quality herein, no increase in wastewater or storm water discharge to the Dominguez Channel is expected. The Dominguez Channel is a concrete lined flood control channel near the LARC. There are no significant plant or animal resources, locally designated species, natural communities, wetland habitats, or animal migration corridors that would be adversely affected by the proposed project. There are no rare, endangered, or threatened species at the LARC as native

vegetation has been removed. Because the area in and near the LARC is devoid of native habitat, impacts to other, non-listed species are not expected.

The proposed project would not include the acquisition of additional land for use by the LARC or result in expansion outside of the current boundaries of the facility, which further eliminates the potential for new adverse biological resource impacts.

Therefore, the proposed project would have no direct or indirect impacts that could adversely affect plant or animal species or the habitats on which they rely.

IV. e) & f) The proposed project is not envisioned to conflict with local policies or ordinances protecting biological resources or local, regional, or state conservation plans. Land use and other planning considerations are determined by local governments and no land use or planning requirements would be altered by the proposed project as further discussed in Section X – Land Use and Planning. Additionally, the proposed project would not conflict with any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or any other relevant habitat conservation plan, and would not create divisions in any existing communities because all activities associated with complying with the proposed project would occur within the LARC located in a heavy industrial area, which is not subject to a Habitat or Natural Community Conservation Plan.

The SCAQMD, as the Lead Agency for the proposed project, has found that, when considering the record as a whole, there is no evidence that the proposed project would have potential for any new adverse effects on wildlife resources or the habitat upon which wildlife depends. Accordingly, based upon the preceding information, the SCAQMD has, on the basis of substantial evidence, rebutted the presumption of adverse effect contained in §753.5 (d), Title 14 of the California Code of Regulations, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse biological impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
V.	**CULTURAL RESOURCES.** Would the project:				
a)	Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☑
b)	Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?	☐	☐	☐	☑
c)	Directly or indirectly destroy a unique paleontological resource, site, or feature?	☐	☐	☐	☑
d)	Disturb any human remains, including those interred outside formal cemeteries?	☐	☐	☐	☑

Significance Criteria

Impacts to cultural resources will be considered significant if:

- The project results in the disturbance of a significant prehistoric or historic archaeological site or a property of historic or cultural significance to a community or ethnic or social group.
- Unique paleontological resources are present that could be disturbed by construction of the proposed project.
- The project would disturb human remains.

Discussion

V. a) CEQA Guidelines Section 15064.5 states that resources listed in the California Register of Historical Resources or in a local register of historical resources are considered "historical resources." Additionally, CEQA Guidelines Section 15064.5(a)(3) state that "generally, a resource shall be considered by the lead agency to be *historically significant* if the resource meets the criteria for listing in the California Register of Historical Resources including the following:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;

- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values;

- Has yielded or may be likely to yield information important in prehistory or history."

No structures would be demolished as part of the proposed project. New domes would be added to existing storage tanks and new domed tanks would be constructed. The existing storage tanks and other related equipment (e.g., pumps and piping) associated with the proposed project do not meet the eligibility criteria presented above, e.g., associated with historically important events or people, embodying distinctive characteristics of a type, period or method of construction, and would not yield historically important information. Therefore, no significant impacts to historic resources are expected as a result of implementing the proposed project.

V. b), c), and d) The entire LARC has been previously graded and developed for over 90 years. A cultural resources archival search completed for a previous environmental document indicated no archaeological/historical/paleontological sites are located at the LARC and one prehistoric site was identified within a one-mile radius of the facility (see SCAQMD, 1994). The proposed project activities would occur in areas of the LARC where the ground surface has already been disturbed, and this past disturbance eliminates the potential for uncovering unknown archaeological/paleontological sites.

No grading efforts would be required to install the geodesic domes on the two existing crude oil Tanks 510 and 511. Grading would be required for the new crude oil tank area, which was previously the site of two reservoirs that were closed in 1995. The closure of the reservoirs involved the remediation of the site by removal of contaminated soil and capping (importing clean soil) of the site where the historic reservoirs were located. The new storage tank and water draw surge tank would be installed in the same location as the old reservoirs, which is where imported soil has been placed. Further, because the LARC does not contain known paleontological resources, the proposed project would not be expected to impact any sites of paleontological value. Therefore, no impacts to archaeological or paleontological resources are expected. While the likelihood of encountering cultural resources is low, there is still a potential that archaeological resources may exist. In the event that unexpected subsurface cultural resources are encountered during construction, any such impact would be eliminated by following standard construction practices, which comply with following provisions of Section 21083.2 of the Public Resources Code:

- Conduct a cultural resources orientation for construction workers involved in excavation activities. This orientation will show the workers how to identify the kinds of cultural resources that might be encountered, and what steps to take if cultural resources are encountered during excavation activities;

- Monitoring of subsurface earth disturbance by a professional archaeologist and an appropriate representative if cultural resources are exposed during construction;

- Provide the archaeological monitor with the authority to temporarily halt or redirect earth disturbance work in the vicinity of cultural resources exposed during construction so the find can be evaluated and mitigated as appropriate; and

- As required by state law, prevent further disturbance if human remains are unearthed, until the County Coroner has made the necessary findings with respect to origin and disposition, and the Native American Heritage Commission has been notified if the remains are determined to be of Native American descent.

For the same reasons as discussed above, the proposed project would not impact any human remains as the site has been disturbed and imported soil has been placed where the old reservoirs were located, which is the site for the proposed storage tank and water draw surge tank. Based upon the above considerations, no significant adverse cultural resources impacts are expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse cultural resources impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
VI.	**ENERGY.** Would the project:				
a)	Conflict with adopted energy conservation plans?	☐	☐	☐	☑
b)	Result in the need for new or substantially altered power or natural gas utility systems?	☐	☐	☑	☐
c)	Create any significant effects on local or regional energy supplies and on requirements for additional energy?	☐	☐	☑	☐
d)	Create any significant effects on peak and base period demands for electricity and other forms of energy?	☐	☐	☑	☐
e)	Comply with existing energy standards?	☐	☐	☐	☑

Significance Criteria

The impacts to energy will be considered significant if any of the following criteria are met:

- The project conflicts with adopted energy conservation plans or standards.
- The project results in substantial depletion of existing energy resource supplies.
- An increase in demand for utilities impacts the current capacities of the electric and natural gas utilities.
- The project uses non-renewable resources in a wasteful and/or inefficient manner.

Discussion

VI. a) and e) The proposed project is not expected to conflict with any adopted energy conservation plan or existing energy standard. There is no known energy conservation plan or existing energy standard that would apply to the LARC or this proposed project, as it primarily involves modifications to existing storage tanks and the construction of one new storage tank and one new water draw surge tank, which are not subject to energy conservations plans or energy standards. The new substation would provide more dependable power in this portion of the LARC, but would have no impact on any energy plan and is not subject to and existing energy standard. As concluded in the discussion in section b) ,c), and d) below, the amount of energy that may be needed to implement the project construction and operation activities is shown to be less than significant and, thus, the proposed project would not utilize non-renewable energy resources in a wasteful or inefficient manner.

VI. b), c), and d) It is not expected that natural gas-fired or electrically-powered construction equipment would be used because very little construction equipment is natural gas-fired and electricity is not available in the vicinity of the construction area. Construction equipment is primarily fueled by diesel and worker vehicles are primarily fueled by gasoline. Thus, there would be no need for new or substantially altered power or natural gas utility systems during construction of the proposed project. In 2011, the Los Angeles region used 4,892 million gallons of gasoline (CEC, 2011) and 281 million gallons of diesel (CEC, 2011a). The diesel associated with construction of the entire project of approximately 36,000 gallons represents about 0.013 percent of the yearly demand in the Los Angeles region, and a tiny fraction of the total use of fuel in California. Therefore, less than significant adverse impacts on energy are expected during the construction period.

Refinery fuel gas and natural gas required to operate existing equipment located at the LARC will continue to be supplied by the existing facility utility system and Southern California Gas Company. Operation of the proposed project is not expected to increase the amount of natural gas consumption because no new equipment is being installed that requires the use of natural gas. No permanent employees are anticipated to be needed, so no additional demand for gasoline fuel is expected.

The LARC is currently served by Southern California Edison (SCE) for electricity. SCE provides electricity as needed to meet all electricity demands at the LARC. The proposed project includes an electrical power substation that would be installed to upgrade the reliability of the electricity supplied to this portion of the LARC and handle any additional electricity requirements from the proposed project. The new substation would provide more dependable power in this portion of the LARC, but does not represent an increase in electricity use but provides the infrastructure for electricity distribution within the LARC. The new electrical substation would handle a load of about 1,440 kilowatts, most of which would be used to re-feed small substations in the area as electricity demand fluctuates based on operational needs. Existing 12.5 kilovolt (KV) feeders located at the LARC would be extended to the project area to provide power for the new equipment. The electrical power substation is required because there is no existing electricity source in the area where the new crude oil tank and water draw surge tank is to be installed. The proposed project requires electricity primarily to operate two new 2,100 gpm crude feed/transfer pumps associated with the proposed project. The proposed project does not increase the amount of crude oil handled at the LARC, but instead provides for more onsite storage. The overall electricity use would slightly increase due to the new pumps in the proposed project, but would not increase the overall crude oil pumped to the facility. The proposed project merely allows more crude to be pumped and stored at the same time by providing more locations to store crude oil at the LARC. Additionally, no changes to the refining processes are being proposed, so no increase in crude throughput of the LARC would occur.

The estimated incremental increase in electricity associated with the new crude tank and new water draw surge tank would be approximately 25 kilowatts (0.025 megawatts) for lighting, instrumentation, and air conditioning at the new substation.

SCE has developed a long-term procurement plan to review the development of new renewable energy resources and energy efficiency programs to ensure clean, reliable power for future needs. Peak electricity usage for SCE in 2011 was 23,181 megawatts (MW). SCE predicts a peak electricity use increase of about 1.48 percent per year between 2011 and 2022 (about 346 MW per year) with peak electricity usage forecasted to be around 25,591 MW in 2022 (CEC, 2012). The electricity increase associated with the proposed project of 0.025 MW is a negligible portion of the electricity generated by SCE and a small portion of the predicted annual increase of 346 MW. SCE has the capacity to meet the minor increase in electricity required by the proposed project, as it is not expected to result in a substantial increase in electricity. Therefore, less than significant impacts on electricity demand are expected during operation.

Based on these considerations, significant adverse energy impacts are not expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse energy impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
VII.	**GEOLOGY AND SOILS.** Would the project:				
a)	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☐	☑
	• Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☐	☐	☐	☑
	• Strong seismic ground shaking?	☐	☐	☐	☑
	• Seismic–related ground failure, including liquefaction?	☐	☐	☐	☑
b)	Result in substantial soil erosion or the loss of topsoil?	☐	☐	☑	☐
c)	Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☑	☐
d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☑
e)	Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☑

Significance Criteria

The impacts on the geological environment will be considered significant if any of the following criteria apply:

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

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

- Exposure of people or structures to major geologic hazards such as earthquake surface rupture, ground shaking, liquefaction or landslides.

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

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

Discussion

VII. a) The LARC is located within a seismically active region. The most significant potential geologic hazard is estimated to be seismic shaking from future unpredictable earthquakes generated by active or potentially active faults in the region. Table 2-7 identifies those faults in the Southern California region considered important to the project in terms of potential for future activity. Seismic records have been available for the last 200 years, with improved instrumental seismic records available for the past 50 years. Based on a review of earthquake data, most of the earthquake epicenters occur along the Whittier-Elsinore, San Andreas, Newport-Inglewood, Malibu-Santa Monica-Raymond Hills, Palos Verdes, Sierra Madre, San Fernando, Elysian Park-Montebello, and Torrance-Wilmington faults (Jones and Hauksson, 1986). All these faults are elements of the San Andreas Fault system. Past experience indicates that there has not been any substantial damage, structural or otherwise to the LARC as a result of earthquakes. Table 2-8 identifies the historic earthquakes over magnitude 4.5 in southern California, between 1915 and the present, along various faults in the region.

The fault zones in the region with potential for future activity that may affect the Refinery are described below. These faults have been identified under the Alquist-Priolo Earthquake Fault Zoning Act.

Malibu-Santa Monica-Raymond Hills Fault Zone: The Raymond Hills fault is part of the fault system that extends from the base of the San Gabriel Mountains westward to beyond the Malibu coast line. The fault has been relatively quiet, with no recorded seismic events in historic time (see SCEC, 2013, 2013a, 2013b, and 2013c); however, recent studies indicate movement can occur with a recurrence interval of from 740 years for the Santa Monica Mountains Thrust Fault up to 3,290 years for the Hollywood-Santa Monica-Malibu Coast system to rupture (see Dolan, et al., 1995).

Table 2-7

Major Active or Potentially Active Faults in Southern California

Fault Zone	Fault Length (Miles)	Maximum Credible Earthquake	Maximum Acceleration (G)
Malibu-Santa Monica-Raymond Hill	65	7.5	0.49
Newport-Inglewood	25	7.0	0.42
Northridge	12	6.7	0.16
Palos Verdes	20	7.0	0.24
San Andreas	200+	8.25	0.21
San Jacinto	112	7.5	0.11
San Fernando	8	6.8	0.17
Sierra Madre	55	7.3	0.23
Whittier-Elsinore	140	7.1	0.46
Elysian Park – Montebello	15	7.1	0.27

G = acceleration of gravity.

Table 2-8

Significant Historical Earthquakes in Southern California

Date	Location (epicenter)	Magnitude
1915	Imperial Valley	6.3
1918	San Jacinto	~6.8
1923	North San Jacinto Fault	6.3
1925	Santa Barbara	6.3
1927	Lompoc	7.1
1933	Long Beach	6.4
1937	San Jacinto Fault	6.0
1940	Imperial Valley	6.9
1941	Santa Barbara	5.5
1941	Torrance-Gardena	4.8
1942	Fish Creek Mountains	6.6
1946	Walker Pass	6.0
1947	Manix	6.5
1948	Desert Hot Springs	6.0
1952	Kern County	7.5
1952	Bakersfield	5.8
1954	San Jacinto Fault	6.4
1966	Parkfield	6.0
1968	Borrego Mountain	6.5
1971	San Fernando (Sylmar)	6.5
1979	Imperial Valley	6.4
1980	White Wash	5.5
1986	North Palm Springs	5.6

TABLE 2-8 (Concluded)

Significant Historical Earthquakes in Southern California

Date	Location (epicenter)	Magnitude
1987	Whittier	5.9
1987	Elmore Ranch/Superstition Hills	6.2
1991	Sierra Madre	5.8
1992	Joshua Tree	6.1
1992	Landers	7.3
1992	Big Bear	6.4
1992	Mojave (Garlock)	5.7
1994	Northridge	6.7
1995	Ridgecrest	5.4
1999	Hector Mine	7.1
2002	Laguna Salada	5.7
2009	Northern Baja California	5.8
2010	Sierra El Mayor (No. Baja Calif.)	7.2

Source: SCEC, 2013d.

The Newport-Inglewood Fault Zone: The Newport-Inglewood fault is a major tectonic structure within the Los Angeles Basin. This fault is best described as a structural zone comprising a series of echelon and sub-parallel fault segments and folds. The faults of the Newport-Inglewood uplift in some cases exert considerable barrier influence upon the movement of subsurface water (see DWR, 1961). Offsetting of sediments along this fault usually is greater in deeper, older formations. Sediment displacement is less in younger formations. The Alquist-Priolo Act has designated this fault as an earthquake fault zone. The purpose of designating this area as an earthquake fault zone is to mitigate the hazards of fault rupture by prohibiting building structures across the trace of the fault.

This fault poses a seismic hazard to the Los Angeles area (see Toppozada, et al., 1988, 1989), although no surface faulting has been associated with earthquakes along this structural zone during the past 200 years. Since this fault is located within the Los Angeles Metropolitan area, a major earthquake along this fault would produce more destruction than a magnitude 8.0 on the San Andreas fault. The largest instrumentally recorded event was the 1933 Long Beach earthquake, which occurred on the offshore portion of the Newport-Inglewood structural zone with a magnitude of 6.3. A maximum credible earthquake of magnitude 7.0 has been assigned to this fault zone (see Ziony and Yerkes, 1985).

The Palos Verdes Fault Zone: The Palos Verdes fault extends for about 50 miles from the Redondo submarine canyon in Santa Monica Bay to south of Lausen Knoll and is responsible for the uplift of the Palos Verdes Peninsula. This fault is both a right-lateral strike-slip and reverse separation fault. The Gaffey anticline and syncline are reported to extend along the northwestern portion of the Palos Verdes hills. These folds plunge southeast and extend beneath recent alluvium east of the hills and into the San Pedro Harbor, where they may affect movement of ground water (see DWR, 1961). The probability of a moderate or major earthquake along the Palos Verdes fault is low compared to movements on either the Newport-Inglewood or San

Andreas faults (see Los Angeles Harbor Department, 1980). However, this fault is capable of producing strong to intense ground motion and ground surface rupture. This fault zone has not been placed by the California State Mining and Geology Board into an Alquist-Priolo special studies zone.

San Andreas Fault Zone: The San Andreas fault is located on the north side of the San Gabriel Mountains trending east-southeast as it passes the Los Angeles Basin. This fault is recognized as the longest and most active fault in California. It is generally characterized as a right-lateral strike-slip fault which is comprised of numerous sub-parallel faults in a zone over two miles wide. There is a high probability that southern California will experience a magnitude 7.0 or greater earthquake along the San Andreas or San Jacinto fault zones, which could generate strong ground motion in the project area. There is a five to twelve percent probability of such an event occurring in southern California during any one of the next five years and a cumulative 47 percent chance of such an event occurring over a five year period (see Reich, 1992).

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

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

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

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

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

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

In addition to the known surface faults, shallow-dipping concealed "blind" thrust faults have been postulated to underlie portions of the Los Angeles Basin. Because there exist few data to define the potential extent of rupture planes associated with these concealed thrust faults, the maximum earthquake that they might generate is largely unknown.

No faults or fault-related features are known to exist at the LARC site. The closest fault zone to the Refinery is the Newport-Inglewood Fault Zone, which is located approximately 3.0 to 3.5 miles northeast of the LARC. The LARC is not located in any Alquist-Priolo Earthquake fault zone and is not expected to be subject to significant surface fault displacement. Therefore, no significant adverse impacts to the proposed project facilities are expected from seismically-induced ground rupture.

Based on the historical record, it is highly probable that earthquakes will affect the Los Angeles region in the future. Research shows that damaging earthquakes will occur on or near recognized faults which show evidence of recent geologic activity. The proximity of major faults to the LARC facility increases the probability that an earthquake may impact the site. There is the potential for damage in the event of an earthquake. Impacts of an earthquake could include structural failure, spill, etc. The hazards of a release during an earthquake are addressed in Section VIII - Hazards and Hazardous Materials.

The new crude oil storage tank and water draw surge tank must be designed to comply with the California Building Code requirements since the proposed project is located in a seismically active area. The California Building Code is considered to be a standard safeguard against major structural failures and loss of life. The code requires structures that will: 1) resist minor earthquakes without damage; 2) resist moderate earthquakes without structural damage, but with some non-structural damage; and 3) resist major earthquakes without collapse, but with some structural and non-structural damage. The California Building Code bases seismic design on minimum lateral seismic forces ("ground shaking"). The California Building Code requirements

operate on the principle that providing appropriate foundations, among other aspects, helps to protect buildings from failure during earthquakes. The basic formulas used for the California Building Code seismic design require determination of the seismic zone and site coefficient, which represent the foundation conditions at the site.

The new storage tank and water draw surge tank at the LARC would require building permits, as applicable, for all new structures associated with the proposed project from the City of Carson. The LARC must receive approval of all building plans and building permits to assure compliance with the latest Building Code adopted by the City of Carson prior to commencing construction activities. The issuance of building permits from the local authority will assure compliance with the California Building Code requirements which include requirements for building within seismic hazard zones. No significant adverse impacts from seismic hazards are expected since the proposed project would be required to comply with the California Building Codes.

Thus, the proposed project would not alter the exposure of people or property to geological hazards such as earthquakes, landslides, mudslides, ground failure, or other natural hazards beyond the current setting. As a result, substantial exposure of people or structures to the risk of loss, injury, or death involving the rupture of an earthquake fault, seismic ground shaking, ground failure or landslides is not anticipated.

VII. b) The proposed project is located within the confines of the existing LARC. Concrete foundations presently support refinery structures and equipment. Most of the roads in the LARC, including all high traffic roads, have been paved. Some portions of site have also been landscaped, mainly near the administration building. No unstable earth conditions, significant changes in topography or in geologic substructures are anticipated to occur with the project. The major aspects of the proposed project, i.e., the installation of a crude oil storage tank and water draw surge tank, would be installed in an area on the west side of the LARC that is presently vacant, but formerly the site of two below ground level crude storage reservoirs. These reservoirs were closed in 1995 and are currently capped with a one-foot thick impermeable clay layer. Grading/excavation of this area would be required to remove the clay cap and recompact the area for the installation of the concrete foundations to provide ample support for the new tanks. Excavated VOC contaminated soil remediation must occur pursuant to a SCAQMD-approved Rule 1166 Plan to assure the control of fugitive emissions, which generally includes covering contaminated soil piles with heavy plastic sheeting and watering activities to assure the soil remains moist. The Rule 1166 Plan must be approved by the SCAQMD prior to excavation of VOC contaminated soils. The facility has submitted an application for a site-specific SCAQMD Rule 1166 Mitigation Plan, and it is anticipated approval of the plan will be issued along with the permit to construct for the project. Soil remediation activities are also under the jurisdiction of the RWQCB. Following SCAQMD approval of the proposed project, a Soil Management Plan will be submitted to the RWQCB for approval. The RWQCB, when considering the Soil Management Plan, relies on the analysis in this Negative Declaration and the SCAQMD Rule 1166 Mitigation Plan. Placing geodesic domes on existing crude oil Tanks 510 and 511 does not require any grading/excavation activities.

Further, wind erosion is not expected to occur to any appreciable extent, because construction contractors operating at any dust generating sites within the LARC would be required to comply

with the best available control measure (BACM) requirements of SCAQMD Rule 403 – Fugitive Dust. In general, fugitive dust must be controlled through a number of soil stabilizing measures such as watering the site, using chemical soil stabilizers, revegetating inactive sites, et cetera. The proposed project involves the installation of new equipment at a site that was previously graded within the LARC. However, additional grading and excavation is expected to be required to provide stable foundations for the new crude oil storage tank and water draw surge tank. Potential air quality impacts related to grading and excavation are addressed elsewhere in this document (as part of construction air quality impacts discussion in Section III.). No unstable earth conditions or changes in geologic substructures are expected to result from implementing the proposed project.

Further, the LARC has prepared a Storm Water Pollution Prevention Plan (SWPPP) in order to comply with National Pollution Discharge Elimination System (NPDES) standards, and compliance with the SWPPP will continue during and after completion of the proposed project. The SWPPP includes best management practices to control dust and mud transport during rain events to prevent solids and sediment transport into the storm drains and onto streets.

VII. c) Liquefaction would most likely occur in unconsolidated granular sediments that are water saturated less than 30 feet below ground surface (see Tinsley et al., 1985). Based on the latest seismic hazards maps developed under the Seismic Hazards Mapping Act, small portions of the LARC are located in an area of historic (or has the potential for) liquefaction (California Division of Mines and Geology, Map of Seismic Hazard Zones, Long Beach Quadrangle). A small section of the southeast portion of the LARC has conditions conducive to liquefaction. However, the new facilities associated with the proposed project are not located within the area identified for potential liquefaction. Liquefaction associated with seismic events has not occurred at the LARC. There is no evidence of expansive soils at the LARC, and expansion soils have not been encountered as part of the construction of other facilities at the LARC.

Prior to construction, a geotechnical engineering investigation will be conducted for the area where the new crude oil tank, new water draw surge tank, and new electrical power substation are to be located. The City of Carson will review and approve the geotechnical designs and ensure that the designs comply with the California Building Code requirements. Issuance of building permits will not occur until the City of Carson has reviewed and approved the geotechnical engineering investigation for the proposed project. No significant adverse impacts are expected because the proposed project would be required to comply with the California Building Codes.

Subsidence is not anticipated to be a problem since only minor excavation and grading would occur at a site that has been previously excavated and graded. Further, the proposed project would not involve drilling or removal of underground products (e.g., water, crude oil, et cetera) that could produce subsidence effects. Additionally, the affected area is not envisioned to be prone to landslides or have unique geologic features since the LARC is located in a heavy industrial where such features are not known to exist.

For these reasons, implementation of the proposed project would not be expected to alter or make worse any existing potential for subsidence, liquefaction, et cetera.

VII. d) and e) Since the proposed project would occur within the confines of the LARC, which is located in an industrial zone, as explained in VII. c), it is expected that people or property would not be exposed to new impacts related to expansive soils. In addition, because the proposed project is not expected to generate additional wastewater (see Section IX. for further details), the proposed project is not expected to affect soils incapable of supporting water disposal. Further, the LARC currently has an existing wastewater treatment system and discharges treated wastewater to a local sewer system in accordance with its Industrial Wastewater Discharge Permit. The proposed project would not trigger a modification to this permit. For this reason, the proposed project would not require installation of a septic tank or alternative wastewater disposal system. Thus, implementation of the proposed project would not adversely affect soils associated with a septic system or alternative wastewater disposal system.

Based upon these considerations, significant adverse geology and soils impacts are not expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse geology and soils impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
VIII.	**HAZARDS AND HAZARDOUS MATERIALS.** Would the project:				
a)	Create a significant hazard to the public or the environment through the routine transport, use, and disposal of hazardous materials?	☐	☐	☑	☐
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset conditions involving the release of hazardous materials into the environment?	☐	☐	☑	☐
c)	Emit hazardous emissions, or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☑	☐
d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would create a significant hazard to the public or the environment?	☐	☐	☑	☐
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public use airport or a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
f)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☑	☐
g)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☑
h)	Significantly increased fire hazard in areas with flammable materials?	☐	☐	☑	☐

Significance Criteria

The impacts associated with hazards will be considered significant if any of the following occur:

- Non-compliance with any applicable design code or regulation.
- Non-conformance to National Fire Protection Association standards.
- Non-conformance to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection.
- Exposure to hazardous chemicals in concentrations equal to or greater than the Emergency Response Planning Guideline (ERPG) 2 levels.

VIII. a) and b) Petroleum products are currently delivered to both the Wilmington and Carson Plants via pipelines from marine terminals and other facilities in the area as well as via trucks and rail cars. Following project completion, petroleum products would continue to be delivered to both the Wilmington and Carson Plants via pipelines from marine terminals and other facilities in the area as well as via trucks and rail cars. The proposed project would allow for an increase in the amount of crude oil stored at the LARC, but would not increase the amount of product produced at the Refinery or transported to/from the Refinery via pipeline, ships, trucks or railcar, as the crude throughput rate will not change. Because the proposed project does not increase in crude oil throughput, there will be no modification to the refining process or equipment. Ship deliveries of crude oil are expected to occur in the same size vessels (i.e., Panamax, Aframax, and Suezmax) after implementation of the proposed project as the vessels used currently, so no increase in ship traffic is expected but the ships will have less maneuvering as a result improved offloading efficiency from the proposed project (i.e., the elimination of the need for anchorage while waiting to finish offloading). For these reasons, the proposed project would not result in an increase in transportation hazards.

A variety of safety laws and regulations have been developed to reduce the risk of accidental releases of chemicals at industrial facilities, including spill prevention and control and fire protection requirements as discussed below. Phillips 66 maintains its own onsite emergency response department to respond to emergencies and maintains a fully trained 24-hour emergency response team, firefighting equipment including fire engines and foam pumper trucks and trailers, and manual and automatic fire suppression systems for flammable and combustible materials. The LARC staff is trained in accordance with industry standards, and onsite fire training exercises are conducted with the Los Angeles County Fire Department.

The California Hazardous Material Management Act (HMMA) requires that any business that handles hazardous materials greater than specified threshold quantities must prepare a Business Plan. A Business Plan contains a description of the physical and chemical properties of each hazardous and extremely hazardous material that is handled at the facility, where it is used and stored, and symptoms that may result from contact with the substance. Phillips 66 has developed and maintains Business Plan. The Los Angeles County Fire Department, Hazardous Materials

Services Division is responsible for administering the HMMA and is the designated Certified Unified Program Agency (CUPA) for the hazardous material programs within Carson. The HMMA also requires the implementation of an Emergency Response Plan which identifies emergency response procedures in the event of a major release. In the event of an accidental release, Phillips 66 has appropriate mechanisms in place as stated in the California Code of Regulations Title 19 §2765.1 for notifying emergency responders when there is a need for such services.

The proposed new tanks are required to comply with the Spill Control and Countermeasures (SPCC) requirements and would require a revision to the current SPCC Plan. Both the new storage tank and new water draw surge tank would be constructed with surrounding containment berms, capable of containing 110 percent of the maximum volume stored in the largest tank, in compliance with the SPCC requirements. The berms are coated with material that is impervious to petroleum products and effective at minimizing the potential for a release that would migrate offsite and cause contamination.

The Occupational Safety and Health Agency (OSHA) promulgated the Process Safety Management (PSM) of Highly Hazardous Chemicals in the Code of Federal Regulations (CFR) 29 910.119 in 1992. This PSM rule was designed to address the prevention of catastrophic accidents at facilities handling hazardous substances in excess of specific threshold amounts through implementation of PSM systems. A key component of PSM requires the performance of a process hazard analyses to identify potential process deviations and to implement or improve safeguards that would prevent accidental releases of chemicals at industrial facilities.

A federal EPA Risk Management Program (RMP) and a more stringent RMP, the California Accidental Release Program (CalARP), were developed for both the Carson and the Wilmington Plants and submitted to appropriate agencies in 1999. The RMPs contain hazard assessments of both worst-case and more credible accidental release scenarios, an accident prevention program, and an emergency response program. The County of Los Angeles administers the RMP for the Carson Plant. In addition, an emergency response manual has been prepared for both Plants, which describes the emergency response procedures that would be followed in the event of any of several release scenarios along with the responsibilities of key personnel.

The Refinery adheres to the following safety design and process standards:

- The California Health and Safety Code Fire Protection specifications.
- The design standards for petroleum refinery equipment established by the American Petroleum Institute, the American Society of Mechanical Engineers, the American Institute of Chemical Engineers, the American National Standards Institute, and the American Society of Testing and Materials.
- The applicable Cal-OSHA requirements.

The proposed project is not expected to change the amount of hazardous material used or disposed of by the LARC. The proposed project merely provides more storage capacity and does

not change the annual volume of crude oil processed at the LARC, or change the handling practices associated with processing the crude oil. Therefore, no change in the use or disposal of hazardous materials is anticipated as a result of the proposed project.

Thus, as explained above, the proposed project is not expected to create a new significant hazard to the public or the environment through the routine transport, use, and disposal of hazardous materials beyond the current setting. Further, because of the safety mechanisms in place, the proposed project is not expected to create a significant hazard to the public or the environment involving the release of hazardous materials into the environment.

VIII. c) The LARC is not located within one-quarter mile of an existing or proposed school site. As explained in Section VIII a) and b), the proposed project would not change or significantly increase the hazards associated with LARC operations and no off-site hazard impacts are expected. Therefore, the proposed project would not be expected to result in a safety hazard for an existing or proposed school.

VIII. d) Government Code §65962.5 refers to the "Hazardous Waste and Substances Site List," which is a list of facilities that may be subject to the Resource Conservation and Recovery Act (RCRA) corrective action program. The LARC is not included on the list prepared by the Department of Toxic Substances Control (DTSC) pursuant to Government Code §65962.5. Nonetheless, the LARC is included on a list of RCRA-permitted sites that require corrective action as identified by DTSC. Furthermore, the LARC is subject to corrective action under the "Spills, Leaks, Investigation & Cleanup (SLIC) Program" administered by the RWQCB pursuant to California Water Code §13304. In order to provide full public disclosure per CEQA (Public Resources Code §21092.6) with regard to corrective actions required by local agency, the following information is provided:

Applicant:	Phillip 66 (ConocoPhillips) Carson Plant
Address:	1520 East Sepulveda Boulevard, Carson, CA 90745
Phone:	(310) 522-9300
Address of Site:	1520 East Sepulveda Boulevard, Carson, CA 90745
Local Agency:	City of Carson
Assessor's Book:	7315-002-021
List:	DTSC and SLIC Corrective Action
SLIC Case No:	0232

The new tanks and substation for the proposed project would be installed in an area on the west side of the LARC that is presently vacant, but formerly the site of two below ground level crude storage reservoirs. These reservoirs were closed in 1995 under authorization from the RWQCB and are currently capped with a one-foot thick impermeable clay layer. During construction of the proposed project, grading and recompaction of this area would be required to install concrete foundations for the new crude oil tank, water draw surge tank, and electrical power substation, and to erect a dike containment berm. RWQCB approval for excavation and recompaction of this area to allow for development of the proposed project would be required.

Since the proposed project site has been identified as having soil containing VOC materials, excavation at this site is subject to the requirements of SCAQMD Rule 1166. The facility must obtain a SCAQMD-approved Rule 1166 Mitigation Plan to assure the control of fugitive emissions prior to the start of excavation activities. Rule 1166 includes requirements for SCAQMD notification at least 24 hours prior of the start of excavation, monitoring (at least once every 15 minutes, within 3 inches of the excavated soil surface), as well as implementation of a mitigation plan when VOC-contaminated soil is detected. Rule 1166 defines VOC contaminated soil as soil which registers a concentration of 50 ppmv or greater of VOC. An approved mitigation plan generally includes covering contaminated soil piles with heavy plastic sheeting and watering activities to assure the soil remains moist. In addition, VOC-contaminated soils shall be treated or removed within 30 days from the time of excavation. The facility has submitted an application for a site-specific Rule 1166 Mitigation Plan, and it is anticipated that it will be issued along with the permit to construct for the project. Soil remediation activities are also under the jurisdiction of the RWQCB. Following SCAQMD approval of the proposed project, a Soil Management Plan will be submitted to the RWQCB for approval. The RWQCB, when considering the Soil Management Plan, relies on the analysis in this Negative Declaration and the SCAQMD Rule 1166 Mitigation Plan.

During grading and recompaction, activities could potentially uncover soils contaminated with regulated concentrations of certain substances, such as heavy metals and hydrocarbons. The handling, processing, transportation, and disposal of these contaminated soils would continue to be subject to applicable hazardous waste regulations such as Title 22 of the California Code of Regulations and other local and federal rules. Title 22 has multiple requirements for hazardous waste handling, transport, and disposal, such as requirements to use approved disposal and treatment facilities, to use certified hazardous waste transporters, and to have manifests for tracking the hazardous waste. Excavated soil contaminated with concentrations above regulated thresholds generally cannot be reused onsite. These contaminated soils would be properly characterized to determine an appropriate offsite processing method(s). These methods may include recycling of the soil if it is considered a non-hazardous waste, off-site treatment to reduce the contaminant concentrations to non-hazardous levels, or disposal as a hazardous waste at a permitted hazardous waste facility. The LARC would work with the RWQCB, SCAQMD, and DTSC, if necessary, to determine an appropriate offsite processing method for any excavated soil that cannot be reused onsite.

Based on the above requirements and considering that most of the contaminated soils encountered during prior construction projects at the LARC were determined not to be a hazardous waste, no significant adverse impacts are expected from the potential for encountering contaminated soils during grading and excavation. Therefore, impacts related to soil contamination are not expected to create a significant hazard to the public or the environment.

VIII. e) The LARC is not located within an airport land use plan or within two miles of a public or private use airport. Therefore, the proposed project would not be expected to result in a safety hazard for people residing or working in the area of the LARC, on any airport, or on an airport land use plan.

VIII. f) The proposed project is located within the LARC. The proposed project would require revisions to the emergency response plan (i.e., Integrated Contingency Plan) to address emergency response activities that would be associated with the installation of the new crude storage tank and new water draw surge tank. Phillips 66 already uses and stores crude oil at the Refinery so the current emergency response procedures are specific to the use of crude oil. Emergency response related to the new storage tank and new water draw surge tank would include releases, spills, and fires similar to the response provided for the existing crude oil surge tanks. The emergency procedures include detailed requirements for specific actions for employees to take (including evacuation and spill control), individuals to be notified, and agencies to call when assistance is required. As analyzed in Section VIII. h), the fire radiation hazards associated with the proposed new storage tank and new water draw surge tank would remain onsite, so no significant impacts to emergency response activities or emergency response plans at other adjacent facilities would be expected. Thus, the proposed project would not impair implementation or physically interfere with an adopted emergency response plan or evacuation plan. Evacuation plans generally require employees to head towards the employee parking areas and away from the operating portions of the LARC. The emergency response plans would be reviewed and updated to reflect the proposed project. Therefore, no significant adverse impacts to emergency response or evacuations plans are expected.

VIII. g) The proposed project would not increase the existing risk of fire hazards in areas with flammable brush, grass, or trees because the proposed project is located in an urbanized, industrial area and no wildlands are located in the immediate or surrounding areas of the LARC. Also, no substantial or native vegetation exists within the operational portions of the LARC and no vegetation is located in the location of the proposed new crude storage tank and water draw surge tank. For these reasons, the proposed project would not expose people or structures to wildland fires. Therefore, no significant adverse impacts resulting from wildland fire hazards are expected from the proposed project.

VIII. h) The LARC uses a number of hazardous materials at the facility to manufacture petroleum products. The major types of public safety risks consist of impacts from toxic substance releases, fires and explosions. Examples of toxic substances handled by the LARC include hydrogen sulfide, ammonia, regulated flammables like propane and butane, and petroleum products like gasoline, fuel oils, and diesel.

The primary hazards associated with a storage tank are fire hazards and subsequent exposure to thermal radiation. The proposed project includes fire protection equipment/facilities, e.g., monitors, hydrants, and proper containment berming in accordance with the National Fire Protection Association (NFPA) standards for crude oil storage tank and water draw surge tank. Thermal radiation is the heat generated by a fire and the potential impacts associated with exposure. Exposure to thermal radiation would result in burns, the severity of which would depend on the intensity of the fire, the duration of exposure, and the distance of an individual to the fire.

The proposed crude oil storage tank and water draw surge tank would be protected with both foam- and water-based fire extinguishing systems. Centralized foam generation systems would deliver foam to the tanks in the event of a fire. Foam would cover the tank and fire,

extinguishing flames by eliminating the presence of oxygen. In addition, the tanks would also be served by water deluge systems to minimize heat generated in the event of a fire.

The proposed project includes the addition of one new 615,000 barrel crude oil storage tank and one new 14,000 barrel water draw surge tank, which have the potential to increase fire hazards due to the increased storage volume. Therefore, a fire hazard analysis was conducted for the new crude oil storage tank (see Table 2-9), the larger of the two tanks, using the CANNARY by Quest® hazard model. For additional information about the CANNARY by Quest® model, see Appendix C. The fire radiation hazards can extend up to 510 feet (see Table 2-9) from the center of the storage tank and the property boundary is about 100 feet from the storage tank containment area. As shown in Figure 2-1, the fire hazards associated with the proposed storage tank would remain within the boundaries of the LARC and no exposure to off-site receptors of the thermal radiation would occur. Installing geodesic domes would not change the fire radiation hazard distance associated with the existing storage tanks (Tanks 510 and 511), which is 450 feet from the tank centers because the fire radiation hazard distances would not be affected by the addition of the domes.

TABLE 2-9

Maximum Hazard Distances for Maximum Credible Event (1)

Wind Speed (meters/sec)	Maximum Distance (ft) from Center of Unit to Pool/Torch Fire Thermal Radiation (5 kW/m2)
5.0	510

(1) See Appendix C for further details on the hazard modeling and impacts.

Therefore, the fire hazard impacts due to thermal radiation that may be associated with the proposed project are expected to be less than significant.

Based upon the above considerations, significant adverse hazards and hazardous materials impacts are not expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse hazards and hazardous materials impacts were identified, no mitigation measures are necessary or required.

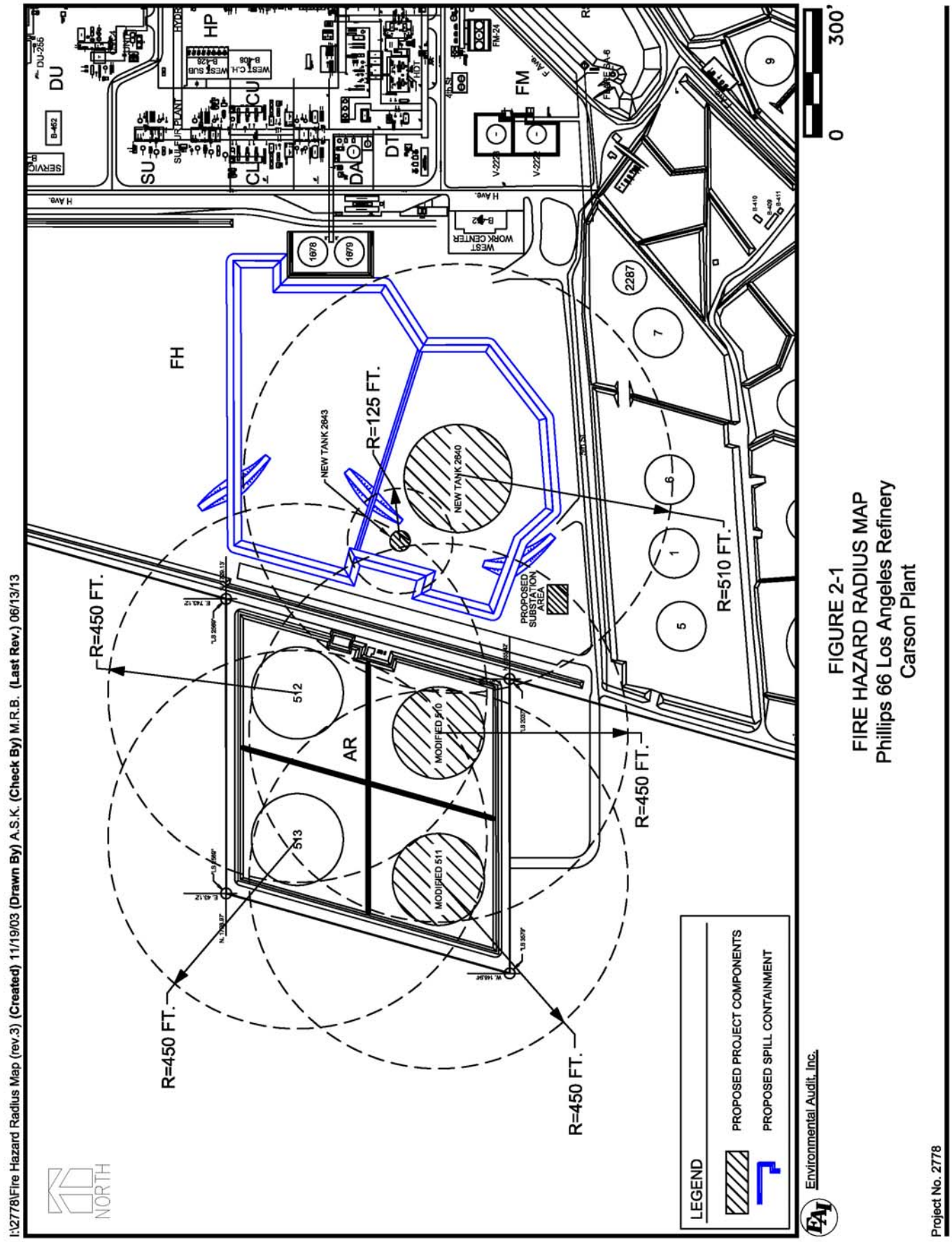

FIGURE 2-1
FIRE HAZARD RADIUS MAP
Phillips 66 Los Angeles Refinery
Carson Plant

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
IX.	**HYDROLOGY AND WATER QUALITY.** Would the project:				
a)	Violate any water quality standards, waste discharge requirements, exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board, or otherwise substantially degrade water quality?	☐	☐	☐	☑
b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☑
c)	Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in substantial erosion or siltation on- or off-site or flooding on- or off-site?	☐	☐	☑	☐
d)	Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☑	☐
e)	Place housing or other structures within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, which would impede or redirect flood flows?	☐	☐	☐	☑

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
f)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam, or inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☑
g)	Require or result in the construction of new water or wastewater treatment facilities or new storm water drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑
h)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☑
i)	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☑

Significance Criteria

Potential impacts on water resources will be considered significant if any of the following criteria apply:

Water Quality:

- The project will cause degradation or depletion of ground water resources substantially affecting current or future uses.
- The project will cause the degradation of surface water substantially affecting current or future uses.
- The project will result in a violation of National Pollutant Discharge Elimination System (NPDES) permit requirements.

- The capacities of existing or proposed wastewater treatment facilities and the sanitary sewer system are not sufficient to meet the needs of the project.

- The project results in substantial increases in the area of impervious surfaces, such that interference with groundwater recharge efforts occurs.

- The project results in alterations to the course or flow of floodwaters.

Water Demand:

- The existing water supply does not have the capacity to meet the increased demands of the project, or the project would use more than 262,830 gallons per day of potable water.

- The project increases demand for water by more than five million gallons per day.

Discussion

IX. a), g), and i): Operations at the LARC currently generate process wastewater, high salts water, treated sour water, and storm water. Wastewater is treated in the wastewater treatment system, which includes American Petroleum Institute (API) separators to remove oil and dissolved air floatation units for additional removal of oil and particulates. The treated process wastewater, high salts water and treated sour water are discharged to the Los Angeles County Sanitation Districts (LACSD) in accordance with the LACSD industrial wastewater permit discharge limits. The storm water is captured, treated as necessary, and discharged to the Dominguez Channel in accordance with a NPDES permit discharge limits. The NPDES permit requires monitoring for various chemicals, pH, and oil and grease, prior to discharge.

During construction of the proposed project, water would be needed to perform the hydrotest of the completed tanks. Hydrotesting involves filling the tank with water to check for leaks. In lieu of being pumped directly to the existing fire water tank (Tank 88A), a portion of the water produced from an onsite well would be diverted to Tank 2640 using the existing firewater pumps and manifold, which deliver water at a rate of 500 to 600 gpm (720,000 to 864,000 gallons per day). Diversion of water would continue until Tank 2640 has been filled to approximately 555,000 bbl (23,247,000 gallons) to perform the required hydrotesting. Once hydrotesting of Tank 2640 has been completed, approximately 12,600 bbl (529,200 gallons) would be transferred to Tank 2643 to perform the necessary hydrotesting. Upon completion of all hydrotesting, the water would be transferred to the existing fire water tank (Tank 88A), which supplies process water to the LARC. Therefore, no new water demand or wastewater would be generated as the result of hydrotesting the tanks.

The operation of the new tanks does not require water. Under normal operations, no water is used in the tank. Under current regulations, should the tank require major reconstruction (e.g., a new tank bottom), hydrotesting prior to reuse would be required. Minor repairs could be inspected using non-destructive testing, such as weld x-rays and ultrasonic testing. Hydrotesting in the future would be performed if required by regulation and would be performed in the same manner as is proposed for the initial construction. Therefore, the proposed project would not

result in an increase in wastewater generated or discharged from the LARC or require a change in any wastewater permits. As a result, no significant adverse impacts associated with wastewater discharges at the LARC are expected from the proposed project.

The two new tanks would be located in an existing tank farm where storm water is managed through the LARC storm water system. No new additional storm water drainage facilities would need to be constructed or the expansion of existing facilities would need to occur to handle the storm water generated in the tank farm. Therefore, no significant adverse impacts associated with construction of or expansion to storm water drainage systems are expected from the proposed project.

The proposed project would not alter wastewater discharge from the LARC and would not affect the capacity of the LACSD facilities. Therefore, the LACSD has adequate capacity to serve the proposed project's projected demand in addition to the provider's existing commitments.

IX. b) and h) Water is primarily provided to the LARC by an onsite water well (i.e., non-potable groundwater). The LARC has adjudicated water rights, which limit the groundwater the LARC can extract from the onsite well (see Appendix D). The proposed project water demand for temporary hydrotesting is within the available water rights of the LARC. Supplemental potable water is supplied to the LARC by the California Water Service Company, which produces water from its own wells and receives water primarily from the Metropolitan Water District.

Construction activities associated with the proposed project would require water for dust suppression during grading for preparation of the project area for the placement of foundations for the new crude oil tank, new water draw surge tank, and new electrical power substation. Grading activities are expected to be limited to a six-week period resulting in in an estimated 2,000 to 3,000 gallons of water per day used for dust suppression purposes (a total of approximately 126,000 gallons during the grading activities). Placement of geodesic domes on existing Tanks 510 and 511 does not require any site preparation or dust suppression activities. Water needed for construction would be supplied from the onsite groundwater well.

As already noted in Section IX. a), g), and i) above, petroleum storage tanks do not require water to operate. During operation of the tanks, should future repairs require hydrotesting, the same procedure of using non-potable groundwater prior to being used in the LARC for process water would be implemented. Therefore, no increase in potable water use would be associated with implementing the proposed project.

The groundwater used for hydrotesting would not be wasted as it would be used in processing following completion of the hydrotesting. To accumulate the necessary hydrotesting water, the LARC would maximize the existing allowable use of the water allocation from the onsite well. As such, no additional groundwater allocation would be required. Therefore, existing entitlements and resources are available for the proposed project and no new or expanded entitlements are needed.

Therefore, no potable water would be used during construction for dust suppression. Further, because non-potable groundwater would be utilized for hydrotesting purpose before it is used as usual for processing via the fire water tank, no increase in the use of groundwater or potable water would occur. Thus, less than significant adverse impacts on water demand would be expected from the proposed project overall. Consequently, the proposed project is not expected to result in a significant adverse impact on potable water demand or groundwater supplies.

IX. c), and d) The LARC is located near the Dominguez Channel and Los Angeles River. The Los Angeles River and the Dominguez Channel are the major drainages that flow into the Los Angeles-Long Beach Harbor complex. Sediments and contaminants are transported into the harbor with the flows from the Los Angeles River, and to a lesser degree, the Dominguez Channel.

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

The Dominguez Channel originates in the area of the Los Angeles International Airport and flows southward into the East Channel of the Los Angeles Harbor. The Dominguez Channel, an 8.5-mile long structure, drains approximately 80 square miles west of the Los Angeles River drainage basin. Permitted discharges from industrial sources are a substantial percentage of the persistent flows in the Dominguez Channel.

The LARC modifications would occur within an existing storage tank farm area, which is currently paved and is expected to remain paved, so no increase in the amount of runoff from the proposed project is expected to occur. As part of construction of the new storage tank and new water draw surge tank, the area surrounding the tanks would be curbed to contain runoff. Any runoff occurring will continue to be collected in a drainage system and handled by the LARC's wastewater system and then either discharged to the Dominguez channel under the conditions of the LARC's existing storm water permit or sent to an onsite wastewater treatment system. Treated storm water is currently discharged to the LACSD sewer system in accordance with the requirements of the facility's Industrial Wastewater Discharge Permit. The proposed project is not expected to increase the storm water runoff from the LARC. The LARC's SWPPP would be updated, as necessary, to reflect the new crude oil storage tank and new water draw surge tank, and include additional Best Management Practices, if required. No new storm drainage facilities or expansion of existing storm facilities are expected to be required.

Any construction that may occur as a result of implementing the proposed project would not alter the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in substantial erosion or siltation on- or off-site or flooding on- or off-site because the affected sites are paved and storm water is directed into the existing wastewater treatment system. Since storm water discharge or runoff is not expected to change in either volume or water quality, no new storm drainage facilities or expansion of existing storm facilities are expected to be required. Thus, no significant adverse storm water quality impacts are expected to result from the operation of the proposed project.

To prevent oil discharges from reaching navigable waters of the United States through proactive measures, the LARC is required to comply with Title 40 of the CFR Part 112 (Oil Pollution Prevention), which sets forth requirements for Spill Prevention, Control and Countermeasure (SPCC) Plans. These regulations require, among other things, that containment facilities be included for all storage tanks, as applicable. In compliance with these regulations, appropriate containment facilities would be constructed for the new crude oil storage tank and new water draw surge tank. Therefore, in the event of a leak, the contents of the new crude oil storage tank or new water draw surge tank would be collected in the containment facilities onsite and would not run off-site or impact water resources.

Therefore, less than significant adverse storm water quality impacts are expected to result from the operation of the proposed project.

IX. e) The proposed project includes installing geodesic domes to the two existing crude oil tanks (Tanks 510 and 511), construction of one new 615,000 barrel crude oil storage tank, one new water draw surge tank, and one new electrical power substation. The proposed project does not include the construction of any housing, nor would it require placing housing within a 100- or 500-year flood hazard area. The project does not anticipate the need for additional permanent workers, so no additional housing is expected (see Section XIII – Population and Housing). The LARC is not located within a 100-year flood hazard area. Since the proposed project is located within the existing boundaries of the LARC, it would not impede or redirect flood flows. The proposed project is not located within a flood zone and therefore, would not expose people or property to a significant risk of loss, injury or death related to flood hazards. Based on the topography and/or site elevations of the LARC in relation to the ocean, the proposed project is not expected to result in an increased risk of flood. Therefore, no significant adverse impacts associated with flooding are expected from the proposed project.

IX. f) The construction activities associated with the proposed project would not occur in an area that could be affected by tsunamis or seiche. The LARC is located approximately 2.1 miles, 1.9 miles, and 4.3 miles from the Ports of Long Beach, Los Angeles, and San Pedro, respectively. The port areas are protected from tsunamis by the construction of breakwaters. Construction of breakwaters combined with the distance of the LATC from the water is expected to minimize the potential impacts of a tsunami or seiche so that no significant impacts are expected. The proposed project does not require construction in areas that are susceptible to mudflows (e.g., hillside or slope areas). The LARC is not located on a hillside or slope area and thus, is not susceptible to mudflow. As a result, the proposed project is not expected to generate significant adverse mudflow impacts. Finally, the proposed project would not affect in any way any potential flood hazards inundation by seiche, tsunami, or mud flow.

Based upon the above considerations, significant adverse hydrology and water quality impacts are not expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse hydrology and water quality impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
X. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☑
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☑

Significance Criteria

Land use and planning impacts will be considered significant if the project conflicts with the land use and zoning designations established by local jurisdictions.

Discussion

X. a), and b) The proposed modifications to two existing crude oil storage tanks (Tanks 510 and 511) by installing geodesic domes and the installation of the new 615,000 barrel crude oil tank, new water draw surge tank, and new electrical power substation, would occur entirely within the existing LARC property boundaries and no new property would be required for the proposed project.

Land use at and surrounding the LARC is zoned heavy industrial, and the proposed project is consistent with this zoning, so no change in zoning designation would be expected. The proposed project would not affect in any way habitat conservation or natural community conservation plans, agricultural resources or operations, and would not create divisions in any existing communities. Further, no new development or alterations to existing land designations would occur as a result of the implementation of the proposed project. Therefore, present or planned land uses in the region would not be affected as a result of implementing the proposed project.

Based upon these considerations, significant adverse land use and planning impacts are not expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse land use and planning impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XI. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☑
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☑

Significance Criteria

Project-related impacts on mineral resources will be considered significant if any of the following conditions are met:

- The project would result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.

- The proposed project results in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

Discussion

XI. a), and b) Implementation of the proposed project would occur entirely within the existing LARC property boundaries all of which is zoned heavy industrial. The Munger Map Book (May 1990 edition) contains data on oil and gas wells in the States of California and Alaska. These data are gathered from state agencies, oil well operators, and various trade journals serving the oil and gas industry. According to Munger, there are no wells (active or abandoned) located on the LARC property and the site is not located within an administrative boundary of an oil field. The nearest oil and gas wells are located over one-half mile south from the LARC in an oil field identified as the Wilmington Oil Field. Thus, LARC property does not contain any known mineral resources.

There are no provisions of the proposed project that would result in the loss of availability of a known mineral resource of value to the region and the residents of the State of California such as aggregate, coal, clay, shale, etc., or locally-important mineral resource recovery site delineated on a local plan, specific plan or other land use plan.

Based upon these considerations, no significant adverse impacts to mineral resources are expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse mineral resource impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XII. NOISE. Would the project result in:				
a) Exposure of persons to or generation of permanent noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☑
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☑	☐
c) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☑	☐
d) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public use airport or private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑

Significance Criteria

Noise impacts will be considered significant if:

- Construction noise levels exceed the local noise ordinances or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three decibels (dBA) at the site boundary. Construction noise levels will be considered significant if they exceed federal Occupational Safety and Health Administration (OSHA) noise standards for workers.

- The proposed project operational noise levels exceed any of the local noise ordinances at the site boundary or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three dBA at the site boundary.

Discussion

XII. a) and c) Construction activities associated with the proposed project would generate noise from construction equipment and construction-related traffic. The types of construction equipment to be used include, but are not limited to, trucks, cranes, fork lifts, air compressors, generators, excavators, scrapers, backhoes, front end loaders, welding machines, and ditch witch (i.e., trenching machine for electrical conduit installation). Noise levels for various construction

equipment are provided in Table 2-10. It should be noted that these noise levels are detected at 50 feet from the source. Noise attenuation due to distance will reduce these values as discussed later in this section.

TABLE 2-10

Construction Noise Sources

Equipment	Typical Range (dBA)[(a)]	Analysis Value (dBA)[(b)]
Air Compressor	85-91	85
Backhoe	73-95	80
Compressors	75-87	85
Concrete Mixers	75-88	75
Concrete Pumps	81-85	85
Cranes	75-89	85
Front Loader	73-86	82
Generators	71-83	85
Jackhammers	81-98	85
Pavers	85-88	75
Pumps	68-72	70
Scrapers, Graders	80-93	80
Tractor	77-98	85
Truck	82-95	82

(a) City of Los Angeles, 2006. Levels are in dBA at 50-foot reference distance. These values are based on a range of equipment and operating conditions.

(b) Analysis values are intended to reflect noise levels from equipment in good conditions, with appropriate mufflers, air intake silencers, etc. In addition, these values assume averaging of sound level over all directions from the listed piece of equipment at 50 feet.

The City of Carson Municipal Code, Ordinance No. 95-1068, limits long-term construction noise for periods of 21 days or more to 65 dBA in the daytime (7:00 a.m. to 6:00 p.m.). In addition, non-urgent, essential construction is generally prohibited without a special permit between 6:00 p.m. and 7:00 a.m. weekdays, and on weekends. If the City Engineer determines that the public health, safety, comfort, and convenience will not be affected during these times, the City Engineer may grant special permission for certain noise-generating activities. The construction activities that would generate noise would be carried out during daytime hours, (e.g., 7:00 a.m. to 6:00 p.m., Monday through Friday).

The operational noise limits for the City of Carson are summarized in Table 2-11 for residential, commercial, and industrial areas and are provided for informational purposes. However, the noise limits in Table 2-11 do not apply to construction activities. If the existing ambient noise level already exceeds these limits, then the noise limit becomes equal to the existing ambient noise level.

TABLE 2-11

City of Carson Noise Ordinance Limits

Construction Limit (dBA)		**Operations Limit (exterior dBA except where noted)**					
Area	**L_{max}**	**Area**	**L_{50}**	**L_{25}**	**$L_{8.3}$**	**$L_{1.7}$**	**L_{max}**
Residential	65 (7:00 a.m. – 6:00 p.m.)	Residential (1,2)	50	55	60	65	70
		Commercial (a, b)	60	60	70	75	80
		Industrial (a,b)	70	70	80	85	90
		Indoor Noise – Residences (b): 45 day, 40 night					

Source: City of Carson Ordinance No. 4101

a Residential and commercial nighttime limits (10:00 p.m. – 7:00 a.m.) are 5 dBA lower. Tonal or impulsive type noise also reduces limit by five dBA.

b If ambient noise exceeds limit then limit is increased to ambient noise.

L_X A-weighted sound level, L, that may not be exceeded more than "x" percent of the measured time period.

L_{max} Maximum A-weighted sound level

The LARC is surrounded by other industrial land uses (e.g., Alameda Corridor, other refining-related land uses, and storage tank farms) that generate noise. Construction activities for the proposed project would produce noise as a result of operating construction equipment. The estimated noise level during construction is expected to be an average of about 85 dBA at 50 feet from the construction site. The closest resident is located about one-third mile or 1,760 feet, to the west of Wilmington Avenue at Realty from the construction site. The City of Carson General Plan Noise Element identifies the existing ambient noise levels in the vicinity of the LARC to be between 68.2 and 77.7 dBA in non-residential areas (Carson, 2004). Using an estimated six dBA reduction for every doubling distance, the noise levels from the construction activities at the residential area (conservatively estimated at 1,600 feet from the proposed project) are expected to be about 55 dBA (see Table 2-12), which is below existing ambient noise levels and within the noise levels allowed under the City of Carson noise ordinance. Most sources of the construction noise would be located near ground level, so the noise levels are expected to attenuate more than analyzed herein. In addition, structures, such as existing storage tanks, are located between the peak noise construction activities and the residential areas, so the noise would be lessened further by these obstructions. For a more conservative analysis, noise attenuation due to existing structures has not been included in the analysis.

Because of the nature of the construction activities, the types, number, operation time, and loudness of construction equipment would vary throughout the construction period. As a result, the sound level associated with construction would change as construction progresses. Construction noise sources would be temporary and would cease following construction activities. Noise levels at the closest residential areas are not expected to increase during construction activities; background noise levels in residential areas generally are in the range of 55 dBA to 65 dBA. The noise levels from the construction equipment are expected to be within

TABLE 2-12

Noise Level Attenuation at a Representative Construction Site

Distance from Construction Noise Source (ft)	Estimated Noise Level (dBA)
50	85
100	79
200	73
400	67
800	61
1,600	55
2,400	52
3,200	49
6,400	43

the allowable noise levels established by the local noise ordinances for industrial areas, which are about 65 dBA but in this case would be the existing ambient background of 68.2 and 77.7 dBA because 65 dBA is already exceeded.

Once construction is complete, the geodesic domes on the two existing storage tanks (Tanks 510 and 511), the new crude oil storage tank, the new water draw surge tank, and the new small electrical power substation are not expected to contribute to any noise because storage tanks and electrical power substations are not noise-producing equipment. The two new pumps would generate the same amount of noise as existing pumps at ground level and are not major sources of discernible noise outside the site boundary, so that no increase in noise related to the pumps would be expected. Pumps already exist at the LARC, and implementation of the proposed project would not generate noise beyond that which currently exists at the facility. Therefore, no discernable change to the existing noise setting during operation of the proposed project is expected. As such, no significant adverse noise impacts from the proposed project are expected.

XII. b) Construction of the proposed project would involve equipment and activities that may have the potential to generate groundborne vibration. Construction equipment is operated sporadically during different construction phases. The Federal Transit Administration (FTA) has published standard vibration levels and peak particle velocities for construction equipment operations (FTA, 2006). The approximate velocity level and peak particle velocities for large construction equipment are listed in Table 2-13. Groundborne vibration is quantified in terms of dB, which is a scale that compresses the range of numbers required to describe the oscillations. The FTA uses vibration decibels (abbreviated as VdB) to measure and assess vibration amplitude. In the United States, vibration is referenced to one micro-inch/sec (converted to 25.4 micro-mm/sec in the metric system) and presented in units of VdB. Based on the activities and equipment which would be used during construction, the peak construction equipment source levels are estimated to range between 58 VdB and 100 VdB at a distance of 25 feet.

TABLE 2-13

Representative Construction Equipment Vibration Impacts

Equipment	Approximate Peak Particle Velocity at 25 Ft. (inches/second)[a]	Approximate Velocity Level at 25 Ft. (VdB) [a]	Approximate Velocity Level at Closest Residential Area (VdB)[b]	Significant? (Exceeds 72 VdB)(c)
Pile Driver typical	0.644	100	64	NO
Large Bulldozers	0.089	87	51	NO
Loaded Trucks	0.076	86	50	NO
Jackhammer	0.035	79	43	NO
Small Bulldozer	0.003	58	22	NO

a. Source: FTA, 2006. Data reflects typical vibration level.
b. Distance to closest off-site receptor. Assumes an estimated six VdB reduction for every doubling of distance per FTA 2006.
c. FTA Ground-Borne Vibration Impact Level.

When analyzing groundborne vibration, the FTA recommends using an estimated six VdB reduction for every doubling of distance (FTA, 2006). The groundborne vibration levels at the closest residential receptor are conservatively estimated at 1,600 feet from the proposed project. Using the FTA methodology, the VdB would range from 22 to 64 VdB (see Table 2-13 and Appendix E). The predicted vibration during construction activities can be compared to the FTA groundborne vibration impact level of 72 VdB, which is the level above which human annoyance or interference with vibration-sensitive equipment is expected to occur. Levels of vibration below the FTA groundborne vibration impact level are considered less than significant by the FTA. Therefore, because the vibration from construction activities is less than the FTA vibration impact level, no significant adverse vibration impacts are expected during the construction period.

The equipment associated with the proposed project is not expected to generate detectable groundborne vibration during normal operation because storage tanks and electrical substation equipment do not have oscillating parts which have the potential to generate groundborne vibration. Therefore, vibration from operation of the proposed project is expected to be less than significant and no significant adverse vibration impacts are expected during operation.

XII. d) The LARC is not located with an airport land use plan or within two miles of a public or private airport. Therefore, the proposed project would not expose people residing or working in the area to excessive noise related to the proposed project.

Based upon these considerations, significant adverse noise impacts are not expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse noise impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XIII. POPULATION AND HOUSING. Would the project:				
a) Induce substantial growth in an area either directly (for example, by proposing new homes and businesses) or indirectly (e.g. through extension of roads or other infrastructure)?	☐	☐	☐	☑
b) Displace substantial numbers of people or existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑

Significance Criteria

The impacts of the proposed project on population and housing will be considered significant if the following criteria are exceeded:

- The demand for temporary or permanent housing exceeds the existing supply.
- The proposed project produces additional population, housing or employment inconsistent with adopted plans either in terms of overall amount or location.

Discussion

XIII. a), and b) Construction activities at the LARC would not involve the relocation of individuals, impact housing or commercial facilities, or change the distribution of the population because the proposed project would occur completely within the boundaries of the existing LARC and no housing is located within the LARC. During construction, a maximum of 115 temporary workers would be needed and these workers are expected to come from the existing labor pool in the southern California area. Additionally, once the proposed project is complete, operational activities are not expected to require new permanent employees. In the event that new employees are hired, it is expected that the number of new employees would be small, e.g., no more than one or two people and these workers would be expected from the existing labor pool. Human population within the jurisdiction of the SCAQMD is anticipated to grow regardless of implementing the proposed project. As a result, the proposed project is not anticipated to generate any significant adverse effects, either direct or indirect, on population growth in the district or population distribution.

XIII. b) Because the proposed project includes modifications at the existing LARC which is located in an industrial setting, the proposed project is not expected to result in the creation of any industry that would affect population growth, directly or indirectly induce the construction of single- or multiple-family units, or require the displacement of people or housing elsewhere in

the district. Therefore, implementation of the proposed project is not expected to have a significant adverse impact on population, population distribution, or housing.

Based upon these considerations, significant adverse population and housing impacts are not expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse population and housing impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XIV. PUBLIC SERVICES. Would the proposal result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:				
a) Fire protection?	☐	☐	☐	☑
b) Police protection?	☐	☐	☐	☑
c) Schools?	☐	☐	☐	☑
d) Other public facilities?	☐	☐	☐	☑

Significance Criteria

Impacts on public services will be considered significant if the project results in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response time or other public service performance objectives.

Discussion

XIV. a) To respond to emergency situations, the LARC maintains an onsite fire department, which is supplemented by the resources of public fire departments. Specifically, the LARC is supported by the Los Angeles County Fire Department (LACFD), which has four LACFD stations that serve the Carson area: (1) Station 127 at 2049 E. 223rd Street; (2) Station 10 at 1860 E. Del Amo Boulevard; (3) Station 36 at 127 W. 223rd Street; and (4) Station 116 at 755 E. Victoria. Compliance with state and local fire codes is expected to minimize the need for additional fire protection services.

In addition, the LARC maintains its own onsite emergency response department. LARC maintains a fully trained 24-hour emergency response team; fire-fighting equipment including fire engines and foam pumper trucks or trailers; and manual and automatic fire suppression systems for flammable and combustible materials. LARC staff are trained in accordance with industry standards, and onsite fire training exercises with the LACFD staff are routinely conducted.

During construction, safeguards, monitoring for hazards with equipment designed to detect sources of flammable gases and vapors, written procedures, training, and authorization of equipment used onsite would be in place, thus, construction activities are not expected to result in an increased need for fire response services.

Because the new crude oil storage tank and new water draw surge tank would be located within an existing tank farm, the proposed project would not increase or alter the requirements for additional or altered fire protection during operation. In addition, fire hazards from the proposed project were determined to be not significant (see Section VIII h). Fire-fighting and emergency response personnel and equipment will continue to be maintained and operated at the LARC. Close coordination with local fire departments and emergency services also will be maintained.

XIV. b) The Los Angeles County Sheriff's Department is the responding agency for law enforcement needs in the vicinity of the LARC. Because sheriff and police units are in the field, response times to the LARC may vary depending on the location of the nearest unit.

In addition, the LARC has an existing security department that provides 24-hour protective services for people and property within the fenced boundaries of the facility. As part of their regular duties, the security department would monitor construction activities associated with the proposed project since construction would occur within the confines of the LARC's boundaries. Along with the existing work force, entry and exit of the construction work force would be similarly monitored. Once construction is completed, the proposed project would not be expected to change LARC staffing. Thus, no additional or altered police protection would be required for the proposed project.

XIV. c), and d) As noted in the previous "Population and Housing" (Section XIII.) discussion, the proposed project is not expected to induce population growth in any way because the local labor pool (e.g., workforce) is expected to be sufficient to accommodate any construction activities that may be necessary at affected facilities and operation of any new equipment is not expected to require additional employees. Therefore, there would be no increase in local population and thus no impacts would be expected to local schools or other public facilities. Similarly, since the proposed project is not expected to require additional permanent staffing once construction is completed, an increase in the local population is not expected.

Besides permitting the new equipment and altering permit conditions for the existing equipment by the SCAQMD and building permits from the City of Carson, there would be no need for other types of government services. Permitting agencies are currently equipped with the resources necessary to provide permits and environmental review of the proposed project. Thus, the proposed project would not result in the need for new or physically altered government facilities in order to maintain acceptable service ratios, response times, or other public service performance objectives. There would be no increase in population and, therefore, there would be no need for physically altered government facilities.

Based upon these considerations, significant adverse public services impacts are not expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse public services impacts were identified, no mitigation measures are necessary or required.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XV.	**RECREATION.**				
a)	Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☑
b)	Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment or recreational services?	☐	☐	☐	☑

Significance Criteria

The impacts to recreation will be considered significant if:

- The project results in an increased demand for neighborhood or regional parks or other recreational facilities.

- The project adversely effects existing recreational opportunities.

Discussion

XV. a), and b) The City of Carson currently has 16 public parks, one County park (Victoria), and two public golf courses (Victoria Golf Course and Dominguez Golf Course). The Carson Community Center also provides recreation programs and meeting rooms for all residents. Collectively, excluding the Dominguez Golf Course, the total amount of public park land (City and County owned) is approximately 315 acres.

As noted in the previous "Population and Housing" (Section XIII.) discussion, the existing labor pool in southern California is sufficient to fulfill the labor requirements for the construction of the proposed project. The operation of the proposed project would not require additional workers to be hired at the LARC, and therefore, there would be no significant changes in population densities resulting from the proposed project, and thus no anticipated increase in the use of existing neighborhood and regional parks or other recreational facilities.

As noted in the previous "Land Use and Planning" (Section X.) discussion, there are no provisions in the proposed project that would affect land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments and no land use or planning requirements would be altered by the proposed project.

Because the proposed project is limited to the confines of the LARC, the proposed project would not increase the demand for or use of existing neighborhood and regional parks or other recreational facilities or require the construction of new or expansion of existing recreational facilities that might have an adverse physical effect on the environment because it would not directly or indirectly increase or redistribute population.

Based upon these considerations, significant adverse recreation impacts are not expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse recreation impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XVI. SOLID/HAZARDOUS WASTE. Would the project:				
a) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☑	☐
b) Comply with federal, state, and local statutes and regulations related to solid and hazardous waste?	☐	☐	☑	☐

Significance Criteria

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

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

Discussion

XVI. a), and b) There are no existing structures at the LARC that require demolition, so no increase in solid waste would be associated with demolition activities. However, excavation and grading activities during construction could generate solid waste.

The new crude oil storage tank, new water draw surge tank, and new electrical substation would be installed in an area on the west side of the LARC that is presently vacant, but formerly the site of two below ground level crude storage reservoirs. These reservoirs were closed in 1995 under authorization from the RWQCB and are currently capped with a one-foot thick impermeable clay layer. Grading and recompaction of this area would be required in order to install the concrete foundations for the new crude oil tank and electrical power substation, and to erect a containment berm. RWQCB approval for grading/excavation and recompaction of this area to allow for development of the proposed project would be required, as it requires changes to the clay layer (cap). The excavated clay would be reused to the extent practicable, with any unusable clay appropriately classified and treated or disposed of at the appropriate offsite facility. Based on preliminary soil sampling of the clay to be excavated, minimal amounts of clay are expected to be transported off-site.

Excavation at this site is also subject to the requirements of SCAQMD Rule 1166, which requires SCAQMD approval prior to the start of excavation and requires the offsite treatment of VOC-contaminated soils with concentrations above the Rule 1166 threshold. The facility has submitted an application for a site-specific SCAQMD Rule 1166 Mitigation Plan, and it is anticipated approval of the plan will be issued along with the permit to construct for the project. Soil remediation activities are also under the jurisdiction of the RWQCB. Following SCAQMD

approval of the proposed project, a Soil Management Plan will be submitted to the RWQCB for approval. The RWQCB, when considering the Soil Management Plan, relies on the analysis in this Negative Declaration and the SCAQMD Rule 1166 Mitigation Plan.

Excavated soil, if found to be contaminated, would need to be characterized, treated, and disposed of offsite in accordance with applicable regulations. Where appropriate, the soil would be recycled if it is considered or classified as non-hazardous waste or it can be disposed of at a landfill that accepts non-hazardous waste. Otherwise, the material would need to be disposed of at a hazardous waste facility. (Potential soil contamination is addressed in the Hazards and Hazardous Materials discussion in Section VIII. d.) Most of the contaminated soils encountered during prior construction projects at the Refinery were determined through testing to be non-hazardous wastes. The Refinery would determine an appropriate offsite processing method for any excavated soil that cannot be reused onsite.

Construction-related waste such as shipping packing materials, depending on the classification of the waste, would need to be disposed of at a Class II (industrial) or Class III (municipal) landfill. A Class II landfill can handle wastes that exhibit a level of contamination not considered hazardous, but that are required by the State of California to be managed for disposal to a permitted Class II landfill. For this reason, Class II landfills are specially designed with liners to reduce the risks of groundwater contamination from industrial wastes, also known as California-regulated waste. Similarly, a Class III landfill can handle non-hazardous or municipal waste. Municipal waste is typically generated through day-to-day activities and does not present the hazardous characteristics of hazardous, industrial, or radioactive wastes.

There are 32 active Class III landfills within the SCAQMD's jurisdiction, many of which have liners that can handle both Class II and Class III wastes. According to the Final Program EIR for the 2012 AQMP (SCAQMD, 2012), total Class III landfill waste disposal capacity in the district is approximately 116,796 tons per day.

There are no hazardous waste landfills within the Southern California area. Construction (excavation) activities may encounter soil that through testing is determined to be a hazardous waste. If hazardous waste soil is encountered it must be disposed of at a permitted hazardous waste disposal facility. One such facility in California is the Clean Harbors (formerly Safety-Kleen) facility in Buttonwillow (Kern County). Hazardous waste also can be transported to permitted facilities outside of California. The nearest out-of-state landfills are U.S. Ecology, Inc., located in Beatty, Nevada, and USPCI, Inc., in Murray, Utah.

In summary, the amount of solid or hazardous waste that may be generated during construction is expected to be well within the landfill waste disposal capacity available. No demolition is required as part of the proposed project and large volumes of contaminated clay are not expected to be generated. For these reasons, the construction impacts of the proposed project on solid and hazardous waste disposal facilities are expected to be less than significant.

The operation of the new crude oil storage tank and new water draw sure tank do not routinely generate non-hazardous or hazardous wastes. However, periodically for maintenance (typically every five to 15 years depending on sludge generation), the tanks are emptied and cleaned out,

resulting in a sludge that generally requires treatment to recover useful product (oil), etc., and disposal (e.g., disposal at a hazardous waste landfill). Since the proposed project includes the installation of the new crude oil tank and new water draw surge tank, the proposed project would generate sludge wastes associated with periodic tank cleaning operation. However, less sludge would be generated in the existing crude tanks at the LARC because less crude oil will ultimately be stored there. The daily volume of waste generated during the periodic cleaning of the existing storage tanks and the proposed new storage tanks is expected to be about the same as current conditions because no change in the method for tank cleaning is proposed. Overall, the amount of sludge generated from crude storage is expected to remain the same as current operations because sludge formation is a function of material handling, not the volume of the storage container. The LARC is expected to continue to comply with federal, state, and local statutes and regulations related to solid and hazardous wastes, therefore, no significant adverse increase in solid or hazardous waste is expected due to the proposed project.

Since operation of the new crude oil storage tank and new water draw surge tank, would not generate additional solid or hazardous waste, implementation of the proposed project is not expected to require additional waste disposal capacity or interfere or undermine the LARC's ability to comply with existing federal, state, and local regulations for solid and hazardous waste handling and disposal.

Based upon these considerations, significant adverse solid and hazardous waste impacts are not expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse solid and hazardous waste impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XVII. TRANSPORTATION AND TRAFFIC. Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☑
b) Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☑	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☑
d) Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☐	☐	☐	☑
e) Result in inadequate emergency access?	☐	☐	☐	☑
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☑

Significance Criteria

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

- Peak period levels on major arterials are disrupted to a point where level of service (LOS) is reduced to D, E or F for more than one month.
- An intersection's volume to capacity ratio increase by 0.02 (two percent) or more when the LOS is already D, E or F.
- A major roadway is closed to all through traffic, and no alternate route is available.
- The project conflicts with applicable policies, plans or programs establishing measures of effectiveness, thereby decreasing the performance or safety of any mode of transportation.
- There is an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system.
- The demand for parking facilities is substantially increased.
- Waterborne, rail car, or air traffic is substantially altered.
- Traffic hazards to motor vehicles, bicyclists or pedestrians are substantially increased.
- The need for more than 350 employees.
- An increase in heavy-duty transport truck traffic to and/or from the facility by more than 350 truck round trips per day.
- Increase customer traffic by more than 700 visits per day.

Discussion

XVII. a) and b) The LARC is located at 1520 East Sepulveda Boulevard, between Wilmington Avenue and Alameda Street, in Carson California, about 1.25 miles south of the 405 Freeway. Most of the area surrounding the LARC is heavy industrial land uses. Key arterials servicing the LARC include Sepulveda Boulevard, Wilmington Avenue and Alameda Street. Sepulveda boulevard is an east-west street in the vicinity of the LARC. Alameda Street and Wilmington Avenue are north-south streets in the vicinity of the proposed project.

Approximately 115 construction workers would be commuting to the LARC during peak construction activities. All construction workers would be directed to the LARC for parking since sufficient capacity is available in the contractor parking lot at the LARC. Construction

workers are expected to arrive at the work sites between 6:30 a.m. and 7:00 a.m., which would generally avoid peak hour traffic conditions, and depart between 5:30 p.m. and 6:00 p.m. The construction worker commute is expected to avoid peak hour traffic during morning hours, between 7:00 a.m. and 8:00 a.m., but could impact the evening peak hours (between 4:00 p.m. and 6:00 p.m.). Peak construction activities are expected to be limited to about the six-month period when initial grading and construction of the domes on the existing storage tanks and the new crude storage tank would occur. The increase in construction worker traffic in the area would be temporary and would cease following the completion of construction activities.

The predominant route used to reach the LARC is from the San Diego Interstate 405 Freeway to Alameda Street. Alameda Street, Sepulveda Boulevard, and Wilmington Avenue are identified as major highways in the General Plan for the City of Carson. Major highways typically handle inter-city vehicular trips in the magnitude of 25,000 or more vehicles per day (Carson, 2004a). The projected increase in traffic during the construction phase of the proposed project is less than the significance criteria of 350 employees and well below a one percent increase in traffic on the local streets and at the local intersections. Further, the City of Carson has completed an LOS analysis on the streets near the LARC. All intersections in the vicinity of the LARC are LOS A during both morning and evening peak hours, indicating free flowing traffic conditions (Carson, 2004a). In addition to a maximum of 115 construction worker commute trips, the proposed project would generate a maximum of one additional delivery truck per day to deliver equipment to the site. These delivery trucks would be scheduled to arrive at a time that would avoid peak hour traffic and minimize the delivery time. Therefore, maximum estimated daily impacts on traffic would be approximately 116 trips during the construction phase (morning and evening).

The permanent work force at the LARC is not expected to increase as a result of the proposed project and thus, no increase in operation-related traffic is expected. Therefore, no significant traffic impacts are expected during the operational phase of the proposed project. For these reasons, the anticipated traffic impacts are relatively minimal and thus, would not be expected to conflict with plans, ordinances or policies for establishing effective performance of the circulation system or congestion management plans, if applicable.

The proposed project would not result in any increase in the number or size of marine vessels visiting the marine terminal used by Phillips 66 in the Port of Long Beach. Currently the marine terminal receives vessels of various sizes including Panamax vessels (400,000 bbl capacity) as well as larger vessels (from 720,000 bbl to 1,000,000 bbl capacity). When a ship larger than Panamax calls, LARC accepts delivery of the first portion of the crude oil into the existing tanks then processes the crude oil through LARC to make room in the receiving tanks to accommodate the second discharge from the larger vessel. By installing the new crude oil storage tank, the proposed project would allow larger vessels to discharge the entire volume of material in one ship call, minimizing the time the vessels spend in the Port area and minimizing the ship emissions. However, because the proposed project would not change refining operation, no increase in crude throughput would occur. Therefore, no additional crude oil deliveries would be needed to supply the Refinery. The proposed project streamlines the delivery process.

XVII. c) The proposed project includes modifications to existing equipment and installation of one crude oil storage tank, one new water draw surge tank, associated piping, and one electrical

power substation and tie-in to an existing manifold within the existing boundaries of the LARC. Modifications to existing equipment include the addition of geodesic domes on the two existing crude oil storage tanks (Tanks 510 and 511). The maximum height of these storage tanks is about 118 feet. The height profile of the new storage tank, new water surge tank, and the modified existing storage tanks would be similar in height to other existing storage tanks in the tank farm. The tallest structure at the LARC is the Coker Unit at a height of 250 feet, which is below the height at which air traffic exists. For these reasons, the proposed project would not be expected to result in a change to air traffic patterns such that a notification to the Federal Aviation Administration pursuant to Advisory Circular AC 70/7460-2K would not be required. Further, since the LARC is located about four miles west of the nearest airport, Long Beach Airport, the facility is located outside of the normal flight pattern of Long Beach Airport. In addition, because the proposed project would not involve the delivery of materials via air cargo, no increase in air traffic would be expected.

XVII. d), and e) The proposed project is not expected to substantially increase traffic hazards or create incompatible uses at or adjacent to the site because the proposed project does not include the construction of roadways onsite or off-site that could include design hazards. Emergency access at the LARC would not be impacted by the proposed project because no onsite roadways would be altered as a result of the proposed project and Phillips 66 would continue to maintain the existing emergency access roads and gates to the LARC. Therefore, no changes to emergency response plans are expected as a result of the proposed project.

XVII. f) Because the proposed project would be constructed within the confines of the existing LARC, and no conflict with adopted policies, plans, or programs supporting alternative transportation modes (e.g., bus turnouts, bicycle racks) would be expected.

Based on these considerations, significant adverse transportation and traffic impacts are not expected from implementing the proposed project, and thus, this topic will not be analyzed further.

Mitigation Measures

Since no significant adverse transportation and traffic impacts were identified, no mitigation measures are necessary or required.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☑
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)	☐	☐	☑	☐
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☑	☐

Discussion

XVIII. a) As discussed in the "Biological Resources" (Section IV.), the proposed project is not expected to significantly adversely affect plant or animal species or the habitat on which they rely because the affected equipment is located in the LARC within in industrial area that has already been greatly disturbed for over 90 years and that currently does not support such habitats. Furthermore, the area where the modified storage tanks exist and where the new crude oil storage tank and new water surge tank would be constructed are already either devoid of significant biological resources or whose biological resources have been previously disturbed. Lastly, special status plants, animals, or natural communities are not expected to be found within close proximity to the storage tanks because the LARC is generally devoid of plants and natural communities that could support animals for fire safety reasons.

The proposed project would not require the acquisition of land and the construction activities associated with the modifications to the two existing storage tanks and installation of the new crude oil storage tank and new water draw surge tank are expected to occur entirely with the LARC's existing established boundaries. In other words, implementing the proposed project would not require construction activities in areas where special status plants, animals, or natural communities and important examples of the major periods of California history or prehistory exist. As a result, implementing the proposed project is not expected to adversely affect in any way habitats that support riparian habitat, are federally protected wetlands, or are migratory corridors. Therefore, these areas would not be expected to be adversely affected by the proposed project.

XVIII. b) Based on the preceding analyses in discussion topics I. through XVII., the proposed project is not expected to generate any project-specific significant adverse environmental impacts for the following reasons. The environmental topics that were not checked as areas potentially affected by the proposed project (e.g., agriculture and forestry resources, biological resources, cultural resources, land use and planning, mineral resources, population and housing, public services, and recreation) were found to have 'No Impact' and would not be expected to make any contribution to potential cumulative impacts whatsoever. For the environmental topics checked as areas potentially affected by the proposed project (e.g., aesthetics, air quality and GHG emissions, energy, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, solid and hazardous waste and transportation and traffic), the analysis indicated that project impacts would be less than significant because they would not exceed any project-specific significance thresholds. Based on these conclusions, incremental effects of the proposed project would be minor and, therefore, are not considered to be cumulatively considerable as defined by CEQA Guidelines §15064 (h)(1). Since impacts from the proposed project are not considered to be cumulatively considerable, the proposed project has no potential for generating significant adverse cumulative impacts.

XVIII. c) The proposed project would primarily modify two existing storage tanks, construct one new crude oil storage tank and one new water draw surge tank at the LARC, which would be built in accordance with current BACT requirements. The estimated VOC emission increase from the proposed project operations have been shown (see Table 2-4) to be less than significant. The potential health impacts of the TAC emission increases were evaluated in a health risk assessment (see Appendix C) and the results of the health risk assessment indicated that the TAC emissions in the vicinity of the LARC would be less than significant. Further, the proposed project is not expected to increase the potential adverse hazard impacts associated with the operation of the facility and the hazard impacts were determined to be less than significant.

Based on the preceding analyses, the proposed project is not expected to cause substantial adverse effects on human beings, either directly or indirectly. For the environmental topics that were checked as areas of potentially affected by the proposed project (i.e., aesthetics, air quality and GHG emissions, energy, geology and soils, hazards and hazardous material, hydrology and water quality, noise, solid and hazardous waste, and transportation and traffic), less than significant adverse impacts to these environmental topics were identified.

Based on the discussion in items I. through XVII., the proposed project is not expected to have the potential to cause significant adverse environmental effects to any environmental topic.

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2.7 ACRONYMS

Abbreviation	Description
AQMP	Air Quality Management Plan
AB	Assembly Bill
BACM	Best Available Control Measure
BACT	Best Available Control Technology
Basin	South Coast Air Basin
bbl	barrel, 42 gallons
CalARP	California Accidental Release Program
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
dBA	A weighted noise level measurement in decibels
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report
ERPG	Emergency Response Planning Guideline
Farmland	Prime Farmland, Unique Farmland, or Farmland of Statewide Importance
FDDR	floating double deck roof
FPR	floating pontoon roof
ft	feet
FTA	Federal Transit Administration
G	acceleration of gravity
GHGs	Greenhouse Gases
gpm	gallons per minute
HARP	Hotspots Analysis Reporting Program
HFCs	hydrofluorocarbons
HMMA	Hazardous Material Management Act
HRA	Health Risk Assessment
KV	kilovolt
LACFD	Los Angeles County Fire Department
LACSD	Los Angeles County Sanitation Districts
LARC	Phillips 66 Los Angeles Refinery Carson Plant
lbs/day	pounds per day
LOS	Level of Service
LST	Localized Significance Threshold
MAHI	maximum acute hazard index
MATES	Magnitude of Ambient Air Toxics Impacts from Existing Sources
MCHI	maximum chronic hazard index

MEIR	maximum exposed individual resident
MEIW	maximum exposed individual worker
MT	metric ton
$MTCO_2e$	metric tons of CO_2 equivalent
MW	megawatt
NC	no change
N_2O	nitrous oxide
NFPA	National Fire protection Association
NO_2	nitrogen dioxide
NOx	Nitrogen oxides
NPDES	National Pollution Discharge Elimination System
OEHHA	Office of Environmental Health Hazard Assessment
OSHA	Occupational Safety and Health Administration
PFCs	perfluorocarbons
PM10	particulate matter less than 10 microns in diameter
PM2.5	particulate matter less than 2.5 microns in diameter
PM	particulate matter
ppm	parts per million
PRC	Public Resources Code
PSM	Process Safety Management
RCRA	Resource Conservation and Recovery Act
Refinery	Phillips 66 Los Angeles Refinery, Wilmington Plant and Carson Plant
REL	reference exposure levels
RMP	Risk Management Program
RWQCB	California Regional Water Quality Control Board, Los Angeles Region
SCAQ	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCEC	Southern California Earthquake Center
SCE	Southern California Edison
SF_6	sulfur hexafluoride
SLIC	Spills, Leaks, Investigation and Cleanup
SOx	sulfur oxides
SPCC	Spill Prevention, Control and Countermeasure
SWPPP	Storm Water Pollution Prevention Plan
TACs	toxic air contaminants
VdB	vibration decibels
VOCs	Volatile Organic Compounds

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APPENDIX A

PEAK EMISSION CALCULATIONS

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Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
Construction Emission Summary

	Year 1							Year 2										
Emissions from Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
VOC (lb/day)	6.39	6.39	3.50	6.54	6.17	5.62	4.81	5.19	5.73	4.92	4.22	3.67	2.89	2.86	3.19	2.99	2.57	2.23
CO (lb/day)	43.45	43.45	36.87	55.64	47.58	42.59	38.16	44.20	44.54	43.14	38.83	34.04	24.73	21.51	24.73	21.41	19.85	16.62
NOx (lb/day)	83.06	83.06	40.96	67.47	58.00	55.61	50.06	58.49	60.16	53.86	48.26	40.41	30.62	28.44	32.11	29.26	25.59	21.91
SOx (lb/day)	0.13	0.13	0.09	0.13	0.11	0.10	0.09	0.11	0.11	0.10	0.09	0.07	0.06	0.05	0.06	0.05	0.04	0.04
PM10 (lb/day)	4.26	4.26	2.46	4.11	3.65	3.42	2.93	3.41	3.61	3.26	2.81	2.51	1.89	1.74	2.01	1.83	1.56	1.28
PM2.5 (lb/day)[1]	4.17	4.17	2.41	4.02	3.58	3.35	2.87	3.34	3.54	3.20	2.75	2.46	1.85	1.71	1.97	1.79	1.53	1.26
CO_2 (lb/day)	6810.16	6810.16	4615.35	7058.81	5654.57	5404.14	4864.34	5783.81	6040.38	5560.02	5044.15	3920.31	2975.27	2771.22	3077.74	2719.65	2276.84	1970.32

	Year 1							Year 2										
Emission from Trips - Onsite/Offsite	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
VOC (lb/day)	1.03	1.00	1.33	1.69	2.15	2.15	2.09	2.19	2.22	2.20	1.44	1.43	1.43	0.96	0.77	0.77	0.48	0.39
CO (lb/day)	9.27	9.16	11.85	15.42	19.94	19.94	19.46	20.28	20.46	20.38	13.36	13.27	13.27	8.87	7.12	7.12	4.49	3.61
NOx (lb/day)	2.69	2.24	3.55	3.24	2.68	2.68	1.88	1.95	2.36	1.96	1.29	1.28	1.28	0.85	0.69	0.69	0.43	0.35
SOx (lb/day)	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01
PM10 (lb/day)	5.85	5.22	8.74	10.01	11.22	11.22	10.31	1.67	2.12	1.68	1.10	1.09	1.09	0.73	0.59	0.59	0.37	0.30
Exhuast PM (lb/day)	0.20	0.19	0.27	0.31	0.35	0.35	0.32	0.36	0.37	0.36	0.24	0.24	0.24	0.16	0.13	0.13	0.08	0.06
Fugitive PM (lb/day)	5.65	5.03	8.47	9.70	10.88	10.88	9.99	1.31	1.74	1.32	0.86	0.86	0.86	0.57	0.46	0.46	0.29	0.23
PM2.5 (lb/day)[1]	1.16	1.04	1.71	1.96	2.20	2.20	2.01	0.58	0.67	0.59	0.38	0.38	0.38	0.26	0.20	0.20	0.13	0.10
Exhuast PM (lb/day)	0.20	0.19	0.27	0.31	0.35	0.35	0.32	0.36	0.37	0.36	0.24	0.24	0.24	0.16	0.13	0.13	0.08	0.06
Fugitive PM (lb/day)	0.96	0.86	1.44	1.65	1.85	1.85	1.70	0.22	0.30	0.22	0.15	0.15	0.15	0.10	0.08	0.08	0.05	0.04
CO_2 (lb/day)	1641.35	1550.83	2178.85	2631.80	3167.39	3167.39	2986.15	3537.87	3640.00	3554.51	2331.19	2314.54	2314.54	1547.88	1242.05	1242.05	783.30	629.35

	Year 1							Year 2										
Fugitive Earthmoving PM - Peak	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
PM10 (lb/day)[2]	20.32	20.32	20.32	20.32	20.32	20.32	20.32	20.32	20.32	20.32	20.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)[1][2]	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	11.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 1							Year 2										
Offroad Fugitive PM - Peak	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
PM10 (lb/day)[2]	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36	11.36
PM2.5 (lb/day)[1][2]	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39

	Year 1							Year 2										
Paint	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.60	16.60	0.00	0.00	0.00	62.25	62.25

	Year 1							Year 2										
Fugitive VOC	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
VOC (lb/day)	0.00	0.00	3.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Year 1							Year 2										
Total Emissions[3]	**Thresholds**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
VOC (lb/day)	75	7.42	7.40	8.09	8.24	8.32	7.78	6.89	7.38	7.94	7.12	5.66	21.71	20.92	3.82	3.96	3.76	65.30	64.87
CO (lb/day)	550	52.72	52.61	48.72	71.06	67.52	62.53	57.62	64.48	65.01	63.52	52.20	47.31	38.00	30.38	31.85	28.53	24.34	20.23
NOx (lb/day)	100	85.75	85.30	44.51	70.71	60.68	58.29	51.94	60.44	62.52	55.82	49.55	41.69	31.90	29.29	32.80	29.94	26.02	22.26
SOx (lb/day)	150	0.14	0.14	0.11	0.16	0.14	0.13	0.12	0.14	0.15	0.14	0.12	0.10	0.08	0.07	0.07	0.06	0.05	0.04
PM10 (lb/day)[2]	150	41.80	41.17	42.89	45.80	46.56	46.33	44.92	36.77	37.41	36.63	35.60	14.97	14.34	13.84	13.96	13.78	13.29	12.95
PM2.5 (lb/day)[1][2]	55	19.51	19.39	18.30	20.15	19.95	19.72	19.06	18.10	18.38	17.96	17.31	5.23	4.62	4.35	4.56	4.39	4.04	3.75
CO_2 (tonnes/day)	NA	3.83	3.79	3.08	4.40	4.00	3.89	3.56	4.23	4.39	4.13	3.35	2.83	2.40	1.96	1.96	1.80	1.39	1.18
CO_2 (tonnes/yr)	NA							597.47											666.21
30yr amortized CO_2 (tonnes/yr)	NA																		42.12

(1) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_5ratio.xls

(2) Mitigated PM.

(3) Peak daily emissions are highlighed in yellow.

Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
Construction Equipment Emission Rates

Equipment Type	Hp	2013 Emission Factors lb/hr[1]					
		VOC	CO	NOx	SOx	PM10	CO_{2EQ}
Crane	250	0.0778	0.2948	1.1241	0.0014	0.0516	73.3462
Fork Lift	120	0.0253	0.2176	0.2634	0.0004	0.0220	19.3615
Man Lift	120	0.0101	0.2425	0.1976	0.0005	0.0101	26.7116
Welder	Electric	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Air Compressor	50	0.0380	0.2546	0.1950	0.0004	0.0177	20.7119
Generator	50	0.0380	0.2639	0.1950	0.0004	0.0177	20.7119
Light Plant	50	0.0380	0.3456	0.1950	0.0004	0.0177	20.7119
Track Excavator	120	0.0306	0.5177	0.3698	0.0007	0.0278	36.1744
Scraper	250	0.1534	0.6408	2.2020	0.0024	0.1012	126.2025
Backhoe	120	0.0344	0.3529	0.3949	0.0007	0.0315	36.1695
Front End Loader	120	0.0344	0.3529	0.3949	0.0007	0.0315	36.1695
3-yd Loader	175	0.0438	0.5861	0.6229	0.0012	0.0315	61.7966
Grader	500	0.0660	0.6289	0.9806	0.0026	0.0373	140.4933
Skip Loader	120	0.0344	0.3529	0.3949	0.0007	0.0315	36.1695
Trash Pump	50	0.0339	0.1004	0.1493	0.0003	0.0147	15.6525
Trash Pump	50	0.0339	0.3116	0.1493	0.0003	0.0147	15.6525
Ditch Witch	50	0.0471	0.1355	0.2428	0.0005	0.0224	26.1733
Roller	120	0.0436	0.4063	0.4850	0.0007	0.0362	38.3436

(1) OFFROAD2011 emissions except for CO, which are from the OFFROAD2007.

Equipment Type	Hp	2014 Emission Factors lb/hr[1]					
		VOC	CO	NOx	SOx	PM10	CO_{2EQ}
Crane	250	0.0753	0.2817	1.0834	0.0014	0.0497	73.3415
Fork Lift	120	0.0240	0.2158	0.2500	0.0004	0.0209	19.3615
Man Lift	120	0.0084	0.2400	0.1696	0.0005	0.0081	26.7116
Welder	Electric	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Air Compressor	50	0.0374	0.2446	0.1937	0.0004	0.0175	20.7137
Generator	50	0.0374	0.2545	0.1937	0.0004	0.0175	20.7137
Light Plant	50	0.0374	0.3331	0.1937	0.0004	0.0175	20.7137
Track Excavator	120	0.0292	0.5137	0.3533	0.0007	0.0263	36.1863
Scraper	250	0.1467	0.6146	2.1091	0.0024	0.0964	126.1285
Backhoe	120	0.0323	0.3503	0.3747	0.0007	0.0294	36.0979
Front End Loader	120	0.0323	0.3503	0.3747	0.0007	0.0294	36.0979
3-yd Loader	175	0.0409	0.5857	0.5774	0.0012	0.0290	61.7668
Grader	500	0.0686	0.5992	0.9810	0.0026	0.0377	140.4799
Skip Loader	120	0.0323	0.3503	0.3747	0.0007	0.0294	36.0979
Trash Pump	50	0.0332	0.0959	0.1476	0.0003	0.0144	15.6525
Trash Pump	50	0.0332	0.3004	0.1476	0.0003	0.0144	15.6525
Ditch Witch	50	0.0462	0.1355	0.2404	0.0005	0.0221	26.1684
Roller	120	0.0413	0.4030	0.4591	0.0007	0.0342	38.3145

(1) OFFROAD2011 emissions except for CO, which are from the OFFROAD2007.

Equipment Type	Hp	2015 Emission Factors lb/hr[1]					
		VOC	CO	NOx	SOx	PM10	CO_{2EQ}
Crane	250	0.0567	0.2713	0.5684	0.0006	0.0422	29.8511
Fork Lift	120	0.0232	0.2143	0.2409	0.0004	0.0202	19.3615
Man Lift	120	0.0079	0.2377	0.1566	0.0005	0.0072	26.7116
Welder	Electric	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Air Compressor	50	0.0377	0.2360	0.1937	0.0004	0.0175	20.7115
Generator	50	0.0377	0.2465	0.1937	0.0004	0.0175	20.7115
Light Plant	50	0.0377	0.3227	0.1937	0.0004	0.0175	20.7115
Track Excavator	120	0.0289	0.5102	0.3456	0.0007	0.0257	36.1904
Scraper	250	0.1443	0.5906	2.0728	0.0024	0.0946	126.1095
Backhoe	120	0.0316	0.3480	0.3641	0.0007	0.0285	36.0740
Front End Loader	120	0.0316	0.3480	0.3641	0.0007	0.0285	36.0740
3-yd Loader	175	0.0407	0.5853	0.5655	0.0012	0.0286	61.7679
Grader	500	0.0712	0.5739	0.9830	0.0026	0.0381	140.4726
Skip Loader	120	0.0316	0.3480	0.3641	0.0007	0.0285	36.0740
Trash Pump	50	0.0327	0.0919	0.1461	0.0003	0.0141	15.6525
Trash Pump	50	0.0327	0.2910	0.1461	0.0003	0.0141	15.6525
Ditch Witch	50	0.0458	0.1355	0.2382	0.0005	0.0217	26.1595
Roller	120	0.0406	0.4000	0.4506	0.0007	0.0336	38.3134

(1) OFFROAD2011 emissions except for CO, which are from the OFFROAD2007.

Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
Construction Equipment Emissions

		Year 1											
Equipment	**Hours (hr/day)**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Crane	6									2	3	3	3
Fork Lift	2						1	1	2	2	3	3	3
Man Lift	8									4	4	4	4
Welder	8									8	8	8	8
Air Compressor	8						2	2	2	2	2	2	2
Generator	8									3	3	3	3
Light Plant	8										2	2	2
Track Excavator	8								2				
Scraper	7						3	3					
Backhoe	4								1	2	2	2	2
Front End Loader	8						1	1	1	1	1	1	0
3-yd Loader	8						1	1	1	1			
Grader	8						2	2	2	2	1	1	1
Skip Loader	4						1	1	1	2			
Trash Pump	8									2	2	2	
Trash Pump	8									2	2		
Ditch Witch	8												
Roller	8						2	2	1	1			

	Emission Rate (lb/hr)	Year 1											
VOC	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Crane	0.078	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	1.40	1.40	1.40
Fork Lift	0.025	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.10	0.10	0.15	0.15	0.15
Man Lift	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.32	0.32	0.32
Welder	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	0.038	0.00	0.00	0.00	0.00	0.00	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Generator	0.038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.91	0.91	0.91
Light Plant	0.038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.61	0.61
Track Excavator	0.031	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.00	0.00
Scraper	0.153	0.00	0.00	0.00	0.00	0.00	3.22	3.22	0.00	0.00	0.00	0.00	0.00
Backhoe	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.27	0.27	0.27	0.27
Front End Loader	0.034	0.00	0.00	0.00	0.00	0.00	0.27	0.27	0.27	0.27	0.27	0.27	0.00
3-yd Loader	0.044	0.00	0.00	0.00	0.00	0.00	0.35	0.35	0.35	0.35	0.00	0.00	0.00
Grader	0.066	0.00	0.00	0.00	0.00	0.00	1.06	1.06	1.06	1.06	0.53	0.53	0.53
Skip Loader	0.034	0.00	0.00	0.00	0.00	0.00	0.14	0.14	0.14	0.27	0.00	0.00	0.00
Trash Pump	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.54	0.54	0.00
Trash Pump	0.034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.54	0.00	0.00
Ditch Witch	0.047	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller	0.044	0.00	0.00	0.00	0.00	0.00	0.70	0.70	0.35	0.35	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	6.39	6.39	3.50	6.54	6.17	5.62	4.81

	Emission Rate (lb/hr)	Year 1											
CO	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Crane	0.295	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.54	5.31	5.31	5.31
Fork Lift	0.218	0.00	0.00	0.00	0.00	0.00	0.44	0.44	0.87	0.87	1.31	1.31	1.31
Man Lift	0.243	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.76	7.76	7.76	7.76
Welder	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	0.255	0.00	0.00	0.00	0.00	0.00	4.07	4.07	4.07	4.07	4.07	4.07	4.07
Generator	0.264	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.33	6.33	6.33	6.33
Light Plant	0.346	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.53	5.53	5.53
Track Excavator	0.518	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.28	0.00	0.00	0.00	0.00
Scraper	0.641	0.00	0.00	0.00	0.00	0.00	13.46	13.46	0.00	0.00	0.00	0.00	0.00
Backhoe	0.353	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.41	2.82	2.82	2.82	2.82
Front End Loader	0.353	0.00	0.00	0.00	0.00	0.00	2.82	2.82	2.82	2.82	2.82	2.82	0.00
3-yd Loader	0.586	0.00	0.00	0.00	0.00	0.00	4.69	4.69	4.69	4.69	0.00	0.00	0.00
Grader	0.629	0.00	0.00	0.00	0.00	0.00	10.06	10.06	10.06	10.06	5.03	5.03	5.03
Skip Loader	0.353	0.00	0.00	0.00	0.00	0.00	1.41	1.41	1.41	2.82	0.00	0.00	0.00
Trash Pump	0.100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.61	1.61	1.61	0.00
Trash Pump	0.312	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.99	4.99	0.00	0.00
Ditch Witch	0.136	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller	0.406	0.00	0.00	0.00	0.00	0.00	6.50	6.50	3.25	3.25	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	43.45	43.45	36.87	55.64	47.58	42.59	38.16

	Emission Rate (lb/hr)	Year 1											
NOX	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Crane	1.124	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.49	20.23	20.23	20.23
Fork Lift	0.263	0.00	0.00	0.00	0.00	0.00	0.53	0.53	1.05	1.05	1.58	1.58	1.58
Man Lift	0.198	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.32	6.32	6.32	6.32
Welder	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	0.195	0.00	0.00	0.00	0.00	0.00	3.12	3.12	3.12	3.12	3.12	3.12	3.12
Generator	0.195	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.68	4.68	4.68	4.68
Light Plant	0.195	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.12	3.12	3.12
Track Excavator	0.370	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.92	0.00	0.00	0.00	0.00
Scraper	2.202	0.00	0.00	0.00	0.00	0.00	46.24	46.24	0.00	0.00	0.00	0.00	0.00
Backhoe	0.395	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.58	3.16	3.16	3.16	3.16
Front End Loader	0.395	0.00	0.00	0.00	0.00	0.00	3.16	3.16	3.16	3.16	3.16	3.16	0.00
3-yd Loader	0.623	0.00	0.00	0.00	0.00	0.00	4.98	4.98	4.98	4.98	0.00	0.00	0.00
Grader	0.981	0.00	0.00	0.00	0.00	0.00	15.69	15.69	15.69	15.69	7.85	7.85	7.85
Skip Loader	0.395	0.00	0.00	0.00	0.00	0.00	1.58	1.58	1.58	3.16	0.00	0.00	0.00
Trash Pump	0.149	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.39	2.39	2.39	0.00
Trash Pump	0.149	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.39	2.39	0.00	0.00
Ditch Witch	0.243	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller	0.485	0.00	0.00	0.00	0.00	0.00	7.76	7.76	3.88	3.88	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	83.06	83.06	40.96	67.47	58.00	55.61	50.06

Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
Construction Equipment Emissions

	Emission Rate (lb/hr)	Year 1											
SOx	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Crane	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02
Fork Lift	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Man Lift	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02
Welder	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	0.000	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Generator	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Light Plant	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Track Excavator	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Scraper	0.002	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00
Backhoe	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Front End Loader	0.001	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00
3-yd Loader	0.001	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Grader	0.003	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.04	0.02	0.02	0.02
Skip Loader	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Trash Pump	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trash Pump	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ditch Witch	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller	0.001	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.09	0.13	0.11	0.10	0.09

	Emission Rate (lb/hr)	Year 1											
PM10	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Crane	0.052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.93	0.93	0.93
Fork Lift	0.022	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.09	0.09	0.13	0.13	0.13
Man Lift	0.010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.32	0.32	0.32
Welder	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	0.018	0.00	0.00	0.00	0.00	0.00	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Generator	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.43	0.43	0.43
Light Plant	0.018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.28	0.28
Track Excavator	0.028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.00	0.00	0.00
Scraper	0.101	0.00	0.00	0.00	0.00	0.00	2.13	2.13	0.00	0.00	0.00	0.00	0.00
Backhoe	0.031	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.25	0.25	0.25	0.25
Front End Loader	0.031	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.25	0.25	0.25	0.25	0.00
3-yd Loader	0.032	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.25	0.25	0.00	0.00	0.00
Grader	0.037	0.00	0.00	0.00	0.00	0.00	0.60	0.60	0.60	0.60	0.30	0.30	0.30
Skip Loader	0.031	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.13	0.25	0.00	0.00	0.00
Trash Pump	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.24	0.24	0.00
Trash Pump	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.24	0.00	0.00
Ditch Witch	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller	0.036	0.00	0.00	0.00	0.00	0.00	0.58	0.58	0.29	0.29	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	4.26	4.26	2.46	4.11	3.65	3.42	2.93

	Emission Rate (lb/hr)	Year 1											
CO2EQ	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Crane	73.346	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	880.15	1320.23	1320.23	1320.23
Fork Lift	19.362	0.00	0.00	0.00	0.00	0.00	38.72	38.72	77.45	77.45	116.17	116.17	116.17
Man Lift	26.712	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	854.77	854.77	854.77	854.77
Welder	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	20.712	0.00	0.00	0.00	0.00	0.00	331.39	331.39	331.39	331.39	331.39	331.39	331.39
Generator	20.712	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	497.09	497.09	497.09	497.09
Light Plant	20.712	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	331.39	331.39	331.39
Track Excavator	36.174	0.00	0.00	0.00	0.00	0.00	0.00	0.00	578.79	0.00	0.00	0.00	0.00
Scraper	126.202	0.00	0.00	0.00	0.00	0.00	2650.25	2650.25	0.00	0.00	0.00	0.00	0.00
Backhoe	36.169	0.00	0.00	0.00	0.00	0.00	0.00	0.00	144.68	289.36	289.36	289.36	289.36
Front End Loader	36.169	0.00	0.00	0.00	0.00	0.00	289.36	289.36	289.36	289.36	289.36	289.36	0.00
3-yd Loader	61.797	0.00	0.00	0.00	0.00	0.00	494.37	494.37	494.37	494.37	0.00	0.00	0.00
Grader	140.493	0.00	0.00	0.00	0.00	0.00	2247.89	2247.89	2247.89	2247.89	1123.95	1123.95	1123.95
Skip Loader	36.169	0.00	0.00	0.00	0.00	0.00	144.68	144.68	144.68	289.36	0.00	0.00	0.00
Trash Pump	15.652	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	250.44	250.44	250.44	0.00
Trash Pump	15.652	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	250.44	250.44	0.00	0.00
Ditch Witch	26.173	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller	38.344	0.00	0.00	0.00	0.00	0.00	613.50	613.50	306.75	306.75	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	6810.16	6810.16	4615.35	7058.81	5654.57	5404.14	4864.34

Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
Construction Equipment Emissions

		Year 2											
Equipment	**Hours (hr/day)**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Crane	6	3	3	2	2	2	2	2	2	2	2	2	
Fork Lift	2	3	3										
Man Lift	8	4	4	4	4	4	4	4	4	3	2	2	
Welder	8	8	8	8	8	8	8	8	8	8	6	6	
Air Compressor	8	2	2	1	1	1	1						
Generator	8	3	3	3	3	3	3	3	3	3	2	2	
Light Plant	8										2	2	
Track Excavator	8												
Scraper	8												
Backhoe	4	2	2	1	1	1	2						
Front End Loader	8	0	0	1	1	1							
3-yd Loader	8	1	1	1	1	1							
Grader	8	1	1	1	1								
Skip Loader	4	1	2	2	2	2	2	2	2	1			
Trash Pump	8							2	2	2			
Trash Pump	8												
Ditch Witch	8		2	1									
Roller	8	2	1	2	1	1			1	1	1		

	Emission Rate (lb/hr)	**Year 2**											
VOC	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Crane	0.075	1.35	1.35	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.00
Fork Lift	0.024	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Man Lift	0.008	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.20	0.13	0.13	0.00
Welder	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	0.037	0.60	0.60	0.30	0.30	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.037	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.60	0.60	0.00
Light Plant	0.037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.60	0.00
Track Excavator	0.029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper	0.147	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0.032	0.26	0.26	0.13	0.13	0.13	0.26	0.00	0.00	0.00	0.00	0.00	0.00
Front End Loader	0.032	0.00	0.00	0.26	0.26	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3-yd Loader	0.041	0.33	0.33	0.33	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0.069	0.55	0.55	0.55	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skip Loader	0.032	0.13	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.13	0.00	0.00	0.00
Trash Pump	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.53	0.53	0.00	0.00	0.00
Trash Pump	0.033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ditch Witch	0.046	0.00	0.74	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller	0.041	0.66	0.33	0.66	0.33	0.33	0.00	0.00	0.33	0.33	0.33	0.00	0.00
Total		5.19	5.73	4.92	4.22	3.67	2.89	2.86	3.19	2.99	2.57	2.23	0.00

	Emission Rate (lb/hr)	**Year 2**											
CO	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Crane	0.282	5.07	5.07	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	0.00
Fork Lift	0.216	1.29	1.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Man Lift	0.240	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	5.76	3.84	3.84	0.00
Welder	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	0.245	3.91	3.91	1.96	1.96	1.96	1.96	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.254	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	4.07	4.07	0.00
Light Plant	0.333	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.33	5.33	0.00
Track Excavator	0.514	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper	0.615	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0.350	2.80	2.80	1.40	1.40	1.40	2.80	0.00	0.00	0.00	0.00	0.00	0.00
Front End Loader	0.350	0.00	0.00	2.80	2.80	2.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3-yd Loader	0.586	4.69	4.69	4.69	4.69	4.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0.599	4.79	4.79	4.79	4.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skip Loader	0.350	1.40	2.80	2.80	2.80	2.80	2.80	2.80	2.80	1.40	0.00	0.00	0.00
Trash Pump	0.096	0.00	0.00	0.00	0.00	0.00	0.00	1.53	1.53	1.53	0.00	0.00	0.00
Trash Pump	0.300	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ditch Witch	0.136	0.00	2.17	1.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller	0.403	6.45	3.22	6.45	3.22	3.22	0.00	0.00	3.22	3.22	3.22	0.00	0.00
Total		44.20	44.54	43.14	38.83	34.04	24.73	21.51	24.73	21.41	19.85	16.62	0.00

	Emission Rate (lb/hr)	**Year 2**											
NOX	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Crane	1.083	19.50	19.50	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00	
Fork Lift	0.250	1.50	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Man Lift	0.170	5.43	5.43	5.43	5.43	5.43	5.43	5.43	5.43	4.07	2.71	2.71	0.00
Welder	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	0.194	3.10	3.10	1.55	1.55	1.55	1.55	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.194	4.65	4.65	4.65	4.65	4.65	4.65	4.65	4.65	4.65	3.10	3.10	0.00
Light Plant	0.194	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.10	3.10	0.00
Track Excavator	0.353	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper	2.109	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0.375	3.00	3.00	1.50	1.50	1.50	3.00	0.00	0.00	0.00	0.00	0.00	0.00
Front End Loader	0.375	0.00	0.00	3.00	3.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3-yd Loader	0.577	4.62	4.62	4.62	4.62	4.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0.981	7.85	7.85	7.85	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skip Loader	0.375	1.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	1.50	0.00	0.00	0.00
Trash Pump	0.148	0.00	0.00	0.00	0.00	0.00	0.00	2.36	2.36	2.36	0.00	0.00	0.00
Trash Pump	0.148	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ditch Witch	0.240	0.00	3.85	1.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller	0.459	7.35	3.67	7.35	3.67	3.67	0.00	0.00	3.67	3.67	3.67	0.00	0.00
Total		58.49	60.16	53.86	48.26	40.41	30.62	28.44	32.11	29.26	25.59	21.91	0.00

Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
Construction Equipment Emissions

	Emission Rate (lb/hr)	Year 2											
SOx	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Crane	0.001	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00
Fork Lift	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Man Lift	0.001	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.00
Welder	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	0.000	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.000	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Light Plant	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00
Track Excavator	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0.001	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Front End Loader	0.001	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3-yd Loader	0.001	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0.003	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skip Loader	0.001	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Trash Pump	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trash Pump	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ditch Witch	0.000	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller	0.001	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.00
Total		0.11	0.11	0.10	0.09	0.07	0.06	0.05	0.06	0.05	0.04	0.04	0.00

	Emission Rate (lb/hr)	Year 2											
PM10	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Crane	0.050	0.89	0.89	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.00
Fork Lift	0.021	0.13	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Man Lift	0.008	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.19	0.13	0.13	0.00
Welder	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	0.017	0.28	0.28	0.14	0.14	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.017	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.28	0.28	0.00
Light Plant	0.017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.28	0.00
Track Excavator	0.026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper	0.096	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	0.029	0.24	0.24	0.12	0.12	0.12	0.24	0.00	0.00	0.00	0.00	0.00	0.00
Front End Loader	0.029	0.00	0.00	0.24	0.24	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3-yd Loader	0.029	0.23	0.23	0.23	0.23	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0.038	0.30	0.30	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skip Loader	0.029	0.12	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.12	0.00	0.00	0.00
Trash Pump	0.014	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.23	0.23	0.00	0.00	0.00
Trash Pump	0.014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ditch Witch	0.022	0.00	0.35	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller	0.034	0.55	0.27	0.55	0.27	0.27	0.00	0.00	0.27	0.27	0.27	0.00	0.00
Total		3.41	3.61	3.26	2.81	2.51	1.89	1.74	2.01	1.83	1.56	1.28	0.00

	Emission Rate (lb/hr)	Year 2											
CO2EQ	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Crane	73.341	1320.15	1320.15	880.10	880.10	880.10	880.10	880.10	880.10	880.10	880.10	880.10	0.00
Fork Lift	19.362	116.17	116.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Man Lift	26.712	854.77	854.77	854.77	854.77	854.77	854.77	854.77	854.77	641.08	427.39	427.39	0.00
Welder	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressor	20.714	331.42	331.42	165.71	165.71	165.71	165.71	0.00	0.00	0.00	0.00	0.00	0.00
Generator	20.714	497.13	497.13	497.13	497.13	497.13	497.13	497.13	497.13	497.13	331.42	331.42	0.00
Light Plant	20.714	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	331.42	331.42	0.00
Track Excavator	36.186	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scraper	126.128	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Backhoe	36.098	288.78	288.78	144.39	144.39	144.39	288.78	0.00	0.00	0.00	0.00	0.00	0.00
Front End Loader	36.098	0.00	0.00	288.78	288.78	288.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3-yd Loader	61.767	494.13	494.13	494.13	494.13	494.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	140.480	1123.84	1123.84	1123.84	1123.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skip Loader	36.098	144.39	288.78	288.78	288.78	288.78	288.78	288.78	288.78	144.39	0.00	0.00	0.00
Trash Pump	15.652	0.00	0.00	0.00	0.00	0.00	0.00	250.44	250.44	250.44	0.00	0.00	0.00
Trash Pump	15.652	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ditch Witch	26.168	0.00	418.69	209.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Roller	38.314	613.03	306.52	613.03	306.52	306.52	0.00	0.00	306.52	306.52	306.52	0.00	0.00
Total		5783.81	6040.38	5560.02	5044.15	3920.31	2975.27	2771.22	3077.74	2719.65	2276.84	1970.32	0.00

Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
Onsite Construction Vehicle Trip Emissions

		Year 1											
Vehicle	**Miles per Day**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Commuters	40	0	0	0	0	0	0	0	0	0	0	0	0
Pickup Trucks	1						4	4	4	4	4	4	4
Total Light Vehicle Miles		0	0	0	0	0	4	4	4	4	4	4	4
Flatbed Truck	5												
Stakebed Truck	5												
Boom Truck	5												
Buses	5												
Haul Trucks	5						2	2	2	2	2	2	
Dump Truck	10						4	4					
Water Truck	5						2	2	2	2			
Total Medium Truck Miles		0	0	0	0	0	60	60	20	20	10	10	0
Semi Tractor	1						1			1			
Concrete Truck	1								4	2	1	1	
Total Heavy Truck Miles		0	0	0	0	0	1	0	4	3	1	1	0

	Emission Rate (lb/mi)[1]	**Year 1 Emissions (lb/day)**											
VOC	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Light Duty	0.0007048	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0011406	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.02	0.02	0.01	0.01	0.00
Heavy Duty	0.0010927	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.03	0.03	0.02	0.02	0.00
CO	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Light Duty	0.0065732	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Medium Duty	0.0090458	0.00	0.00	0.00	0.00	0.00	0.54	0.54	0.18	0.18	0.09	0.09	0.00
Heavy Duty	0.0052059	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.02	0.01	0.01	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.57	0.57	0.23	0.22	0.12	0.12	0.03
NOx	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Light Duty	0.0006348	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0111055	0.00	0.00	0.00	0.00	0.00	0.67	0.67	0.22	0.22	0.11	0.11	0.00
Heavy Duty	0.0217857	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.09	0.07	0.02	0.02	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.69	0.67	0.31	0.29	0.14	0.14	0.00
SOx	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Light Duty	0.0000101	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000227	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000384	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Light Duty Exhaust	0.0001067	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0004298	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.01	0.01	0.00	0.00	0.00
Heavy Duty Exhaust	0.0008211	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.01	0.01	0.01	0.01	0.00
Light Duty Fugitive[2]	0.00337564	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Medium Duty Fugitve[2]	0.00713657	0.00	0.00	0.00	0.00	0.00	0.43	0.43	0.14	0.14	0.07	0.07	0.00
Heavy Duty Fugitive[2]	0.02934884	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.12	0.09	0.03	0.03	0.00
Total Fugitive PM		0.00	0.00	0.00	0.00	0.00	0.47	0.44	0.27	0.24	0.11	0.11	0.01
Total		0.00	0.00	0.00	0.00	0.00	0.50	0.47	0.29	0.26	0.12	0.12	0.01
CO_{2EQ}	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Light Duty	1.009	0.00	0.00	0.00	0.00	0.00	4.04	4.04	4.04	4.04	4.04	4.04	4.04
Medium Duty	2.486	0.00	0.00	0.00	0.00	0.00	149.15	149.15	49.72	49.72	24.86	24.86	0.00
Heavy Duty	4.311	0.00	0.00	0.00	0.00	0.00	4.31	0.00	17.24	12.93	4.31	4.31	0.00
Total		0.00	0.00	0.00	0.00	0.00	157.49	153.18	70.99	66.68	33.20	33.20	4.04

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, December 2003

$E = k(sL/2)^{0.65} \times (W/3)^{1.5} - C$

Where: k = 0.016 lb/VMT for PM10, sL = road silt loading (gms/m2) from CARB Methodology 7.9 for paved roads (0.240 for local roads and 0.037 for major/collector roads), W = weight of vehicles (2.4 tons for light; 5 for medium trucks, and 20 for heavy trucks), and C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (0.00047 lbs/VMT).

(3) Carbon Dioxide Equivalence (CQ) = $CO_2 + CH_4 * 21 + N2O*310$

where CO2 emissions factors are from Emfac2011 and CH4 emissions factors are from Emfac2007

where light vehicle N2O = CH4*0.001/0.0005 EPA Direct Emissions from Mobile Combustion Sources (May 2008)

where medium/heavy duty vehicle N2O = CH4*.0051/0.0048 EPA Direct Emissions from Mobile Combustion Sources (May 2008)

	2013		
Chemical	**Light**	**Medium**	**Heavy**
CO_2	1.0000	2.3415	4.0287
CH_4	0.0001	0.0001	0.0001
CO_E	1.043	2.372	4.061

Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
Onsite Construction Vehicle Trip Emissions

		Year 2											
Vehicle	**Miles per Day**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Commuters	40	0	0	0	0	0	0	0	0	0	0	0	0
Pickup Trucks	1	4	4	4	4	4	4	2	2	2	2	1	0
Total Light Vehicle Miles		4	4	4	4	4	4	2	2	2	2	1	0
Flatbed Truck	5												
Stakebed Truck	5												
Boom Truck	5												
Buses	5												
Haul Trucks	5												
Dump Truck	10												
Water Truck	5												
Total Medium Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0
Semi Tractor	1												
Concrete Truck	1		1										
Total Heavy Truck Miles		0	1	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)[1]	**Year 2 Emissions (lb/day)**											
VOC	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Light Duty	0.0006440	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0010068	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0008507	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Light Duty	0.0059632	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.00
Medium Duty	0.0080776	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0041638	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.02	0.03	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.00
NOx	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Light Duty	0.0005739	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0101198	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0191762	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Light Duty	0.0000101	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000230	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000386	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Light Duty Exhaust	0.0001061	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0003418	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0005596	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Duty Fugitive[2]	0.000386	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Fugitve[2]	0.002104	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive[2]	0.020119	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_{2EQ}	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Light Duty	1.040	4.16	4.16	4.16	4.16	4.16	4.16	2.08	2.08	2.08	2.08	1.04	0.00
Medium Duty	2.400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	4.071	0.00	4.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		4.16	8.23	4.16	4.16	4.16	4.16	2.08	2.08	2.08	2.08	1.04	0.00

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, December 2003

$E = k(sL/2)^{0.65} \times (W/3)^{1.5} - C$

Where: k = 0.016 lb/VMT for PM10, sL = road silt loading (gms/m2) from CARB Methodology 7.9 for paved roads (0.240 for local roads and 0.037 for major/collector roads), W = weight of vehicles (2.4 tons for light; 5 for medium trucks, and 20 for heavy trucks), and C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (0.00047 lbs/VMT).

(3) Carbon Dioxide Equivalence (CQ) = $CO_2 + CH_4 * 21 + N2O*310$

where CO2 emissions factors are from Emfac2011 and CH4 emissions factors are from Emfac2007

where light vehicle N2O = CH4*0.001/0.0005 EPA Direct Emissions from Mobile Combustion Sources (May 2008)

where medium/heavy duty vehicle N2O = CH4*.0051/0.0048 EPA Direct Emissions from Mobile Combustion Sources (May 2008)

	2014		
Chemical	**Light**	**Medium**	**Heavy**
CO_2	0.9998	2.3722	4.0420
CH_4	0.0001	0.0001	0.0001
CO_E	1.040	2.400	4.071

Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
Offsite Construction Vehicle Trip Emissions

		Year 1												
Vehicle	**Miles per Day**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Commuters	29.4						40	40	55	75	100	100	100
Pickup Trucks	16						2	2	2	2	2	2	1
Total Light Vehicle Miles		0	0	0	0	0	1208	1208	1649	2237	2972	2972	2956
Flatbed Truck	16												
Stakebed Truck	16												
Boom Truck	16												
Buses	16												
Haul Trucks	20						2	2	2	1	1	1	
Dump Truck	8						4	4					
Water Truck	16												
Total Medium Truck Miles		0	0	0	0	0	72	72	40	20	20	20	0
Semi Tractor	20						1			1			
Concrete Truck	20								4	2	1	1	
Total Heavy Truck Miles		0	0	0	0	0	20	0	80	60	20	20	0

	Emission Rate (lb/mi)[1]	**Year 1 Emissions (lb/day)**											
VOC	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Light Duty	0.0007048	0.00	0.00	0.00	0.00	0.00	0.85	0.85	1.16	1.58	2.09	2.09	2.08
Medium Duty	0.0011406	0.00	0.00	0.00	0.00	0.00	0.08	0.08	0.05	0.02	0.02	0.02	0.00
Heavy Duty	0.0010927	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.09	0.07	0.02	0.02	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.96	0.93	1.30	1.67	2.14	2.14	2.08
CO	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Light Duty	0.0065732	0.00	0.00	0.00	0.00	0.00	7.94	7.94	10.84	14.70	19.54	19.54	19.43
Medium Duty	0.0090458	0.00	0.00	0.00	0.00	0.00	0.65	0.65	0.36	0.18	0.18	0.18	0.00
Heavy Duty	0.0052059	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.42	0.31	0.10	0.10	0.00
Total		0.00	0.00	0.00	0.00	0.00	8.70	8.59	11.62	15.20	19.82	19.82	19.43
NOx	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Light Duty	0.0006348	0.00	0.00	0.00	0.00	0.00	0.77	0.77	1.05	1.42	1.89	1.89	1.88
Medium Duty	0.0111055	0.00	0.00	0.00	0.00	0.00	0.80	0.80	0.44	0.22	0.22	0.22	0.00
Heavy Duty	0.0217857	0.00	0.00	0.00	0.00	0.00	0.44	0.00	1.74	1.31	0.44	0.44	0.00
Total		0.00	0.00	0.00	0.00	0.00	2.00	1.57	3.23	2.95	2.54	2.54	1.88
SOx	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Light Duty	0.0000101	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.03
Medium Duty	0.0000227	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000384	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.03	0.03
PM10	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Light Duty Exhaust	0.0001067	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.18	0.24	0.32	0.32	0.32
Medium Duty Exhaust	0.0004298	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.02	0.01	0.01	0.01	0.00
Heavy Duty Exhaust	0.0008211	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.07	0.05	0.02	0.02	0.00
Total Exhaust PM		0.00	0.00	0.00	0.00	0.00	0.18	0.16	0.26	0.30	0.34	0.34	0.32
Light Duty Fugitive[2]	0.00337564	0.00	0.00	0.00	0.00	0.00	4.08	4.08	5.57	7.55	10.03	10.03	9.98
Medium Duty Fugitve[2]	0.00713657	0.00	0.00	0.00	0.00	0.00	0.51	0.51	0.29	0.14	0.14	0.14	0.00
Heavy Duty Fugitive[2]	0.02934884	0.00	0.00	0.00	0.00	0.00	0.59	0.00	2.35	1.76	0.59	0.59	0.00
Total Fugitive PM		0.00	0.00	0.00	0.00	0.00	5.18	4.59	8.20	9.45	10.76	10.76	9.98
Total		0.00	0.00	0.00	0.00	0.00	5.35	4.75	8.46	9.75	11.10	11.10	10.29
CO_{2EQ}	**2013**						**1**	**2**	**3**	**4**	**5**	**6**	**7**
Light Duty	1.009	0.00	0.00	0.00	0.00	0.00	1218.67	1218.67	1663.57	2256.76	2998.26	2998.26	2982.12
Medium Duty	2.486	0.00	0.00	0.00	0.00	0.00	178.98	178.98	99.43	49.72	49.72	49.72	0.00
Heavy Duty	4.311	0.00	0.00	0.00	0.00	0.00	86.21	0.00	344.85	258.64	86.21	86.21	0.00
Total		0.00	0.00	0.00	0.00	0.00	1483.86	1397.65	2107.85	2565.12	3134.19	3134.19	2982.12

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, December 2003

$E = k(sL/2)^{0.65} \times (W/3)^{1.5} - C$

Where: k = 0.016 lb/VMT for PM10, sL = road silt loading (gms/m2) from CARB Methodology 7.9 for paved roads (0.240 for local roads and 0.037 for major/collector roads), W = weight of vehicles (2.4 tons for light; 5 for medium trucks, and 20 for heavy trucks), and C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (0.00047 lbs/VMT).

(3) Carbon Dioxide Equivalence (CQ) = $CO_2 + CH_4 * 21 + N2O*310$

where CO2 emissions factors are from Emfac2011 and CH4 emissions factors are from Emfac2007

where light vehicle N2O = CH4*0.001/0.0005 EPA Direct Emissions from Mobile Combustion Sources (May 2008)

where medium/heavy duty vehicle N2O = CH4*.0051/0.0048 EPA Direct Emissions from Mobile Combustion Sources (May 2008)

	2013		
Chemical	**Light**	**Medium**	**Heavy**
CO_2	1.0000	2.3415	4.0287
CH_4	0.0001	0.0001	0.0001
CO_E	1.043	2.372	4.061

Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
Offsite Construction Vehicle Trip Emissions

		Year 2											
Vehicle	**Miles per Day**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Commuters	29.4	115	115	115	75	75	75	50	40	40	25	20	
Pickup Trucks	16	1	2	2	2	1	1	1	1	1	1	1	
Total Light Vehicle Miles		3397	3413	3413	2237	2221	2221	1486	1192	1192	751	604	0
Flatbed Truck	16												
Stakebed Truck	16												
Boom Truck	16												
Buses	16												
Haul Trucks	20												
Dump Truck	8												
Water Truck	16												
Total Medium Truck Miles		0	0	0	0	0	0	0	0	0	0	0	0
Semi Tractor	20												
Concrete Truck	20		1										
Total Heavy Truck Miles		0	20	0	0	0	0	0	0	0	0	0	0

	Emission Rate (lb/mi)[1]	**Year 2 Emissions (lb/day)**											
VOC	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Light Duty	0.0006440	2.19	2.20	2.20	1.44	1.43	1.43	0.96	0.77	0.77	0.48	0.39	0.00
Medium Duty	0.0010068	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0008507	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2.19	2.22	2.20	1.44	1.43	1.43	0.96	0.77	0.77	0.48	0.39	0.00
CO	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Light Duty	0.0059632	20.26	20.35	20.35	13.34	13.24	13.24	8.86	7.11	7.11	4.48	3.60	0.00
Medium Duty	0.0080776	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0041638	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		20.26	20.44	20.35	13.34	13.24	13.24	8.86	7.11	7.11	4.48	3.60	0.00
NOx	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Light Duty	0.0005739	1.95	1.96	1.96	1.28	1.27	1.27	0.85	0.68	0.68	0.43	0.35	0.00
Medium Duty	0.0101198	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0191762	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		1.95	2.34	1.96	1.28	1.27	1.27	0.85	0.68	0.68	0.43	0.35	0.00
SOx	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Light Duty	0.0000101	0.03	0.03	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.00
Medium Duty	0.0000230	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000386	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.03	0.04	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.00
PM10	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Light Duty Exhaust	0.0001061	0.36	0.36	0.36	0.24	0.24	0.24	0.16	0.13	0.13	0.08	0.06	0.00
Medium Duty Exhaust	0.0003418	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0005596	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.36	0.37	0.36	0.24	0.24	0.24	0.16	0.13	0.13	0.08	0.06	0.00
Light Duty Fugitive[2]	0.000386	1.31	1.32	1.32	0.86	0.86	0.86	0.57	0.46	0.46	0.29	0.23	0.00
Medium Duty Fugitve[2]	0.002104	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive[2]	0.020119	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		1.31	1.72	1.32	0.86	0.86	0.86	0.57	0.46	0.46	0.29	0.23	0.00
Total		1.67	2.09	1.68	1.10	1.09	1.09	0.73	0.59	0.59	0.37	0.30	0.00
CO_{2EQ}	**2014**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	
Light Duty	1.040	3533.71	3550.35	3550.35	2327.03	2310.38	2310.38	1545.80	1239.97	1239.97	781.22	628.31	0.00
Medium Duty	2.400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	4.071	0.00	81.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		3533.71	3631.77	3550.35	2327.03	2310.38	2310.38	1545.80	1239.97	1239.97	781.22	628.31	0.00

(1) Emfac2011 emission factors for the South Coast Air District.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, December 2003

$E = k(sL/2)^{0.65} x (W/3)^{1.5} - C$

Where: k = 0.016 lb/VMT for PM10, sL = road silt loading (gms/m2) from CARB Methodology 7.9 for paved roads (0.240 for local roads and 0.037 for major/collector roads), W = weight of vehicles (2.4 tons for light; 5 for medium trucks, and 20 for heavy trucks), and C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (0.00047 lbs/VMT).

(3) Carbon Dioxide Equivalence (CQ) = $CO_2 + CH_4 * 21 + N2O*310$

where CO2 emissions factors are from Emfac2011 and CH4 emissions factors are from Emfac2007

where light vehicle N2O = CH4*0.001/0.0005 EPA Direct Emissions from Mobile Combustion Sources (May 2008)

where medium/heavy duty vehicle N2O = CH4*.0051/0.0048 EPA Direct Emissions from Mobile Combustion Sources (May 2008)

	2014		
Chemical	**Light**	**Medium**	**Heavy**
CO_2	0.9998	2.3722	4.0420
CH_4	0.0001	0.0001	0.0001
CO_E	1.040	2.400	4.071

Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
Offroad Construction Vehicle Dust Emissions

Vehicle	Miles/Trip	Trips/Day
Mechanics Trucks	0.05	4
Total Light Vehicle Miles		0.2
Delivery Trucks	0.05	0
Total Medium Truck Miles		0
Haul Trucks	0.05	2
Dump Trucks	0.05	4
Water Trucks	0.5	3
Total Heavy Truck Miles		1.8
Backhoe	0.5	3
Loader	0.5	2
Trencher	0.5	2
Excavator	1	2
Grader/Scraper	1	6
Total Heavy-Heavy Duty Miles		11.5

PM10	Emission Rate (lb/mi)[1]	Emissions (lb/day)
Light Duty	0.9052149	0.18
Medium Duty	1.2907494	0.00
Heavy Duty	2.0273082	3.65
Heavy Heavy Duty	2.2006518	25.31
Uncontrolled Total		29.14
Controlled Total[2]		11.36

(1) Based on Section 13.2.2 of EPA's Compilation of Air Pollutant Emission Factors (AP-42).
Emission Rate = 1.5((s/12)^.9)*((W/3)^.45)
s = silt content = 7.5%
W = Vehicle Weight (ton) =2.5 for light, 5.5 for medium, 15 for heavy, and 18 for heavy heavy (EMFAC2007).

(2) Controlled Emissions assume that watering 3 times per day reduces emissions by 61 percent (Uncontrolled Emissions x 0.39)

Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
Paint Emissions

Activity	Year 1							Year 2										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Volume paint applied per day (gal)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	0.0	0.0	0.0	75.0	75.0
VOC content (lb/gal)[(1)]	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
VOC Emissions (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.6	16.6	0.0	0.0	0.0	62.3	62.3

(1) Based on SCAQMD Rule 1113 VOC limit of 100g/L for industrial maintenance coatings.

Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
Peak Daily Fugitive PM Construction Emissions

Grading Operations	Average Pieces of Equipment Operating	Peak Pieces of Equipment Operating	Hours of Operation	PM10 Emission Factor (lb/hour)	Water Control Factor[5]	Controlled Emissions: Average PM10 Emissions (lbs/day)	Controlled Emissions: Peak PM10 Emissions (lbs/day)	Uncontrolled Emissions: Average PM10 Emissions (lbs/day)	Uncontrolled Emissions: Peak PM10 Emissions (lbs/day)	SCAQMD Emission Factor Source
Construction Activities[1]	6	6	10	0.348	0.39	8.13	8.13	20.8581913	20.8581913	Table A9-9-F

Stockpiles	Average Tons of Materials Handled Per Day	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor[5]	Controlled Emissions: Average PM10 Emissions Pounds/day	Controlled Emissions: Peak PM10 Emissions Pounds/day	Uncontrolled Emissions: Average PM10 Emissions Pounds/day	Uncontrolled Emissions: Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Construction Activities[2]	1000	1000	0.00005	0.39	0.02009809	0.02009809	0.05153357	0.05153357	Table A9-9-G

Assumptions: 1cubic yard trench spoils = 1 ton

WIND EROSION Disturbed Area and Temporary Stockpiles	Days of Construction	Average Acreage Disturbed Per Day	Peak Acreage Disturbed Per Day	PM10 Emission Factor (lb/day/acre)	Average PM10 Emissions Pounds/day	Peak PM10 Emissions Pounds/day	Average PM10 Emissions Tons/Year	Peak PM10 Emissions Tons/Year	SCAQMD Emission Factor Source
Construction Activities[3]	20	0.25	0.25	0.120	0.030	0.030	0.000	0.000	Table A9-9-E

Filling and Dumping	Estimated Materials Handled Per Day (tons)	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor[5]	Controlled Emissions: Average PM10 Emissions Pounds/day	Controlled Emissions: Peak PM10 Emissions Pounds/day	Uncontrolled Emissions: Average PM10 Emissions Pounds/day	Uncontrolled Emissions: Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Truck Filling[4]	1000.0	1000.0	0.02205	0.39	8.5995	8.5995	22.05	22.05	Table A9-9
Truck Dumping	1000.0	1000.0	0.009075	0.39	3.53925	3.53925	9.075	9.075	Table A9-9

TOTAL PM10 Pounds/day	Average	Peak
(Controlled Emissions)	20.3235	20.32347
(Uncontrolled Emissions)	52.035	52.035

(1) Emissions (lbs/hr) = [0.75 x $(G^{1.5})/(H^{1.4})$ x J
where G = silt content (7.5%), H = moisture content (15.0%) and J = hrs of operation (EPA AP-42 Table 11.9-1 for bulldozing overburden).

(2) Emissions (lbs/ton) = 0.00112 x $[(G/5)^{1.3}/(H/2)^{1.4}]$ x I/J
where G=mean wind speed (4.1 mph), H=moisture content of surface material (15%); I=lbs of dirt handled per day; and J=2,000 lbs/ton. Wind speed data acquired from Long Beach 2005-2007 SCAQMD meteorological file.

(3) Emissions (lbs/day/acre) = 1.7 x [(G/1.5)*(365-H)/235] x I/15 x J
where G = silt content (7.5%); H = days with >0.01 inch of rain (34); I = percentage of time wind speed exceeds 12 mph (0.3%) and J= fraction of TSP (0.5). Wind speed data acquired from Long Beach 2005-2007 SCAQMD meteorological file.

(4) Used SCAQMD Table 9-9 Default emission factors.

(5) Mitigated Emissions assume that watering 3 times per day controls emissions by 61 percent (Uncontrolled Emissions x 0.39). www.AQMD.gov/CEQA/handbook/mitigation/fugitive/Table XI-A.doc

Appendix A
Phillips 66 Carson Plant
Crude Oil Storage Capacity Project
LST Analysis for Construction Emissions

	On-site Source Emissions (lbs/day)					
	CO	**VOC**	**NOx**	**SOx**	**PM10**	**PM2.5**
Peak Construction Emissions	55.64		83.06		46.56	20.15
Screening Value[(1)(2)]	**7,558**	**NA**	**142**	**NA**	**158**	**93**
Significant?	**NO**	**-**	**NO**	**-**	**NO**	**NO**

(1) Screening values for LST analysis from SCAQMD Final Localized Significance Threshold Methodology, Appendix C (October 2009).

(2) 1 acre site located in SRA No. 4 at 500 meters.

Appendix A
Phillips 66 Carson Plant
Increase Crude Capacity Project
Peak Operational VOC Emissions

Sources	VOC (lb/day)[1]
Existing Tank 510 Emissions[2]	7.52
Existing Tank 511 Emissions[2]	9.22
Total Baseline Emissions	**16.74**
Modified Tank 510 Crude Tank	17.04
Modified Tank 511 Crude Tank	17.04
New Tank 2640 Crude Tank[3]	19.54
New Tank 2643 Crude Tank[3]	4.27
New Fugitive Emissions	9.67
Total Proposed Project Emissions	**67.57**
Net Emissions	**50.83**
Significance Threshold	**55.00**
Significant?	**NO**

(1) Peak daily emissions based on peak month in TANKS 4.0 models for each tank.

(2) Based on TANKS 4.0 model with 2010 throughputs.

(3) Tank leg emissions scaled for 4" legs.

Appendix A
Phillips 66 Carson Plant
Increase Crude Capacity Project
Operational GHG Emissions

GHG from Electrical Demand		
Electrical Demand	25	kW
Hours of Operation	8760	per year
Total Electrical Demand	219	MWh/yr
CO2e Emission Factor	634.6	lbs/MWh
Total CO2e Emissions	*63*	*tonnes/yr*
GHG from Construction		
Total Construction GHG	1264	tonnes
30-yr Ammortized GHG	*43*	*tonnes/yr*
Total Operational GHG	**106**	**tonnes/yr**

Appendix A
Phillips 66 Carson Plant
Increase Crude Capacity Project
Fugitive VOC Emissions

Component Count

Process Unit: **Philips 66 Carson Plant New Crude Tank 2640**

Source Unit		Service	No. Of Existing Components (1)	No. of Existing Components to be Removed (2)	No. of New Components to be Installed (3)	Correlation Equation (CE) Factor (500 ppm)		
						Correlation Equation Factor 500 ppm Screening Value (lbs/year)	Pre Mod Emissions Based on Correlation 500 ppm Screening Value (lbs/year)	Post Modification Emissions based on 500 ppm Correlation Equation Factor (lbs/year)
Valves	Sealed Bellows	All	0	0	190	0.00	0	-
	SCAQMD Approved I&M Program	Gas / Vapor	0	0	14	4.55	0	63.64
		Light Liquid (4)	0	0	83	4.55	0	377.30
		Heavy Liquid (5)	0	0		4.55	0	-
		> 8 inches	0	0			0	-
Pumps	Sealless Type	Light Liquid (4)	0	0	5	0.00	0	-
	Double Mechanical Seals or Equivalent Seals	Light Liquid (4)	0	0	0	46.83	-	-
	Single Mechanical Seals	Heavy Liquid (5)	0	0	2	46.83	0	93.65
Compressors		Gas / Vapor	0	0		9.09	-	-
Flanges (ANSI 16.5-1988)		All	0	0	258	6.99	-	1,803.47
Connectors		All	0	0	134	2.86	-	383.43
Pressure Relief Valves		All	0	0	6	9.09	0	54.54
Process Drains with P-Trap or Seal Pot		All	0	0	0	9.09	-	-
Other (including fittings, hatches, sight-glasses, and meters)		All	0	0	7	9.09	-	63.63
Total Emissions		lb/year					-	2,840
		lbs/day					0	7.78

-1 Any component currently installed prior to the modification.

-2 Any component to be removed due to modification.

-3 Any new component proposed to be installed due to the modification; this also includes new components to be installed to replace existing components.

-4 Light liquid and gas/liquid streams: Liquid or gas/liquid stream 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 present at 20% by volume. - used single mechanical seal EF

-5 Heavy Liquid: streams with a vapor pressure equal to or less than that of kerosene (< 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at 20% by volume.

-6 Emission Factors were developed using actual emissions for 10 quarters from Q3, 2005 through Q4, 2007 for Cleans Fuel Area and using a factor of 2 to the actual emissions.

Appendix A
Phillips 66 Carson Plant
Increase Crude Capacity Project
Fugitive VOC Emissions

Component Count

Process Unit: **Philips 66 Carson Plant New Crude Tank 2643**

Source Unit		Service	No. Of Existing Components (1)	No. of Existing Components to be Removed (2)	No. of New Components to be Installed (3)	Correlation Equation (CE) Factor (500 ppm)		
						Correlation Equation Factor 500 ppm Screening Value (lbs/year)	Pre Mod Emissions Based on Correlation 500 ppm Screening Value (lbs/year)	Post Modification Emissions based on 500 ppm Correlation Equation Factor (lbs/year)
Valves	Sealed Bellows	All	0	0	61	0.00	0	-
	SCAQMD Approved I&M Program	Gas / Vapor	0	0	0	4.55	0	-
		Light Liquid (4)	0	0	16	4.55	0	72.73
		Heavy Liquid (5)	0	0	0	4.55	0	-
		> 8 inches	0	0	0		0	-
Pumps	Sealless Type	Light Liquid (4)	0	0	0	0.00	0	-
	Double Mechanical Seals or Equivalent Seals	Light Liquid (4)	0	0	0	46.83	-	-
	Single Mechanical Seals	Heavy Liquid (5)	0	0	0	46.83	0	-
Compressors		Gas / Vapor	0	0	0	9.09	-	-
Flanges (ANSI 16.5-1988)		All	0	0	79	6.99	-	552.22
Connectors		All	0	0	20	2.86	-	57.23
Pressure Relief Valves		All	0	0	0	9.09	0	-
Process Drains with P-Trap or Seal Pot		All	0	0	0	9.09	-	-
Other (including fittings, hatches, sight-glasses, and meters)		All	0	0	1	9.09	-	9.09
Total Emissions		lb/year					-	691
		lbs/day					0	1.89

-1 Any component currently installed prior to the modification.

-2 Any component to be removed due to modification.

-3 Any new component proposed to be installed due to the modification; this also includes new components to be installed to replace existing components.

-4 Light liquid and gas/liquid streams: Liquid or gas/liquid stream 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 present at 20% by volume. - used single mechanical seal EF

-5 Heavy Liquid: streams with a vapor pressure equal to or less than that of kerosene (< 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at 20% by volume.

-6 Emission Factors were developed using actual emissions for 10 quarters from Q3, 2005 through Q4, 2007 for Cleans Fuel Area and using a factor of 2 to the actual emissions.

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	R510/511
City:	Long Beach
State:	California
Company:	
Type of Tank:	Domed External Floating Roof Tank
Description:	285000 bbl tank (working capacity)

Tank Dimensions

Diameter (ft):	218.60
Volume (gallons):	11,970,000.00
Turnovers:	63.16

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good

Roof Characteristics

Type:	Pontoon
Fitting Category	Detail

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal	Shoe-mounted

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	2
Roof Drain (3-in. Diameter)/90% Closed	1
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Gasketed	34
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	2
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Gasketed	77
Automatic Gauge Float Well/Bolted Cover, Gasketed	2
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	1

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format

Liquid Contents of Storage Tank

R510/511 - Domed External Floating Roof Tank
Long Beach, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Crude Oil (RVP11)	Jan	61.79	56.79	66.79	64.33	8.7413	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2270	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0015	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0514	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1519	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1155	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0042	N/A	N/A	86.1700	0.0096	0.0090	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0027	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0031	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3490	N/A	N/A	92.1300	0.0058	0.0009	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.4710	N/A	N/A	49.6789	0.9611	0.9847	215.40	
Xylenes (mixed isomers)						0.0962	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Feb	62.78	57.67	67.88	64.33	8.8800	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0228	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2607	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0016	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0533	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1832	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1195	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0558	N/A	N/A	86.1700	0.0096	0.0091	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0028	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0032	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3597	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.6203	N/A	N/A	49.6754	0.9611	0.9845	215.40	
Xylenes (mixed isomers)						0.0996	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Mar	63.78	58.57	68.99	64.33	9.0228	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0237	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2957	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0017	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0553	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2157	N/A	N/A	82.1500	0.0074	0.0041	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1236	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1093	N/A	N/A	86.1700	0.0096	0.0092	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0029	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0034	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3710	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.7740	N/A	N/A	49.6718	0.9611	0.9843	215.40	
Xylenes (mixed isomers)						0.1031	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Apr	65.70	59.89	71.51	64.33	9.3013	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0256	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3652	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0019	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0594	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777

Cyclohexene						1.2800	N/A	N/A	82.1500	0.0074	0.0042	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1320	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.2152	N/A	N/A	86.1700	0.0096	0.0094	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0032	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0038	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3934	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.0738	N/A	N/A	49.6648	0.9611	0.9840	215.40	
Xylenes (mixed isomers)						0.1101	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	May	67.27	61.79	72.76	64.33	9.5335	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0272	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4241	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0020	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0629	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3346	N/A	N/A	82.1500	0.0074	0.0042	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1392	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3049	N/A	N/A	86.1700	0.0096	0.0095	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0034	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0041	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4125	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.3236	N/A	N/A	49.6591	0.9611	0.9838	215.40	
Xylenes (mixed isomers)						0.1162	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Jun	68.98	63.35	74.61	64.33	9.7902	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0291	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4904	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0022	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0668	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3960	N/A	N/A	82.1500	0.0074	0.0043	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1474	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4054	N/A	N/A	86.1700	0.0096	0.0097	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0037	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0045	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4341	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.5998	N/A	N/A	49.6528	0.9611	0.9835	215.40	
Xylenes (mixed isomers)						0.1231	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Jul	71.26	65.04	77.47	64.33	10.1419	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0317	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5831	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0025	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0725	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4817	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1589	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5456	N/A	N/A	86.1700	0.0096	0.0099	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0040	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0050	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4645	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.9781	N/A	N/A	49.6443	0.9611	0.9831	215.40	
Xylenes (mixed isomers)						0.1329	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Aug	71.60	65.63	77.58	64.33	10.1959	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0321	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5975	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0025	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0734	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4951	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1608	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5674	N/A	N/A	86.1700	0.0096	0.0099	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0041	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0051	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4693	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.0361	N/A	N/A	49.6430	0.9611	0.9830	215.40	

Xylenes (mixed isomers)						0.1344	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Sep	70.17	64.65	75.68	64.33	9.9722	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0304	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5381	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0023	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0697	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4401	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1533	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4776	N/A	N/A	86.1700	0.0096	0.0098	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0039	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0048	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4497	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.7956	N/A	N/A	49.6484	0.9611	0.9832	215.40	
Xylenes (mixed isomers)						0.1281	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Oct	67.76	62.48	73.04	64.33	9.6062	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0277	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4428	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0021	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0640	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3519	N/A	N/A	82.1500	0.0074	0.0043	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1415	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3332	N/A	N/A	86.1700	0.0096	0.0096	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0035	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0042	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4186	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.4019	N/A	N/A	49.6573	0.9611	0.9837	215.40	
Xylenes (mixed isomers)						0.1181	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Nov	64.31	59.22	69.40	64.33	9.0986	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0242	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3145	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0017	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0564	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2330	N/A	N/A	82.1500	0.0074	0.0041	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1259	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1380	N/A	N/A	86.1700	0.0096	0.0092	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0030	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0035	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3770	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.8556	N/A	N/A	49.6699	0.9611	0.9843	215.40	
Xylenes (mixed isomers)						0.1050	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Dec	61.76	56.83	66.70	64.33	8.7379	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2262	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0015	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0514	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1512	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1154	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0030	N/A	N/A	86.1700	0.0096	0.0090	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0027	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0031	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3487	N/A	N/A	92.1300	0.0058	0.0009	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.4674	N/A	N/A	49.6790	0.9611	0.9847	215.40	
Xylenes (mixed isomers)						0.0961	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d

Emissions Report - Detail Format

Detail Calculations (AP-42)

R510/511 - Domed External Floating Roof Tank
Long Beach, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	129.3637	132.6208	136.0466	142.9539	148.9552	155.8714	165.8725	167.4663	160.9664	150.8849	137.8970	129.2861
Seal Factor A (lb-mole/ft-yr):	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seal-related Wind Speed Exponent:	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000
Value of Vapor Pressure Function:	0.2219	0.2275	0.2334	0.2452	0.2555	0.2674	0.2845	0.2873	0.2761	0.2588	0.2366	0.2218
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	8.7413	8.8800	9.0228	9.3013	9.5335	9.7902	10.1419	10.1959	9.9722	9.6062	9.0986	8.7379
Tank Diameter (ft):	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Withdrawal Losses (lb):	275.6528	275.6528	275.6528	275.6528	275.6528	275.6528	275.6528	275.6528	275.6528	275.6528	275.6528	275.6528
Net Throughput (gal/mo.):	63,000,000.000063,000,000.000063,000,000.000063,000,000.000063,000,000.000063,000,000.000063,000,000.000063,000,000.000063,000,000.000063,000,000.000063,000,000.000063,000,000.000063,000,000.0000											
Shell Clingage Factor (bbl/1000 sqft):	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
Average Organic Liquid Density (lb/gal):	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000
Tank Diameter (ft):	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000	218.6000
Roof Fitting Losses (lb):	66.0133	67.6754	69.4236	72.9483	76.0107	79.5401	84.6435	85.4569	82.1400	76.9955	70.3678	65.9738
Value of Vapor Pressure Function:	0.2219	0.2275	0.2334	0.2452	0.2555	0.2674	0.2845	0.2873	0.2761	0.2588	0.2366	0.2218
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	178.4800	178.4800	178.4800	178.4800	178.4800	178.4800	178.4800	178.4800	178.4800	178.4800	178.4800	178.4800
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Losses (lb):	471.0298	475.9490	481.1230	491.5550	500.6187	511.0643	526.1688	528.5760	518.7592	503.5332	483.9176	470.9127

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	2	1.60	0.00	0.00	16.0949
Roof Drain (3-in. Diameter)/90% Closed	1	1.80	0.14	1.10	9.0534
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Gasketed	34	1.30	0.08	0.65	222.3109
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1	0.47	0.02	0.97	2.3639
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	2	6.20	1.20	0.94	62.3678
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1	56.00	0.00	0.00	281.6608
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Gasketed	77	0.53	0.11	0.13	205.2603
Automatic Gauge Float Well/Bolted Cover, Gasketed	2	2.80	0.00	0.00	28.1661
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	1	14.00	3.70	0.78	70.4152

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

R510/511 - Domed External Floating Roof Tank
Long Beach, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Crude Oil (RVP11)	1,758.18	3,307.83	897.19	0.00	5,963.21
1,2,4-Trimethylbenzene	0.06	9.30	0.03	0.00	9.39
Benzene	1.51	4.68	0.77	0.00	6.96
Chrysene	0.00	0.07	0.00	0.00	0.07
Cresol (-m)	0.00	0.02	0.00	0.00	0.02
Cumene	0.00	0.08	0.00	0.00	0.08
Cyclohexene	7.43	24.48	3.79	0.00	35.69
Ethylbenzene	0.16	4.94	0.08	0.00	5.17
Hexane (-n)	16.65	31.76	8.50	0.00	56.90
Naphthalene	0.00	3.03	0.00	0.00	3.03
Phenol	0.00	0.01	0.00	0.00	0.01
Toluene	1.79	19.09	0.91	0.00	21.79
Unidentified Components	1,729.77	3,179.16	882.69	0.00	5,791.61
Xylenes (mixed isomers)	0.82	31.23	0.42	0.00	32.47

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	2640 legged2
City:	Long Beach
State:	California
Company:	
Type of Tank:	Domed External Floating Roof Tank
Description:	500000 bbl domed tank (working capacity)

Tank Dimensions

Diameter (ft):	260.00
Volume (gallons):	21,005,922.00
Turnovers:	59.98

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good

Roof Characteristics

Type:	Pontoon
Fitting Category	Detail

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Fitting/Status	Quantity
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	5
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	3
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Gasketed	134
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	4
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Gasketed	34
Roof Drain (3-in. Diameter)/90% Closed	3

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

2640 legged2 - Domed External Floating Roof Tank
Long Beach, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Crude Oil (RVP11)	Jan	61.79	56.79	66.79	64.33	8.7413	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2270	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0015	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0514	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1519	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1155	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0042	N/A	N/A	86.1700	0.0096	0.0090	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0027	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0031	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3490	N/A	N/A	92.1300	0.0058	0.0009	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.4710	N/A	N/A	49.6789	0.9611	0.9847	215.40	
Xylenes (mixed isomers)						0.0962	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Feb	62.78	57.67	67.88	64.33	8.8800	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0228	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2607	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0016	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0533	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1832	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1195	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0558	N/A	N/A	86.1700	0.0096	0.0091	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0028	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0032	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3597	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.6203	N/A	N/A	49.6754	0.9611	0.9845	215.40	
Xylenes (mixed isomers)						0.0996	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Mar	63.78	58.57	68.99	64.33	9.0228	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0237	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2957	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0017	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0553	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2157	N/A	N/A	82.1500	0.0074	0.0041	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1236	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1093	N/A	N/A	86.1700	0.0096	0.0092	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0029	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0034	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3710	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.7740	N/A	N/A	49.6718	0.9611	0.9843	215.40	
Xylenes (mixed isomers)						0.1031	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Apr	65.70	59.89	71.51	64.33	9.3013	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0256	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56

Benzene						1.3652	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0019	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0594	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2800	N/A	N/A	82.1500	0.0074	0.0042	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1320	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.2152	N/A	N/A	86.1700	0.0096	0.0094	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0032	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0038	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3934	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.0738	N/A	N/A	49.6648	0.9611	0.9840	215.40	
Xylenes (mixed isomers)						0.1101	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	May	67.27	61.79	72.76	64.33	9.5335	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0272	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4241	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0020	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0629	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3346	N/A	N/A	82.1500	0.0074	0.0042	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1392	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3049	N/A	N/A	86.1700	0.0096	0.0095	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0034	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0041	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4125	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.3236	N/A	N/A	49.6591	0.9611	0.9838	215.40	
Xylenes (mixed isomers)						0.1162	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Jun	68.98	63.35	74.61	64.33	9.7902	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0291	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4904	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0022	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0668	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3960	N/A	N/A	82.1500	0.0074	0.0043	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1474	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4054	N/A	N/A	86.1700	0.0096	0.0097	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0037	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0045	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4341	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.5998	N/A	N/A	49.6528	0.9611	0.9835	215.40	
Xylenes (mixed isomers)						0.1231	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Jul	71.26	65.04	77.47	64.33	10.1419	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0317	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5831	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0025	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0725	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4817	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1589	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5456	N/A	N/A	86.1700	0.0096	0.0099	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0040	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0050	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4645	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.9781	N/A	N/A	49.6443	0.9611	0.9831	215.40	
Xylenes (mixed isomers)						0.1329	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Aug	71.60	65.63	77.58	64.33	10.1959	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0321	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5975	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0025	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0734	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4951	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1608	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5674	N/A	N/A	86.1700	0.0096	0.0099	86.17	Option 2: A=6.876, B=1171.17, C=224.41

Naphthalene						0.0041	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0051	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4693	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.0361	N/A	N/A	49.6430	0.9611	0.9830	215.40	
Xylenes (mixed isomers)						0.1344	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Sep	70.17	64.65	75.68	64.33	9.9722	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0304	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5381	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0023	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0697	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4401	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1533	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4776	N/A	N/A	86.1700	0.0096	0.0098	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0039	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0048	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4497	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.7956	N/A	N/A	49.6484	0.9611	0.9832	215.40	
Xylenes (mixed isomers)						0.1281	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Oct	67.76	62.48	73.04	64.33	9.6062	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0277	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4428	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0021	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0640	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3519	N/A	N/A	82.1500	0.0074	0.0043	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1415	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3332	N/A	N/A	86.1700	0.0096	0.0096	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0035	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0042	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4186	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.4019	N/A	N/A	49.6573	0.9611	0.9837	215.40	
Xylenes (mixed isomers)						0.1181	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Nov	64.31	59.22	69.40	64.33	9.0986	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0242	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3145	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0017	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0564	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2330	N/A	N/A	82.1500	0.0074	0.0041	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1259	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1380	N/A	N/A	86.1700	0.0096	0.0092	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0030	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0035	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3770	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.8556	N/A	N/A	49.6699	0.9611	0.9843	215.40	
Xylenes (mixed isomers)						0.1050	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Dec	61.76	56.83	66.70	64.33	8.7379	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2262	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0015	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0514	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1512	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1154	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0030	N/A	N/A	86.1700	0.0096	0.0090	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0027	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0031	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3487	N/A	N/A	92.1300	0.0058	0.0009	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.4674	N/A	N/A	49.6790	0.9611	0.9847	215.40	
Xylenes (mixed isomers)						0.0961	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

2640 legged2 - Domed External Floating Roof Tank
Long Beach, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	57.6988	59.1515	60.6795	63.7603	66.4370	69.5218	73.9825	74.6934	71.7943	67.2977	61.5048	57.6642
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seal-related Wind Speed Exponent:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Value of Vapor Pressure Function:	0.2219	0.2275	0.2334	0.2452	0.2555	0.2674	0.2845	0.2873	0.2761	0.2588	0.2366	0.2218
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	8.7413	8.8800	9.0228	9.3013	9.5335	9.7902	10.1419	10.1959	9.9722	9.6062	9.0986	8.7379
Tank Diameter (ft):	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Withdrawal Losses (lb):	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673
Net Throughput (gal/mo.):	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
Average Organic Liquid Density (lb/gal):	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000
Tank Diameter (ft):	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000
Roof Fitting Losses (lb):	75.1897	77.0828	79.0740	83.0887	86.5768	90.5967	96.4096	97.3360	93.5581	87.6984	80.1495	75.1446
Value of Vapor Pressure Function:	0.2219	0.2275	0.2334	0.2452	0.2555	0.2674	0.2845	0.2873	0.2761	0.2588	0.2366	0.2218
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	203.2900	203.2900	203.2900	203.2900	203.2900	203.2900	203.2900	203.2900	203.2900	203.2900	203.2900	203.2900
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Losses (lb):	519.1558	522.5016	526.0208	533.1163	539.2811	546.3858	556.6594	558.2967	551.6196	541.2634	527.9216	519.0761

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	5	6.20	1.20	0.94	155.9194
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	3	14.00	3.70	0.78	211.2456
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1	0.47	0.02	0.97	2.3639
Roof Leg (3-in. Diameter)/Adjustable, Center Area, Gasketed	134	0.53	0.11	0.13	357.2063
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	14.0830
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	4	1.60	0.00	0.00	32.1898
Roof Leg (3-in. Diameter)/Adjustable, Pontoon Area, Gasketed	34	1.30	0.08	0.65	222.3109
Roof Drain (3-in. Diameter)/90% Closed	3	1.80	0.14	1.10	27.1602

TANKS 4.0.9d
Emissions Report - Detail Format

Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

2640 legged2 - Domed External Floating Roof Tank
Long Beach, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Crude Oil (RVP11)	784.19	4,635.21	1,021.90	0.00	6,441.30
1,2,4-Trimethylbenzene	0.03	13.04	0.03	0.00	13.09
Benzene	0.68	6.55	0.88	0.00	8.11
Chrysene	0.00	0.09	0.00	0.00	0.09
Cresol (-m)	0.00	0.03	0.00	0.00	0.03
Cumene	0.00	0.11	0.00	0.00	0.12
Cyclohexene	3.31	34.30	4.32	0.00	41.93
Ethylbenzene	0.07	6.92	0.09	0.00	7.08
Hexane (-n)	7.43	44.50	9.68	0.00	61.60
Naphthalene	0.00	4.24	0.00	0.00	4.24
Phenol	0.00	0.01	0.00	0.00	0.01
Toluene	0.80	26.76	1.04	0.00	28.59
Unidentified Components	771.51	4,454.89	1,005.39	0.00	6,231.79
Xylenes (mixed isomers)	0.37	43.76	0.48	0.00	44.61

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	2640 legless2
City:	Long Beach
State:	California
Company:	
Type of Tank:	Domed External Floating Roof Tank
Description:	500000 bbl domed tank (working capacity)

Tank Dimensions

Diameter (ft):	260.00
Volume (gallons):	21,005,922.00
Turnovers:	59.98

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good

Roof Characteristics

Type:	Pontoon
Fitting Category	Detail

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Fitting/Status	Quantity
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	5
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	3
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	4
Roof Drain (3-in. Diameter)/90% Closed	3

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

2640 legless2 - Domed External Floating Roof Tank
Long Beach, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Crude Oil (RVP11)	Jan	61.79	56.79	66.79	64.33	8.7413	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2270	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0015	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0514	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1519	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1155	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0042	N/A	N/A	86.1700	0.0096	0.0090	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0027	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0031	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3490	N/A	N/A	92.1300	0.0058	0.0009	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.4710	N/A	N/A	49.6789	0.9611	0.9847	215.40	
Xylenes (mixed isomers)						0.0962	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Feb	62.78	57.67	67.88	64.33	8.8800	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0228	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2607	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0016	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0533	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1832	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1195	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0558	N/A	N/A	86.1700	0.0096	0.0091	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0028	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0032	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3597	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.6203	N/A	N/A	49.6754	0.9611	0.9845	215.40	
Xylenes (mixed isomers)						0.0996	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Mar	63.78	58.57	68.99	64.33	9.0228	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0237	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2957	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0017	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0553	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2157	N/A	N/A	82.1500	0.0074	0.0041	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1236	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1093	N/A	N/A	86.1700	0.0096	0.0092	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0029	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0034	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3710	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.7740	N/A	N/A	49.6718	0.9611	0.9843	215.40	
Xylenes (mixed isomers)						0.1031	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Apr	65.70	59.89	71.51	64.33	9.3013	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0256	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56

Benzene						1.3652	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0019	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0594	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2800	N/A	N/A	82.1500	0.0074	0.0042	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1320	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.2152	N/A	N/A	86.1700	0.0096	0.0094	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0032	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0038	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3934	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.0738	N/A	N/A	49.6648	0.9611	0.9840	215.40	
Xylenes (mixed isomers)						0.1101	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	May	67.27	61.79	72.76	64.33	9.5335	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0272	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4241	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0020	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0629	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3346	N/A	N/A	82.1500	0.0074	0.0042	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1392	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3049	N/A	N/A	86.1700	0.0096	0.0095	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0034	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0041	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4125	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.3236	N/A	N/A	49.6591	0.9611	0.9838	215.40	
Xylenes (mixed isomers)						0.1162	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Jun	68.98	63.35	74.61	64.33	9.7902	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0291	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4904	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0022	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0668	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3960	N/A	N/A	82.1500	0.0074	0.0043	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1474	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4054	N/A	N/A	86.1700	0.0096	0.0097	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0037	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0045	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4341	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.5998	N/A	N/A	49.6528	0.9611	0.9835	215.40	
Xylenes (mixed isomers)						0.1231	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Jul	71.26	65.04	77.47	64.33	10.1419	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0317	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5831	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0025	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0725	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4817	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1589	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5456	N/A	N/A	86.1700	0.0096	0.0099	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0040	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0050	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4645	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.9781	N/A	N/A	49.6443	0.9611	0.9831	215.40	
Xylenes (mixed isomers)						0.1329	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Aug	71.60	65.63	77.58	64.33	10.1959	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0321	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5975	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0025	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0734	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4951	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1608	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5674	N/A	N/A	86.1700	0.0096	0.0099	86.17	Option 2: A=6.876, B=1171.17, C=224.41

Naphthalene						0.0041	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0051	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4693	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.0361	N/A	N/A	49.6430	0.9611	0.9830	215.40	
Xylenes (mixed isomers)						0.1344	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Sep	70.17	64.65	75.68	64.33	9.9722	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0304	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5381	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0023	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0697	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4401	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1533	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4776	N/A	N/A	86.1700	0.0096	0.0098	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0039	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0048	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4497	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.7956	N/A	N/A	49.6484	0.9611	0.9832	215.40	
Xylenes (mixed isomers)						0.1281	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Oct	67.76	62.48	73.04	64.33	9.6062	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0277	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4428	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0021	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0640	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3519	N/A	N/A	82.1500	0.0074	0.0043	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1415	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3332	N/A	N/A	86.1700	0.0096	0.0096	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0035	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0042	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4186	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.4019	N/A	N/A	49.6573	0.9611	0.9837	215.40	
Xylenes (mixed isomers)						0.1181	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Nov	64.31	59.22	69.40	64.33	9.0986	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0242	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3145	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0017	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0564	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2330	N/A	N/A	82.1500	0.0074	0.0041	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1259	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1380	N/A	N/A	86.1700	0.0096	0.0092	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0030	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0035	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3770	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.8556	N/A	N/A	49.6699	0.9611	0.9843	215.40	
Xylenes (mixed isomers)						0.1050	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Dec	61.76	56.83	66.70	64.33	8.7379	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2262	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0015	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0514	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1512	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1154	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0030	N/A	N/A	86.1700	0.0096	0.0090	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0027	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0031	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3487	N/A	N/A	92.1300	0.0058	0.0009	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.4674	N/A	N/A	49.6790	0.9611	0.9847	215.40	
Xylenes (mixed isomers)						0.0961	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

2640 legless2 - Domed External Floating Roof Tank
Long Beach, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	57.6988	59.1515	60.6795	63.7603	66.4370	69.5218	73.9825	74.6934	71.7943	67.2977	61.5048	57.6642
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seal-related Wind Speed Exponent:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Value of Vapor Pressure Function:	0.2219	0.2275	0.2334	0.2452	0.2555	0.2674	0.2845	0.2873	0.2761	0.2588	0.2366	0.2218
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	8.7413	8.8800	9.0228	9.3013	9.5335	9.7902	10.1419	10.1959	9.9722	9.6062	9.0986	8.7379
Tank Diameter (ft):	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Withdrawal Losses (lb):	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673	386.2673
Net Throughput (gal/mo.):	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000	105,000,000.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
Average Organic Liquid Density (lb/gal):	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000
Tank Diameter (ft):	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000	260.0000
Roof Fitting Losses (lb):	32.5739	33.3941	34.2567	35.9960	37.5071	39.2486	41.7669	42.1682	40.5315	37.9930	34.7226	32.5544
Value of Vapor Pressure Function:	0.2219	0.2275	0.2334	0.2452	0.2555	0.2674	0.2845	0.2873	0.2761	0.2588	0.2366	0.2218
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	88.0700	88.0700	88.0700	88.0700	88.0700	88.0700	88.0700	88.0700	88.0700	88.0700	88.0700	88.0700
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Losses (lb):	476.5400	478.8129	481.2036	486.0236	490.2114	495.0377	502.0167	503.1289	498.5931	491.5580	482.4948	476.4859

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	5	6.20	1.20	0.94	155.9194
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	3	14.00	3.70	0.78	211.2456
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1	0.47	0.02	0.97	2.3639
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	14.0830
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	4	1.60	0.00	0.00	32.1898
Roof Drain (3-in. Diameter)/90% Closed	3	1.80	0.14	1.10	27.1602

TANKS 4.0.9d
Emissions Report - Detail Format

Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

2640 legless2 - Domed External Floating Roof Tank
Long Beach, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Crude Oil (RVP11)	784.19	4,635.21	442.71	0.00	5,862.11
1,2,4-Trimethylbenzene	0.03	13.04	0.01	0.00	13.08
Benzene	0.68	6.55	0.38	0.00	7.61
Chrysene	0.00	0.09	0.00	0.00	0.09
Cresol (-m)	0.00	0.03	0.00	0.00	0.03
Cumene	0.00	0.11	0.00	0.00	0.12
Cyclohexene	3.31	34.30	1.87	0.00	39.48
Ethylbenzene	0.07	6.92	0.04	0.00	7.03
Hexane (-n)	7.43	44.50	4.19	0.00	56.12
Naphthalene	0.00	4.24	0.00	0.00	4.24
Phenol	0.00	0.01	0.00	0.00	0.01
Toluene	0.80	26.76	0.45	0.00	28.00
Unidentified Components	771.51	4,454.89	435.56	0.00	5,661.96
Xylenes (mixed isomers)	0.37	43.76	0.21	0.00	44.34

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	2643 legged
City:	Long Beach
State:	California
Company:	
Type of Tank:	Domed External Floating Roof Tank
Description:	10000bbl (working capacity) domed water surge tank

Tank Dimensions

Diameter (ft):	44.00
Volume (gallons):	421,470.00
Turnovers:	76.53

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good

Roof Characteristics

Type:	Double Deck
Fitting Category	Detail

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	2
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	3
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	12
Roof Drain (3-in. Diameter)/90% Closed	1
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

2643 legged - Domed External Floating Roof Tank
Long Beach, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Crude Oil (RVP11)	Jan	61.79	56.79	66.79	64.33	8.7413	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2270	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0015	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0514	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1519	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1155	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0042	N/A	N/A	86.1700	0.0096	0.0090	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0027	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0031	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3490	N/A	N/A	92.1300	0.0058	0.0009	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.4710	N/A	N/A	49.6789	0.9611	0.9847	215.40	
Xylenes (mixed isomers)						0.0962	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Feb	62.78	57.67	67.88	64.33	8.8800	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0228	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2607	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0016	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0533	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1832	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1195	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0558	N/A	N/A	86.1700	0.0096	0.0091	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0028	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0032	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3597	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.6203	N/A	N/A	49.6754	0.9611	0.9845	215.40	
Xylenes (mixed isomers)						0.0996	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Mar	63.78	58.57	68.99	64.33	9.0228	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0237	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2957	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0017	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0553	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2157	N/A	N/A	82.1500	0.0074	0.0041	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1236	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1093	N/A	N/A	86.1700	0.0096	0.0092	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0029	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0034	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3710	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.7740	N/A	N/A	49.6718	0.9611	0.9843	215.40	
Xylenes (mixed isomers)						0.1031	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Apr	65.70	59.89	71.51	64.33	9.3013	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0256	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56

Benzene						1.3652	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0019	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0594	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2800	N/A	N/A	82.1500	0.0074	0.0042	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1320	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.2152	N/A	N/A	86.1700	0.0096	0.0094	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0032	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0038	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3934	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.0738	N/A	N/A	49.6648	0.9611	0.9840	215.40	
Xylenes (mixed isomers)						0.1101	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	May	67.27	61.79	72.76	64.33	9.5335	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0272	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4241	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0020	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0629	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3346	N/A	N/A	82.1500	0.0074	0.0042	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1392	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3049	N/A	N/A	86.1700	0.0096	0.0095	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0034	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0041	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4125	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.3236	N/A	N/A	49.6591	0.9611	0.9838	215.40	
Xylenes (mixed isomers)						0.1162	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Jun	68.98	63.35	74.61	64.33	9.7902	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0291	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4904	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0022	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0668	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3960	N/A	N/A	82.1500	0.0074	0.0043	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1474	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4054	N/A	N/A	86.1700	0.0096	0.0097	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0037	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0045	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4341	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.5998	N/A	N/A	49.6528	0.9611	0.9835	215.40	
Xylenes (mixed isomers)						0.1231	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Jul	71.26	65.04	77.47	64.33	10.1419	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0317	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5831	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0025	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0725	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4817	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1589	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5456	N/A	N/A	86.1700	0.0096	0.0099	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0040	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0050	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4645	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.9781	N/A	N/A	49.6443	0.9611	0.9831	215.40	
Xylenes (mixed isomers)						0.1329	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Aug	71.60	65.63	77.58	64.33	10.1959	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0321	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5975	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0025	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0734	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4951	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1608	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5674	N/A	N/A	86.1700	0.0096	0.0099	86.17	Option 2: A=6.876, B=1171.17, C=224.41

Naphthalene						0.0041	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0051	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4693	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.0361	N/A	N/A	49.6430	0.9611	0.9830	215.40	
Xylenes (mixed isomers)						0.1344	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Sep	70.17	64.65	75.68	64.33	9.9722	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0304	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5381	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0023	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0697	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4401	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1533	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4776	N/A	N/A	86.1700	0.0096	0.0098	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0039	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0048	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4497	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.7956	N/A	N/A	49.6484	0.9611	0.9832	215.40	
Xylenes (mixed isomers)						0.1281	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Oct	67.76	62.48	73.04	64.33	9.6062	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0277	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4428	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0021	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0640	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3519	N/A	N/A	82.1500	0.0074	0.0043	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1415	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3332	N/A	N/A	86.1700	0.0096	0.0096	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0035	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0042	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4186	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.4019	N/A	N/A	49.6573	0.9611	0.9837	215.40	
Xylenes (mixed isomers)						0.1181	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Nov	64.31	59.22	69.40	64.33	9.0986	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0242	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3145	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0017	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0564	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2330	N/A	N/A	82.1500	0.0074	0.0041	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1259	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1380	N/A	N/A	86.1700	0.0096	0.0092	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0030	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0035	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3770	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.8556	N/A	N/A	49.6699	0.9611	0.9843	215.40	
Xylenes (mixed isomers)						0.1050	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Dec	61.76	56.83	66.70	64.33	8.7379	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2262	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0015	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0514	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1512	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1154	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0030	N/A	N/A	86.1700	0.0096	0.0090	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0027	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0031	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3487	N/A	N/A	92.1300	0.0058	0.0009	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.4674	N/A	N/A	49.6790	0.9611	0.9847	215.40	
Xylenes (mixed isomers)						0.0961	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

2643 legged - Domed External Floating Roof Tank
Long Beach, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	9.7644	10.0103	10.2688	10.7902	11.2432	11.7652	12.5201	12.6404	12.1498	11.3888	10.4085	9.7586
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seal-related Wind Speed Exponent:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Value of Vapor Pressure Function:	0.2219	0.2275	0.2334	0.2452	0.2555	0.2674	0.2845	0.2873	0.2761	0.2588	0.2366	0.2218
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	8.7413	8.8800	9.0228	9.3013	9.5335	9.7902	10.1419	10.1959	9.9722	9.6062	9.0986	8.7379
Tank Diameter (ft):	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Withdrawal Losses (lb):	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317
Net Throughput (gal/mo.):	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
Average Organic Liquid Density (lb/gal):	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000
Tank Diameter (ft):	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000
Roof Fitting Losses (lb):	45.2381	46.3771	47.5751	49.9905	52.0892	54.5078	58.0051	58.5625	56.2895	52.7640	48.2222	45.2110
Value of Vapor Pressure Function:	0.2219	0.2275	0.2334	0.2452	0.2555	0.2674	0.2845	0.2873	0.2761	0.2588	0.2366	0.2218
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	122.3100	122.3100	122.3100	122.3100	122.3100	122.3100	122.3100	122.3100	122.3100	122.3100	122.3100	122.3100
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Losses (lb):	113.4342	114.8190	116.2756	119.2124	121.7641	124.7047	128.9569	129.6346	126.8710	122.5845	117.0624	113.4012

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	2	1.60	0.00	0.00	16.0949
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	14.0830
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	31.1839
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	3	14.00	3.70	0.78	211.2456
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1	0.47	0.02	0.97	2.3639
Roof Leg (3-in. Diameter)/Adjustable, Double-Deck Roofs	12	0.82	0.53	0.14	49.4918
Roof Drain (3-in. Diameter)/90% Closed	1	1.80	0.14	1.10	9.0534
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1	56.00	0.00	0.00	281.6608

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

2643 legged - Domed External Floating Roof Tank
Long Beach, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Crude Oil (RVP11)	132.71	701.18	614.83	0.00	1,448.72
1,2,4-Trimethylbenzene	0.00	1.97	0.02	0.00	2.00
Benzene	0.11	0.99	0.53	0.00	1.64
Chrysene	0.00	0.01	0.00	0.00	0.01
Cresol (-m)	0.00	0.00	0.00	0.00	0.00
Cumene	0.00	0.02	0.00	0.00	0.02
Cyclohexene	0.56	5.19	2.60	0.00	8.35
Ethylbenzene	0.01	1.05	0.05	0.00	1.11
Hexane (-n)	1.26	6.73	5.82	0.00	13.81
Naphthalene	0.00	0.64	0.00	0.00	0.64
Phenol	0.00	0.00	0.00	0.00	0.00
Toluene	0.13	4.05	0.63	0.00	4.81
Unidentified Components	130.56	673.90	604.89	0.00	1,409.36
Xylenes (mixed isomers)	0.06	6.62	0.29	0.00	6.97

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	2643 legless
City:	Long Beach
State:	California
Company:	
Type of Tank:	Domed External Floating Roof Tank
Description:	10000bbl (working capacity) domed water surge tank

Tank Dimensions

Diameter (ft):	44.00
Volume (gallons):	421,470.00
Turnovers:	76.53

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good

Roof Characteristics

Type:	Double Deck
Fitting Category	Detail

Tank Construction and Rim-Seal System

Construction:	Welded
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	2
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	3
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Roof Drain (3-in. Diameter)/90% Closed	1
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1

Meterological Data used in Emissions Calculations: Long Beach, California (Avg Atmospheric Pressure = 14.7 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

2643 legless - Domed External Floating Roof Tank
Long Beach, California

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Crude Oil (RVP11)	Jan	61.79	56.79	66.79	64.33	8.7413	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2270	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0015	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0514	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1519	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1155	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0042	N/A	N/A	86.1700	0.0096	0.0090	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0027	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0031	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3490	N/A	N/A	92.1300	0.0058	0.0009	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.4710	N/A	N/A	49.6789	0.9611	0.9847	215.40	
Xylenes (mixed isomers)						0.0962	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Feb	62.78	57.67	67.88	64.33	8.8800	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0228	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2607	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0016	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0533	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1832	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1195	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0558	N/A	N/A	86.1700	0.0096	0.0091	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0028	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0032	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3597	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.6203	N/A	N/A	49.6754	0.9611	0.9845	215.40	
Xylenes (mixed isomers)						0.0996	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Mar	63.78	58.57	68.99	64.33	9.0228	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0237	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2957	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0017	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0553	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2157	N/A	N/A	82.1500	0.0074	0.0041	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1236	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1093	N/A	N/A	86.1700	0.0096	0.0092	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0029	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0034	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3710	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.7740	N/A	N/A	49.6718	0.9611	0.9843	215.40	
Xylenes (mixed isomers)						0.1031	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Apr	65.70	59.89	71.51	64.33	9.3013	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0256	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56

Benzene						1.3652	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0019	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0594	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2800	N/A	N/A	82.1500	0.0074	0.0042	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1320	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.2152	N/A	N/A	86.1700	0.0096	0.0094	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0032	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0038	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3934	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.0738	N/A	N/A	49.6648	0.9611	0.9840	215.40	
Xylenes (mixed isomers)						0.1101	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	May	67.27	61.79	72.76	64.33	9.5335	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0272	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4241	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0020	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0629	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3346	N/A	N/A	82.1500	0.0074	0.0042	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1392	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3049	N/A	N/A	86.1700	0.0096	0.0095	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0034	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0041	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4125	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.3236	N/A	N/A	49.6591	0.9611	0.9838	215.40	
Xylenes (mixed isomers)						0.1162	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Jun	68.98	63.35	74.61	64.33	9.7902	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0291	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4904	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0022	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0668	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3960	N/A	N/A	82.1500	0.0074	0.0043	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1474	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4054	N/A	N/A	86.1700	0.0096	0.0097	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0037	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0045	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4341	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.5998	N/A	N/A	49.6528	0.9611	0.9835	215.40	
Xylenes (mixed isomers)						0.1231	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Jul	71.26	65.04	77.47	64.33	10.1419	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0317	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5831	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0025	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0725	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4817	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1589	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5456	N/A	N/A	86.1700	0.0096	0.0099	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0040	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0050	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4645	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.9781	N/A	N/A	49.6443	0.9611	0.9831	215.40	
Xylenes (mixed isomers)						0.1329	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Aug	71.60	65.63	77.58	64.33	10.1959	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0321	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5975	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0025	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0734	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4951	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1608	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.5674	N/A	N/A	86.1700	0.0096	0.0099	86.17	Option 2: A=6.876, B=1171.17, C=224.41

Naphthalene						0.0041	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0051	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4693	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						11.0361	N/A	N/A	49.6430	0.9611	0.9830	215.40	
Xylenes (mixed isomers)						0.1344	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Sep	70.17	64.65	75.68	64.33	9.9722	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0304	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.5381	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0023	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0697	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.4401	N/A	N/A	82.1500	0.0074	0.0044	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1533	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.4776	N/A	N/A	86.1700	0.0096	0.0098	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0039	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0048	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4497	N/A	N/A	92.1300	0.0058	0.0011	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.7956	N/A	N/A	49.6484	0.9611	0.9832	215.40	
Xylenes (mixed isomers)						0.1281	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Oct	67.76	62.48	73.04	64.33	9.6062	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0277	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.4428	N/A	N/A	78.1100	0.0014	0.0009	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0021	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0640	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.3519	N/A	N/A	82.1500	0.0074	0.0043	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1415	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.3332	N/A	N/A	86.1700	0.0096	0.0096	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0035	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0042	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.4186	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						10.4019	N/A	N/A	49.6573	0.9611	0.9837	215.40	
Xylenes (mixed isomers)						0.1181	N/A	N/A	106.1700	0.0094	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Nov	64.31	59.22	69.40	64.33	9.0986	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0242	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.3145	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0017	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0564	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.2330	N/A	N/A	82.1500	0.0074	0.0041	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1259	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.1380	N/A	N/A	86.1700	0.0096	0.0092	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0030	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0035	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3770	N/A	N/A	92.1300	0.0058	0.0010	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.8556	N/A	N/A	49.6699	0.9611	0.9843	215.40	
Xylenes (mixed isomers)						0.1050	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude Oil (RVP11)	Dec	61.76	56.83	66.70	64.33	8.7379	N/A	N/A	50.0000			205.00	Option 4: RVP=11
1,2,4-Trimethylbenzene						0.0219	N/A	N/A	120.1900	0.0028	0.0000	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						1.2262	N/A	N/A	78.1100	0.0014	0.0008	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Chrysene						0.0000	N/A	N/A	228.2800	0.0000	0.0000	228.28	Option 2: A=7.30847, B=2609.83, C=148.439
Cresol (-m)						0.0015	N/A	N/A	108.1000	0.0000	0.0000	108.10	Option 2: A=7.508, B=1856.36, C=199.07
Cumene						0.0514	N/A	N/A	120.1900	0.0000	0.0000	120.19	Option 2: A=6.93666, B=1460.793, C=207.777
Cyclohexene						1.1512	N/A	N/A	82.1500	0.0074	0.0040	82.15	Option 2: A=6.8861, B=1229.973, C=224.1
Ethylbenzene						0.1154	N/A	N/A	106.1700	0.0015	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						2.0030	N/A	N/A	86.1700	0.0096	0.0090	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Naphthalene						0.0027	N/A	N/A	128.2000	0.0009	0.0000	128.20	Option 2: A=7.3729, B=1968.36, C=222.61
Phenol						0.0031	N/A	N/A	94.1112	0.0000	0.0000	94.11	Option 2: A=7.1345, B=1516.07, C=174.57
Toluene						0.3487	N/A	N/A	92.1300	0.0058	0.0009	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						9.4674	N/A	N/A	49.6790	0.9611	0.9847	215.40	
Xylenes (mixed isomers)						0.0961	N/A	N/A	106.1700	0.0094	0.0004	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

2643 legless - Domed External Floating Roof Tank
Long Beach, California

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	9.7644	10.0103	10.2688	10.7902	11.2432	11.7652	12.5201	12.6404	12.1498	11.3888	10.4085	9.7586
Seal Factor A (lb-mole/ft-yr):	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seal-related Wind Speed Exponent:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Value of Vapor Pressure Function:	0.2219	0.2275	0.2334	0.2452	0.2555	0.2674	0.2845	0.2873	0.2761	0.2588	0.2366	0.2218
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	8.7413	8.8800	9.0228	9.3013	9.5335	9.7902	10.1419	10.1959	9.9722	9.6062	9.0986	8.7379
Tank Diameter (ft):	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Withdrawal Losses (lb):	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317	58.4317
Net Throughput (gal/mo.):	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000	2,688,000.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
Average Organic Liquid Density (lb/gal):	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000	7.1000
Tank Diameter (ft):	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000	44.0000
Roof Fitting Losses (lb):	41.5986	42.6460	43.7476	45.9687	47.8985	50.1225	53.3385	53.8510	51.7609	48.5191	44.3426	41.5737
Value of Vapor Pressure Function:	0.2219	0.2275	0.2334	0.2452	0.2555	0.2674	0.2845	0.2873	0.2761	0.2588	0.2366	0.2218
Vapor Molecular Weight (lb/lb-mole):	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000	50.0000
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	112.4700	112.4700	112.4700	112.4700	112.4700	112.4700	112.4700	112.4700	112.4700	112.4700	112.4700	112.4700
Average Wind Speed (mph):	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Losses (lb):	109.7947	111.0879	112.4482	115.1906	117.5734	120.3195	124.2903	124.9232	122.3424	118.3396	113.1828	109.7639

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	2	1.60	0.00	0.00	16.0949
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	14.0830
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	31.1839
Unslotted Guide-Pole Well/Gasketed sliding Cover, w. Wiper	3	14.00	3.70	0.78	211.2456
Gauge-Hatch/Sample Well (8-in. Diam.)/Weighted Mech. Actuation, Gask.	1	0.47	0.02	0.97	2.3639
Roof Drain (3-in. Diameter)/90% Closed	1	1.80	0.14	1.10	9.0534
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1	56.00	0.00	0.00	281.6608

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

2643 legless - Domed External Floating Roof Tank
Long Beach, California

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Crude Oil (RVP11)	132.71	701.18	565.37	0.00	1,399.26
1,2,4-Trimethylbenzene	0.00	1.97	0.02	0.00	1.99
Benzene	0.11	0.99	0.49	0.00	1.59
Chrysene	0.00	0.01	0.00	0.00	0.01
Cresol (-m)	0.00	0.00	0.00	0.00	0.00
Cumene	0.00	0.02	0.00	0.00	0.02
Cyclohexene	0.56	5.19	2.39	0.00	8.14
Ethylbenzene	0.01	1.05	0.05	0.00	1.11
Hexane (-n)	1.26	6.73	5.35	0.00	13.34
Naphthalene	0.00	0.64	0.00	0.00	0.64
Phenol	0.00	0.00	0.00	0.00	0.00
Toluene	0.13	4.05	0.57	0.00	4.76
Unidentified Components	130.56	673.90	556.23	0.00	1,360.70
Xylenes (mixed isomers)	0.06	6.62	0.26	0.00	6.95

Estimation of VOC Emissions from Excavating Contaminated Soil During LARC Crude Storage Capacity Project Construction

Equations for estimating emissions from contaminated soil are provided in DTSC's Preliminary Endangerment Assessment (PEA) Guidance Manual. The Equations are based on the Jury Model evaluated by USEPA. Emissions are estimated based on chemical concentrations in soil and physical properties of those chemicals.

The chemical concentrations were estimated based on methods established by the Total Petroleum Hydrocarbon (TPH) Work Group. The actual volatile organic chemicals (VOCs) in the soil are a complex mixture of various hydrocarbons. The concentrations of total petroleum hydrocarbons present in the soil were analyzed by USEPA Test Method 8015. Results were reported in terms of gasoline and diesel range organic compounds. Results for samples at the estimated depth of the elevation (38 feet above mean sea level) are listed in the attached Table 1. The highest gasoline result reported (640 mg/kg) was in the location of Soil Boring (SB) 19 at a depth of 4' below existing grade. The highest diesel result reported (14000 mg/kg) was in the location of Soil Boring (SB) 26 at a depth of 4' below existing grade.

In accordance with practices developed by the TPH Work Group, surrogate hydrocarbons were used to simulate the physical properties of the detected hydrocarbons. Based on the retention times of the detected hydrocarbons, surrogate compounds were assigned based on the ranges shown in Table 2. Physical properties for the surrogate compounds used for estimating the emission rates were taken from a Utah, Department of Environmental Quality publication "Guidelines for Fractionation at Leaking Underground Storage Tank Sites" (see Attachment 1) Surrogate concentrations estimated from the maximum detected levels from Table 1 are summarized in Table 3.

Emissions for each surrogate compound were calculated based on the Total Emission Rate calculations in Appendix A of the PEA Guidance Manual (see Attachment 2). The exposure area was taken as the size of the excavation at its greatest extent (60,000 square feet). Instead of the six years that is usually used to estimate emission rates for noncarcinogenic risk assessments, the exposure time was taken as one day to maximize the estimated daily emission rates. Values for Soil Bulk Density, Particle Density and Soil Moisture were obtained from the geotechnical data collected for the tank foundation design.

The estimates of emissions are summarized in Table 4. The total peak daily estimated VOC emissions are 3.26 pounds per day.

TABLES

TABLE 1. TOTAL PETROLEUM HYDROCARBON RESULTS
LARC RESERVOIR 1

Sample ID	Lab Report ID	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	Total TPH (mg/kg)
SB-16 @ 5'	12-09-1278	140	**9300**	**9440**
SB-17 @ 4'	12-09-1439	0.08	770	770.08
SB-18 @ 4'	12-09-1439	0.52	**5300**	**5300.52**
SB-19 @ 4'	12-09-1439	2.3	**14000**	**14002.3**
SB-20 @ 4'	12-09-1439	0.69	**1800**	**1800.69**
SB-21 @ 4'	12-09-1439	3.8	**8800**	**8803.8**
SB-22 @ 4'	12-09-1439	*	**7900**	**7900**
B-23 @ 4'	12-09-1490	240	**4200**	**4440**
B-24 @ 4'	12-09-1490	0	**3800**	**3800**
B-25 @ 4'	12-09-1490	*	**2600**	**2600**
B-26 @ 4'	12-09-1490	640	**7900**	**8540**
SB-27 @ 4'	12-09-1531	99	**2700**	**2799**
B-29 @ 4'	12-09-1490	610	**10000**	**10610**
B-30 @ 4'	12-09-1490	1	9	10

Limits			
Minimum	0.08	9.4	10.27
Maximum	640	14000	14002.3
Average	144.79	5648.53	5772.63

Notes:

* - not detected at or above reporting limit.

mg/kg - milligrams per kilogram

mg/L - milligrams per liter

INS - insufficient material to run test

Class III Landfills: <1000 mg/kg GRO, <3000 mg/kg DRO, <3000 mg/kg MRO

Table 2: Retention Times for Speciation

Carbon Ranges	TPH (Diesel) Peaks Low	TPH (Diesel) Peaks High	TPH (Gasoline) Peaks Low	TPH (Gasoline) Peaks High
	(minutes)	(minutes)	(minutes)	(minutes)
C5-C6	0	0.233	1.402	2.859
C7-C8	0.234	0.694	2.86	5.395
C9-C10	0.695	1.223	5.396	13.558
C11-C12	1.224	1.696	13.559	22.736
C13-C16	1.697	2.494	NA	NA
C17-C21	2.495	3.297	NA	NA
C22-C35	3.298	4.96	NA	NA

Table 3: Surrogate Concentrations

SB26@4'	Areas	mg/kg	
Gasoline	17181208	640	TPH
C5-C6	40141	1	Hexane
C7-C8	80112	3	Heptane
C9-C10	844770	31	Nonane
C11-C12	7006698	261	Undecane
Subtotal	7971721	297	
C13+	8280452	343	Hexadecane
SB19@4'	Areas	mg/kg	
Diesel	5523.09	14000	TPH
C5-C6	0.00	0	
C7-C8	0.00	0	
C9-C10	8.68	22	Nonane
C11-C12	61.23	155	Undecane
C13-C16	373.13	946	Hexadecane
C17-C21	845.84	2144	Heptadecane
C22-C35	2359.52	5981	Heptadecane
Subtotal	3648.40	9248	
C35+	1624.35	4117	Nonvolatile

Table 4: Calculation of Maximum Daily VOC Emissions

	Bulk Density	Particle Density	Moisture
#/ft3	128	160	15.36
g/cm3	2.05	2.57	0.25
Pt	0.2		
Pa	0.075		
Pa3.33/Pt2	0.00449		
A	55741824	cm2	
T	86400	sec.	

Carbon Range	Surrogate Compound	Hc	Kd	Kas	Dei	α
		unitless	l/kg	g/ml	cm2/sec	
C5-C6	Hexane	41	12.6	3.253968	0.000384	3.585E-05
C7-C8	Heptane	48	63.2	0.759494	0.0003	7.035E-06
C9-C10	Nonane	5	632	0.007911	0.000289	7.222E-08
C11-C12	Undecane	0.48	6320	7.59E-05	0.000206	4.953E-10
C13-C16	Hexadecane	0.036	100000	3.6E-07	0.000177	2.016E-12
C17-C21	Heptadecane	8.40E-04	8000000	1.05E-10	0.000147	4.883E-16
C22-C35	Heptadecane	8.40E-04	8000000	1.05E-10	0.000147	4.883E-16

E/C(mg/kg)	Gasoline from SB26@4'	Diesel from SB19@4'	Worst Case	E mg/sec
	mg/kg	mg/kg		
3.35E-03	1	0	1	5.02E-03
1.38E-03	3	0	3	4.12E-03
1.37E-04	31	22	31	4.30E-03
1.13E-05	261	155	261	2.95E-03
7.21E-07	343	946	946	6.82E-04
1.12E-08	0	2144	2144	2.41E-05
1.12E-08	0	5981	5981	6.71E-05

Total Daily VOC Emissions 1.72E-02 mg/sec

3.26 #/day

ATTACHMENTS

Table 2: TPH Fraction-Specific [a] and Chemical-Specific Property [a] and Toxicity Values

TPH Fractions and Chemicals showing Carbon Number and Representative CAS number	EPA Analytical Method[b]	Molecular weight (g/mol)	Vapor Pressure[c] (mm Hg)	Henry's Law Constant[d] (L-H_2O/L-air, unitless)	Diffusion Coefficient in Air [e] (D^{air}, cm^2/s)	Diffusion Coefficient in Water [e] (D^w, cm^2/s)	Aqueous Solubility (20-25° C) (pure compound) (mg/L)	Adsorption Coefficient (Koc) (mL/g)	Cancer Slope Factor, Oral (SF_o) (kg-day/mg)	Cancer Slope Factor, Inhalation (SF_i) (kg-day/mg)	Reference Dose, Oral (RfD_o) (mg/kg-day)	Reference Dose, Inhalation (RfD_i) (mg/kg-day)
ALIPHATICS												
C_5-C_6 110-54-3 (hexane)	8260B	81	2.66 E+02 [g]	4.10 E+01	8.57 E-02	8.34 E-06	3.60 E+01	6.30 E+02	-	-	6.00 E-02 [h]	6.00 E-02 [h]
C_7-C_8 142-82-5 (heptane)	8260B	100	4.80 E+01	7.70 E+01	6.69 E-02	6.89 E-06	5.40 E+00	3.16 E+03	-	-	6.00 E-02 [h]	6.00 E-02 [h]
C_9-C_{10} 111-84-2 (nonane)	8260B	130	5.00 E+00	1.60 E+02	6.44 E-02	5.90 E-06	4.30 E-01	3.16 E+04	-	-	1.00 E-01 [i]	2.90 E-01 [i]
C_{11}-C_{12} 1120-21-4 (undecane)	8270B	160	4.80 E-01	1.60 E+02	4.60 E-02	5.19 E-06	3.40 E-02	3.16 E+05	-	-	1.00 E-01 [i]	2.90 E-01 [i]
C_{13}-C_{16} 544-76-3 (hexadecane)	8270B	200	3.60 E-02	1.60 E+02	3.95 E-02	4.50 E-06	7.60 E-04	5.00 E+06	-	-	1.00 E-01 [i]	2.90 E-01 [i]
C_{17}-C_{21} 544-76-3 (heptadecane)	8270B	270	8.40 E-04	1.10 E+02	3.28 E-02	3.76 E-06	2.50 E-06	4.00 E+08	-	-	2.00 E+00 [i]	na [i]
C22-C35 629-78-7 (heptadecane)	8270B	280	8.40 E-04	1.10 E+02	3.28 E-02	3.76 E-06	1.50 E-06	4.00 E+08	-	-	2.00 E+00 i	na i

Source: Utah Department of Environmental Quality - Guidelines for TPH Fractionation at Leaking Underground Storage Tank Sites, 2012 - http://www.undergroundtanks.utah.gov/docs/fractionation.pdf (accessed July 10, 2013)

For contaminants which do not fit into either of the classes listed above, use this third equation, which is based primarily on pesticides:

$$K_{oc} = 10^{((0.544 \log K_{ow}) + 1.377)}$$

Where:

K_{oc} = organic carbon partition coefficient, L/kg (mL/g)

K_{ow} = octanol/water partition coefficient, L/kg (Ml/g)

Step 2: Calculate the Total Emission Rate

If bulk soil concentrations do not exceed C_{sat}, then calculate an emission rate for each contaminant using the equation below. This equation assumes the bulk soil concentration of the contaminant is less than the saturation concentration, C_{sat}. The default values are the same as those stated in EPA (1991b), except for the area of contamination, (A), the fraction of organic carbon in the soil (f_{oc}), and the exposure interval (T). The default value for the exposed surface area is equal to 5,000 square feet (4.84×10^6 cm^2 or 484 m^2), the minimum dimensions of a residential lot in California (Hadley and Sedman, 1990). The default value for soil organic carbon is 0.02 (1992b). The default values for exposure interval are 30 yr for carcinogenic risk and 6 yr for non-carcinogenic hazard.

$$E = \frac{2\, A\, D_{ei}\, P_a\ K_{as}\, C_i \times 10^3\ mg/g}{\sqrt{\pi\, \alpha\, T}}$$

Where:

E_i = average emission rate of contaminant i over the residential lot during the exposure interval, mg/sec

A = area of contamination, cm^2; default = $4.84 \times 10^{+6}$ cm^2,

D_{ei} = effective diffusivity of compound, cm^2/sec
= $D_i (P_a^{3.33}/P_t^2)$

Where:

D_i = diffusivity in air, cm^2/s.
(Values are shown in Appendix C, Table 4. If the desired value is not found in Table 4, refer to USEPA (1992b), equation (9), page 13.)

P_t = total soil porosity, unitless
= 1-(ß/ρ)

Where:

ß = soil bulk density, g/cm^3 (default = 1.5 g/cm^3)

ρ = particle density, g/cm^3 (default = 2.65 g/cm^3)

P_t = 0.434

P_a = air filled soil porosity, unitless
= $P_t - \Theta_m$ ß

Where:

Θ_m = soil moisture content, cm^3/g (default = 0.1 cm^3/g)

P_a = 0.284

K_{as} = soil/air partition coefficient, g/cm^3
= $(H_c/K_d) \times 41$

Where:

H_c = Henry's Law constant, atm-m^3/mole

41 = conversion factor to change H_c to dimensionless form

K_d = soil-water partition coefficient (cm^3-water/g-soil)
(= L/kg)

C_i = bulk soil concentration of contaminant i, g/g-soil

T = exposure interval, sec (default = 30 yr = 9.5 x 10^8 seconds)

α = conversion factor composed of quantities defined above

$$\alpha = \frac{D_{ei} \times P_a}{P_a + [(\rho)(1 - P_a)/K_{as}]}$$

LAB RESULTS

Calscience Environmental Laboratories, Inc.

Analytical Report

ACCREDITED IN ACCORDANCE WITH nelac

TriHydro Corporation		Date Received:	09/24/12
2501 Cherry Street, Suite 200		Work Order No:	12-09-1439
Signal Hill, CA 90755-2070		Preparation:	EPA 3550B
		Method:	EPA 8015B (M)

Project: LARC Soil Characterization Analysis 436-087-001

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SB-19@4'	**12-09-1439-9-A**	**09/21/12 09:56**	**Solid**	**GC 45**	**09/26/12**	**09/27/12 19:02**	**120926B03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
TPH as Diesel	14000	100	31	20	HD	mg/kg

Surrogates:	REC (%)	Control Limits	Qual
n-Octacosane	99	61-145	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SB-19@8'	**12-09-1439-10-A**	**09/21/12 10:06**	**Solid**	**GC 45**	**09/26/12**	**09/27/12 19:17**	**120926B03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
TPH as Diesel	12000	100	31	20	HD	mg/kg

Surrogates:	REC (%)	Control Limits	Qual
n-Octacosane	103	61-145	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SB-19@12'	**12-09-1439-11-A**	**09/21/12 10:22**	**Solid**	**GC 45**	**09/26/12**	**09/27/12 19:48**	**120926B03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
TPH as Diesel	65000	500	160	100	HD	mg/kg

Surrogates:	REC (%)	Control Limits	Qual
n-Octacosane	119	61-145	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SB-19@16'	**12-09-1439-12-A**	**09/21/12 10:27**	**Solid**	**GC 45**	**09/26/12**	**09/27/12 20:03**	**120926B03**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
TPH as Diesel	42000	250	78	50	HD	mg/kg

Surrogates:	REC (%)	Control Limits	Qual
n-Octacosane	117	61-145	

Return to Contents

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

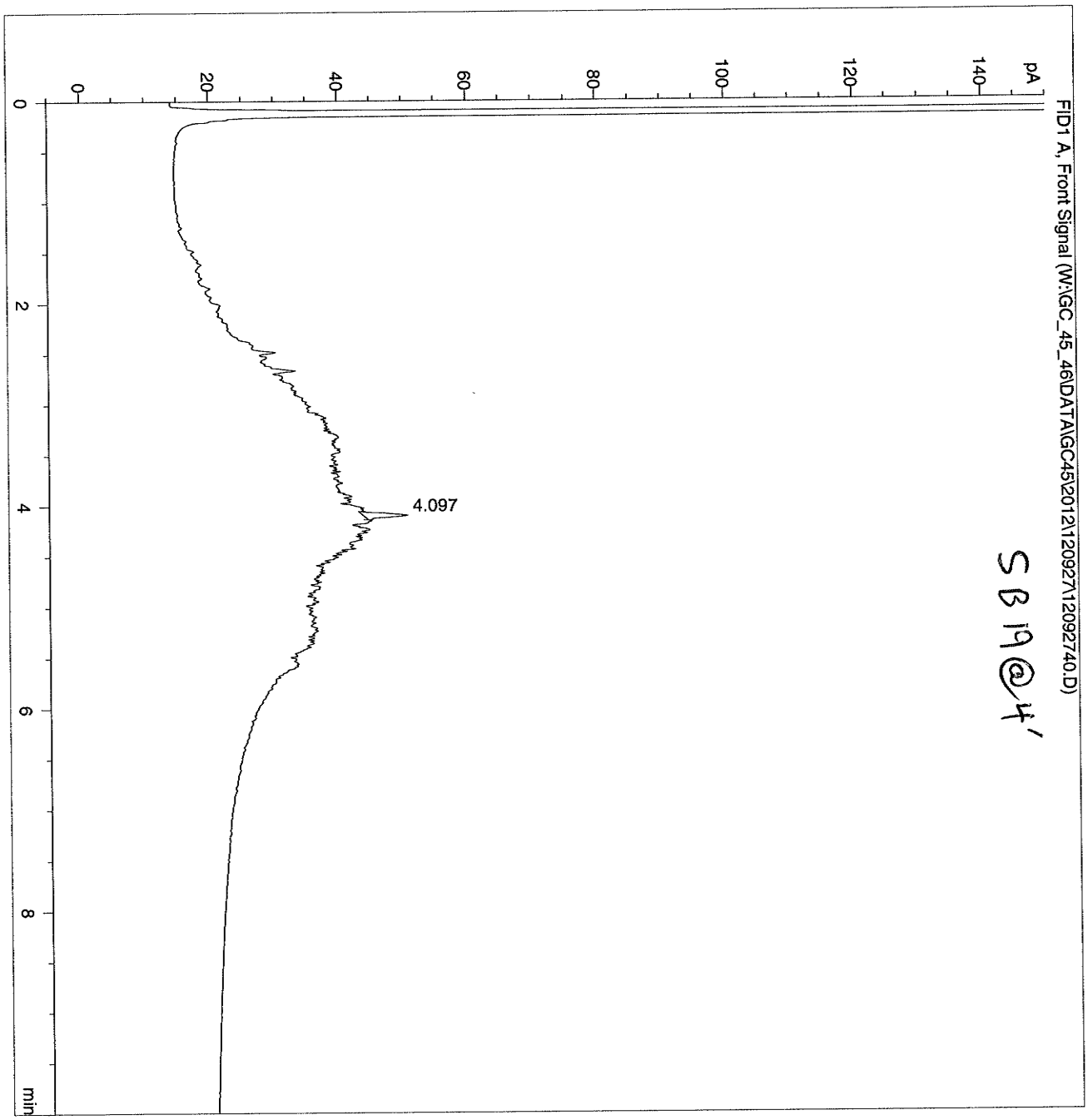
Area Percent Report

Data File Name : W:\GC_45_46\DATA\GC45\2012\120927\12092740.D
Page Number : 2
Operator : FZ/YW
Instrument : GC 45
Sample Name : 12-09-1439-9 20X

Acquired on : 27 Sep 12 7:02:33 PM
Report Created on: 28 Sep 12 02:18 pm

Vial Number : Vial 32
Injection Number : 1
Sequence Line : 40
Instrument Method: C:\CHEM32\2\METHODS\TPH4->

Analysis Method : 8015B.MTH



Area Percent Report

Data File Name : W:\GC_45_46\DATA\GC45\2012\120927\12092740.D
Page Number : 1
Operator : FZ/YW
Instrument : GC 45
Sample Name : 12-09-1439-9 20X

Vial Number : Vial 32
Injection Number : 1
Sequence Line : 40
Instrument Method: C:\CHEM32\2\METHODS\TPH4->

Acquired on : 27 Sep 12 7:02:33 PM
Report Created on: 28 Sep 12 02:39 pm

Analysis Method : 8015B.MTH

Sig. 1 in W:\GC_45_46\DATA\GC45\2012\120927->

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	0.701	0.06	0	MV	0.019	0.001
2	0.799	0.56	0	VV	0.056	0.010
3	0.850	0.29	0	VV	0.037	0.005
4	0.885	0.20	0	VV	0.028	0.004
5	0.936	0.42	0	VV	0.044	0.008
6	0.989	0.62	0	VV	0.036	0.011
7	1.029	0.89	0	VV	0.036	0.016
8	1.116	2.42	1	VV	0.065	0.044
9	1.161	1.04	1	VV	0.032	0.019
10	1.207	2.18	1	VV	0.043	0.039
11	1.247	2.90	1	VV	0.041	0.053
12	1.380	9.72	2	VV	0.085	0.176
13	1.453	5.04	2	VV	0.042	0.091
14	1.480	9.16	3	VV	0.050	0.166
15	1.571	15.54	4	VV	0.070	0.281
16	1.611	18.87	4	VV	0.074	0.342
17	1.699	12.12	4	VV	0.051	0.219
18	1.745	11.61	4	VV	0.045	0.210
19	1.847	31.69	6	VV	0.095	0.574
20	1.931	24.23	6	VV	0.070	0.439
21	2.014	42.29	7	VV	0.099	0.766
22	2.084	11.62	7	VV	0.028	0.210
23	2.109	8.55	7	VV	0.021	0.155
24	2.154	21.72	8	VV	0.048	0.393
25	2.202	24.70	8	VV	0.050	0.447
26	2.243	16.53	8	VV	0.033	0.299
27	2.300	17.91	9	VV	0.034	0.324
28	2.353	30.47	10	VV	0.051	0.552
29	2.383	28.03	12	VV	0.040	0.508
30	2.419	37.53	12	VV	0.051	0.680
31	2.481	54.13	16	VV	0.058	0.980
32	2.529	55.11	14	VV	0.065	0.998
33	2.589	24.53	14	VV	0.029	0.444
34	2.618	24.57	15	VV	0.027	0.445
35	2.663	61.85	19	VV	0.055	1.120
36	2.730	55.00	17	VV	0.055	0.996
37	2.815	107.30	18	VV	0.097	1.943
38	2.863	29.42	19	VV	0.026	0.533
39	2.886	22.32	19	VV	0.020	0.404
40	2.935	65.75	20	VV	0.055	1.190
41	2.975	43.39	21	VV	0.035	0.786
42	3.017	52.52	21	VV	0.042	0.951
43	3.077	44.52	21	VV	0.035	0.806
44	3.081	35.49	22	VV	0.027	0.643
45	3.131	64.39	24	VV	0.046	1.166

Area Percent Report

Data File Name : W:\GC_45_46\DATA\GC45\2012\120927\12092740.D
Page Number : 2
Operator : FZ/YW
Instrument : GC 45
Sample Name : 12-09-1439-9 20X

Vial Number : Vial 32
Injection Number : 1
Sequence Line : 40
Instrument Method: C:\CHEM32\2\METHODS\TPH4->

Acquired on : 27 Sep 12 7:02:33 PM
Report Created on: 28 Sep 12 02:39 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341]

Pk	Ret Time	Area	Height	Peak	Width	Response %
46	3.156	39.35	23	VV	0.028	0.713
47	3.184	37.47	24	VV	0.026	0.678
48	3.240	46.65	24	VV	0.033	0.845
49	3.241	31.10	24	VV	0.022	0.563
50	3.263	29.68	24	VV	0.020	0.537
51	3.325	124.63	25	VV	0.082	2.257
52	3.370	55.42	25	VV	0.037	1.003
53	3.408	40.23	25	VV	0.027	0.728
54	3.435	40.50	26	VV	0.026	0.733
55	3.463	76.88	26	VV	0.050	1.392
56	3.516	65.61	25	VV	0.044	1.188
57	3.558	46.57	25	VV	0.031	0.843
58	3.590	41.97	25	VV	0.028	0.760
59	3.616	34.17	25	VV	0.023	0.619
60	3.638	32.96	25	VV	0.022	0.597
61	3.662	35.97	26	VV	0.023	0.651
62	3.712	85.12	25	VV	0.056	1.541
63	3.743	37.71	25	VV	0.025	0.683
64	3.777	72.52	26	VV	0.047	1.313
65	3.815	36.65	25	VV	0.024	0.664
66	3.836	26.79	25	VV	0.018	0.485
67	3.855	28.29	26	VV	0.018	0.512
68	3.874	31.40	27	VV	0.020	0.569
69	3.910	60.58	27	VV	0.037	1.097
70	3.934	40.63	27	VV	0.025	0.736
71	3.960	50.33	27	VV	0.031	0.911
72	4.023	83.73	29	VV	0.048	1.516
73	4.043	51.31	30	VV	0.028	0.929
74	4.097	250.34	36	VV	0.116	4.533
75	4.199	29.41	29	VV	0.017	0.532
76	4.237	77.40	30	VV	0.043	1.401
77	4.264	55.90	30	VV	0.031	1.012
78	4.293	32.51	29	VV	0.019	0.589
79	4.314	38.46	29	VV	0.022	0.696
80	4.337	84.38	29	VV	0.049	1.528
81	4.390	46.16	28	VV	0.028	0.836
82	4.424	54.61	28	VV	0.033	0.989
83	4.450	49.07	27	VV	0.031	0.888
84	4.481	34.39	26	VV	0.022	0.623
85	4.508	72.53	25	VV	0.048	1.313
86	4.557	63.87	24	VV	0.045	1.157
87	4.606	55.66	23	VV	0.041	1.008
88	4.640	28.50	23	VV	0.021	0.516
89	4.663	96.06	23	VV	0.069	1.739
90	4.732	25.76	22	VV	0.019	0.466
91	4.754	48.90	23	VV	0.036	0.885

Area Percent Report

Data File Name : W:\GC_45_46\DATA\GC45\2012\120927\12092740.D
Page Number : 3
Operator : FZ/YW
Instrument : GC 45
Sample Name : 12-09-1439-9 20X

Vial Number : Vial 32
Injection Number : 1
Sequence Line : 40
Instrument Method: C:\CHEM32\2\METHODS\TPH4->

Acquired on : 27 Sep 12 7:02:33 PM
Report Created on: 28 Sep 12 02:39 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341]

Pk	Ret Time	Area	Height	Peak	Width	Response %
92	4.803	78.29	22	VV	0.058	1.418
93	4.851	29.59	22	VV	0.023	0.536
94	4.876	34.98	21	VV	0.028	0.633
95	4.908	46.06	22	VV	0.035	0.834
96	4.947	34.85	22	VM	0.026	0.631
97	4.953	42.21	22	MV	0.032	0.764
98	5.009	47.40	21	VV	0.037	0.858
99	5.040	52.08	21	VV	0.041	0.943
100	5.075	22.13	21	VV	0.017	0.401
101	5.099	69.86	22	VV	0.054	1.265
102	5.155	54.20	21	VV	0.042	0.981
103	5.210	49.39	22	VV	0.038	0.894
104	5.234	61.23	22	VV	0.047	1.109
105	5.279	25.37	21	VV	0.020	0.459
106	5.303	36.64	21	VV	0.029	0.663
107	5.329	26.61	21	VV	0.021	0.482
108	5.355	50.22	21	VV	0.040	0.909
109	5.394	87.85	21	VV	0.071	1.591
110	5.483	41.84	18	VV	0.038	0.758
111	5.512	42.80	18	VM	0.039	0.775
112	5.561	150.31	18	MV	0.136	2.722
113	5.694	93.49	15	VV	0.102	1.693
114	5.803	93.74	14	VM	0.114	1.697
115	5.922	10.81	12	MV	0.015	0.196
116	5.939	31.80	12	VV	0.045	0.576
117	5.983	47.74	11	VV	0.073	0.864
118	6.065	13.59	10	VV	0.023	0.246
119	6.096	28.00	10	VV	0.048	0.507
120	6.139	29.43	9	VV	0.055	0.533
121	6.197	31.83	8	VV	0.063	0.576
122	6.263	28.88	7	VV	0.064	0.523
123	6.327	26.81	7	VV	0.066	0.485
124	6.400	28.68	6	VV	0.080	0.519
125	6.483	5.92	5	VV	0.019	0.107
126	6.502	19.80	5	VM	0.068	0.358
127	6.571	3.13	4	MV	0.013	0.057
128	6.588	4.87	4	VV	0.019	0.088
129	6.610	14.91	4	VV	0.059	0.270
130	6.672	17.81	4	VV	0.077	0.323
131	6.749	11.34	4	VV	0.051	0.205
132	6.808	16.43	4	VV	0.077	0.297
133	6.881	3.09	3	VV	0.016	0.056
134	6.904	13.64	3	VV	0.071	0.247
135	6.976	4.63	3	VV	0.026	0.084
136	7.004	5.00	3	VV	0.029	0.091
137	7.029	3.33	3	VV	0.020	0.060

Area Percent Report

Data File Name : W:\GC_45_46\DATA\GC45\2012\120927\12092740.D
Page Number : 4
Operator : FZ/YW
Instrument : GC 45
Sample Name : 12-09-1439-9 20X

Vial Number : Vial 32
Injection Number : 1
Sequence Line : 40
Instrument Method: C:\CHEM32\2\METHODS\TPH4->

Acquired on : 27 Sep 12 7:02:33 PM
Report Created on: 28 Sep 12 02:39 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341]

Pk	Ret Time	Area	Height	Peak	Width	Response %
138	7.072	9.78	3	VV	0.058	0.177
139	7.110	3.36	3	VV	0.021	0.061
140	7.138	11.83	3	VV	0.075	0.214
141	7.235	12.84	3	VV	0.083	0.232
142	7.314	9.37	2	VV	0.066	0.170
143	7.369	5.15	2	VV	0.038	0.093
144	7.403	12.28	2	VV	0.089	0.222
145	7.508	7.73	2	VV	0.061	0.140
146	7.558	1.99	2	VV	0.017	0.036
147	7.579	4.36	2	VV	0.036	0.079
148	7.618	7.41	2	VV	0.064	0.134
149	7.680	2.25	2	VV	0.021	0.041
150	7.733	10.99	2	VV	0.101	0.199
151	7.809	2.50	2	VV	0.025	0.045
152	7.837	5.66	2	VV	0.057	0.103
153	7.889	5.36	2	VV	0.057	0.097
154	7.956	7.16	2	VV	0.079	0.130
155	8.031	5.16	1	VV	0.061	0.093
156	8.116	6.26	1	VV	0.079	0.113
157	8.176	2.71	1	VV	0.037	0.049
158	8.211	1.25	1	VV	0.017	0.023
159	8.227	1.13	1	VV	0.016	0.020
160	8.259	3.51	1	VV	0.049	0.064
161	8.305	4.02	1	VV	0.059	0.073
162	8.354	3.94	1	VV	0.060	0.071
163	8.438	4.52	1	VV	0.073	0.082
164	8.492	7.36	1	VV	0.124	0.133
165	8.636	2.13	1	VV	0.040	0.039
166	8.670	1.34	1	VV	0.027	0.024
167	8.700	2.77	1	VV	0.056	0.050
168	8.757	3.12	1	VV	0.067	0.057
169	8.820	1.66	1	VV	0.039	0.030
170	8.870	3.22	1	VV	0.078	0.058
171	8.946	0.70	1	VV	0.020	0.013
172	8.974	1.83	1	VV	0.052	0.033
173	9.037	2.24	1	VV	0.063	0.041
174	9.091	0.96	1	VV	0.030	0.017
175	9.117	3.83	1	VV	0.127	0.069
176	9.260	0.51	0	VV	0.020	0.009
177	9.282	0.66	0	VV	0.026	0.012
178	9.312	0.86	0	VV	0.035	0.016
179	9.348	2.19	0	VV	0.098	0.040
180	9.449	0.86	0	VV	0.048	0.016
181	9.509	0.83	0	VV	0.048	0.015
182	9.549	1.28	0	VV	0.080	0.023
183	9.664	0.43	0	VV	0.037	0.008

Area Percent Report

Data File Name : W:\GC_45_46\DATA\GC45\2012\120927\12092740.D
Page Number : 5
Operator : FZ/YW
Instrument : GC 45
Sample Name : 12-09-1439-9 20X

Vial Number : Vial 32
Injection Number : 1
Sequence Line : 40
Instrument Method: C:\CHEM32\2\METHODS\TPH4->

Acquired on : 27 Sep 12 7:02:33 PM
Report Created on: 28 Sep 12 02:39 pm

Analysis Method : 8015B.MTH

Software Revision: Rev. B.03.02 [341]

Pk	Ret Time	Area	Height	Peak	Width	Response %
184	9.686	0.84	0	VV	0.071	0.015
185	9.767	0.30	0	VV	0.032	0.005
186	9.829	0.61	0	VV	0.091	0.011
187	9.947	0.12	0	VV	0.038	0.002
188	9.997	0.01	0	VM	0.011	0.000

Total area = 5523.09

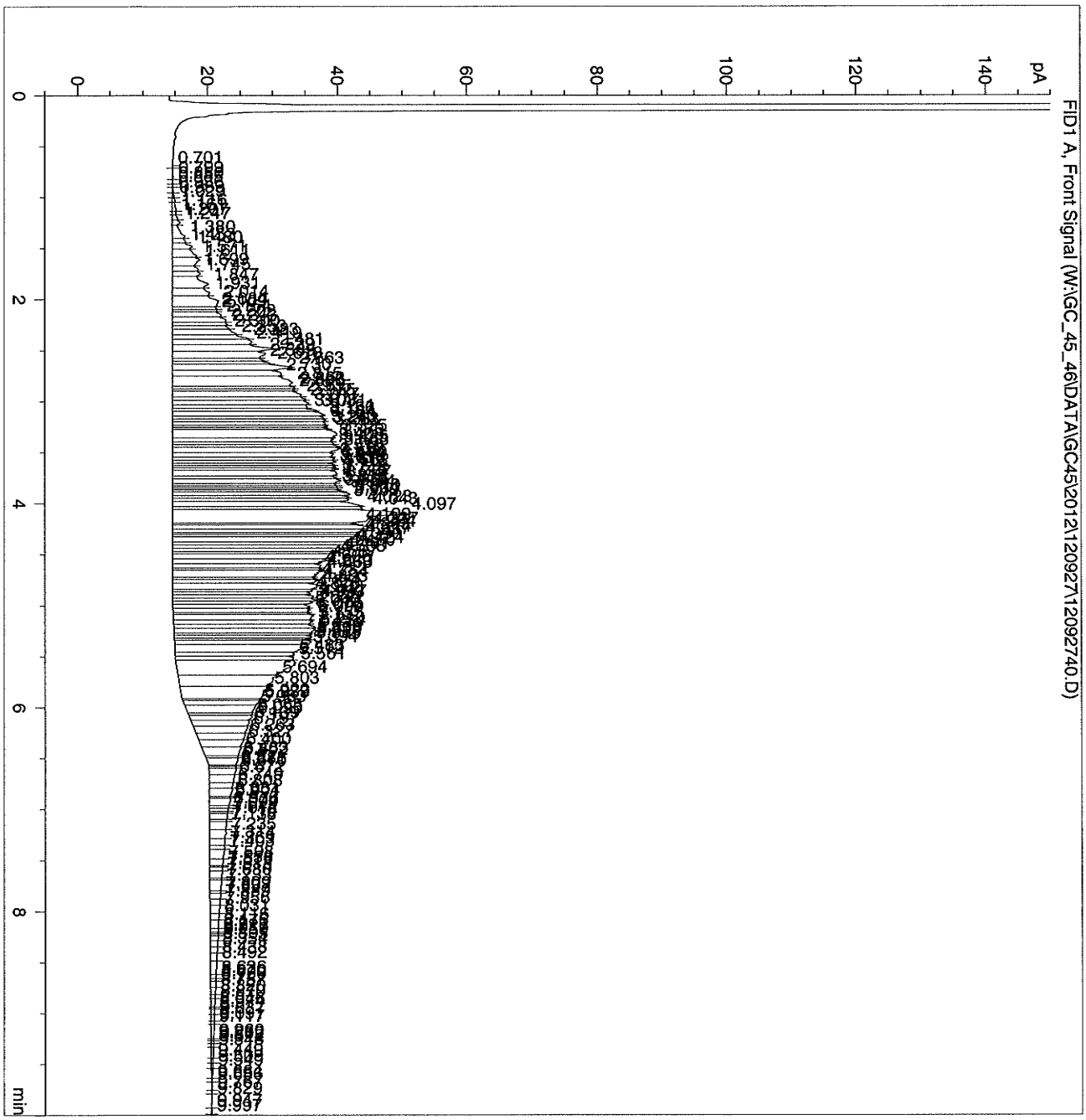
Area Percent Report

Data File Name : W:\GC_45_46\DATA\GC45\2012\120927\12092740.D
Page Number : 6
Operator : FZ/YW
Instrument : GC 45
Sample Name : 12-09-1439-9 20X

Vial Number : Vial 32
Injection Number : 1
Sequence Line : 40
Instrument Method: C:\CHEM32\2\METHODS\TPH4->

Acquired on : 27 Sep 12 7:02:33 PM
Report Created on: 28 Sep 12 02:39 pm

Analysis Method : 8015B.MTH



Calscience Environmental Laboratories, Inc.

Analytical Report

ACCREDITED IN ACCORDANCE WITH nelac

TriHydro Corporation		Date Received:	09/24/12
2501 Cherry Street, Suite 200		Work Order No:	12-09-1490
Signal Hill, CA 90755-2070		Preparation:	EPA 5035
		Method:	EPA 8015B (M)

Project: LARC Soil Characterization Analysis 436-087-001

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SB-25@4'	**12-09-1490-13-F**	**09/24/12 12:38**	**Solid**	**GC 22**	**09/25/12**	**09/25/12 19:25**	**120925B01**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
TPH as Gasoline	ND	0.24	0.048	0.95		mg/kg

Surrogates:	REC (%)	Control Limits	Qual
1,4-Bromofluorobenzene	94	60-126	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SB-25@8'	**12-09-1490-14-E**	**09/24/12 12:48**	**Solid**	**GC 22**	**09/25/12**	**09/26/12 01:22**	**120925B02**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
TPH as Gasoline	260	110	23	458	HD	mg/kg

Surrogates:	REC (%)	Control Limits	Qual
1,4-Bromofluorobenzene	95	60-126	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SB-26@4'	**12-09-1490-15-E**	**09/24/12 14:33**	**Solid**	**GC 22**	**09/25/12**	**09/26/12 01:54**	**120925B02**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
TPH as Gasoline	640	110	21	425	HD	mg/kg

Surrogates:	REC (%)	Control Limits	Qual
1,4-Bromofluorobenzene	98	60-126	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SB-26@8'	**12-09-1490-16-E**	**09/24/12 14:43**	**Solid**	**GC 22**	**09/25/12**	**09/26/12 02:26**	**120925B02**

Comment(s): -Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qual	Units
TPH as Gasoline	220	89	18	357	HD	mg/kg

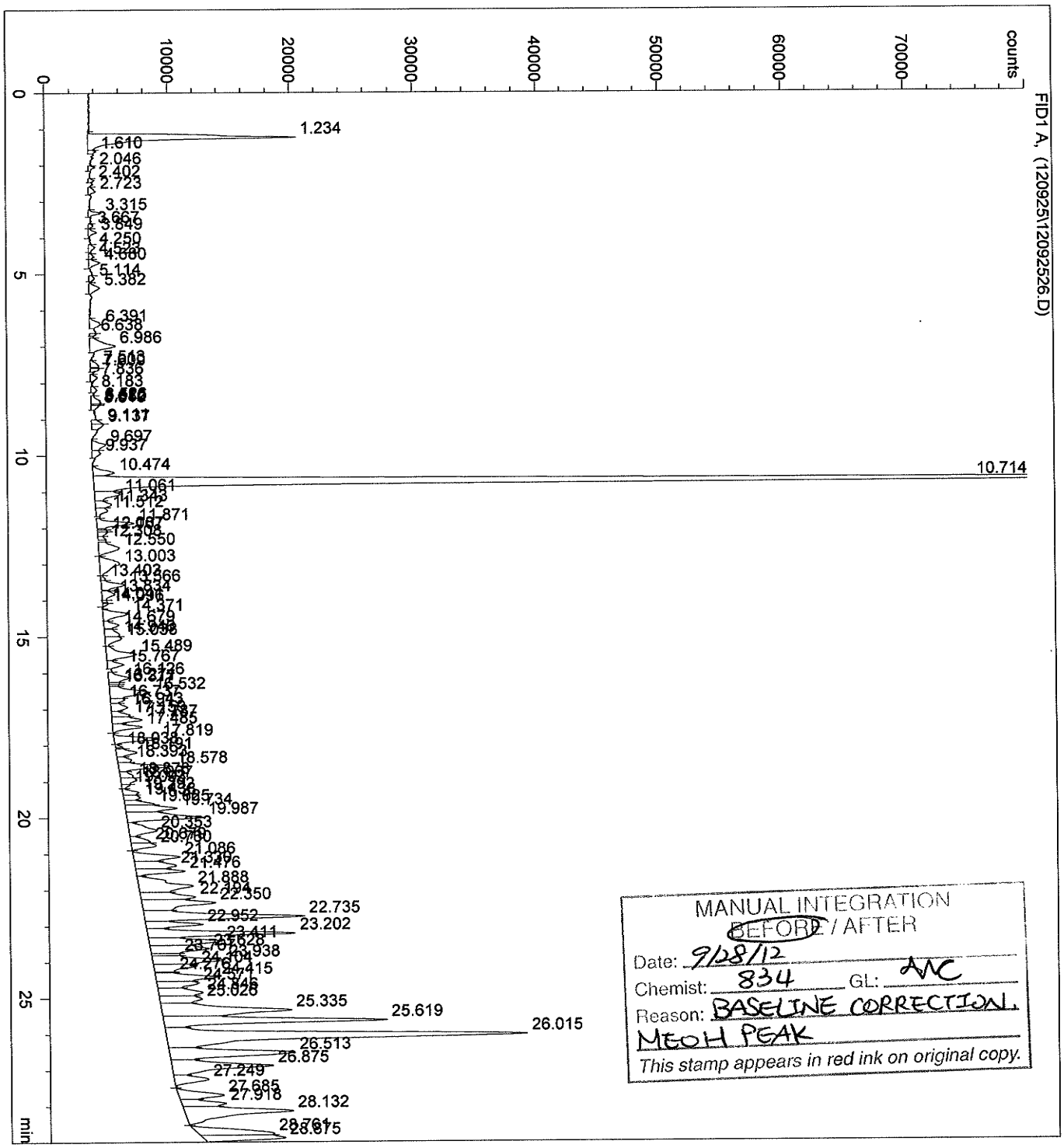
Surrogates:	REC (%)	Control Limits	Qual
1,4-Bromofluorobenzene	92	60-126	

Return to Contents

Area Percent Report

Data File Name : W:\DATA\2012\120925\12092526.D
Operator : AD
Instrument : GC 22
Sample Name : 1490-14E5.46 20u 458X
Run Time Bar Code:
Acquired on : 26 Sep 12 01:22 am
Report Created on: 26 Sep 12 02:18 pm

Page Number : 3
Vial Number : Vial 26
Injection Number : 1
Sequence Line : 26
Instrument Method: 80158021.M
Analysis Method : 8015B(M).MTH



MANUAL INTEGRATION
BEFORE / AFTER
Date: 9/28/12
Chemist: 834 GL: ANC
Reason: BASELINE CORRECTION.
MeOH PEAK
This stamp appears in red ink on original copy.

Area Percent Report

Data File Name : W:\DATA\2012\120925\12092527.D
Operator : AD
Instrument : GC 22
Sample Name : 1490-15E5.88 20u 4x5X
Run Time Bar Code:
Acquired on : 26 Sep 12 01:54 am
Report Created on: 26 Sep 12 02:26 pm

Page Number : 1
Vial Number : Vial 27
Injection Number : 1
Sequence Line : 27
Instrument Method: 80158021.M
Analysis Method : 8015B(M).MTH

Sig. 1 in W:\DATA\2012\120925\12092527.D

Pk	Ret Time	Area	Height	Peak	Width	Response %
1	1.607	6271	1607	VV	0.065	0.035
2	1.689	4746	1389	VV	0.057	0.026
3	2.040	6117	1284	VV	0.079	0.034
4	2.400	5019	968	VV	0.086	0.028
5	2.493	3754	800	VV	0.078	0.021
6	2.722	12638	1660	VV	0.127	0.070
7	2.849	1596	377	VV	0.071	0.009
8	3.309	12873	2278	VV	0.094	0.071
9	3.526	1706	421	VV	0.068	0.009
10	3.656	5103	850	VV	0.100	0.028
11	3.840	9072	1474	VV	0.103	0.050
12	4.249	7470	944	VV	0.132	0.041
13	4.490	1896	636	VV	0.050	0.010
14	4.516	2843	673	VV	0.070	0.016
15	4.686	14206	1751	VV	0.135	0.078
16	4.993	2137	510	VV	0.070	0.012
17	5.134	6653	863	VV	0.128	0.037
18	5.384	16153	1470	VV	0.183	0.089
19	6.367	12502	1128	VV	0.185	0.069
20	6.613	3259	889	VV	0.061	0.018
21	6.619	1529	909	VV	0.028	0.008
22	6.651	3662	901	VV	0.068	0.020
23	6.987	49432	3677	VV	0.224	0.273
24	7.220	4516	752	VV	0.100	0.025
25	7.530	12581	1462	VV	0.143	0.069
26	7.594	11184	1483	VV	0.126	0.062
27	7.837	4134	1131	VV	0.061	0.023
28	7.852	7780	1120	VV	0.116	0.043
29	8.180	9677	995	VV	0.162	0.053
30	8.550	13872	1625	VV	0.142	0.077
31	8.554	6285	1648	VV	0.064	0.035
32	8.617	7927	1476	VV	0.090	0.044
33	8.743	1635	806	VV	0.034	0.009
34	8.827	1810	914	VV	0.033	0.010
35	8.896	2368	1010	VV	0.039	0.013
36	8.924	2340	1022	VV	0.038	0.013
37	8.997	2758	1132	VV	0.041	0.015
38	9.143	15142	2288	VV	0.110	0.084
39	9.160	18115	2308	VV	0.131	0.100
40	9.326	10891	1265	VV	0.143	0.060
41	9.695	31455	2552	VV	0.205	0.174
42	9.940	22532	1809	VV	0.208	0.124
43	10.159	1796	685	VV	0.044	0.010
44	10.463	42744	4231	VV	0.168	0.236
45	10.713	929035	118347	VV	0.131	5.130
46	11.071	44324	4284	VV	0.172	0.245
47	11.352	42278	3828	VV	0.184	0.233
48	11.517	27089	3004	VV	0.150	0.150
49	11.665	7099	1655	VV	0.072	0.039
50	11.868	80983	8598	VV	0.157	0.447
51	12.083	36959	3346	VV	0.184	0.204
52	12.210	2798	2743	VV	0.017	0.015
53	12.330	17526	3237	VV	0.090	0.097
54	12.343	12570	3302	VV	0.063	0.069
55	12.549	96586	5861	VV	0.275	0.533

Area Percent Report

Data File Name : W:\DATA\2012\120925\12092527.D
Operator : AD
Instrument : GC 22
Sample Name : 1490-15E5.88 20u 4YSX
Run Time Bar Code:
Acquired on : 26 Sep 12 01:54 am
Report Created on: 26 Sep 12 02:26 pm

Page Number : 2
Vial Number : Vial 27
Injection Number : 1
Sequence Line : 27
Instrument Method: 80158021.M
Analysis Method : 8015B(M).MTH

Pk	Ret Time	Area	Height	Peak	Width	Response %
56	12.910	44206	5356	VV	0.138	0.244
57	12.955	12478	5426	VV	0.038	0.069
58	12.986	73733	5429	VV	0.226	0.407
59	13.360	44215	4535	VV	0.162	0.244
60	13.567	74946	6603	VV	0.189	0.414
61	13.700	7124	4139	VV	0.029	0.039
62	13.834	82987	5494	VV	0.252	0.458
63	14.064	34875	3940	VV	0.148	0.193
64	14.375	148661	11161	VV	0.222	0.821
65	14.670	71953	6387	VV	0.188	0.397
66	14.923	60708	6845	VV	0.148	0.335
67	14.953	10260	6824	VV	0.025	0.057
68	15.038	99406	7526	VV	0.220	0.549
69	15.480	188995	11436	VV	0.275	1.044
70	15.771	94129	7826	VV	0.200	0.520
71	15.921	33024	5846	VV	0.094	0.182
72	16.134	103286	9516	VV	0.181	0.570
73	16.272	87757	8994	VV	0.163	0.485
74	16.536	181433	12808	VV	0.236	1.002
75	16.701	17940	7799	VV	0.038	0.099
76	16.733	53476	7804	VV	0.114	0.295
77	16.959	95538	8546	VV	0.186	0.528
78	17.287	227292	14897	VV	0.254	1.255
79	17.486	109498	12351	VV	0.148	0.605
80	17.614	69109	9985	VV	0.115	0.382
81	17.816	195776	18708	VV	0.174	1.081
82	18.206	215150	14645	VV	0.245	1.188
83	18.389	117440	12943	VV	0.151	0.648
84	18.605	305789	28574	VV	0.178	1.688
85	18.973	367416	15713	VV	0.390	2.029
86	19.343	106572	12862	VV	0.138	0.588
87	19.446	110659	15500	VV	0.119	0.611
88	19.617	156719	20846	VV	0.125	0.865
89	19.727	293781	26353	VV	0.186	1.622
90	19.994	379055	27240	VV	0.232	2.093
91	20.352	355351	20259	VV	0.292	1.962
92	20.640	218638	18697	VV	0.195	1.207
93	20.773	198329	18863	VV	0.175	1.095
94	21.099	348307	25463	VV	0.228	1.923
95	21.321	286910	24870	VV	0.192	1.584
96	21.477	203444	22227	VV	0.153	1.123
97	21.738	219428	22222	VV	0.165	1.212
98	21.910	413090	28314	VV	0.243	2.281
99	22.202	289024	26318	VV	0.183	1.596
100	22.350	373423	25429	VV	0.245	2.062
101	22.742	658955	61375	VV	0.179	3.639
102	22.955	258651	26397	VV	0.163	1.428
103	23.212	429340	40367	VV	0.177	2.371
104	23.418	371717	29936	VV	0.207	2.053
105	23.623	231916	24704	VV	0.156	1.281
106	23.943	720180	29447	VV	0.408	3.977
107	24.413	338082	26632	VV	0.212	1.867
108	24.587	185126	20900	VV	0.148	1.022
109	24.839	311528	23215	VV	0.224	1.720
110	25.039	274320	23791	VV	0.192	1.515
111	25.351	593795	33928	VV	0.292	3.279

Area Percent Report

Data File Name : W:\DATA\2012\120925\12092527.D
Operator : AD
Instrument : GC 22
Sample Name : 1490-15E5.88 20u 425X
Run Time Bar Code:
Acquired on : 26 Sep 12 01:54 am
Report Created on: 26 Sep 12 02:26 pm

Page Number : 3
Vial Number : Vial 27
Injection Number : 1
Sequence Line : 27
Instrument Method: 80158021.M
Analysis Method : 8015B(M).MTH

Pk	Ret Time	Area	Height	Peak	Width	Response %
112	25.625	583126	50015	VV	0.194	3.220
113	26.040	1113334	62907	VV	0.295	6.148
114	26.519	489735	30607	VV	0.267	2.704
115	26.881	566147	29237	VV	0.323	3.126
116	27.237	101347	18584	VV	0.091	0.560
117	27.245	218383	18669	VV	0.195	1.206
118	27.680	389940	22019	VV	0.295	2.153
119	27.912	237749	20623	VV	0.192	1.313
120	28.129	538123	24414	VV	0.367	2.971
121	28.777	299339	22706	VV	0.220	1.653
122	28.879	298652	24714	VM	0.201	1.649

Total area = 18110243

Appendix A
Philips 66 Crude Capacity Project
Emissions Summary

Emission per Barrel (lb/1000 bbl delivered)

Project Emissions	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Panamax	1.0	2.4	27.8	0.8	0.5	0.4	0.2
Aframax	0.5	1.3	14.6	0.5	0.2	0.2	0.2
Suezmax	0.5	1.2	14.4	0.5	0.2	0.2	0.3

Emission per Barrel (lb/1000 bbl delivered)

Existing	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Panamax	1.0	2.4	27.8	0.8	0.5	0.4	0.2
Aframax	0.7	1.7	19.8	0.8	0.4	0.3	0.4
Suezmax	0.7	1.6	19.0	0.7	0.3	0.3	0.5

Net Emission per Barrel (lb/1000 bbl delivered) - Project Panamax Compared to Existing Vessels

Existing	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Panamax	-	-	-	-	-	-	-

Net Emission per Barrel (lb/1000 bbl delivered) - Project Aframax Compared to Existing Vessels

Existing	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Panamax	(0.5)	(1.2)	(13.2)	(0.3)	(0.2)	(0.2)	0.1
Aframax	(0.2)	(0.5)	(5.2)	(0.3)	(0.1)	(0.1)	(0.1)
Suezmax	(0.1)	(0.4)	(4.3)	(0.2)	(0.1)	(0.1)	(0.2)

Net Emission per Barrel (lb/1000 bbl delivered) - Project Suezmax Compared to Existing Vessels

Existing	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Panamax	(0.5)	(1.2)	(13.4)	(0.3)	(0.2)	(0.2)	0.1
Aframax	(0.2)	(0.5)	(5.4)	(0.3)	(0.1)	(0.1)	(0.1)
Suezmax	(0.2)	(0.4)	(4.5)	(0.2)	(0.1)	(0.1)	(0.2)

Appendix A
Philips 66 Crude Capacity Project
Panamax Parameters

OGV Main Engine Usage per One-Way Transit

Activity	Propulsion Max kW [1]	Speed (Kts) [1]	Load Factor [2]	Distance (nm/trip) [3]	Duration (hr/trip)	Energy Consumed (kW-hr/trip)
California to AQMD Overwater Boundary [4]	11,060	14.8	1.00	110.0	7.43	82,203
Fairway: AQMD Overwater Boundary to 20-Mile [5]	11,060	12.0	0.53	22.9	1.90	11,226
Fairway: 20-Mile to Precautionary Zone [5]	11,060	12.0	0.53	20.0	1.67	9,826
Precautionary Zone [6,7]	11,060	9.0	0.22	8.1	0.90	2,238
Harbor Transit Inbound [8]	11,060	5.0	0.04	3.5	0.70	299
Harbor Transit Outbound [8]	11,060	8.0	0.16	3.5	0.44	764
Turning [8]	11,060	n/a	0.02	n/a	0.25	55
Docking [8]	11,060	n/a	0.02	n/a	0.25	55
Hoteling [9]	11,060	n/a	-	n/a	8.00	-
Anchorage [10]	11,060	n/a	-	n/a	-	-

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table A.3 (Starcrest 2012)

(2) Load factor = (speed/max speed)$^{3.}$ Load factor of 0.02 represents minimum load factor for propulsion engines.

(3) Distances from Starcrest (2010), except for California to AQMD and harbor, which were measured from a map. Assumes northern route.

Average One-Way Transit Distances	nmiles
California to AQMD Boundary	110.0
Fairway 1-way nm	42.9
20nm 1-way Distance within Fairway	20.0
PZ to Breakwater 1-way nm	8.1

(4) Assume no Vessel Speed Reduction (VSR).

(5) Assume VSR to 12 knots.

(6) Portion of transit that occurs from PZ boundary to the breakwater.

(7) Average speeds in the precautionary zone are from POLB Air Emissions Inventory 2011 - Table 2.4 (Starcrest 2012)

(8) In harbor transit times and load factors from POLB Air Emissions Inventory 2005 - pg.67 (Starcrest 2007)

(9) Assumes 320,000 barrels unloaded at 40,000 barrels per hour.

(10) Assumes no anchorage.

OGV Auxiliary Generator Usage per One-Way Transit

Activity	Auxiliary kW per Vessel [1]	Hours/ Transit	kW-Hrs/ Transit
Point Conception to AQMD Overwater Boundary	630	7.43	4,682
Fairway: AQMD Overwater Boundary to 20-Mile	630	1.90	1,200
Fairway: 20-Mile to Precautionary Zone	630	1.67	1,050
Precautionary Zone	630	0.90	567
Harbor Transit Inbound	867	0.70	607
Harbor Transit Outbound	867	0.44	379
Turning	867	0.25	217
Docking	867	0.25	217
Hoteling	683	8.0	5,464
Anchorage	630	-	-

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.12 (Starcrest 2012)

OGV Auxiliary Boiler Usage per One-Way Transit

Activity	Boiler kW per Vessel [1]	Hours/ Transit	kW-Hrs/ Transit
Point Conception to AQMD Overwater Boundary	-	7.43	-
Fairway: AQMD Overwater Boundary to 20-Mile	-	1.90	-
Fairway: 20-Mile to Precautionary Zone	-	1.67	-
Precautionary Zone	-	0.90	-
Harbor Transit Inbound	371	0.70	259.700
Harbor Transit Outbound	371	0.44	162.313
Turning	371	0.25	92.750
Docking	371	0.25	92.750
Hoteling	3,000	8.0	24,000.000
Anchorage	371	-	-

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.16 (Starcrest 2012)

Tugboat Usage during Assists

Engine Type	Tugboat Max Hp [1]	Load Factor [2]	Hours/ Assist [3]	Tugboats per Assist	kW-Hrs/ Assist
Main Engine	5,080	0.31	3.28	2	7,695
Auxiliary Generator	850	0.43	3.28	2	1,786

Notes: (1) Based on 2 engines per vessel. Port of Long Beach Air Emissions Inventory - 2011 - Table 3.1, 3.2 (Starcrest 2012)

(2) Port of Long Beach Air Emissions Inventory - 2011 - Table 3.3 (Starcrest 2012)

(3) Time spent operating per vessel trip. Assumed to be equal to vessel "Harbor" transit times 2 to account for tug movement and assist time.

Appendix A
Philips 66 Crude Capacity Project
Aframax Parameters

OGV Main Engine Usage per One-Way Transit

Activity	Propulsion Max kW [1]	Speed (Kts) [1]	Load Factor [2]	Distance (nm/trip) [3]	Duration (hr/trip)	Energy Consumed (kW-hr/trip)
California to AQMD Overwater Boundary [4]	13,319	15.1	1.00	110.0	7.28	97,026
Fairway: AQMD Overwater Boundary to 20-Mile [5]	13,319	12.0	0.50	22.9	1.90	12,729
Fairway: 20-Mile to Precautionary Zone [5]	13,319	12.0	0.50	20.0	1.67	11,141
Precautionary Zone [6,7]	13,319	9.0	0.21	8.1	0.90	2,538
Harbor Transit Inbound [8]	13,319	5.0	0.04	3.5	0.70	338
Harbor Transit Outbound [8]	13,319	8.0	0.15	3.5	0.44	867
Turning [8]	13,319	n/a	0.02	n/a	0.25	67
Docking [8]	13,319	n/a	0.02	n/a	0.25	67
Hoteling [9]	13,319	n/a	-	n/a	18.00	-
Anchorage [10]	13,319	n/a	-	n/a	168.00	-

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table A.3 (Starcrest 2012)
(2) Load factor = (speed/max speed)$^{3.}$ Load factor of 0.02 represents minimum load factor for propulsion engines.
(3) Distances from Starcrest (2010), except for California to AQMD and harbor, which were measured from a map. Assumes northern route.

Average One-Way Transit Distances	nmiles
California to AQMD Boundary	110.0
Fairway 1-way nm	42.9
20nm 1-way Distance within Fairway	20.0
PZ to Breakwater 1-way nm	8.1

(4) Assume no Vessel Speed Reduction (VSR).
(5) Assume VSR to 12 knots.
(6) Portion of transit that occurs from PZ boundary to the breakwater.
(7) Average speeds in the precautionary zone are from POLB Air Emissions Inventory 2011 - Table 2.4 (Starcrest 2012)
(8) In harbor transit times and load factors from POLB Air Emissions Inventory 2005 - pg.67 (Starcrest 2007)
(9) Assumes 720,000 barrels unloaded at 40,000 barrels per hour.
(10) Assumes 7 days of anchorage.

OGV Auxiliary Generator Usage per One-Way Transit

Activity	Auxiliary kW per Vessel [1]	Hours/ Transit	kW-Hrs/ Transit
Point Conception to AQMD Overwater Boundary	584	7.28	4,254
Fairway: AQMD Overwater Boundary to 20-Mile	584	1.90	1,112
Fairway: 20-Mile to Precautionary Zone	584	1.67	973
Precautionary Zone	584	0.90	526
Harbor Transit Inbound	803	0.70	562
Harbor Transit Outbound	803	0.44	351
Turning	803	0.25	201
Docking	803	0.25	201
Hoteling	632	18.0	11,376
Anchorage	584	168.0	98,112

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.12 (Starcrest 2012)

OGV Auxiliary Boiler Usage per One-Way Transit

Activity	Boiler kW per Vessel [1]	Hours/ Transit	kW-Hrs/ Transit
Point Conception to AQMD Overwater Boundary	-	7.28	-
Fairway: AQMD Overwater Boundary to 20-Mile	-	1.90	-
Fairway: 20-Mile to Precautionary Zone	-	1.67	-
Precautionary Zone	-	0.90	-
Harbor Transit Inbound	371	0.70	259.700
Harbor Transit Outbound	371	0.44	162.313
Turning	371	0.25	92.750
Docking	371	0.25	92.750
Hoteling	3,000	18.0	54,000.000
Anchorage	371	168.0	62,328.000

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.16 (Starcrest 2012)

Tugboat Usage during Assists

Engine Type	Tugboat Max Hp [1]	Load Factor [2]	Hours/ Assist [3]	Tugboats per Assist	kW-Hrs/ Assist
Main Engine	5,080	0.31	3.28	2	7,695
Auxiliary Generator	850	0.43	3.28	2	1,786

Notes: (1) Based on 2 engines per vessel. Port of Long Beach Air Emissions Inventory - 2011 - Table 3.1, 3.2 (Starcrest 2012)
(2) Port of Long Beach Air Emissions Inventory - 2011 - Table 3.3 (Starcrest 2012)
(3) Time spent operating per vessel trip. Assumed to be equal to vessel "Harbor" transit times 2 to account for tug movement and assist time.

Appendix A
Philips 66 Crude Capacity Project
Suezmax Parameters

OGV Main Engine Usage per One-Way Transit

Activity	Propulsion Max kW [1]	Speed (Kts) [1]	Load Factor [2]	Distance (nm/trip) [3]	Duration (hr/trip)	Energy Consumed (kW-hr/trip)
California to AQMD Overwater Boundary [4]	18,587	15.3	1.00	110.0	7.19	133,632
Fairway: AQMD Overwater Boundary to 20-Mile [5]	18,587	12.0	0.48	22.9	1.90	17,076
Fairway: 20-Mile to Precautionary Zone [5]	18,587	12.0	0.48	20.0	1.67	14,946
Precautionary Zone [6,7]	18,587	9.0	0.20	8.1	0.90	3,405
Harbor Transit Inbound [8]	18,587	5.0	0.03	3.5	0.70	454
Harbor Transit Outbound [8]	18,587	8.0	0.14	3.5	0.44	1,162
Turning [8]	18,587	n/a	0.02	n/a	0.25	93
Docking [8]	18,587	n/a	0.02	n/a	0.25	93
Hoteling [9]	18,587	n/a	-	n/a	25.00	-
Anchorage [10]	18,587	n/a	-	n/a	168.00	-

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table A.3 (Starcrest 2012)
(2) Load factor = (speed/max speed)$^{3.}$ Load factor of 0.02 represents minimum load factor for propulsion engines.
(3) Distances from Starcrest (2010), except for California to AQMD and harbor, which were measured from a map. Assumes northern route.

Average One-Way Transit Distances	nmiles
California to AQMD Boundary	110.0
Fairway 1-way nm	42.9
20nm 1-way Distance within Fairway	20.0
PZ to Breakwater 1-way nm	8.1

(4) Assume no Vessel Speed Reduction (VSR).
(5) Assume VSR to 12 knots.
(6) Portion of transit that occurs from PZ boundary to the breakwater.
(7) Average speeds in the precautionary zone are from POLB Air Emissions Inventory 2011 - Table 2.4 (Starcrest 2012)
(8) In harbor transit times and load factors from POLB Air Emissions Inventory 2005 - pg.67 (Starcrest 2007)
(9) Assumes 1,000,000 barrels unloaded at 40,000 barrels per hour.
(10) Assumes 7 days of anchorage.

OGV Auxiliary Generator Usage per One-Way Transit

Activity	Auxiliary kW per Vessel [1]	Hours/ Transit	kW-Hrs/ Transit
Point Conception to AQMD Overwater Boundary	718	7.19	5,162
Fairway: AQMD Overwater Boundary to 20-Mile	718	1.90	1,367
Fairway: 20-Mile to Precautionary Zone	718	1.67	1,197
Precautionary Zone	718	0.90	646
Harbor Transit Inbound	988	0.70	692
Harbor Transit Outbound	988	0.44	432
Turning	988	0.25	247
Docking	988	0.25	247
Hoteling	778	25.0	19,450
Anchorage	718	168.0	120,624

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.12 (Starcrest 2012)

OGV Auxiliary Boiler Usage per One-Way Transit

Activity	Boiler kW per Vessel [1]	Hours/ Transit	kW-Hrs/ Transit
Point Conception to AQMD Overwater Boundary	-	7.19	-
Fairway: AQMD Overwater Boundary to 20-Mile	-	1.90	-
Fairway: 20-Mile to Precautionary Zone	-	1.67	-
Precautionary Zone	-	0.90	-
Harbor Transit Inbound	371	0.70	259.700
Harbor Transit Outbound	371	0.44	162.313
Turning	371	0.25	92.750
Docking	371	0.25	92.750
Hoteling	3,000	25.0	75,000.000
Anchorage	371	168.0	62,328.000

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.16 (Starcrest 2012)

Tugboat Usage during Assists

Engine Type	Tugboat Max Hp [1]	Load Factor [2]	Hours/ Assist [3]	Tugboats per Assist	kW-Hrs/ Assist
Main Engine	5,080	0.31	3.28	2	7,695
Auxiliary Generator	850	0.43	3.28	2	1,786

Notes: (1) Based on 2 engines per vessel. Port of Long Beach Air Emissions Inventory - 2011 - Table 3.1, 3.2 (Starcrest 2012)
(2) Port of Long Beach Air Emissions Inventory - 2011 - Table 3.3 (Starcrest 2012)
(3) Time spent operating per vessel trip. Assumed to be equal to vessel "Harbor" transit times 2 to account for tug movement and assist time.

Appendix A
Philips 66 Crude Capacity Project
Ocean Going Vessel Emission Factors

Emission Factors for OGV

Engine Type	Assumed Fuel Type	Assumed Fuel Use Application	VOC	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	Source
Main Propulsion Engine (g/kW-hr)												
OGV Main Engines	MGO (0.1% S)	All (current in-use fuel)	0.60	1.40	17.01	0.42	0.26	0.20	620	0.0120	0.02914	(1,2)
Tugboat Main Engines	CARB (500 ppm S)	2006	0.68	1.97	7.31	0.18	0.36	0.29	683	0.0040	0.03100	(3)
(Medium Speed Diesel)	CARB (15 ppm S)	2007+	0.49	1.97	6.93	0.01	0.31	0.25	683	0.0029	0.02939	(3,4)
Auxiliary Engine (g/kW-hr)												
OGV Auxiliary Engines	MGO (0.1% S)	All (current in-use fuel)	0.40	1.10	13.82	0.49	0.26	0.20	683	0.0080	0.02914	(2,5)
Tugboat Auxiliary Engines	CARB (500 ppm S)	2006	0.81	3.73	5.10	0.18	0.15	0.12	722	0.0100	0.03100	(3)
(High Speed Diesel)	CARB (15 ppm S)	2007+	0.58	3.73	4.74	0.01	0.11	0.09	722	0.0072	0.02939	(3,4)
Auxiliary Boiler (g/kW-hr)												
OGV Auxiliary Boilers	MGO (0.1% S)	All (current in-use fuel)	0.10	0.20	1.97	0.66	0.14	0.10	970	0.002	0.0752	(2,6)

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.5, 2.6. (Starcrest 2012)

(2) Fuel emission factors were adjusted in accordance with lower sulfur fuels. Port of Long Beach Air Emissions Inventory - 2011 - Table 2.17. (Starcrest 2012)

(3) Emission Estimation Methodology for Commericial Harbor Craft Operating in California. (CARB 2007)

(4) Port of Long Beach Air Emissions Inventory - 2011 - Table 3.6. (Starcrest 2012)

(5) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.10, 2.11. (Starcrest 2012)

(6) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.14, 2.15.. (Starcrest 2012)

Load Emission Factor Adjustments for OGV Main Propulsion Engines

Activity	Load Factor	VOC	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Point Conception to AQMD Overwater Boundary	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fairway: AQMD Overwater Boundary to 20-Mile	0.48	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fairway: 20-Mile to Precautionary Zone	0.48	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Precautionary Zone	0.20	0.98	0.98	1.00	1.00	0.99	0.99	1.00	0.98	1.00
Harbor Transit Inbound	0.03	9.38	5.57	2.51	1.00	3.61	3.61	1.00	9.38	2.51
Harbor Transit Outbound	0.14	1.43	1.39	1.08	1.00	1.13	1.13	1.00	1.43	1.08
Turning	0.02	21.18	9.70	4.63	1.00	7.29	7.29	1.00	21.18	4.63
Docking	0.02	21.18	9.70	4.63	1.00	7.29	7.29	1.00	21.18	4.63
Hoteling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anchorage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.7. (Starcrest 2012)

Low-Load Emission Factor Regression Factors for OGV Main Propulsion Engines

Variable	VOC	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Exponent	1.5	1	1.5	0	1.5	1.5	0	1.5	1.5
Intercept	0.3859	0.1458	10.4496	0	0.2551	0.2551	0	0.3859	10.4496
Coefficient	0.0667	0.8378	0.1255	1	0.0059	0.0059	1	0.0667	0.1255
Ref. EF @ 20% Load	1.132	4.335	11.853	1	0.321	0.321	1	1.132	11.853

Appendix A
Philips 66 Crude Capacity Project
Panamax Emissions

Total Emissions per Delivery (lb/visit) - Project

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Ships - Point Conception to AQMD x 2	225.7	530.1	6,451.9	162.4	97.7	78.2	109.9
Ships - AQMD to 20 mile x 2	31.8	75.1	915.2	23.4	14.0	11.2	15.8
Ships - 20 mile to PZ x 2	27.8	65.7	801.1	20.5	12.2	9.8	13.8
Ships - PZ x 2	6.8	16.3	201.9	5.4	3.1	2.5	3.6
Ships - Harbor Transit Inbound	4.3	6.7	47.7	1.3	1.0	0.8	0.9
Ships - Harbor Transit Outbound	1.8	4.3	43.1	1.4	0.7	0.6	0.9
Ships - Turning	1.8	2.2	16.6	0.4	0.4	0.3	0.3
Ships - Docking	1.8	2.2	16.6	0.4	0.4	0.3	0.3
Ships - Hoteling	10.1	23.8	270.9	40.8	10.3	7.9	27.6
Tugboats	10.6	48.1	136.2	0.1	5.6	4.5	6.6
Total	**322.55**	**774.69**	**8,901.33**	**256.10**	**145.45**	**115.99**	**179.74**

Total Emissions per Delivery (lb/visit) - Existing

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Ships - Point Conception to AQMD x 2	225.7	530.1	6,451.9	162.4	97.7	78.2	109.9
Ships - AQMD to 20 mile x 2	31.8	75.1	915.2	23.4	14.0	11.2	15.8
Ships - 20 mile to PZ x 2	27.8	65.7	801.1	20.5	12.2	9.8	13.8
Ships - PZ x 4	6.8	16.3	201.9	5.4	3.1	2.5	3.6
Ships - Harbor Transit Inbound x 2	4.3	6.7	47.7	1.3	1.0	0.8	0.9
Ships - Harbor Transit Outbound x 2	1.8	4.3	43.1	1.4	0.7	0.6	0.9
Ships - Turning x 2	1.8	2.2	16.6	0.4	0.4	0.3	0.3
Ships - Docking x 2	1.8	2.2	16.6	0.4	0.4	0.3	0.3
Ships - Hoteling	10.1	23.8	270.9	40.8	10.3	7.9	27.6
Ships - Anchorage	-	-	-	-	-	-	-
Tugboats x 2	10.6	48.1	136.2	0.1	5.6	4.5	6.6
Total	**322.55**	**774.69**	**8,901.33**	**256.10**	**145.45**	**115.99**	**179.74**

Emission per Barrel (lb/1000 bbl delivered)

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Project	1.0	2.4	27.8	0.8	0.5	0.4	0.2
Existing	1.0	2.4	27.8	0.8	0.5	0.4	0.2
Delta	-	-	-	-	-	-	-

Appendix A
Philips 66 Crude Capacity Project
Aframax Emissions

Total Emissions per Delivery (lb/visit) - Project

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Ships - Point Conception to AQMD x 2	264.2	619.6	7,537.8	188.9	113.9	91.1	128.0
Ships - AQMD to 20 mile x 2	35.6	84.0	1,022.6	26.0	15.6	12.4	17.6
Ships - 20 mile to PZ x 2	31.2	73.5	895.1	22.7	13.6	10.9	15.4
Ships - PZ x 2	7.5	18.0	221.8	5.8	3.4	2.7	3.9
Ships - Harbor Transit Inbound	4.8	7.3	50.1	1.3	1.1	0.9	0.9
Ships - Harbor Transit Outbound	2.0	4.6	46.4	1.4	0.8	0.6	1.0
Ships - Turning	2.1	2.5	18.1	0.4	0.4	0.3	0.3
Ships - Docking	2.1	2.5	18.1	0.4	0.4	0.3	0.3
Ships - Hoteling	21.9	51.4	581.5	90.9	22.6	17.3	61.5
Tugboats	10.6	48.1	136.2	0.1	5.6	4.5	6.6
Total	**381.94**	**911.44**	**10,527.84**	**338.05**	**177.41**	**141.11**	**235.37**

Total Emissions per Delivery (lb/visit) - Existing

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Ships - Point Conception to AQMD x 2	264.2	619.6	7,537.8	188.9	113.9	91.1	128.0
Ships - AQMD to 20 mile x 2	35.6	84.0	1,022.6	26.0	15.6	12.4	17.6
Ships - 20 mile to PZ x 2	31.2	73.5	895.1	22.7	13.6	10.9	15.4
Ships - PZ x 4	15.1	35.9	443.7	11.7	6.9	5.5	7.8
Ships - Harbor Transit Inbound x 2	9.5	14.6	100.1	2.6	2.2	1.7	1.7
Ships - Harbor Transit Outbound x 2	4.0	9.3	92.9	2.8	1.6	1.3	1.9
Ships - Turning x 2	4.1	5.0	36.1	0.8	0.8	0.7	0.6
Ships - Docking x 2	4.1	5.0	36.1	0.8	0.8	0.7	0.6
Ships - Hoteling	21.9	51.4	581.5	90.9	22.6	17.3	61.5
Ships - Anchorage	100.3	265.4	3,260.0	197.1	73.8	58.1	129.8
Tugboats x 2	21.2	96.2	272.5	0.2	11.3	9.0	13.3
Total	**511.20**	**1,259.88**	**14,278.58**	**544.66**	**263.02**	**208.65**	**378.11**

Emission per Barrel (lb/1000 bbl delivered)

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Project	0.5	1.3	14.6	0.5	0.2	0.2	0.2
Existing	0.7	1.7	19.8	0.8	0.4	0.3	0.4
Delta	(0.2)	(0.5)	(5.2)	(0.3)	(0.1)	(0.1)	(0.1)

Appendix A
Philips 66 Crude Capacity Project
Suezmax Emissions

Total Emissions per Delivery (lb/visit) - Project

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Ships - Point Conception to AQMD x 2	362.6	849.9	10,339.3	258.7	156.1	124.8	175.3
Ships - AQMD to 20 mile x 2	47.6	112.0	1,364.3	34.6	20.7	16.6	23.4
Ships - 20 mile to PZ x 2	41.7	98.1	1,194.1	30.3	18.1	14.5	20.5
Ships - PZ x 2	10.0	23.8	294.0	7.7	4.5	3.6	5.2
Ships - Harbor Transit Inbound	6.3	9.6	64.9	1.5	1.4	1.1	1.0
Ships - Harbor Transit Outbound	2.6	6.1	60.9	1.8	1.0	0.8	1.2
Ships - Turning	2.8	3.4	24.1	0.5	0.5	0.4	0.3
Ships - Docking	2.8	3.4	24.1	0.5	0.5	0.4	0.3
Ships - Hoteling	33.7	80.2	918.9	130.2	33.4	25.6	88.0
Tugboats	10.6	48.1	136.2	0.1	5.6	4.5	6.6
Total	**520.75**	**1,234.70**	**14,420.66**	**465.88**	**242.04**	**192.50**	**321.83**

Total Emissions per Delivery (lb/visit) - Existing

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Ships - Point Conception to AQMD x 2	362.6	849.9	10,339.3	258.7	156.1	124.8	175.3
Ships - AQMD to 20 mile x 2	47.6	112.0	1,364.3	34.6	20.7	16.6	23.4
Ships - 20 mile to PZ x 2	41.7	98.1	1,194.1	30.3	18.1	14.5	20.5
Ships - PZ x 4	20.0	47.6	588.0	15.4	9.1	7.3	10.4
Ships - Harbor Transit Inbound x 2	12.6	19.2	129.7	3.1	2.8	2.2	2.1
Ships - Harbor Transit Outbound x 2	5.2	12.2	121.7	3.6	2.1	1.6	2.4
Ships - Turning x 2	5.7	6.8	48.1	1.0	1.1	0.9	0.7
Ships - Docking x 2	5.7	6.8	48.1	1.0	1.1	0.9	0.7
Ships - Hoteling	33.7	80.2	918.9	130.2	33.4	25.6	88.0
Ships - Anchorage	120.1	320.0	3,945.8	221.5	86.5	68.3	145.4
Tugboats x 2	21.2	96.2	272.5	0.2	11.3	9.0	13.3
Total	**676.06**	**1,649.14**	**18,970.54**	**699.54**	**342.22**	**271.70**	**481.92**

Emission per Barrel (lb/1000 bbl delivered)

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Project	0.5	1.2	14.4	0.5	0.2	0.2	0.3
Existing	0.7	1.6	19.0	0.7	0.3	0.3	0.5
Delta	(0.2)	(0.4)	(4.5)	(0.2)	(0.1)	(0.1)	(0.2)

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APPENDIX B

HEALTH RISK ASSESSMENT

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Phillips 66 Los Angeles Refinery
Carson Plant
CEQA Health Risk Analysis
Crude Oil Storage Capacity Project

August 1, 2013

Prepared for: Phillips 66
Prepared by: Environmental Audit, Inc.
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Phillips 66 – Carson Plant
SCAQMD Rule 1401 Analysis
Crude Oil Storage Capacity Project

FACILITY INFORMATION

The Phillips 66 Los Angeles Refinery – Carson Plant (LARC) is located at 1520 East Sepulveda in the City of Carson in the southern portion of Los Angeles County (see Figure 1). The South Coast Air Quality Management District (SCAQMD) identification number for the facility is 171109. Land use at the LARC is designated by the City of Carson as heavy industrial zoning. The LARC is bounded on the north by Sepulveda Boulevard, on the west by Wilmington Avenue, on the south by a branch of the Burlington Northern and Santa Fe Railroad, and on the east by the Alameda rail corridor and Alameda Boulevard. Property to the north of the LARC is occupied by the Tesoro Los Angeles Refinery-Carson Operations (formerly BP Los Angeles Refinery). The western boundary of the LARC property borders the Container Transportation Services shipping and container storage facility. Property across Wilmington Avenue includes a residential neighborhood to the northwest and commercial uses to the southwest. Land uses to the south of the LARC are used as heavy industrial. Land to the south of Lomita Avenue is dominated by port-related activities. Land to the east of Alameda Street is occupied by the Kinder Morgan storage tank farm and the Tesoro Los Angeles Refinery – Wilmington Operations (formerly Shell/Equilon/Texaco Refinery).

INTRODUCTION

The LARC operates bulk crude oil supply storage facilities to handle incoming crude oil supplies from domestic, i.e., primarily via onshore pipelines, and various vessel-delivered sources from the Port of Long Beach at Berth 121.

LARC currently has four existing 320,000 barrel[1] (bbl) (nominal capacity[2]) receiving tanks for crude oil. Crude oils from up to three different sources are segregated using the four existing 320,000 bbl tanks, which limits vessel delivery volumes to Panamax vessels (400,000 bbl capacity). For larger vessels, such as Aframax (720,000 bbl capacity) or Suezmax (1,000,000 bbl capacity), LARC requires two ship calls to unload the full volume of the vessels, resulting in seven to 10 days when the ship remains in the port area. When a ship larger than Panamax calls, LARC accepts delivery of the first portion of the crude oil into the existing tanks then processes the crude oil through LARC to make room in the receiving tanks to accommodate the second discharge from the larger vessel. In order to avoid the extra time and related vessel hoteling emissions, LARC needs more crude oil tankage and capacity to accommodate the larger vessels so they can discharge all crude oil in one call.

Phillips 66 is proposing to increase crude oil storage capacity at the LARC by installing one new 615,000 bbl crude oil tank[3] (Tank 2640) and associated support facilities at the LARC. In addition, the throughput of two existing 320,000 bbl nominal capacity storage tanks (Tanks 510 and 511)

[1] One barrel equals 42 gallons.
[2] Nominal capacity is the physical maximum capacity of the storage tank. Working capacity is less than the physical capacity.
[3] The new crude oil tank would have a nominal (maximum) capacity of 614,656 barrels and a working capacity of 500,141 barrels. Herein the new crude oil storage tank will be referred to as 615,000 barrel capacity storage tanks.

would be increased, therefore the proposed project also includes the construction of geodesic domes on existing crude oil Tanks 510 and 511. The proposed project also includes the construction of one 14,000 bbl water draw surge tank (Tank 2643). In addition, to provide power to the western portion of the LARC, one new electrical substation will be installed. The proposed project would comply with the South Coast Air Quality Management District's (SCAQMD) best available control technology (BACT), as applicable, for control of volatile organic compounds (VOCs) emissions from refinery storage tanks. No changes to refinery processes are included in the proposed project, therefore, the crude throughput rate of the LARC would not change as a result of implementing the proposed project. The addition of crude oil storage capacity streamlines the movement of ships delivering crude oil to the LARC without changing the overall volume of crude oil delivered to the LARC. Therefore, the proposed project would not increase the crude oil throughput of the Refinery, only the crude oil storage capacity.

As part of the CEQA process, Environmental Audit Inc. (EAI) has performed a health risk analysis for the proposed project. EAI has calculated emissions to evaluate the maximum potential impacts of toxic air contaminants (TACs) associated with the proposed project.

Based on information provided by Phillips 66, the proposed project has been modeled as six area sources (four tanks and two fugitive areas) (See Figure 2). TACs in the emissions from the proposed project are regulated by SCAQMD Rule 1401 – New Source Review for Toxic Air Contaminants. The health risks were evaluated using the SCAQMD *Risk Assessment Procedures for Rules 1401 and 212 Version 7.0* (July 2005). The analysis for cancer and non-cancer risks is presented below. The sources are expected to emit nine chemicals listed in Appendix I of the SCAQMD Rule 1401 Guidelines – four are considered carcinogens, eight are considered to have adverse chronic health effects, and four are considered to have adverse acute health effects (See Attachement A).

EMISSION ESTIMATES

The emissions estimates of TACs for tanks are calculated using the U.S. EPA TANKS 4.0.9d emissions model. Fugitive emissions are based on the Method 2 of the *SCAQMD Guide for Fugitive Emissions Calculations* (SCAQMD, 2003). All emissions are based on a hybrid crude oil speciation, including Tank 2643, which is primarily water. Emissions from Tank 2643 are treated as the same crude oil found in the other tanks instead of a diluted crude oil to present a conservative emission estimate. The emission rates for the health risk model are based on annualized emissions. The calculated emissions and hybrid speciation are presented in Attachement B.

HEALTH RISK ASSESSMENT

The California Air Resources Board (CARB) Hotspots Analysis Reporting Program (HARP) model is the most appropriate model for determining the air quality impact from proposed project. The HARP model (CARB, 2005) combines the US EPA Industrial Source Complex dispersion model with a risk calculation model based on the Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA, 2003). The dispersion portion of the HARP model provides estimates of source-specific annual and hourly maximum ambient groundlevel concentrations. The risk

calculator in the HARP model estimates the cancer risk, chronic index, and acute index values. The model default values were modified to conform to the SCAQMD Supplement Guidelines for Preparing Risk Assessment for the Air Toxics "Hot Spots" Information and Assessment Act (AB2588) (SCAQMD, 2005).

The project is modeled as six area sources. The source parameters are listed in Table 1. The locations of the sources were identified based on data provided by Phillips 66 and the Long Beach and Torrance United Stated Geological Survey Quadrangles (see attached Figure 2).

The receptors used in the model include a fenceline receptor grid and a fine receptor grid. The terrain surrounding the LARC is relatively flat; however, terrain variations were included for the receptor networks. The fenceline receptor grid (maximal spacing every 50 meters(m)) were used to determine the maximum concentrations at the property line of the LARC. A fine receptor grid (100 m x 100 m spacing) was used to identify the maximum impact locations. Figure 3 shows all modeled receptors.

All maximum impact locations are verified as credible locations for receptors (i.e., streets, railroad tracks, and waterways are not considered valid receptor locations). The locations of the maximum impacts are then verified for the type of receptor and are reported below. Selected tables from the HARP model are included in Attachment C. The complete output results from the HARP model are on file at the SCAQMD.

TABLE 1

Source Parameters

Name	UTME	UTMN	Release Height (ft)	Width (ft)	Length (ft)
Tank 510	384270	3741030	50	218	218
Tank 511	384170	3741030	50	218	218
Tank 2640	384424	3740995	65	260	260
Tank 2640 Fugitives	384424	3740995	6	260	260
Tank 2643	384405	3741085	51.5	40	44
Tank 2643 Fugitives	384405	3741085	6	40	44

CANCER RISK ANALYSIS

The maximum cancer risk from the proposed project for an exposed individual resident (MEIR) is located 650 meters south of the LARC boundary. The incremental cancer risk is 1.27×10^{-7} or 0.1 cancer cases per one million at the MEIR. Benzene contributes approximately 90.4 percent of the calculated cancer risk at the MEIR. The inhalation pathway accounts for 99.2 percent of the cancer risk. The cancer risk at the MEIR is less than the significance threshold of one cancer case per one

million, therefore, the cancer risk at the MEIR is less than significant. Detailed cancer risk contributions by pathway and pollutants are presented in Attachment C.

The maximum exposed incremental cancer risk at an occupational exposure (MEIW) is located approximately 50 meters west of the LARC boundary. The incremental cancer risk is 1.33×10^{-7} or 0.1cancer cases per one million at the MEIW. Benzene contributes approximately 85.7 percent of the calculated cancer risk at the MEIW. The inhalation pathway accounts for 98.5 percent of the cancer risk. The cancer risk at the MEIW is less than the significance threshold of one cancer case per one million, therefore, the cancer risk at the MEIW is less than significant. Detailed cancer risk contributions by pathway and pollutants are presented in Attachment C.

NON-CANCER RISK ANALYSIS

The maximum chronic hazard index (MCHI) total for the proposed project for the central nervous system is 0.0005. The MCHI is located at the same receptor as the MEIW. Benzene contributes approximately 72.4 percent of the calculated MCHI. The MCHI is less than the significance threshold of 1.0, therefore, the MCHI is less than significant for the proposed project. Detailed contribution by pollutant to the chronic hazard index for the maximum receptor location is presented in Attachment C.

The maximum acute hazard index (MAHI) total for the developmental and reproductive systems is 0.0015. The MAHI is located on the western boundary of the Refinery. Benzene contributes approximately 98.0 percent of the calculated MAHI. The MAHI is less than the significance threshold of 1.0, therefore, the MAHI is less than significant for the proposed project. Detailed contribution by pollutant to the acute hazard index for the maximum receptor location is presented in Attachment C.

CONCLUSIONS

The cancer risk for the TACs emitted from the proposed project is below the significance threshold of 10 cancer cases per one million and chronic and acute hazard indices are below the 1.0 threshold established under CEQA. Therefore, the cancer risk and hazard index thresholds are not expected to be exceeded at any receptor location. No further health risk analyses are required.

Phillips 66 – Carson Plant
SCAQMD Rule 1401 Analysis
Crude Oil Storage Capacity Project

REFERENCES

CARB/OEHHA, 2003. *Air Resources Board Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk,* October 2003.

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SCAQMD, 2008. *Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory,* June 2008.

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SCAQMD, 2003. *Guide for Fugitive Emissions Calculations. 2003.*

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FIGURES

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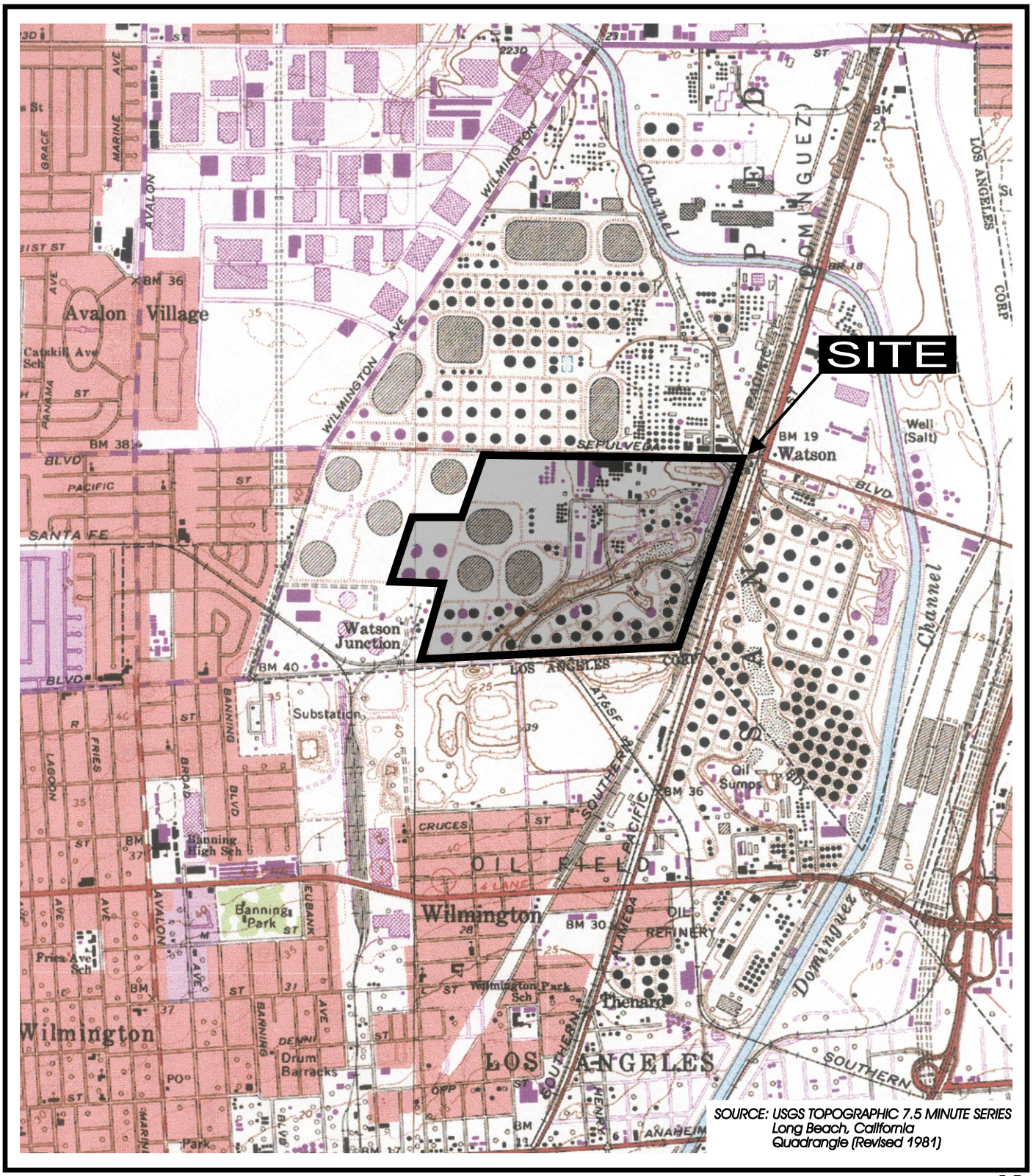

Environmental Audit, Inc.

SITE LOCATION MAP
Phillips 66 Los Angeles Refinery
Carson Plant

Project No. 2778

Figure 1

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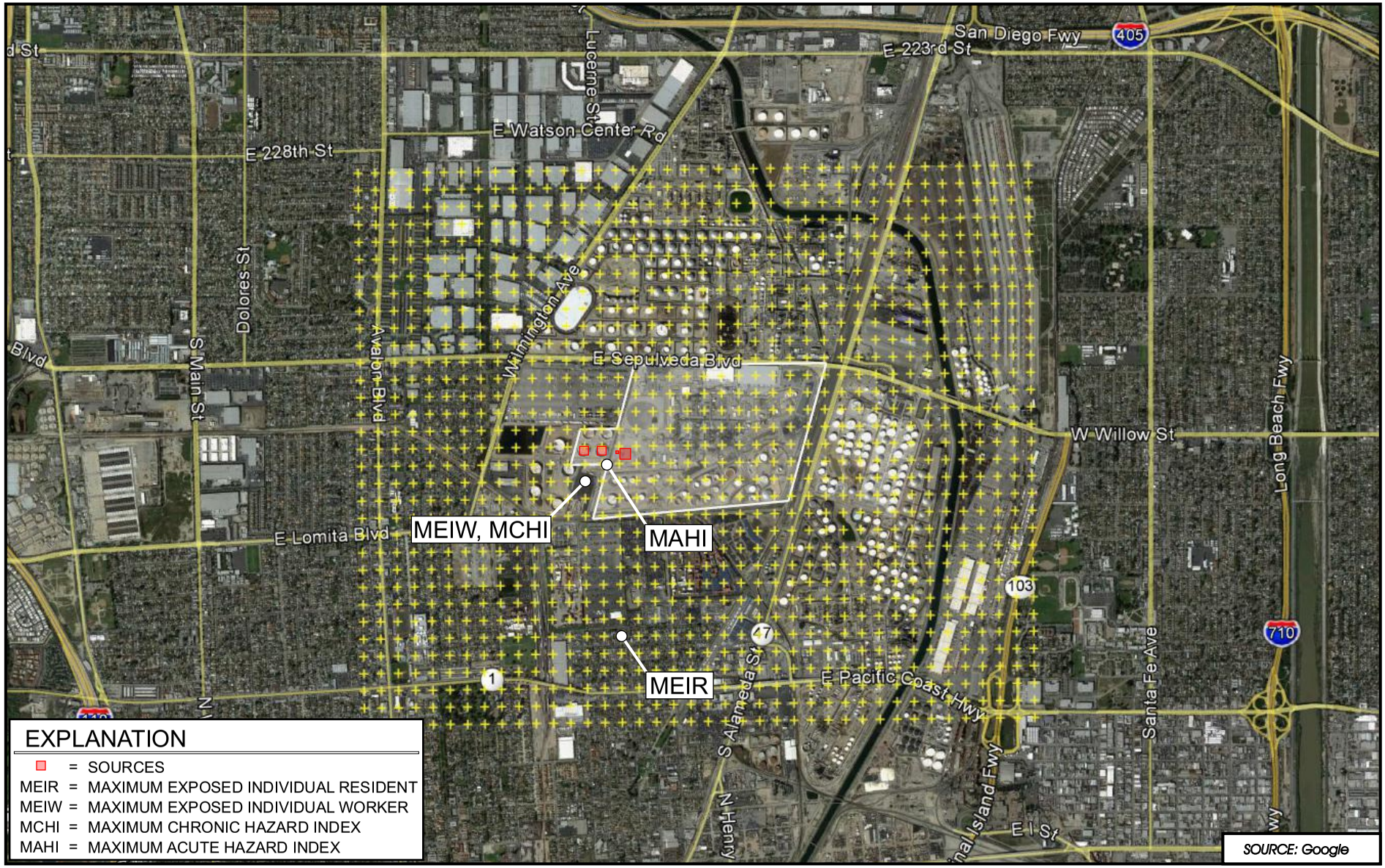

ENVIRONMENTAL AUDIT, INC.

MAXIMUM IMPACT LOCATIONS
Phillips 66 Los Angeles Refinery
Carson Plant

Project No. 2778

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Figure 2

ORIGINAL IN COLOR

Attachment A
Health Risk Tables

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Attachment A

Health Data

Phillips 66 Carson Plant
Crude Oil Storage Capacity Project

CHEMICAL	CAS NO.	CancerPF (Inhalation) $(mg/kg\text{-}d)^{-1}$	CancerPF (Oral) $(mg/kg\text{-}d)^{-1}$	ChronicREL (Inhalation) $(\mu g/m^3)$	ChronicREL (Oral) (mg/kg-d)	AcuteREL (Inhalation) $(\mu g/m^3)$
Benzene	71432	0.1	*	60	*	1300
Chrysene	218019	3.90E-02	1.20E-01	*	*	*
Cresols	1319773	*	*	600	*	*
Ethyl Benzene	100414	8.70E-03	*	2000	*	*
Hexane	110543	*	*	7000	*	*
Naphthalene	91203	0.12	*	9	*	*
Phenol	108952	*	*	200	*	5800
Toluene	108883	*	*	300	*	37000
Xylenes	1330207	*	*	700	*	22000

PF = Potency Factor

REL = Reference Exposure Limit

Source: SCAQMD, Risk Assessment Proceedures for Rules 1401 and 212, Attachment L, Tables for Applications Deemed Complete on or after July 1, 2005.

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Attachment B
Emission Calculations

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Attachment B
Emissions Calculations

Phillips 66 Carson Plant
Crude Oil Capacity Project

: Component Count

Process Unit: **Philips 66 Carson Plant New Crude Tank 2640**

Source Unit		Service	No. Of Existing Components (1)	No. of Existing Components to be Removed (2)	No. of New Components to be Installed (3)	Correlation Equation (CE) Factor (500 ppm) Correlation Equation Factor 500 ppm Screening Value (lbs/year)	Pre Mod Emissions Based on Correlation 500 ppm Screening Value (lbs/year)	Post Modification Emissions based on 500 ppm Correlation Equation Factor (lbs/year)
Valves	Sealed Bellows	All	0	0	190	0.00	0	-
	SCAQMD Approved I&M Program	Gas / Vapor	0	0	14	4.55	0	63.64
		Light Liquid (4)	0	0	83	4.55	0	377.30
		Heavy Liquid (5)	0	0		4.55	0	-
		> 8 inches	0	0			0	-
Pumps	Sealless Type	Light Liquid (4)	0	0	5	0.00	0	-
	Double Mechanical Seals or Equivalent Seals	Light Liquid (4)	0	0	0	46.83	-	-
	Single Mechanical Seals	Heavy Liquid (5)	0	0	2	46.83	0	93.65
Compressors		Gas / Vapor	0	0		9.09	-	-
Flanges (ANSI 16.5-1988)		All	0	0	258	6.99	-	1,803.47
Connectors		All	0	0	134	2.86	-	383.43
Pressure Relief Valves		All	0	0	6	9.09	0	54.54
Process Drains with P-Trap or Seal Pot		All	0	0	0	9.09	-	-
Other (including fittings, hatches, sight-glasses, and meters)		All	0	0	7	9.09	-	63.63
Total Emissions		lb/year					-	2,840
		lbs/day					0	7.78

-1 Any component currently installed prior to the modification.

-2 Any component to be removed due to modification.

-3 Any new component proposed to be installed due to the modification; this also includes new components to be installed to replace existing components.

-4 Light liquid and gas/liquid streams: Liquid or gas/liquid stream 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 present at 20% by volume. - used single mechanical seal EF

-5 Heavy Liquid: streams with a vapor pressure equal to or less than that of kerosene (< 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at 20% by volume.

-6 Emission Factors were developed using actual emissions for 10 quarters from Q3, 2005 through Q4, 2007 for Cleans Fuel Area and using a factor of 2 to the actual emissions.

Attachment B
Emissions Calculations

Phillips 66 Carson Plant
Crude Oil Capacity Project

ɜ Component Count

Process Unit: **Philips 66 Carson Plant New Crude Tank 2643**

Source Unit		Service	No. Of Existing Components (1)	No. of Existing Components to be Removed (2)	No. of New Components to be Installed (3)	Correlation Equation (CE) Factor (500 ppm) Correlation Equation Factor 500 ppm Screening Value (lbs/year)	Pre Mod Emissions Based on Correlation 500 ppm Screening Value (lbs/year)	Post Modification Emissions based on 500 ppm Correlation Equation Factor (lbs/year)
Valves	Sealed Bellows	All	0	0	61	0.00	0	-
	SCAQMD	Gas / Vapor	0	0	0	4.55	0	-
	Approved	Light Liquid (4)	0	0	16	4.55	0	72.73
	I&M Program	Heavy Liquid (5)	0	0	0	4.55	0	-
		> 8 inches	0	0	0		0	-
Pumps	Sealless Type	Light Liquid (4)	0	0	0	0.00	0	-
	Double Mechanical Seals or Equivalent Seals	Light Liquid (4)	0	0	0	46.83	-	-
	Single Mechanical Seals	Heavy Liquid (5)	0	0	0	46.83	0	-
Compressors		Gas / Vapor	0	0	0	9.09	-	-
Flanges (ANSI 16.5-1988)		All	0	0	79	6.99	-	552.22
Connectors		All	0	0	20	2.86	-	57.23
Pressure Relief Valves		All	0	0	0	9.09	0	-
Process Drains with P-Trap or Seal Pot		All	0	0	0	9.09	-	-
Other (including fittings, hatches, sight-glasses, and meters)		All	0	0	1	9.09	-	9.09
Total Emissions		lb/year					-	691
		lbs/day					0	1.89

-1 Any component currently installed prior to the modification.

-2 Any component to be removed due to modification.

-3 Any new component proposed to be installed due to the modification; this also includes new components to be installed to replace existing components.

-4 Light liquid and gas/liquid streams: Liquid or gas/liquid stream 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 present at 20% by volume. - used single mechanical seal EF

-5 Heavy Liquid: streams with a vapor pressure equal to or less than that of kerosene (< 0.1 psia @ 100°F or 689 Pa @ 38°C), based on the most volatile class present at 20% by volume.

-6 Emission Factors were developed using actual emissions for 10 quarters from Q3, 2005 through Q4, 2007 for Cleans Fuel Area and using a factor of 2 to the actual emissions.

Attachment B
Emissions Calculations

Philips 66 Carson Plant
Crude Speciation

Exisitng Crude Speciation

Chemical	Crude Liquid Wt%	Crude Vapor Wt%
Benzene	0.14	2.83
PACs (Chrysene)	0.00	0.00
Cresol (mixed isomers)	0.00	0.00
Ethylbenzene	0.15	0.13
n-Hexane	0.89	38.55
Naphthalene	0.09	0.00
Phenol	0.00	0.00
Toluene	0.58	1.01
Xylene (mixed isomers)	0.94	0.19
Cumene	0.00	0.00
Cyclohexane	0.74	19.14
1,2,4-Trimethylbenzene	0.28	0.01

Canadian Crude Speciation

Component	wt% liquid	ppm liquid	Molecular Weight	Vapor Pressure (mm Hg)	Vapor Pressure (psi)	wt fraction vapor	wt % vapor
Benzene	0.12	1200.00	78.11	95.2	1.8408824	2.02E-04	0.0202
Ethylbenzene	0.041	410.00	106.17	9.53	0.1842816	6.90E-06	0.0007
Hexane	0.96	9600.00	86.18	150	2.90055	2.54E-03	0.2542
Toluene	0.23	2300.00	92.4	28.4	0.5491708	1.15E-04	0.0115
Xylene	0.207	2070.00	106.16	6.72	0.1299446	2.46E-05	0.0025

Hybrid Speciation

Chemical	Crude Liquid Wt%	Crude Vapor Wt%
Benzene	0.14	2.83
PACs (Chrysene)	0.00	0.00
Cresol (mixed isomers)	0.00	0.00
Ethylbenzene	0.15	0.13
n-Hexane	0.96	38.55
Naphthalene	0.09	0.00
Phenol	0.00	0.00
Toluene	0.58	1.01
Xylene (mixed isomers)	0.94	0.19
Cumene	0.00	0.00
Cyclohexane	0.74	19.14
1,2,4-Trimethylbenzene	0.28	0.01

Attachment B
Emissions Calculations

Philips 66 Carson Plant
Fugitive Component Emissions

		Tank 2640			Tank 2643		
Chemical	**Crude Vapor Wt%**	**Emissions lb/yr**	**Emissions lb/day**	**Emissions lb/hr**	**Emissions lb/yr**	**Emissions lb/day**	**Emissions lb/hr**
Benzene	2.83	8.04E+01	0.22	9.18E-03	19.58	0.05	2.24E-03
PACs (Chrysene)	0.00	3.85E-05	0.00	4.39E-09	9.37E-06	0.00	1.07E-09
Cresol (mixed isomers)	0.00	4.63E-05	0.00	5.28E-09	1.13E-05	0.00	1.29E-09
Ethylbenzene	0.13	3.56E+00	0.01	4.06E-04	8.66E-01	0.00	9.89E-05
n-Hexane	38.55	1094.60	3.00	1.25E-01	266.47	0.73	3.04E-02
Naphthalene	0.00	2.45E-02	0.00	2.79E-06	5.95E-03	0.00	6.79E-07
Phenol	0.00	1.10E-04	0.00	1.25E-08	2.67E-05	0.00	3.05E-09
Toluene	1.01	2.87E+01	0.08	3.28E-03	7.00	0.02	7.99E-04
Xylene (mixed isomers)	0.19	5.50E+00	0.02	6.28E-04	1.34E+00	0.00	1.53E-04
Cumene	0.00	7.59E-03	0.00	8.67E-07	0.00	0.00	2.11E-07
Cyclohexane	19.14	543.63	1.49	6.21E-02	132.34	0.36	1.51E-02
1,2,4-Trimethylbenzene	0.01	3.54E-01	0.00	4.04E-05	8.62E-02	0.00	9.84E-06
Total VOC	100.00	2.84E+03	7.78	3.24E-01	691.27	1.89	7.89E-02

Attachment B
Emissions Calculations

Philips 66 Carson Plant
Tank Working Loss Emissions

	Tank 2640[(1)]			Tank 2643[(1)]			Tank R510/R511		
Chemical	Emissions lb/yr	Emissions lb/day	Emissions lb/hr	Emissions lb/yr	Emissions lb/day	Emissions lb/hr	Emissions lb/yr	Emissions lb/day	Emissions lb/hr
Benzene	8.50	0.0233	9.70E-04	1.68	0.0046	1.92E-04	6.96	0.0191	7.945E-04
PACs (Chrysene)	0.09	0.0002	1.03E-05	0.01	0.0000	1.14E-06	0.07	0.0002	7.991E-06
Cresol (mixed isomers)	0.03	0.0001	3.42E-06	-	-	0.00E+00	0.02	0.0001	2.283E-06
Ethylbenzene	7.12	0.0195	8.13E-04	1.11	0.0030	1.27E-04	5.17	0.0142	5.902E-04
n-Hexane	65.86	0.1804	7.52E-03	14.18	0.0388	1.62E-03	56.90	0.1559	6.495E-03
Naphthalene	4.24	0.0116	4.84E-04	0.64	0.0018	7.31E-05	3.03	0.0083	3.459E-04
Phenol	0.01	0.0000	1.14E-06	-	-	0.00E+00	0.01	0.0000	1.142E-06
Toluene	29.05	0.0796	3.32E-03	4.85	0.0133	5.54E-04	21.79	0.0597	2.487E-03
Xylene (mixed isomers)	44.82	0.1228	5.12E-03	6.99	0.0191	7.97E-04	32.47	0.0890	3.707E-03
Cumene	0.12	0.0003	1.37E-05	0.02	0.0001	2.28E-06	0.08	0.0002	9.132E-06
Cyclohexane	43.84	0.1201	5.00E-03	8.51	0.0233	9.72E-04	35.69	0.0978	4.074E-03
1,2,4-Trimethylbenzene	13.10	0.0359	1.50E-03	2.01	0.0055	2.29E-04	9.39	0.0257	1.072E-03
Total VOC	6,891.78	18.8816	7.87E-01	1,487.19	4.0745	1.70E-01	5963.21	16.3376	6.807E-01

(1) Tank leg emissions scaled for 4" legs.

Attachment B
Emissions Calculations

Philips 66 Carson Plant
Total Tank Operational Emissions

	Tank 2640			Tank 2643		
Chemical	Emissions lb/yr	Emissions lb/day	Emissions lb/hr	Emissions lb/yr	Emissions lb/day	Emissions lb/hr
Benzene	88.95	0.2437	0.0102	21.26	0.0583	0.0024
PACs (Chrysene)	0.09	0.0002	0.0000	0.01	0.0000	0.0000
Cresol (mixed isomers)	0.03	0.0001	0.0000	0.00	0.0000	0.0000
Ethylbenzene	10.68	0.0293	0.0012	1.98	0.0054	0.0002
n-Hexane	1,160.47	3.1794	0.1325	280.64	0.7689	0.0320
Naphthalene	4.26	0.0117	0.0005	0.65	0.0018	0.0001
Phenol	0.01	0.0000	0.0000	0.00	0.0000	0.0000
Toluene	57.78	0.1583	0.0066	11.84	0.0324	0.0014
Xylene (mixed isomers)	50.32	0.1379	0.0057	8.32	0.0228	0.0010
Cumene	0.13	0.0003	0.0000	0.02	0.0001	0.0000
Cyclohexane	587.47	1.6095	0.0671	140.85	0.3859	0.0161
1,2,4-Trimethylbenzene	13.45	0.0369	0.0015	2.09	0.0057	0.0002
Total VOC	9,731.43	26.6614	1.1109	2,178.46	5.9684	0.2487

Attachment B
Emissions Calculations

Philips 66 Carson Plant
Tank 510/511 Total Operational Emissions[(1)]

	Existing Tank R510			Project Tank R510			Net Tank R510		
Chemical	Emissions lb/yr	Emissions lb/day	Emissions lb/hr	Emissions lb/yr	Emissions lb/day	Emissions lb/hr	Emissions lb/yr	Emissions lb/day	Emissions lb/hr
Benzene	6.58	0.0180	0.0008	6.96	0.0191	0.0008	0.38	0.0010	4.34E-05
PACs (Chrysene)	0.01	0.0000	0.0000	0.07	0.0002	0.0000	0.06	0.0002	6.85E-06
Cresol (mixed isomers)	-	-	-	0.02	0.0001	0.0000	0.02	0.0001	2.28E-06
Ethylbenzene	1.62	0.0044	0.0002	5.17	0.0142	0.0006	3.55	0.0097	4.05E-04
n-Hexane	63.43	0.1738	0.0072	56.90	0.1559	0.0065	(6.53)	(0.0179)	-7.45E-04
Naphthalene	0.65	0.0018	0.0001	3.03	0.0083	0.0003	2.38	0.0065	2.72E-04
Phenol	-	-	-	0.01	0.0000	0.0000	0.01	0.0000	1.14E-06
Toluene	10.65	0.0292	0.0012	21.79	0.0597	0.0025	11.14	0.0305	1.27E-03
Xylene (mixed isomers)	9.67	0.0265	0.0011	32.47	0.0890	0.0037	22.80	0.0625	2.60E-03
Cumene	0.02	0.0001	0.0000	0.08	0.0002	0.0000	0.06	0.0002	6.85E-06
Cyclohexane	32.60	0.0893	0.0037	35.69	0.0978	0.0041	3.09	0.0085	3.53E-04
1,2,4-Trimethylbenzene	2.19	0.0060	0.0003	9.39	0.0257	0.0011	7.20	0.0197	8.22E-04
Total VOC	2,279.80	6.2460	0.2603	5,963.21	16.3376	0.6807	3,683.41	10.0915	4.20E-01

	Existing Tank R511			Project Tank R511			Net Tank R511		
Chemical	Emissions lb/yr	Emissions lb/day	Emissions lb/hr	Emissions lb/yr	Emissions lb/day	Emissions lb/hr	Emissions lb/yr	Emissions lb/day	Emissions lb/hr
Benzene	6.73	0.0184	0.0008	6.96	0.0191	0.0008	0.23	0.0006	2.63E-05
PACs (Chrysene)	0.02	0.0001	0.0000	0.07	0.0002	0.0000	0.05	0.0001	5.71E-06
Cresol (mixed isomers)	-	-	-	0.02	0.0001	0.0000	0.02	0.0001	2.28E-06
Ethylbenzene	1.79	0.0049	0.0002	5.17	0.0142	0.0006	3.38	0.0093	3.86E-04
n-Hexane	64.40	0.1764	0.0074	56.90	0.1559	0.0065	(7.50)	(0.0205)	-8.56E-04
Naphthalene	0.75	0.0021	0.0001	3.03	0.0083	0.0003	2.28	0.0062	2.60E-04
Phenol	-	-	-	0.01	0.0000	0.0000	0.01	0.0000	1.14E-06
Toluene	11.28	0.0309	0.0013	21.79	0.0597	0.0025	10.51	0.0288	1.20E-03
Xylene (mixed isomers)	10.70	0.0293	0.0012	32.47	0.0890	0.0037	21.77	0.0596	2.49E-03
Cumene	0.02	0.0001	0.0000	0.08	0.0002	0.0000	0.06	0.0002	6.85E-06
Cyclohexane	33.41	0.0915	0.0038	35.69	0.0978	0.0041	2.28	0.0062	2.60E-04
1,2,4-Trimethylbenzene	6.73	0.0184	0.0008	9.39	0.0257	0.0011	2.66	0.0073	3.04E-04
Total VOC	2,406.90	6.5942	0.2748	5,963.21	16.3376	0.6807	3,556.31	9.7433	4.06E-01

(1) Existing total VOC emissions based on 2010 throughput values and TANKS 4.0 model.

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Attachment C

Detailed Risk Tables

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Attachment C

Maximum Exposed Individual Resident and Contribution

Philips 66 Carson Plant
Crude Oil Storage Capacity Project

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG	MEAT	ORAL	TOTAL
Benzene	1.13E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.13E-07
Chrysene	5.49E-11	7.29E-10	1.09E-10	0.00E+00	0.00E+00	0.00E+00	9.25E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-09	1.82E-09
Cresols	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethyl Benzene	1.40E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.40E-09
Hexane	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	8.60E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.60E-09
Phenol	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xylenes	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SUM	1.24E-07	7.29E-10	1.09E-10	0.00E+00	0.00E+00	0.00E+00	9.25E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-09	1.25E-07

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG	MEAT	ORAL	TOTAL
Benzene	90.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	90.40%
Chrysene	0.04%	0.58%	0.09%	0.00%	0.00%	0.00%	0.74%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.41%	1.46%
Cresols	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Ethyl Benzene	1.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.12%
Hexane	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Naphthalene	6.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.88%
Phenol	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Toluene	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Xylenes	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
SUM	99.20%	0.58%	0.09%	0.00%	0.00%	0.00%	0.74%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.41%	100.00%

Oral is the combined risk of all non-inhalation pathways.

Attachment C

Maximum Exposed Individual Worker and Contribution

Philips 66 Carson Plant
Crude Oil Storage Capacity Project

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG	MEAT	ORAL	TOTAL
Benzene	1.14E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E-07
Chrysene	1.03E-10	2.37E-09	3.08E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.68E-09	2.78E-09
Cresols	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethyl Benzene	1.99E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.99E-09
Hexane	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	1.42E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.42E-08
Phenol	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xylenes	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SUM	1.31E-07	2.37E-09	3.08E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.68E-09	1.33E-07

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG	MEAT	ORAL	TOTAL
Benzene	85.71%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	85.71%
Chrysene	0.08%	1.78%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.02%	2.09%
Cresols	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Ethyl Benzene	1.50%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.50%
Hexane	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Naphthalene	10.68%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.68%
Phenol	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Toluene	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Xylenes	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
SUM	98.50%	1.78%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.02%	100.00%

Oral is the combined risk of all non-inhalation pathways.

Attachment C

Maximum Chronic Hazard Index and Contribution

Philips 66 Carson Plant
Crude Oil Storage Capacity Project

CHEM	CV	CNS	BONE	DEVEL	ENDO	EYE	GILV	IMMUN	KIDN	REPRO	RESP	SKIN	BLOOD	MAX	CNS
Benzene	0.00E+00	**3.33E-04**	0.00E+00	3.33E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-04	3.33E-04	**72.4%**
Chrysene	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.0%**
Cresols	0.00E+00	**2.69E-08**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.69E-08	**0.0%**
Ethyl Benzene	0.00E+00	**0.00E+00**	0.00E+00	2.00E-06	2.00E-06	0.00E+00	2.00E-06	0.00E+00	2.00E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-06	**0.0%**
Hexane	0.00E+00	**3.76E-05**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.76E-05	**8.2%**
Naphthalene	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.30E-04	0.00E+00	0.00E+00	2.30E-04	**0.0%**
Phenol	3.82E-08	**3.82E-08**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.82E-08	0.00E+00	3.82E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.82E-08	**0.0%**
Toluene	0.00E+00	**5.82E-05**	0.00E+00	5.82E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.82E-05	0.00E+00	0.00E+00	5.82E-05	**12.7%**
Xylenes	0.00E+00	**3.08E-05**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.08E-05	0.00E+00	0.00E+00	3.08E-05	**6.7%**
SUM	3.82E-08	**4.60E-04**	0.00E+00	3.94E-04	2.00E-06	0.00E+00	2.04E-06	0.00E+00	2.04E-06	0.00E+00	3.19E-04	0.00E+00	3.33E-04	4.60E-04	**100.0%**

Attachment C

Maximum Acute Hazard Index and Contribution

Philips 66 Carson Plant
Crude Oil Storage Capacity Project

CHEM	CV	CNS	BONE	DEVEL	ENDO	EYE	GILV	IMMUN	KIDN	REPRO	RESP	SKIN	BLOOD	MAX	DEVEL
Benzene	0.00E+00	0.00E+00	0.00E+00	**1.50E-03**	0.00E+00	0.00E+00	0.00E+00	1.50E-03	0.00E+00	**1.50E-03**	0.00E+00	0.00E+00	1.50E-03	1.50E-03	**98.0%**
Chrysene	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.0%**
Cresols	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.0%**
Ethyl Benzene	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.0%**
Hexane	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.0%**
Naphthalene	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.0%**
Phenol	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	2.46E-08	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	2.46E-08	0.00E+00	0.00E+00	2.46E-08	**0.0%**
Toluene	0.00E+00	2.52E-05	0.00E+00	**2.52E-05**	0.00E+00	2.52E-05	0.00E+00	0.00E+00	0.00E+00	**2.52E-05**	2.52E-05	0.00E+00	0.00E+00	2.52E-05	**1.6%**
Xylenes	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	0.00E+00	2.62E-05	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	2.62E-05	0.00E+00	0.00E+00	2.62E-05	**0.0%**
SUM	0.00E+00	2.52E-05	0.00E+00	**1.53E-03**	0.00E+00	5.14E-05	0.00E+00	1.50E-03	0.00E+00	**1.53E-03**	5.14E-05	0.00E+00	1.50E-03	1.53E-03	**100.0%**

This file: C:\HARP\PROJECTS\2778P665\2778 P66-5 MEIR.txt

Created by HARP Version 1.4f Build 23.11.01
Uses ISC Version 99155
Uses BPIP (Dated: 04112)
Creation date: 8/1/2013 2:49:07 PM

EXCEPTION REPORT
   (there have been no changes or exceptions)

INPUT FILES:
   Source-Receptor file: C:\HARP\PROJECTS\2778P665\2778P665.SRC
   Averaging period adjustment factors file: not applicable
   Emission rates file: database
   Site parameters file: C:\HARP\PROJECTS\resident pathway.sit

Coordinate system: UTM NAD83

Screening mode is OFF

Exposure duration: 70 year (adult resident)
Analysis method: Derived (Adjusted) Method
Health effect: Cancer Risk
Receptor(s):   1096
Sources(s):   All
Chemicals(s):   All

SITE PARAMETERS

DEPOSITION

   Deposition rate (m/s)   0.02

DRINKING WATER

*** Pathway disabled ***

FISH

*** Pathway disabled ***

PASTURE

*** Pathway disabled ***

HOME GROWN PRODUCE

   HUMAN INGESTION
   Fraction of ingested leafy vegetable
     from home grown source   0.052
   Fraction of ingested exposed vegetable
     from home grown source   0.052
   Fraction of ingested protected vegetable
     from home grown source   0.052
   Fraction of ingested root vegetable

from home grown source 0.052

PIGS, CHICKENS AND EGGS

*** Pathway disabled ***

DERMAL ABSORPTION

*** Pathway enabled ***

SOIL INGESTION

*** Pathway enabled ***

MOTHER'S MILK

*** Pathway enabled ***

CHEMICAL CROSS-REFERENCE TABLE AND BACKGROUND CONCENTRATIONS

CHEM	CAS	ABBREVIATION	POLLUTANT NAME	BACKGROUND (ug/m^3)
0001	71432	Benzene	Benzene	0.000E+00
0002	218019	Chrysene	Chrysene	0.000E+00
0003	1319773	Cresols	Cresols (mixtures of) {Cresylic acid}	0.000E+00
0004	100414	Ethyl Benzene	Ethyl benzene	0.000E+00
0005	110543	Hexane	Hexane	0.000E+00
0006	91203	Naphthalene	Naphthalene	0.000E+00
0007	108952	Phenol	Phenol	0.000E+00
0008	108883	Toluene	Toluene	0.000E+00
0009	1330207	Xylenes	Xylenes (mixed)	0.000E+00

CHEMICAL HEALTH VALUES

CHEM	CAS	ABBREVIATION	CancerPF(Inh) (mg/kg-d)^-1	CancerPF(Oral) (mg/kg-d)^-1	ChronicREL(Inh) ug/m^3	ChronicREL(Oral) mg/kg-d	AcuteREL ug/m^3
0001	71432	Benzene	1.00E-01	*	6.00E+01	*	1.30E+03
0002	218019	Chrysene	3.90E-02	1.20E-01	*	*	*
0003	1319773	Cresols	*	*	6.00E+02	*	*
0004	100414	Ethyl Benzene	8.70E-03	*	2.00E+03	*	*
0005	110543	Hexane	*	*	7.00E+03	*	*
0006	91203	Naphthalene	1.20E-01	*	9.00E+00	*	*
0007	108952	Phenol	*	*	2.00E+02	*	5.80E+03
0008	108883	Toluene	*	*	3.00E+02	*	3.70E+04
0009	1330207	Xylenes	*	*	7.00E+02	*	2.20E+04

EMISSIONS DATA SOURCE: Emission rates loaded from database
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC=2778 DEV=1 PRO=1 STK=1 NAME=PHILLIPS66 STACK 1 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	0.38	4.337899543378
218019	Chrysene	1	0	0.06	6.849315068493
1319773	Cresols	1	0	0.02	2.283105022831
100414	Ethyl Benzene	1	0	3.55	4.052511415525

110543	Hexane	1	0	0	0
91203	Naphthalene	1	0	2.38	2.716894977168
108952	Phenol	1	0	0.01	1.141552511415
108883	Toluene	1	0	11.14	1.271689497716
1330207	Xylenes	1	0	22.8	2.602739726027

EMISSIONS FOR FACILITY FAC=2778 DEV=2 PRO=1 STK=2 NAME=PHILLIPS66 STACK 2 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	0.23	2.625570776255
218019	Chrysene	1	0	0.05	5.707762557077
1319773	Cresols	1	0	0.02	2.283105022831
100414	Ethyl Benzene	1	0	3.38	3.858447488584
110543	Hexane	1	0	0	0
91203	Naphthalene	1	0	2.28	2.602739726027
108952	Phenol	1	0	0.01	1.141552511415
108883	Toluene	1	0	10.51	1.199771689497
1330207	Xylenes	1	0	21.77	2.485159817351

EMISSIONS FOR FACILITY FAC=2778 DEV=3 PRO=1 STK=3 NAME=PHILLIPS66 STACK 3 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	8.498888888888	9.701927955352
218019	Chrysene	1	0	0.09	1.027397260273
1319773	Cresols	1	0	0.03	3.424657534246
100414	Ethyl Benzene	1	0	7.118888888888	8.126585489599
110543	Hexane	1	0	65.86222222222	7.518518518518
91203	Naphthalene	1	0	4.24	4.840182648401
108952	Phenol	1	0	0.01	1.141552511415
108883	Toluene	1	0	29.04888888888	3.316083206494
1330207	Xylenes	1	0	44.82	5.116438356164

EMISSIONS FOR FACILITY FAC=2778 DEV=5 PRO=1 STK=5 NAME=PHILLIPS66 STACK 5 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	1.678888888888	1.916539827498
218019	Chrysene	1	0	0.01	1.141552511415
1319773	Cresols	1	0	0	0
100414	Ethyl Benzene	1	0	1.11	1.267123287671
110543	Hexane	1	0	14.17555555555	1.618214104515
91203	Naphthalene	1	0	0.64	7.305936073059
108952	Phenol	1	0	0	0
108883	Toluene	1	0	4.848888888888	5.535261288685
1330207	Xylenes	1	0	6.985555555555	7.974378488077

EMISSIONS FOR FACILITY FAC=2778 DEV=5 PRO=2 STK=6 NAME=PHILLIPS66 STACK 6 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	19.58380139590	2.235593766655
218019	Chrysene	1	0	9.366475360299	1.069232347066
1319773	Cresols	1	0	1.127026849100	1.286560330023
100414	Ethyl Benzene	1	0	0.866365902785	9.890021721297
110543	Hexane	1	0	266.4665569156	3.041855672552
91203	Naphthalene	1	0	5.952168295429	6.794712666015
108952	Phenol	1	0	2.671511936235	3.049671160086
108883	Toluene	1	0	6.995118368536	7.985294941251

1330207	Xylenes	1	0	1.339005007749	1.528544529394

EMISSIONS FOR FACILITY FAC=2778 DEV=3 PRO=2 STK=7 NAME=PHILLIPS66 STACK 7 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	80.44722382500	9.183473039384
218019	Chrysene	1	0	3.847603049727	4.392240924346
1319773	Cresols	1	0	4.629651789941	5.284990627787
100414	Ethyl Benzene	1	0	3.558896982601	4.062667788358
110543	Hexane	1	0	1094.603356759	0.124954721091
91203	Naphthalene	1	0	2.445058573800	2.791162755479
108952	Phenol	1	0	1.097415738348	1.252757692178
108883	Toluene	1	0	28.73486315040	3.280235519453
1330207	Xylenes	1	0	5.500425243474	6.279024250541

CANCER RISK REPORT

DOMINANT PATHWAYS, Receptor 1096

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG
0001	A	-	-	-	-	-	-	-	-	-	-	-
0002	-	YES	-	-	-	-	YES	-	-	-	-	-
0003	-	-	-	-	-	-	-	-	-	-	-	-
0004	A	-	-	-	-	-	-	-	-	-	-	-
0005	-	-	-	-	-	-	-	-	-	-	-	-
0006	A	-	-	-	-	-	-	-	-	-	-	-
0007	-	-	-	-	-	-	-	-	-	-	-	-
0008	-	-	-	-	-	-	-	-	-	-	-	-
0009	-	-	-	-	-	-	-	-	-	-	-	-

DERIVED CANCER RISK, RECEPTOR 1096

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG	MEAT	ORAL	TOTAL	UTME	
0001	1.13E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.13E-07		
0002	5.49E-11	7.29E-10	1.09E-10	0.00E+00	0.00E+00	0.00E+00	9.25E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-09	1.82E-09		
0003	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0004	1.40E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.40E-09		
0005	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0006	8.60E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.60E-09		
0007	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0008	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
SUM	1.24E-07	7.29E-10	1.09E-10	0.00E+00	0.00E+00	0.00E+00	9.25E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-09	1.25E-07	384400	374

This file: C:\HARP\PROJECTS\2778P665\2778 P66-5 MEIW.txt

Created by HARP Version 1.4f Build 23.11.01
Uses ISC Version 99155
Uses BPIP (Dated: 04112)
Creation date: 8/1/2013 2:50:04 PM

EXCEPTION REPORT
   (there have been no changes or exceptions)

INPUT FILES:
   Source-Receptor file: C:\HARP\PROJECTS\2778P665\2778P665.SRC
   Averaging period adjustment factors file: not applicable
   Emission rates file: database
   Site parameters file: C:\HARP\PROJECTS\worker pathway.sit

Coordinate system: UTM NAD83

Screening mode is OFF

Exposure duration: Standard work schedule (49 wks/yr, 5 days/wk, 8 hrs/day, 40 yrs)
Analysis method: Point estimate
Health effect: Cancer Risk
Receptor(s):   734
Sources(s):   All
Chemicals(s):   All

SITE PARAMETERS

DEPOSITION

   Deposition rate (m/s)   0.02

DRINKING WATER

*** Pathway disabled ***

FISH

*** Pathway disabled ***

PASTURE

*** Pathway disabled ***

HOME GROWN PRODUCE

*** Pathway disabled ***

PIGS, CHICKENS AND EGGS

*** Pathway disabled ***

DERMAL ABSORPTION

*** Pathway enabled ***

SOIL INGESTION

*** Pathway enabled ***

MOTHER'S MILK

*** Pathway disabled ***

CHEMICAL CROSS-REFERENCE TABLE AND BACKGROUND CONCENTRATIONS

CHEM	CAS	ABBREVIATION	POLLUTANT NAME	BACKGROUND (ug/m^3)
0001	71432	Benzene	Benzene	0.000E+00
0002	218019	Chrysene	Chrysene	0.000E+00
0003	1319773	Cresols	Cresols (mixtures of) {Cresylic acid}	0.000E+00
0004	100414	Ethyl Benzene	Ethyl benzene	0.000E+00
0005	110543	Hexane	Hexane	0.000E+00
0006	91203	Naphthalene	Naphthalene	0.000E+00
0007	108952	Phenol	Phenol	0.000E+00
0008	108883	Toluene	Toluene	0.000E+00
0009	1330207	Xylenes	Xylenes (mixed)	0.000E+00

CHEMICAL HEALTH VALUES

CHEM	CAS	ABBREVIATION	CancerPF(Inh) (mg/kg-d)^-1	CancerPF(Oral) (mg/kg-d)^-1	ChronicREL(Inh) ug/m^3	ChronicREL(Oral) mg/kg-d	AcuteREL ug/m^3
0001	71432	Benzene	1.00E-01	*	6.00E+01	*	1.30E+03
0002	218019	Chrysene	3.90E-02	1.20E-01	*	*	*
0003	1319773	Cresols	*	*	6.00E+02	*	*
0004	100414	Ethyl Benzene	8.70E-03	*	2.00E+03	*	*
0005	110543	Hexane	*	*	7.00E+03	*	*
0006	91203	Naphthalene	1.20E-01	*	9.00E+00	*	*
0007	108952	Phenol	*	*	2.00E+02	*	5.80E+03
0008	108883	Toluene	*	*	3.00E+02	*	3.70E+04
0009	1330207	Xylenes	*	*	7.00E+02	*	2.20E+04

EMISSIONS DATA SOURCE: Emission rates loaded from database
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC=2778 DEV=1 PRO=1 STK=1 NAME=PHILLIPS66 STACK 1 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	0.38	4.337899543378
218019	Chrysene	1	0	0.06	6.849315068493
1319773	Cresols	1	0	0.02	2.283105022831
100414	Ethyl Benzene	1	0	3.55	4.052511415525
110543	Hexane	1	0	0	0
91203	Naphthalene	1	0	2.38	2.716894977168
108952	Phenol	1	0	0.01	1.141552511415
108883	Toluene	1	0	11.14	1.271689497716
1330207	Xylenes	1	0	22.8	2.602739726027

EMISSIONS FOR FACILITY FAC=2778 DEV=2 PRO=1 STK=2 NAME=PHILLIPS66 STACK 2 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	0.23	2.625570776255
218019	Chrysene	1	0	0.05	5.707762557077
1319773	Cresols	1	0	0.02	2.283105022831
100414	Ethyl Benzene	1	0	3.38	3.858447488584
110543	Hexane	1	0	0	0
91203	Naphthalene	1	0	2.28	2.602739726027
108952	Phenol	1	0	0.01	1.141552511415
108883	Toluene	1	0	10.51	1.199771689497
1330207	Xylenes	1	0	21.77	2.485159817351

EMISSIONS FOR FACILITY FAC=2778 DEV=3 PRO=1 STK=3 NAME=PHILLIPS66 STACK 3 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	8.498888888888	9.701927955352
218019	Chrysene	1	0	0.09	1.027397260273
1319773	Cresols	1	0	0.03	3.424657534246
100414	Ethyl Benzene	1	0	7.118888888888	8.126585489599
110543	Hexane	1	0	65.86222222222	7.518518518518
91203	Naphthalene	1	0	4.24	4.840182648401
108952	Phenol	1	0	0.01	1.141552511415
108883	Toluene	1	0	29.04888888888	3.316083206494
1330207	Xylenes	1	0	44.82	5.116438356164

EMISSIONS FOR FACILITY FAC=2778 DEV=5 PRO=1 STK=5 NAME=PHILLIPS66 STACK 5 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	1.678888888888	1.916539827498
218019	Chrysene	1	0	0.01	1.141552511415
1319773	Cresols	1	0	0	0
100414	Ethyl Benzene	1	0	1.11	1.267123287671
110543	Hexane	1	0	14.17555555555	1.618214104515
91203	Naphthalene	1	0	0.64	7.305936073059
108952	Phenol	1	0	0	0
108883	Toluene	1	0	4.848888888888	5.535261288685
1330207	Xylenes	1	0	6.985555555555	7.974378488077

EMISSIONS FOR FACILITY FAC=2778 DEV=5 PRO=2 STK=6 NAME=PHILLIPS66 STACK 6 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	19.58380139590	2.235593766655
218019	Chrysene	1	0	9.366475360299	1.069232347066
1319773	Cresols	1	0	1.127026849100	1.286560330023
100414	Ethyl Benzene	1	0	0.866365902785	9.890021721297
110543	Hexane	1	0	266.4665569156	3.041855672552
91203	Naphthalene	1	0	5.952168295429	6.794712666015
108952	Phenol	1	0	2.671511936235	3.049671160086
108883	Toluene	1	0	6.995118368536	7.985294941251
1330207	Xylenes	1	0	1.339005007749	1.528544529394

EMISSIONS FOR FACILITY FAC=2778 DEV=3 PRO=2 STK=7 NAME=PHILLIPS66 STACK 7 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	80.44722382500	9.183473039384
218019	Chrysene	1	0	3.847603049727	4.392240924346
1319773	Cresols	1	0	4.629651789941	5.284990627787

100414	Ethyl Benzene	1	0	3.558896982601	4.062667788358
110543	Hexane	1	0	1094.603356759	0.124954721091
91203	Naphthalene	1	0	2.445058573800	2.791162755479
108952	Phenol	1	0	1.097415738348	1.252757692178
108883	Toluene	1	0	28.73486315040	3.280235519453
1330207	Xylenes	1	0	5.500425243474	6.279024250541

CANCER RISK REPORT

AVERAGE CANCER RISK, RECEPTOR 734

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG	MEAT	ORAL	TOTAL	UTME	
0001	1.14E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E-07		
0002	1.03E-10	2.37E-09	3.08E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.68E-09	2.78E-09		
0003	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0004	1.99E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.99E-09		
0005	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0006	1.42E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.42E-08		
0007	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0008	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
0009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
SUM	1.31E-07	2.37E-09	3.08E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.68E-09	1.33E-07	384200	374

This file: C:\HARP\PROJECTS\2778P665\2778 P66-5 MCHI.txt

Created by HARP Version 1.4f Build 23.11.01
Uses ISC Version 99155
Uses BPIP (Dated: 04112)
Creation date: 8/1/2013 2:48:38 PM

EXCEPTION REPORT
   (there have been no changes or exceptions)

INPUT FILES:
   Source-Receptor file: C:\HARP\PROJECTS\2778P665\2778P665.SRC
   Averaging period adjustment factors file: not applicable
   Emission rates file: database
   Site parameters file: C:\HARP\PROJECTS\resident pathway.sit

Coordinate system: UTM NAD83

Screening mode is OFF

Exposure duration: resident
Analysis method: Derived (OEHHA) Method
Health effect: Chronic HI
Receptor(s):   734
Sources(s):   All
Chemicals(s):   All

SITE PARAMETERS

DEPOSITION

   Deposition rate (m/s)   0.02

DRINKING WATER

*** Pathway disabled ***

FISH

*** Pathway disabled ***

PASTURE

*** Pathway disabled ***

HOME GROWN PRODUCE

   HUMAN INGESTION
   Fraction of ingested leafy vegetable
     from home grown source   0.052
   Fraction of ingested exposed vegetable
     from home grown source   0.052
   Fraction of ingested protected vegetable
     from home grown source   0.052
   Fraction of ingested root vegetable

from home grown source 0.052

PIGS, CHICKENS AND EGGS

*** Pathway disabled ***

DERMAL ABSORPTION

*** Pathway enabled ***

SOIL INGESTION

*** Pathway enabled ***

MOTHER'S MILK

*** Pathway enabled ***

CHEMICAL CROSS-REFERENCE TABLE AND BACKGROUND CONCENTRATIONS

CHEM	CAS	ABBREVIATION	POLLUTANT NAME	BACKGROUND (ug/m^3)
0001	71432	Benzene	Benzene	0.000E+00
0002	218019	Chrysene	Chrysene	0.000E+00
0003	1319773	Cresols	Cresols (mixtures of) {Cresylic acid}	0.000E+00
0004	100414	Ethyl Benzene	Ethyl benzene	0.000E+00
0005	110543	Hexane	Hexane	0.000E+00
0006	91203	Naphthalene	Naphthalene	0.000E+00
0007	108952	Phenol	Phenol	0.000E+00
0008	108883	Toluene	Toluene	0.000E+00
0009	1330207	Xylenes	Xylenes (mixed)	0.000E+00

CHEMICAL HEALTH VALUES

CHEM	CAS	ABBREVIATION	CancerPF(Inh) (mg/kg-d)^-1	CancerPF(Oral) (mg/kg-d)^-1	ChronicREL(Inh) ug/m^3	ChronicREL(Oral) mg/kg-d	AcuteREL ug/m^3
0001	71432	Benzene	1.00E-01	*	6.00E+01	*	1.30E+03
0002	218019	Chrysene	3.90E-02	1.20E-01	*	*	*
0003	1319773	Cresols	*	*	6.00E+02	*	*
0004	100414	Ethyl Benzene	8.70E-03	*	2.00E+03	*	*
0005	110543	Hexane	*	*	7.00E+03	*	*
0006	91203	Naphthalene	1.20E-01	*	9.00E+00	*	*
0007	108952	Phenol	*	*	2.00E+02	*	5.80E+03
0008	108883	Toluene	*	*	3.00E+02	*	3.70E+04
0009	1330207	Xylenes	*	*	7.00E+02	*	2.20E+04

EMISSIONS DATA SOURCE: Emission rates loaded from database
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC=2778 DEV=1 PRO=1 STK=1 NAME=PHILLIPS66 STACK 1 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	0.38	4.337899543378
218019	Chrysene	1	0	0.06	6.849315068493
1319773	Cresols	1	0	0.02	2.283105022831
100414	Ethyl Benzene	1	0	3.55	4.052511415525

110543	Hexane	1	0	0	0
91203	Naphthalene	1	0	2.38	2.716894977168
108952	Phenol	1	0	0.01	1.141552511415
108883	Toluene	1	0	11.14	1.271689497716
1330207	Xylenes	1	0	22.8	2.602739726027

EMISSIONS FOR FACILITY FAC=2778 DEV=2 PRO=1 STK=2 NAME=PHILLIPS66 STACK 2 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	0.23	2.625570776255
218019	Chrysene	1	0	0.05	5.707762557077
1319773	Cresols	1	0	0.02	2.283105022831
100414	Ethyl Benzene	1	0	3.38	3.858447488584
110543	Hexane	1	0	0	0
91203	Naphthalene	1	0	2.28	2.602739726027
108952	Phenol	1	0	0.01	1.141552511415
108883	Toluene	1	0	10.51	1.199771689497
1330207	Xylenes	1	0	21.77	2.485159817351

EMISSIONS FOR FACILITY FAC=2778 DEV=3 PRO=1 STK=3 NAME=PHILLIPS66 STACK 3 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	8.498888888888	9.701927955352
218019	Chrysene	1	0	0.09	1.027397260273
1319773	Cresols	1	0	0.03	3.424657534246
100414	Ethyl Benzene	1	0	7.118888888888	8.126585489599
110543	Hexane	1	0	65.86222222222	7.518518518518
91203	Naphthalene	1	0	4.24	4.840182648401
108952	Phenol	1	0	0.01	1.141552511415
108883	Toluene	1	0	29.04888888888	3.316083206494
1330207	Xylenes	1	0	44.82	5.116438356164

EMISSIONS FOR FACILITY FAC=2778 DEV=5 PRO=1 STK=5 NAME=PHILLIPS66 STACK 5 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	1.678888888888	1.916539827498
218019	Chrysene	1	0	0.01	1.141552511415
1319773	Cresols	1	0	0	0
100414	Ethyl Benzene	1	0	1.11	1.267123287671
110543	Hexane	1	0	14.17555555555	1.618214104515
91203	Naphthalene	1	0	0.64	7.305936073059
108952	Phenol	1	0	0	0
108883	Toluene	1	0	4.848888888888	5.535261288685
1330207	Xylenes	1	0	6.985555555555	7.974378488077

EMISSIONS FOR FACILITY FAC=2778 DEV=5 PRO=2 STK=6 NAME=PHILLIPS66 STACK 6 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	19.58380139590	2.235593766655
218019	Chrysene	1	0	9.366475360299	1.069232347066
1319773	Cresols	1	0	1.127026849100	1.286560330023
100414	Ethyl Benzene	1	0	0.866365902785	9.890021721297
110543	Hexane	1	0	266.4665569156	3.041855672552
91203	Naphthalene	1	0	5.952168295429	6.794712666015
108952	Phenol	1	0	2.671511936235	3.049671160086
108883	Toluene	1	0	6.995118368536	7.985294941251

1330207	Xylenes	1	0	1.339005007749	1.528544529394

EMISSIONS FOR FACILITY FAC=2778 DEV=3 PRO=2 STK=7 NAME=PHILLIPS66 STACK 7 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	80.44722382500	9.183473039384
218019	Chrysene	1	0	3.847603049727	4.392240924346
1319773	Cresols	1	0	4.629651789941	5.284990627787
100414	Ethyl Benzene	1	0	3.558896982601	4.062667788358
110543	Hexane	1	0	1094.603356759	0.124954721091
91203	Naphthalene	1	0	2.445058573800	2.791162755479
108952	Phenol	1	0	1.097415738348	1.252757692178
108883	Toluene	1	0	28.73486315040	3.280235519453
1330207	Xylenes	1	0	5.500425243474	6.279024250541

CHRONIC HI REPORT

DOMINANT PATHWAYS, Receptor 734

CHEM	INHAL	DERM	SOIL	MOTHER	FISH	WATER	VEG	DAIRY	BEEF	CHICK	PIG	EGG
0001	YES	-	-	-	-	-	-	-	-	-	-	-
0002	YES	YES	-	-	-	-	YES	-	-	-	-	-
0003	YES	-	-	-	-	-	-	-	-	-	-	-
0004	YES	-	-	-	-	-	-	-	-	-	-	-
0005	YES	-	-	-	-	-	-	-	-	-	-	-
0006	YES	-	-	-	-	-	-	-	-	-	-	-
0007	YES	-	-	-	-	-	-	-	-	-	-	-
0008	YES	-	-	-	-	-	-	-	-	-	-	-
0009	YES	-	-	-	-	-	-	-	-	-	-	-

DERIVED CHRONIC HI, RECEPTOR 734

CHEM	CV	CNS	BONE	DEVEL	ENDO	EYE	GILV	IMMUN	KIDN	REPRO	RESP	SKIN	BLOOD	MAX	UTME	UTMN	ZON
0001	0.00E+00	3.33E-04	0.00E+00	3.33E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-04	3.33E-04			
0002	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
0003	0.00E+00	2.69E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.69E-08			
0004	0.00E+00	0.00E+00	0.00E+00	2.00E-06	2.00E-06	0.00E+00	2.00E-06	0.00E+00	2.00E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-06			
0005	0.00E+00	3.76E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.76E-05			
0006	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.30E-04	0.00E+00	0.00E+00	2.30E-04			
0007	3.82E-08	3.82E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.82E-08	0.00E+00	3.82E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.82E-08			
0008	0.00E+00	5.82E-05	0.00E+00	5.82E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.82E-05	0.00E+00	0.00E+00	5.82E-05			
0009	0.00E+00	3.08E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.08E-05	0.00E+00	0.00E+00	3.08E-05			
SUM	3.82E-08	4.60E-04	0.00E+00	3.94E-04	2.00E-06	0.00E+00	2.04E-06	0.00E+00	2.04E-06	0.00E+00	3.19E-04	0.00E+00	3.33E-04	4.60E-04	384200	3740900	1

This file: C:\HARP\PROJECTS\2778P665\2778 P66-5 MAHI.txt

Created by HARP Version 1.4f Build 23.11.01
Uses ISC Version 99155
Uses BPIP (Dated: 04112)
Creation date: 8/1/2013 2:48:12 PM

EXCEPTION REPORT
   (there have been no changes or exceptions)

INPUT FILES:
   Source-Receptor file: C:\HARP\PROJECTS\2778P665\2778P665.SRC
   Averaging period adjustment factors file: not applicable
   Emission rates file: database
   Site parameters file: C:\HARP\PROJECTS\resident pathway.sit

Coordinate system: UTM NAD83

Screening mode is OFF

Analysis method: Point Estimate
Health effect: Acute HI Simple (Concurrent Max.)
Receptor(s):   1328
Sources(s):   All
Chemicals(s):   All

CHEMICAL CROSS-REFERENCE TABLE AND BACKGROUND CONCENTRATIONS

CHEM	CAS	ABBREVIATION	POLLUTANT NAME	BACKGROUND (ug/m^3)
0001	71432	Benzene	Benzene	0.000E+00
0002	218019	Chrysene	Chrysene	0.000E+00
0003	1319773	Cresols	Cresols (mixtures of) {Cresylic acid}	0.000E+00
0004	100414	Ethyl Benzene	Ethyl benzene	0.000E+00
0005	110543	Hexane	Hexane	0.000E+00
0006	91203	Naphthalene	Naphthalene	0.000E+00
0007	108952	Phenol	Phenol	0.000E+00
0008	108883	Toluene	Toluene	0.000E+00
0009	1330207	Xylenes	Xylenes (mixed)	0.000E+00

CHEMICAL HEALTH VALUES

CHEM	CAS	ABBREVIATION	CancerPF(Inh) (mg/kg-d)^-1	CancerPF(Oral) (mg/kg-d)^-1	ChronicREL(Inh) ug/m^3	ChronicREL(Oral) mg/kg-d	AcuteREL ug/m^3
0001	71432	Benzene	1.00E-01	*	6.00E+01	*	1.30E+03
0002	218019	Chrysene	3.90E-02	1.20E-01	*	*	*
0003	1319773	Cresols	*	*	6.00E+02	*	*
0004	100414	Ethyl Benzene	8.70E-03	*	2.00E+03	*	*
0005	110543	Hexane	*	*	7.00E+03	*	*
0006	91203	Naphthalene	1.20E-01	*	9.00E+00	*	*
0007	108952	Phenol	*	*	2.00E+02	*	5.80E+03
0008	108883	Toluene	*	*	3.00E+02	*	3.70E+04
0009	1330207	Xylenes	*	*	7.00E+02	*	2.20E+04

EMISSIONS DATA SOURCE: Emission rates loaded from database
CHEMICALS ADDED OR DELETED: none

EMISSIONS FOR FACILITY FAC=2778 DEV=1 PRO=1 STK=1 NAME=PHILLIPS66 STACK 1 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	0.38	4.337899543378
218019	Chrysene	1	0	0.06	6.849315068493
1319773	Cresols	1	0	0.02	2.283105022831
100414	Ethyl Benzene	1	0	3.55	4.052511415525
110543	Hexane	1	0	0	0
91203	Naphthalene	1	0	2.38	2.716894977168
108952	Phenol	1	0	0.01	1.141552511415
108883	Toluene	1	0	11.14	1.271689497716
1330207	Xylenes	1	0	22.8	2.602739726027

EMISSIONS FOR FACILITY FAC=2778 DEV=2 PRO=1 STK=2 NAME=PHILLIPS66 STACK 2 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	0.23	2.625570776255
218019	Chrysene	1	0	0.05	5.707762557077
1319773	Cresols	1	0	0.02	2.283105022831
100414	Ethyl Benzene	1	0	3.38	3.858447488584
110543	Hexane	1	0	0	0
91203	Naphthalene	1	0	2.28	2.602739726027
108952	Phenol	1	0	0.01	1.141552511415
108883	Toluene	1	0	10.51	1.199771689497
1330207	Xylenes	1	0	21.77	2.485159817351

EMISSIONS FOR FACILITY FAC=2778 DEV=3 PRO=1 STK=3 NAME=PHILLIPS66 STACK 3 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	8.498888888888	9.701927955352
218019	Chrysene	1	0	0.09	1.027397260273
1319773	Cresols	1	0	0.03	3.424657534246
100414	Ethyl Benzene	1	0	7.118888888888	8.126585489599
110543	Hexane	1	0	65.86222222222	7.518518518518
91203	Naphthalene	1	0	4.24	4.840182648401
108952	Phenol	1	0	0.01	1.141552511415
108883	Toluene	1	0	29.04888888888	3.316083206494
1330207	Xylenes	1	0	44.82	5.116438356164

EMISSIONS FOR FACILITY FAC=2778 DEV=5 PRO=1 STK=5 NAME=PHILLIPS66 STACK 5 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	1.678888888888	1.916539827498
218019	Chrysene	1	0	0.01	1.141552511415
1319773	Cresols	1	0	0	0
100414	Ethyl Benzene	1	0	1.11	1.267123287671
110543	Hexane	1	0	14.17555555555	1.618214104515
91203	Naphthalene	1	0	0.64	7.305936073059
108952	Phenol	1	0	0	0
108883	Toluene	1	0	4.848888888888	5.535261288685
1330207	Xylenes	1	0	6.985555555555	7.974378488077

EMISSIONS FOR FACILITY FAC=2778 DEV=5 PRO=2 STK=6 NAME=PHILLIPS66 STACK 6 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	19.58380139590	2.235593766655

218019	Chrysene	1	0	9.366475360299	1.069232347066
1319773	Cresols	1	0	1.127026849100	1.286560330023
100414	Ethyl Benzene	1	0	0.866365902785	9.890021721297
110543	Hexane	1	0	266.4665569156	3.041855672552
91203	Naphthalene	1	0	5.952168295429	6.794712666015
108952	Phenol	1	0	2.671511936235	3.049671160086
108883	Toluene	1	0	6.995118368536	7.985294941251
1330207	Xylenes	1	0	1.339005007749	1.528544529394

EMISSIONS FOR FACILITY FAC=2778 DEV=3 PRO=2 STK=7 NAME=PHILLIPS66 STACK 7 EMS (lbs/yr)
SOURCE MULTIPLIER=1

CAS	ABBREV	MULTIPLIER	BG (ug/m^3)	AVRG (lbs/yr)	MAX (lbs/hr)
71432	Benzene	1	0	80.44722382500	9.183473039384
218019	Chrysene	1	0	3.847603049727	4.392240924346
1319773	Cresols	1	0	4.629651789941	5.284990627787
100414	Ethyl Benzene	1	0	3.558896982601	4.062667788358
110543	Hexane	1	0	1094.603356759	0.124954721091
91203	Naphthalene	1	0	2.445058573800	2.791162755479
108952	Phenol	1	0	1.097415738348	1.252757692178
108883	Toluene	1	0	28.73486315040	3.280235519453
1330207	Xylenes	1	0	5.500425243474	6.279024250541

ACUTE HI REPORT

ACUTE HI, RECEPTOR 1328

CHEM	CV	CNS	BONE	DEVEL	ENDO	EYE	GILV	IMMUN	KIDN	REPRO	RESP	SKIN	BLOOD	MAX	UTME	UTMN	ZON
0001	0.00E+00	0.00E+00	0.00E+00	1.50E-03	0.00E+00	0.00E+00	0.00E+00	1.50E-03	0.00E+00	1.50E-03	0.00E+00	0.00E+00	1.50E-03	1.50E-03			
0002	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
0003	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
0004	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
0005	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
0006	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
0007	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.46E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.46E-08	0.00E+00	0.00E+00	2.46E-08			
0008	0.00E+00	2.52E-05	0.00E+00	2.52E-05	0.00E+00	2.52E-05	0.00E+00	0.00E+00	0.00E+00	2.52E-05	2.52E-05	0.00E+00	0.00E+00	2.52E-05			
0009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.62E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.62E-05	0.00E+00	0.00E+00	2.62E-05			
SUM	0.00E+00	2.52E-05	0.00E+00	1.53E-03	0.00E+00	5.14E-05	0.00E+00	1.50E-03	0.00E+00	1.53E-03	5.14E-05	0.00E+00	1.50E-03	1.53E-03	384333	3740995	1

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APPENDIX C

HAZARDS ANALYSIS

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QUEST
CONSULTANTS INC.®

July 3, 2013

Ms. Debra Bright Stevens
Environmental Audit, Inc.
1000-A Ortega Way
Placentia, CA 92670-7125

Re: Phillips 66 Tank Fire Calculations

Dear Ms. Stevens:

Phillips 66 is proposing to install one new 615,000 barrel crude storage tank at the Phillips 66 Carson Plant located at 1520 East Sepulveda Boulevard, Carson, California. Phillips 66 is also proposing to increase the throughput of two existing 320,000 barrel nominal capacity storage tanks so the proposed project includes the construction of geodesic domes on existing crude Tanks 510 and 511. The proposed project also includes the construction of a 14,000 barrel water draw surge tank. The new 615,000 barrel tank will be located in an area that already has existing crude storage tanks. The existing and proposed storage tanks are summarized in Table 1. The location of the existing and proposed storage tanks are shown on Figure 1 with the proposed tanks marked with diagonal lines.

Table 1
Storage Tank Parameters

Tank Status	Tank Number(s)	Contents	Tank Diameter (ft)	Tank Wall Height (ft)
Proposed	2640	Crude oil with Reid Vapor Pressure up to 11 psi	260	65
Proposed	2643	Crude oil and water	44	52
Existing	510, 511, 512, 513	Crude oil	218	50

The objective of this study was to compute the potential decrease and/or increase in hazards to the public due to the proposed storage tank additions.

This report details the calculations made to identify the maximum fire radiation hazard zones associated with a tank top fire (pool fire) from any one of the proposed storage tanks. The scenario selected represents the largest, credible releases (i.e., storage tank dome failure) followed by ignition (pool fire) resulting in a large fire.

MAILING: P.O. BOX 721387 NORMAN, OK 73070-8069
SHIPPING: 908 26TH AVENUE NW, SUITE 103 NORMAN, OK 73069
TELEPHONE: (405) 329-7475 FAX: (405) 329-7734
E-mail: info@questconsult.com

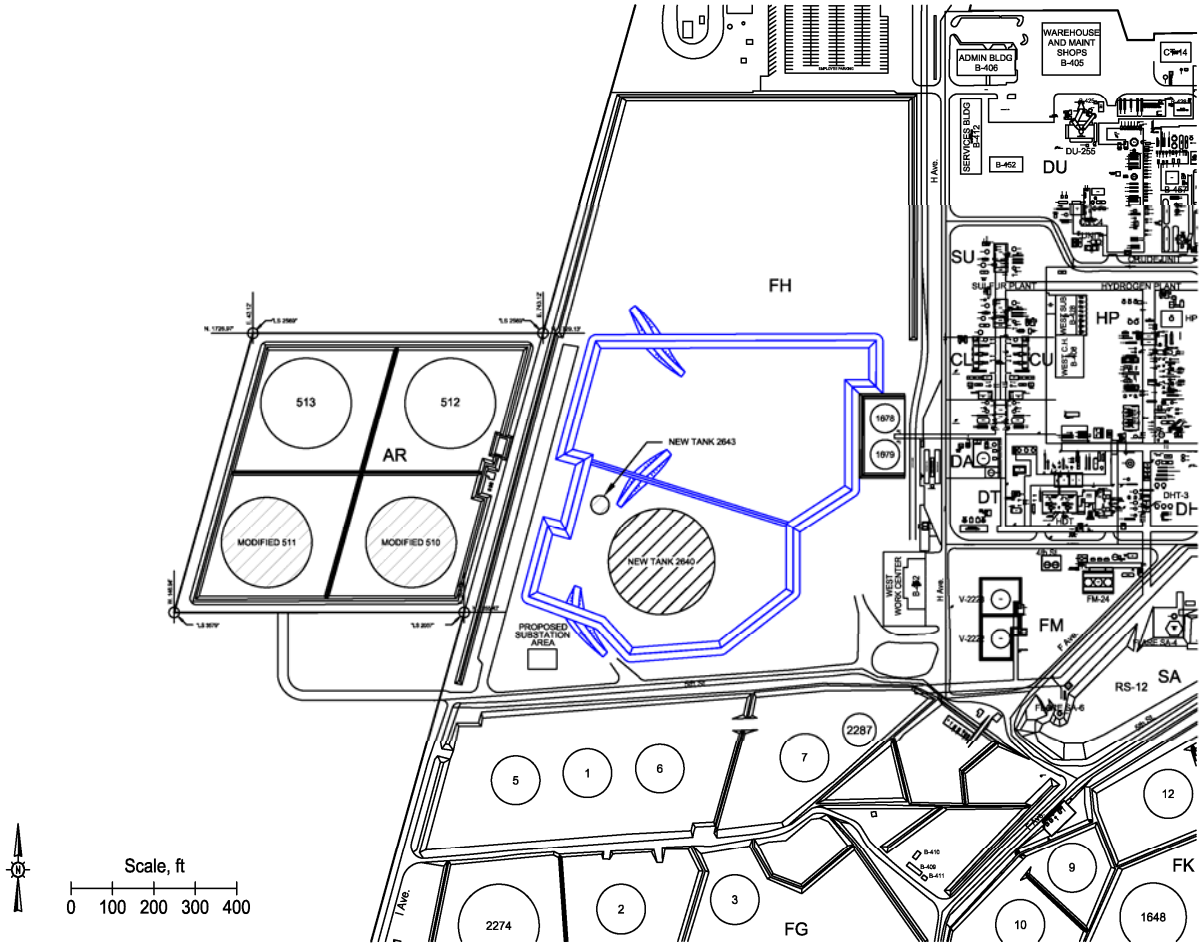

Figure 1
Existing and Proposed Tank Locations

The following atmospheric conditions were employed in the modeling.

Wind speed	= 20 miles/hour (worst case for fires as flame is bent downwind)
Relative humidity	= 70%
Air temperature	= 70°F
Surface temperature	= 70°F

The hazard of interest for pool fires is direct exposure to the flames. Pool fire hazard zones are determined by first calculating the maximum size of the flame column created by the pool fire and then determining how far specific radiant impacts extend from the fire column. For fire radiation hazards, the maximum distance to potentially injurious levels are determined.

The fire radiation hazard endpoint criterion defined in this study corresponds to a hazard level which might cause an injury. Data exist which define an injury level following exposure to fire radiation. Table 2 presents the endpoint hazard criteria used by federal agencies and national associations for this type of analysis.

Table 2
Consequence Analysis Hazard Levels
(Endpoint Criteria for Consequence Analysis)

Hazard Type	Injury Threshold		
	Exposure Duration	Hazard Level	Reference
Radiant heat exposure	40 sec	1,600 Btu/(hr•ft^2) *	40 CFR 68 [EPA, 1996]

40 CFR 68. United States Environmental Protection Agency RMP endpoints.

* Corresponds to second-degree skin burns.

Consequence Analysis

When performing site-specific consequence analysis studies, the ability to accurately model the release, dilution, and dispersion of gases and aerosols is important if an accurate assessment of potential exposure is to be attained. For this reason, Quest uses a modeling package, CANARY by Quest®, that contains a set of complex models that calculate release conditions, initial dilution of the vapor (dependent upon the release characteristics), and the subsequent dispersion of the vapor introduced into the atmosphere. The models contain algorithms that account for thermodynamics, mixture behavior, transient release rates, gas cloud density relative to air, initial velocity of the released gas, and heat transfer effects from the surrounding atmosphere and the substrate. The release and dispersion models contained in the QuestFOCUS package (the predecessor to CANARY by Quest®) were reviewed in a United States Environmental Protection Agency (EPA) sponsored study[1] and an American Petroleum Institute (API) study[2]. In both studies, the QuestFOCUS software was evaluated on technical merit (appropriateness of models for specific applications) and on model predictions for specific releases. One conclusion drawn by both studies was that the dispersion software tended to overpredict the extent of the gas cloud travel, thus resulting in too large a cloud when compared to the test data (i.e., a conservative approach).

A study prepared for the Minerals Management Service[3] reviewed models for use in modeling routine and accidental releases of flammable and toxic gases. CANARY by Quest® received the highest possible ranking in the science and credibility areas. In addition, the report recommends CANARY by Quest® for use when evaluating toxic and flammable gas releases. The specific models contained in the CANARY by Quest® software package have also been extensively reviewed.

[1] *Evaluation of Dense Gas Dispersion Models*. Prepared for the U.S. Environmental Protection Agency by TRC Environmental Consultants Inc., East Hartford, Connecticut, 06108, EPA Contract No. 68-02-4399, May, 1991.

[2] *Hazard Response Modeling Uncertainty (A Quantitative Method)*; *Volume II, Evaluation of Commonly-Used Hazardous Gas Dispersion Models*, S. R. Hanna, D. G. Strimaitis, and J. C. Chang, Study cosponsored by the Air Force Engineerin4g and Services Center, Tyndall Air Force Base, Florida, and the American Petroleum Institute, and performed by Sigma Research Corporation, Westford, Massachusetts, September 1991.

[3] *A Critical Review of Four Types of Air Quality Models Pertinent to MMS Regulatory and Environmental Assessment Missions*, Joseph C. Chang, Mark E. Fernau, Joseph S. Scire, and David G. Strimaitis. Mineral Management Service, Gulf of Mexico OCS Region, U.S. Department of the Interior, New Orleans, November, 1998.

CANARY by Quest® also contains models for pool fire and torch (jet) fire radiation. These models account for material composition, target height relative to the flame, target distance from the flame, atmospheric attenuation (includes humidity), wind speed, and atmospheric temperature. The fire models are based on information in the public domain (published literature) and have been validated with experimental data.

Conclusions

CANARY by Quest® was used to model the potential tank top fire following the failure of the tank dome. Table 3 presents the maximum downwind distances for the pool fire hazard associated with two proposed and four existing storage tanks in the same area of the Phillips 66 refinery. As can be seen from the table, the impact distances can extend up to about 510 feet from the center of the proposed 615,000 barrel tank. This maximum impact distance is larger than the potential hazard zones associated with the nearby existing tanks but the impact distance to 1,600 Btu/(hr•ft^2) does not extend off the refinery property. Thus, the addition of the two proposed storage tanks to this section of the Phillips 66 refinery does not pose any new hazards to areas outside of the existing Refinery.

The results listed in Table 3 are presented in Figure 2. The maximum impact zone distances are shown in Figure 2 for each proposed and existing tank evaluated. The dashed lines around the existing tanks show the area currently potentially exposed to a 1,600 Btu/(hr•ft^2) radiant impact. The dashed lines around the proposed tanks show the area that could be exposed to a 1,600 Btu/(hr•ft^2) radiant impact. As can be seen in Figure 2, neither of the two proposed tanks can produce this impact level outside the refinery property line. The potential radiant impact zones all shown for the four existing tanks (510, 511, 512, and 513) in order to demonstrate the existence of the current potential hazard relative to the potential new hazard associated with tank 2640.

I believe this covers the analysis requested. If you have any questions, please give us a call.

Sincerely,

John B. Cornwell.
Principal Engineer

tml

Table 3
Consequence Modeling Radiation Results

Tank Status	Tank Number(s)	Contents	Tank Diameter (ft)	Tank Wall Height (ft)	Distance (ft) to 1,600 Btu/(hr•ft^2) [measured from center of tank]
Proposed	2640	Hydrocarbon mix with Reid Vapor Pressure up to 11 psi	260	65	510
Proposed	2643	Crude oil and water	44	52	130
Existing	510, 511, 512, 513	Crude oil	218	50	450

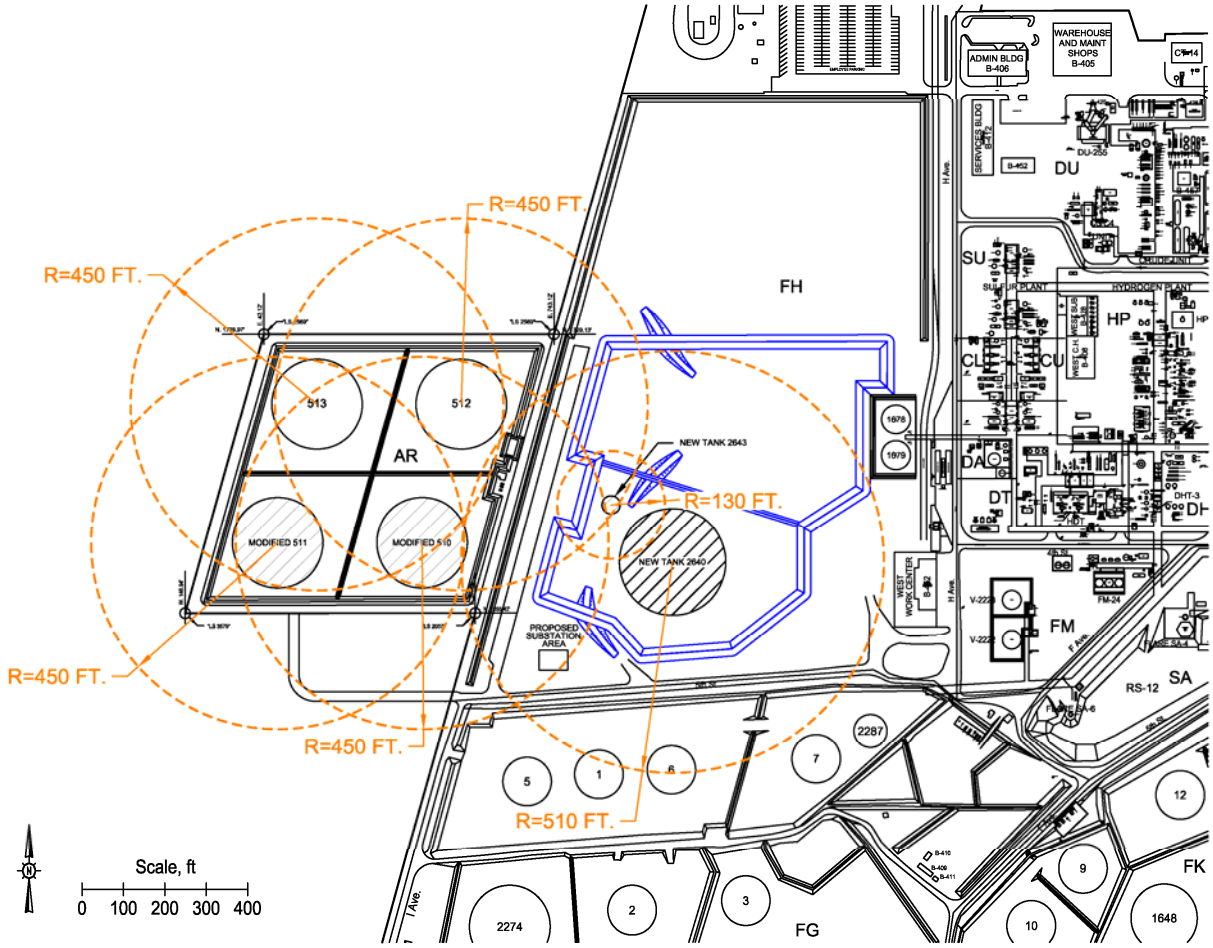

Figure 2
Potential 1,600 Btu/(hr•ft^2) Impact Zones for Existing and Proposed Storage Tanks

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APPENDIX D

Adjudicated Water Rights

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Table 2 – Water Rights Accounting (acre-feet)

Party ID	Party	Sales [1] 2011-12	Adjudicated Right 2011-12	Carryover from 2010-11	Leases [1]		Allowable Extraction [2]	Amount Pumped	In-Lieu	Balance [3]	Allowable Carryover into 2012-2013		
					With Flex	Without Flex					Drought	Normal	Total
7002	A B C Nursery, Inc		24.10	4.82			28.92	14.80		14.12		4.82	4.82
7003	Allied-Signal, Inc (Torrance)		22.50	4.50			27.00	0.00		27.00		4.50	4.50
7013	Aqua Capital Mangement LP		11.80	2.36	-14.16		0.00	0.00		0.00		0.00	0.00
7015	Asahi Fancy Koi, Inc		2.00	34.20			36.20	0.00		36.20	32.20	2.00	34.20
7025	Atlantic Richfield Company		5,309.00	1,061.80			6,370.80	2,421.94		3,948.86		1,061.80	1,061.80
7028	Automation Industries, Inc		0.70	5.40			6.10	0.00		6.10	3.40	2.00	5.40
7048	CBS, Inc.		9.50	2.00			11.50	0.00		11.50		2.00	2.00
7050	California Water Service Company		4,070.00	814.00			4,884.00	2,185.98		2,698.02		814.00	814.00
7053	California Water Service Company (Dominguez)		10,417.45	2,083.49			12,500.94	5,618.11		6,882.83		2,083.49	2,083.49
7052	California Water Service Company (Hawthorne Lease)		0.00	2.00			2.00	312.79		-310.79		-310.79	-310.79
7065	Carson-Harbor Village Mobile Home Park	-1.20	7.00	2.00			9.00	0.00		9.00		2.00	2.00
7070	Carson-Madrona Company		104.00	20.80			124.80	0.00		124.80		20.80	20.80
7075	Century Builders		4.70	2.00			6.70	0.00		6.70		2.00	2.00
7080	Chandler's Palos Verdes Sand & Gravel Company		294.20	-9.30	-40.00		244.90	266.04		-21.14		-21.14	-21.14
7086	Chevron USA, Inc.		4,601.30	140.00	-3,901.30		840.00	0.00		840.00		140.00	140.00
7089	Coastline Church of Christ		0.70	5.40			6.10	0.00		6.10	3.40	2.00	5.40
7093	Conocophillips Company		6,170.00	2,021.78			8,191.78	4,558.39		3,633.39	787.78	1,234.00	2,021.78
7100	Curtis, Owen W		0.36	4.72			5.08	0.00		5.08	2.72	2.00	4.72
7110	Delaney, Golda Estate of		4.10	12.20			16.30	0.00		16.30	10.20	2.00	12.20
7150	El Segundo, City of		953.00	0.40	-953.00		0.40	0.00		0.40		0.40	0.40
7156	Engelsma, Susan Trust		12.10	2.00	-12.10		2.00	0.00		2.00		2.00	2.00
7165	Evergreen America Corp.		5.40	2.00			7.40	0.00		7.40		2.00	2.00
7201	Fujimoto, S.R., S.T., & J.K.		20.00	16.28			36.28	3.95		32.33	12.28	4.00	16.28
7220	Gillingham, Florence R, et al		2.40	2.00			4.40	0.00		4.40		2.00	2.00
7226	Golden State Water Company		7,502.24	2,387.97	6,101.30		15,991.51	13,434.32		2,557.19	3.39	2,553.80	2,557.19
7260	Hawthorne, City of		1,882.00	376.40			2,258.40	0.00		2,258.40		376.40	376.40
7270	Hillside Memorial Park		92.30	-18.75	44.16		117.71	111.12		6.59		6.59	6.59
7278	Hollywood Park Land Company, LLC		282.00	0.00	-282.00		0.00	0.00		0.00		0.00	0.00
7285	Honold, Kristin Brandsma		11.80	2.36			14.16	0.00		14.16		2.36	2.36
7293	Hughes Aircraft Company		0.00	0.00			0.00	0.00		0.00		0.00	0.00
7310	Inglewood, City of		4,449.89	557.66	-1,748.00		3,259.55	2,475.53		784.02		540.38	540.38
7312	Inglewood Park Cemetery		0.00	2.00			2.00	0.00		2.00		2.00	2.00
7364	Kinder Morgan Liquids Terminals, LLC		167.00	33.40			200.40	4.75		195.65		33.40	33.40
7380	Leuzinger, Emma L Estate of		1.40	6.50			7.90	0.00		7.90	4.50	2.00	6.50
7450	Lomita, City of Water System		1,352.00	70.40	-450.00		972.40	12.81		959.59		180.40	180.40
7390	Long Beach, City of		0.70	2.00			2.70	0.00		2.70		2.00	2.00
7400	Lopes, Frank		3.70	11.40			15.10	0.00		15.10	9.40	2.00	11.40
7410	Los Angeles, City of		1,503.00	300.60			1,803.60	0.00		1,803.60		300.60	300.60
7435	Los Angeles County Recreation Facilities		363.70	72.74			436.44	346.26		90.18		72.74	72.74
7440	Los Angeles County Sanitation District 2		102.00	20.40			122.40	0.03		122.37		20.40	20.40

Source: California Department of Water Resources, Watermaster Service in the West Coast Basin, Los Angeles County, September 2012.
http://www.water.ca.gov/watermaster/sd_documents/west_basin_2012/westcoastbasinwatermasterreport2012.pdf (downloaded July 2, 2013)

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APPENDIX E

NOISE IMPACT CALCULATIONS

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TABLE E-1

Construction Noise Impact Estimates

Distance from Construction Activities	Estimated Noise Levels (dBA)
50	85
100	79
200	73
400(1)	67
800	61
1,600(2)	55
3,200	49

(1) Distance to closest industrial receptor.
(2) Distance to closest resident (sensitive receptor).

TABLE E-2

Construction Vibration Impact Estimates

Distance from Construction Activities	Construction Equipment Vibration (VdB)				
	Pile Driver	Large Bulldozers	Loaded Trucks	Jackhammer	Small Bulldozer
25	100	87	86	79	58
50	94	81	80	73	52
100	88	75	74	67	46
200	82	69	68	61	40
400	76	63	62	55	34
800	70	57	56	49	28
1,600(1)	64	51	50	43	22
3,200	58	45	44	37	16

(1) Distance to closest resident (sensitive receptor). Note there is no CEQA significance threshold for industrial sources.