3.12

RISK OF UPSET/HAZARDOUS MATERIALS

3.12.1 Introduction

This section discusses potential impacts on public health and safety from risk of upset and hazardous materials associated with implementation of the proposed Project and its alternatives. For the purposes of this analysis, risk of upset is defined as accidental conditions that could potentially result in crude oil spills, fires, and explosions. Data on risks associated with marine vessels and marine transportation are also discussed in Section 3.9, Marine Transportation.

3.12.1.1 Relationship to the 1992 Deep Draft Final EIS/EIR

The 1992 Deep Draft Final Environmental Impact Statement/Environmental Impact Report (FEIS/FEIR) (USACE and LAHD 1992) evaluated at a project-specific level, and recommended mitigation to the extent feasible for, all significant impacts related to risk of upset and hazardous materials (this section was termed “Public System Safety” in the Deep Draft FEIS/FEIR) associated with navigational and landfill improvements required in the creation of Pier 400. This includes those portions of the proposed Project located on Pier 400. In addition, the Deep Draft FEIS/FEIR evaluated at a general, or programmatic, level the foreseeable impacts of development and operation of terminal facilities planned for location on Pier 400, including a marine oil terminal and associated infrastructure. The Deep Draft FEIS/FEIR identified the primary risk of upset/hazardous materials impacts of terminal development and operations as resulting from 1) handing, storing, and transport of hazardous material; 2) accidents involving a release or spill of hazardous material; 3) and accidents resulting in fire or explosion. The Deep Draft FEIS/FEIR determined that these impacts would be significant and recommended seven programmatic mitigation measures to address these issues. The Deep Draft FEIS/FEIR concluded that with the incorporation of mitigation measures, there would be no unavoidable significant adverse impacts.

The Deep Draft FEIS/FEIR incorporated the mitigation measures listed below to address the potential impacts from fires, explosions, or spills. All but one of these mitigation measures are applicable to the proposed Project as noted below. All applicable mitigation measures must be implemented by the proposed Project as

Project conditions in addition to any new mitigation measures developed specific to the Project in this Supplemental EIS and Subsequent EIR (SEIS/SEIR). Mitigation measures from the Deep Draft FEIS/FEIR and new project-specific mitigation measures developed as part of this supplemental document would be enforced by inclusion in a Mitigation Monitoring and Reporting Program (MMRP).

Mitigation Measures from the 1992 Deep Draft Final EIS/EIR that are Applicable to the Proposed Project

The following mitigation measures were developed in the Deep Draft FEIS/FEIR to reduce the potential risks from fires or spills during construction and operation of the proposed Project as analyzed in the Deep Draft FEIS/FEIR. These mitigation measures remain applicable to the current proposed Project and must be implemented with the noted changes in oil spill cleanup cooperatives:

Mitigation Measure (MM) 4I-2 required that all facility operators handling hazardous liquid in bulk be a member of the Clean Coastal Waters (CCW) cooperative or equivalent Oil Spill Response Organization (OSRO) approved by the U.S. Coast Guard (USCG).

MM 4I-3 stated that the overland transportation corridor was to be designed so that spills along the corridor would be contained and not allowed to run off into the water.

MM 4I-4 required that facilities handling crude oil or petroleum products have built-in fire protection measures. Current codes (e.g., Uniform Fire Code) and standards (e.g., National Fire Protection Association [NFPA] 30) require fixed fire monitoring and suppression systems for facilities handling crude oil. The proposed Project is designed to meet or exceed all applicable codes and standards.

MM 4I-5 required that besides fresh water supplied to the facilities, the facilities should also be equipped to use seawater for fire protection. Specific equipment and flow rates would be included in the Fire Protection Plan to be approved by the Los Angeles Fire Department (LAFD).

MM 4I-7 required that the Port Police provide adequate security coverage of the area. For the proposed Project this would likely include vehicle barriers, site control and regular patrols.

Mitigation Measures from the 1992 Deep Draft Final EIS/EIR that are No Longer Applicable or are Not Applicable to the Proposed Project

MM 4I-1 stated that pipelines (versus truck or rail transport) were to be used where practicable to transport large quantities of crude oil or petroleum products.

Reason No Longer Applicable: *This mitigation measure has already been incorporated into the proposed Project. The proposed Project entails construction of pipelines for the transportation of all products and would not entail any transportation of crude oil or petroleum products via trucks or rail.*

MM 4I-6 stated that the Port of Los Angeles (Port) was to continue to implement its Fire Protection Master Plan to upgrade fire protection services to a level adequate to meet the additional needs of planned projects.

Reason No Longer Applicable: *This mitigation measure has already been accomplished and includes the proposed Project. The California Coastal Commission certified the Ports' Risk Management Plan (RMP) in November 1983. The certified RMP has been used for the siting of new hazardous liquid cargo facilities and any proposed modification, expansion or relocation of existing hazardous liquid cargo facilities in a manner that minimizes or eliminates risks to life and property in and around the port through the physical separation of hazards and vulnerable resources. An RMP was prepared for the proposed Project as described in the 1992 Deep Draft Final EIS/EIR. On November 18, 1992, the Los Angeles Board of Harbor Commissioners approved submission of a Master Plan amendment to the Coastal Commission for certification which was approved on April 14, 1993. As part of this process, the Port Risk Management Analysis has been updated for the proposed Project consistent with the Port Master Plan's fire protection requirements.*

3.12.2 Environmental Setting

For the proposed Project, environmental setting or baseline conditions reflect the current (2004) risks of upset associated with Port operations, as well as other oil and gas facilities that presently operate in the general proposed Project area.

3.12.2.1 Regional Overview

Port operations (e.g., navigation of large vessels in constricted channels, operation of heavy machinery and cranes, machinery fueling and fuel storage, handling and storage of various potentially hazardous loads, etc.) involve a variety of risks that may result in an accident. Risks associated with the proposed operation of a marine terminal would include marine vessel accidents leading to tanker damage, and subsequent oil spills into the environment. Risks associated with the proposed crude oil and petroleum product transfers, storage, and pipeline transport would include those associated with transfer equipment damage, pipeline damage, and oil storage or pumping equipment damage or failure. These risks could lead to subsequent oil or fuel spills into or near water, fires, and hazardous combustion byproducts releases.

Petroleum products that would be delivered to the proposed Marine Terminal mainly include stabilized crude oil and heavier, partially refined petroleum products, which contain relatively minor proportions of light-end, flammable petroleum hydrocarbons. Several crude oil streams are proposed as part of the proposed Project, mainly those originating in the Middle East such as Arabian Light Crude. The risk analysis in Section 3.12.4 evaluated potential project-related impacts based on the worst-case characteristics of the most volatile petroleum stream that would be handled at the proposed facilities. In addition, the use of floating roof tanks and Best Available Control Technologies (BACTs) in proposed petroleum storage tanks eliminates the tank vapor space and all but a residual amount of vapors emanating from crude oil, which in turn, substantially reduces the potential for a large flammable vapor cloud and subsequent explosion.

Sensitive Receptors

The Port and project-related operations present risks to proposed Project personnel, employees of other facilities in the area, recreational and visitor populations, and nearby permanent residential populations. This analysis focuses on evaluating the risk to the public in the vicinity of the proposed Project.

The San Pedro Bay Ports are surrounded by residential areas, including the communities of San Pedro to the west, Wilmington to the north, and Long Beach to the east. Sensitive receptors within these communities include schools, community and daycare facilities, and hospitals (see Figure 3.12-1). These facilities are considered sensitive since they are populated with the young, elderly and/or infirm where rapid evacuation for large numbers of people is not likely to occur in the event of an accident. The Terminal Island prison is not considered a sensitive receptor since its population is generally comprised of healthy adult individuals and it is located at a sufficient distance from Project-related facilities to accommodate sheltering in place within robustly constructed facilities during an accident at Berth 408 or other Project facilities.

Plans are also underway to develop two new park areas in the region, which would be considered sensitive receptors. These parks include: (1) Avalon Triangle Park, an active recreational park, is proposed for development in the 2.84-acre (1.15-hectare [ha]) triangular area bounded by Avalon Boulevard, Harry Bridges Boulevard, and Broad Avenue and (2) A small 0.82-acre (0.33-ha) passive use park, the Banning's Landing Pedestrian Plaza, is planned for location on the west side of the Banning's Landing Community Center.

Risks from Oil Facilities in the Port of Los Angeles Area

The region surrounding the Port (the Los Angeles Basin) contains a number of natural oil and gas fields. Development and use of these natural resources have been ongoing in the area for nearly a century. As a result, there is a variety of oil-production and refining facilities scattered throughout the area (see Figure 3.12-2) and connected by various pipelines. The presence and operation of these facilities, especially those close to other Port operations, currently present some level of baseline risk to the public and environment. However, these risks are not quantified under the scope of this document unless there is an overlap in risk with the proposed Project.

Although oil facilities and pipelines in the area are engineered safely and undergo extensive environmental review prior to their approval and construction, and rigorous safety testing prior to their operation, the nature of the materials handled by these facilities and pipelines nonetheless pose risks to people, the environment, and property in the vicinity. Upsets are possible even under normal operating conditions for oil pipelines and oil facilities, and they therefore pose an ever-present risk of exposing the surrounding population to accidental releases of materials. These releases can subsequently lead to biological and/or hydrological damage, fires, and/or releases of petroleum fire hazardous combustion byproducts.

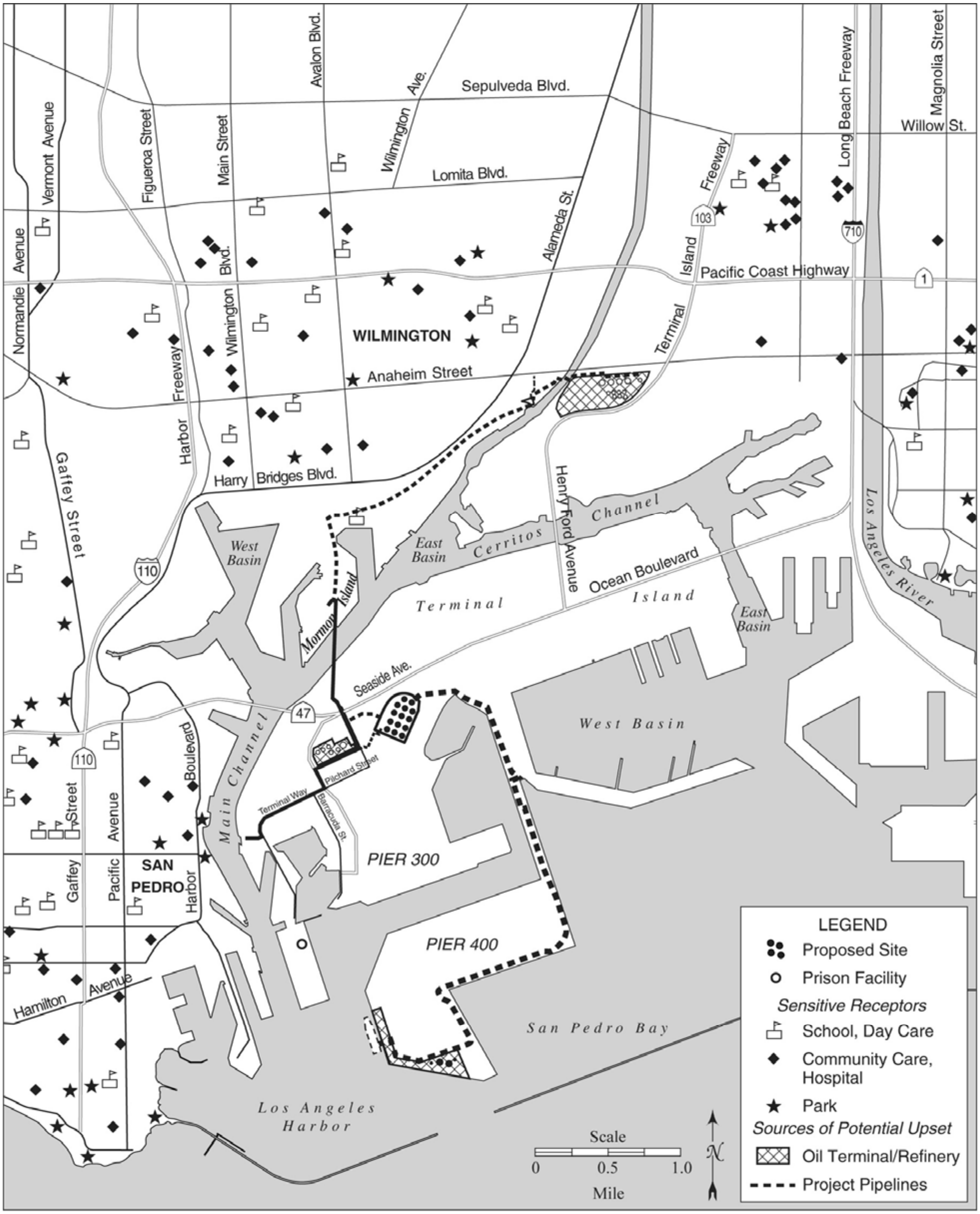

Figure 3.12-1. Sensitive Receptors in the Project Area

The San Pedro Bay Ports also contain facilities that handle other types of non-petroleum product hazardous materials. The San Pedro Bay Ports maintain a RMP (LAHD 1983; Port of Long Beach 1981) that outlines the locations of various hazards throughout the Port and addresses response capabilities and emergency procedures. The RMP contains policies designed to minimize the impacts of accidents associated with the release of hazardous materials. The Release Response Plan prepared in accordance with the Hazardous Material Release Response Plans and Inventory Law (California Health and Safety Code, Chapter 6.95), which is administered by the LAFD, also regulates hazardous material activities within the Port. These activities are conducted under the review of a number of agencies and regulations, including the RMP, USCG, fire department, and state and federal departments of transportation (49 Code of Federal Regulations [CFR] Part 176).

Currently, oil and petroleum product imports dominate the oil movement through the San Pedro Bay Ports and San Pedro Bay. Recent data on oil and petroleum product throughput for San Pedro Bay is presented in Table 3.12-1 and indicate some inter-annual variability, but a general increasing trend in crude oil and petroleum product deliveries. A number of factors, such as refinery and pipeline availability, commodity prices and availability, cause these variations. Total Port oil throughput would increase with proposed Project operations, which would introduce an estimated additional 247 million barrels per year (mby) to the San Pedro Bay Ports by 2040, which would accommodate an annual average growth in petroleum demand of 2.8 percent between 2004 and 2040.

Table 3.12-1. San Pedro Bay Ports Annual Crude Oil and Petroleum Product Throughput (mby)

Product	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*
Port of Los Angeles						
Crude Oil	17.5	15.8	13.4	13.5	12.5	1.9
Petroleum Products	49.7	38.3	43.7	63.1	67.0	108.9
Total	67.2	54.1	57.1	76.6	79.5	110.8
Port of Long Beach						
Crude Oil	127.5	133.0	129.2	124.6	126.7	151.6
Petroleum Products	42.8	44.1	29.8	37.2	27.6	10.0
Total	170.3	177.1	159.0	161.8	154.3	161.6
San Pedro Bay						
Crude Oil	145.0	148.8	142.6	138.1	139.2	153.5
Petroleum Products	92.5	82.4	73.5	100.3	94.6	118.9
Total	237.5	231.1	216.1	238.4	233.8	272.4
Sources: USACE (2001-2005; 2007).						

History of Oil Spills

The California State Lands Commission (CSLC) has been tracking oil spills from California marine terminals since 1992. A total of 128 spills, varying from a few teaspoons to 1,092 gallons (26 barrels [bbl]), occurred during the 10 years reported from 1992 through 2001. This equates to approximately 13 spills per year.

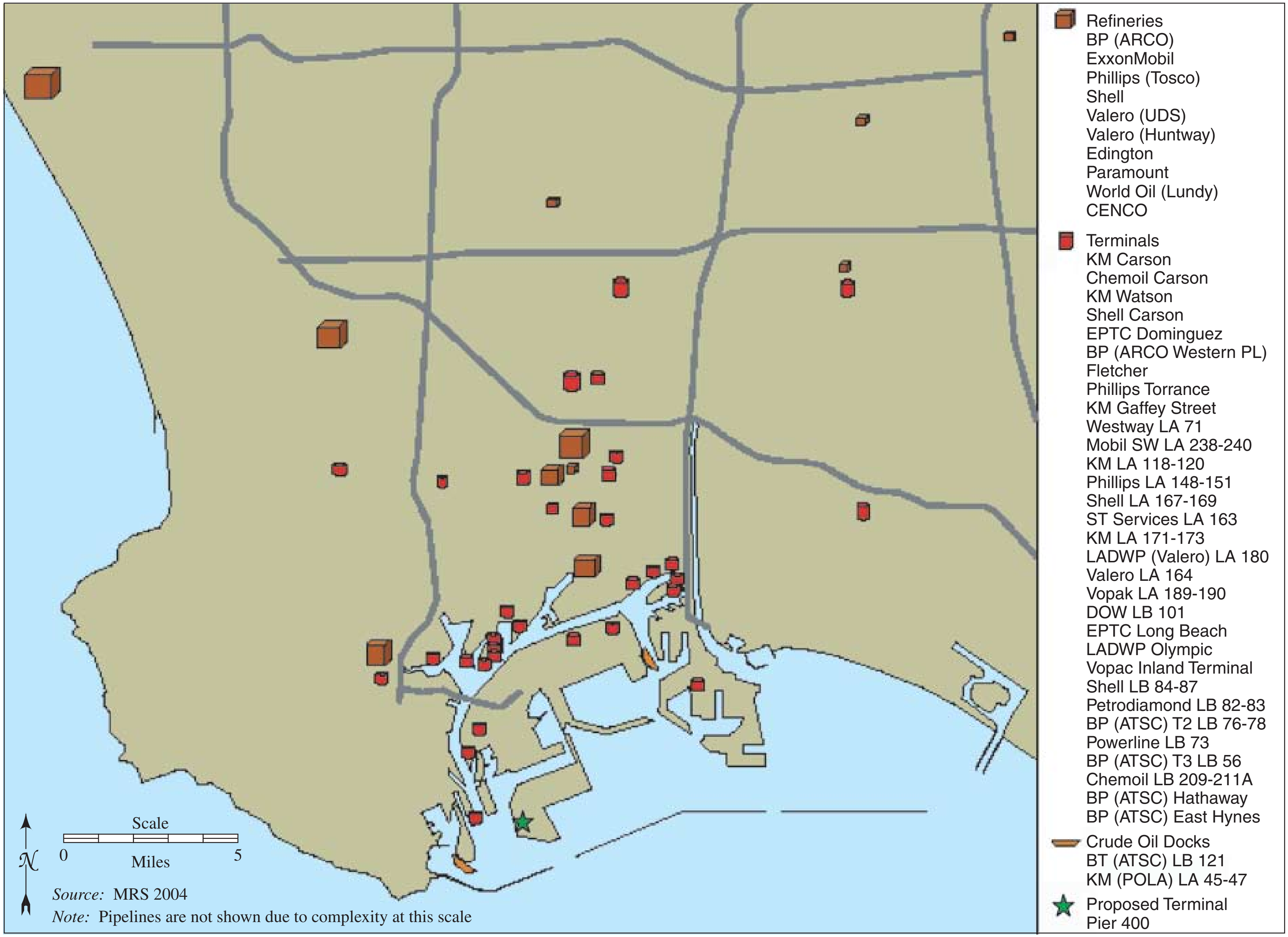

Figure 3.12-2. Los Angeles Area Petroleum Facilities Infrastructure

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Terminals were the responsible party for approximately 57 percent of the spills, while vessels were responsible for the remaining 43 percent. An updated CSLC (2007) evaluation of marine terminal oil spill shows that the rate of oil spills at California marine terminals is declining. For the period 1994-2006, California marine terminal oil spills declined from a high of six per 1,000 transfers to two per 1,000 transfers.

The USCG maintains a database for all pollution incidents into U.S. Waters. An analysis of the database indicates that the percentage of the volume of oil spilled per vessel type varies greatly from year to year. In all but a very few years, the largest percentage of the oil spilled during that year came from tankers (USCG 2004). Tanker accidents, however, have been the cause of most of the largest spills (by volume). The International Tanker Owners Pollution Federation Ltd. (ITOPF) has been maintaining a database of statistics on all tanker oil spills (except due to acts of war) occurring throughout the world since 1970. The data (Table 3.12-2) show that the number of spills per year has steadily declined since the 1970s, and show the effectiveness of international efforts to reduce oil spills.

Table 3.12-2. Statistical Facts on Worldwide Oil Spills from Oil Transportation Vessels

Time	*Number of Oil Spills 7-700 tons*	*Number of Oil Spills over 700 tons*	*Quantity of Oil spilled (tons)*	*Average Number of Spills per Year*
1970-1979	536	252	3,142,000	79
1980-1989	356	93	1,176,000	45
1990-1999	280	78	1,140,000	36
2000	19	4	14,000	23
2001	16	3	8,000	19
2002	12	3	82,000	15
2003	15	4	42,000	19
2004	16	5	15,000	21
2005	21	3	17,000	24

Sources: ITOPF 2004, 2005, 2006.

On December 17, 1976, the Liberian oil tanker Sansinena, moored at Berth 46, Union Oil Terminal, Los Angeles Harbor, exploded, split in half, and burned while taking on ballast and bunker fuel. The casualties amounted to six crew members dead and 22 injured, two crew members and one security guard missing and presumed dead, and 36 members of the public injured. The vessel did not have a cargo of crude oil onboard. The blast shattered windows for miles around and triggered a fire that spread across the dock and around the tanker. The LAFD soon arrived on the scene to contain the blaze and rescue survivors. A USCG investigation later concluded that the incident was caused by flammable vapor buildup on the deck of the ship. During ballasting, vapors were vented onto the deck area during low wind speed conditions, eventually finding an ignition source. The initial deflagration (sub sonic flame front velocity) transitioned to a detonation when the flame front entered one of the storage tanks, causing a confined explosion in Tank 10. The ignition source was never identified, although there were numerous possibilities.

This scenario is no longer probable due to prohibitions on flammable vapor venting both during loading, unloading, and ballasting operations. In addition, vessel tank vapor spaces are “inerted” to prevent flammable vapor mixtures (i.e., hydrocarbons and air in a mixture between the upper and lower flammability limits). The proposed Project would have a dedicated vapor recovery system to control the venting of flammable hydrocarbon vapors. All vessels calling at the proposed facility would also be equipped with inert gas systems to prevent flammable vapor mixtures from forming in vessel tanks.

In July 2006, a tanker carrying 215,000 gallons of gasoline experienced a malfunction of the ship inert gas system. The tanker, Probo Elk, failed a standard inspection when it was found that four of the ship's seven cargo tanks had inert gas levels above the maximum allowed oxygen content of 8 percent. The ship inert gas system and tank vapor spaces were stabilized without incident, but a voluntary zone within ½ mile of the ship was implemented as a precaution (Littlejohn, 2006).

Figure 3.12-3 displays the number of oil spills that were recorded in southern California waters (except San Diego County) from 1998 to 2005. These spills range in size from a cup to over 5,000 gallons. The causes of these spills are extremely varied and include incidents such as recreational boats pumping oil from their bilge; oil platform and pipeline spills; fuel dock, marine terminal, and bunkering accidents; storm drain inputs; and large commercial vessels discharging oil-contaminated ballast water.

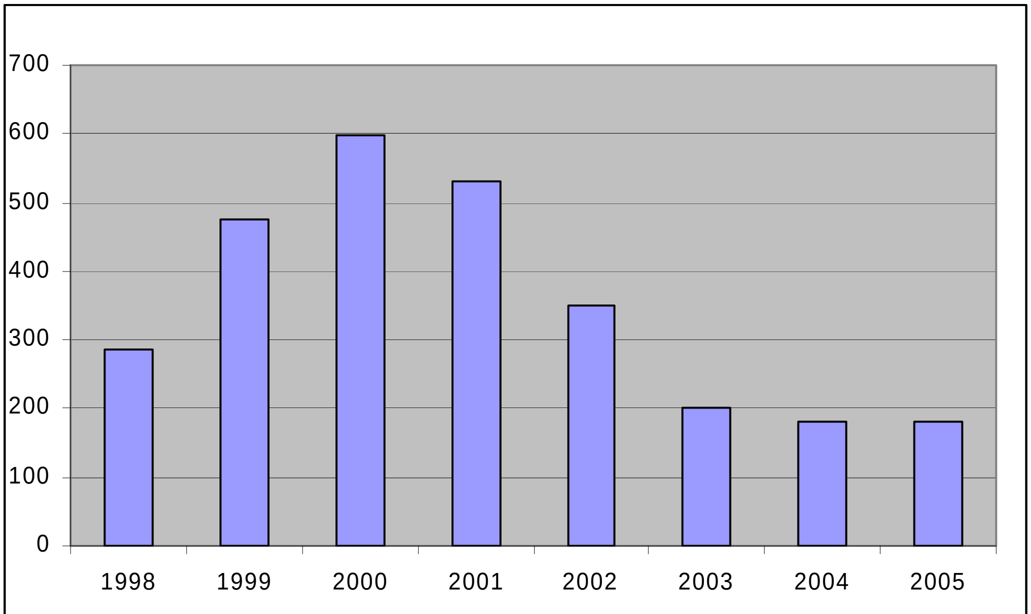
To understand oil spill significance, the amount spilled during this period is presented in Figure 3.12-4. The volumes provided are for all spills in the Captain of the Port (COTP) area of responsibility, but the actual amount that affected the water in the Los Angeles Harbor area was less than 2,000 gallons in 2004.

To provide some reference to the magnitude of spills in the Los Angeles Harbor area, the largest spill from year 2005 was 1,900 gallons when a tanker truck was ruptured on a bridge of Highway 710 spilling the contents into the LA River which then flowed into the Port of Long Beach (Marine Exchange 2006). According to the Marine Exchange, there has been only one noteworthy hazardous materials (HazMat) spill, other than petroleum, into the water during recent years: in 2005, a spill of 6,000 pounds of caustic soda, also due to a truck accident, occurred.

Ports of Los Angeles and Long Beach Oil Spill Response Capability

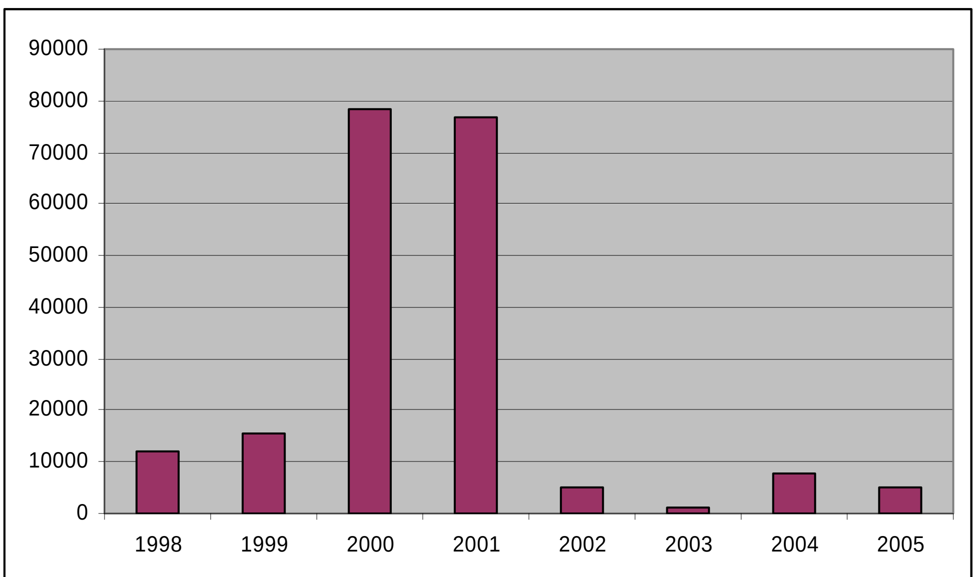
The responsibility for onshore and offshore spill containment and cleanup lies with the owner/operator of the facility or vessel involved in the spill (40 CFR, Part 112). All Los Angeles Harbor Department (LAHD) marine terminals and all vessels calling at the marine terminals are required to have oil spill response plans and a certain level of initial response capability. As it is not economically feasible or practical for terminal operators and vessels to each have their own equipment to respond to more than minor spills, operators rely on pooled or contract capabilities. Most spills at the Ports of Los Angeles and Long Beach are small and handled by commercial contractors. Most major oil companies are members of Marine Spill Response Corporation (MSRC), an oil spill cooperative established to respond to marine spills in Los Angeles and Orange counties, including the proposed Project area.

Figure 3.12-3. History of Oil Spills in the San Pedro Bay Ports (number of spills)



Note: The data for the Figure is from the entire area of responsibility for the Captain of the Port including the Ports of Los Angeles, Long Beach, Port Hueneme, and the waters extending from the Orange/San Diego County line to the northern limit of San Luis Obispo County.
Source: Marine Exchange 2006.

Figure 3.12-4. Quantities of Oil Spilled in the COTP Area (gallons)



Source: Marine Exchange 2006.

The vessel and terminal owners use various companies and organizations to provide their response capability. The USCG has created the OSRO classification program so that facility and tank vessel operators can contract with and list OSRO in their response plans in lieu of providing extensive lists of response resources to show that the listed organization can meet the response requirements. Organizations looking to receive a USCG OSRO classification submit an extensive list of their resources and capabilities to the USCG for evaluation. The State of California has a similar OSRO classification program to allow facility and tank vessel operators to list OSROs in meeting State oil spill response requirements.

Organizations that provide oil spill removal in the proposed Project area include: Advanced Cleanup Technology; ANCON Marine, Inc.; Clean Seas, LLC; NRC Environmental Services Inc.; Heritage Environmental Services; Marine Spill Response Corporation (MSRC); National Response Corporation; Oil Mop, LLC; Patriot Environmental Services; SoCal Ship Services; and Tractide Marine Corporation. The 1992 Deep Draft FEIS/FEIR **MM 4I-2** requires that the proposed Project operator be a member of MSRC or similar cooperative. The major capabilities of this organization are summarized below.

Marine Spill Response Corporation

The MSRC has the largest, dedicated, standby oil spill response program in the U.S., including open water, shoreline, and mid-continent river operations. MSRC response services are available to all Marine Preservation Association (MPA) members, companies that have contracted with MSRC, and on a reimbursable basis.

MSRC responds to oil spills of any size, shoreline cleanup and, as appropriate, hazardous material spill response and response to spills outside the U.S. MSRC can provide additional response capabilities through a network of contractors that make up MSRC's Spill Team Area Responders (STARs).

MSRC equipment in the proposed Project area is summarized in Table 3.12-3.

3.12.2.2 Hazardous Materials

Hazardous materials are the raw materials for a product or process that may be classified as toxic, flammable, corrosive, or reactive. Numerous facilities that handle, store, or transport hazardous materials are located within the Port. The LAHD estimates that 5,000 hazardous material containers are handled at the Port each year (Curry 2004). Regulated, non-cargo hazardous materials in the Port may include maritime-use compounds such as chlorinated solvents, petroleum products, compressed gases, paints, cleaners, and pesticides.

Numerous federal, state, and local agencies regulate the storage, use, transport, generation, or handling of these materials. The transfer, handling, storage, and transport of hazardous liquid bulk cargoes within the Port is governed by the amendment to the LAHD RMP (LAHD 1983), and is also under the review of a number of agencies and regulations, including the USCG, Los Angeles City and

Table 3.12-3. MSRC Response Equipment at the Ports of Los Angeles and Long Beach

Description	*Quantity or Length*	*Location*
Booms – various Simplex Boom, Expandi, ReelPack, Solid Fill	up to 13,000 ft (3,960 m)	Port of Long Beach (Berth 57 & 59)
Skimmers (recovery capacity in bbl/day) WP 1 (3,017) Lori Lors (29,724) Lori Bow Collect (2,477) GT-185 (5,416) Multi-Model 24 (2,500)	 1 6 1 4 1	
Vessels Shallow Water Barge (400 bbl) 18' Small boat Shallow Water Push Boat Lori Barges (100 bbl on each, total 300 bbl)	 1 2 1 3 barges	
Additional Recovery Capacity – on the boats Clean Waters I, Recovery 1, Recovery 2, and Response 3	up to 6,000 bbl total	
Skimmers (recovery capacity in bbl/day) Walosep WM, (336) Desmi Terminator (3,019) GT-185 (3,990) Lori Side Collectors (2,477) Lori Bow Collectors (4,954)	 1 1 3 1 2	Yard and Warehouse, Port of Long Beach
Booms – various Kepner, Amer Marine, Maer Marine, Expandi, Parker, and Cont Sys	up to 15,300 FT (3,750 M)	
Vessels 16’ Small Boats Fast Tanks (62 bbl each, total 124 bbl) Drancones (29 bbl each, total 87 bbl) Kepner Sea Bag (29 bbl) 8 bbl tanks, total 16 bbl	 2 2 3 1 2	
Booms – various Amer Marine, Solid Fill, Kepner	up to 11,240 ft (3,425 m)	Fire Boat Stations No.20 & 5, Berth 35, Port of Long Beach; Berth 120 and 46 in Port of Los Angeles
FORMER CCW RESPONSE EQUIPMENT AT PORT OF LONG BEACH (MERGED WITH MSRC)		
Oil Spill Response Vessels (OSRVs) Clean Waters 1, Recovery 1, and Recovery 2 (4,908 bbl/day each, with nearly 6,000 bbl total storage capacity)	3	3 OSRVs have 2 Lori 4 Brush skimming systems & open-ocean boom.
Fast Response Boats (FRB) Work boats Oil storage barges (100 bbl capacity each)	7 6 3	3 FRBs have hydraulic boom reels (over 1,000 ft of boom).
Vessel dedicated skimmers Vessel of opportunity skimming systems Additional skimmers	17 3 3	Skimming system: Walosep W-1 Skimmer, hydraulic power pack, hydraulic crane, & 15-bbl oil/water sep. storage tank.
Containment boom	54,912 ft (16,737 m)	
Source: MSRC 2006.		

County fire departments, and state and federal departments of transportation (49 CFR Part 176). Hazardous materials classifications that may be transported at the Port include:

- Corrosive materials — solids, liquids, or gases that can damage living material or cause fire.
- Flammable liquids – liquids which may catch fire easily. Specifically a flammable liquid is a liquid which has a flash point below 100°F. Flash point is defined as the lowest temperature at which the liquid can form an ignitable mixture in air.
- Combustible liquids – liquids which have flash points between 100°F and 200°F. In general, combustible liquids must be heated to form an ignitable mixture in air.
- Flammable gas – any material that has a boiling point of 20°C (68°F) or less at 101.3 kilopascals (kPa), which is ignitable when in a mixture of 13 percent or less by volume with air, or has a flammable range with air of at least 12 percent regardless of the lower limit.
- Explosive materials — any compound classified by the NFPA as A, B, or C explosives.
- Oxidizing materials — any element or compound that yields oxygen or reacts when subjected to water, heat, or fire conditions.
- Toxic materials — gases, liquids, or solids that may create a hazard to life or health by ingestion, inhalation, or absorption through the skin.
- Unstable materials — those materials that react from heat, shock, friction, contamination, etc., and that are capable of violent decomposition or autoreaction, but which are not designed primarily as an explosive.
- Radioactive materials — those materials that undergo spontaneous emission of radiation from decaying atomic nuclei.
- Water-reactive materials — those materials that react violently or dangerously upon exposure to water or moisture.

Since 2002, there have been only two reported injuries from accidental releases of hazardous materials from containers; no deaths have resulted from releases of hazardous materials at the Port (Curry 2004).

Spills of petroleum products in the vicinity of the Ultramar facility have resulted in contamination of soils and shallow groundwater beneath the site. Groundwater remediation is currently being completed at the facility. See Section 3.7, Groundwater and Soils, for additional information regarding soils and groundwater contamination in the proposed Project area.

Soil at the existing PASHA Omni Terminal at Berth 174 contains hydrocarbons, and site remediation is expected to occur prior to the construction of Pipeline Segment 3. However, if by the time the proposed Project pipelines are to be placed and the site has not been remediated, any hazardous materials encountered and disturbed as a result of the installation activity would be hauled away to the proper landfill.

Pipeline Segment 3 may traverse beneath the former Koppers wood treating facility. This site is known to contain hazardous materials up to 12 to 15 ft (3.6 to 4.6 m) below ground. Due to the depth of the pipelines (up to 60 ft [18.3 m] below ground), HDD would mostly be completed below the depth of contamination. However, contaminated soil and groundwater associated with this site may be encountered during HDD just south of the intersection of McFarland Avenue and Alameda Street, where the western and eastern portions of Pipeline Segment 3 are drilled and where the pipeline returns to the surface (Figure 2-7). Construction through such materials could result in health and safety impacts to construction personnel, as well as require special handling, transport, and disposal protocol. See Section 3.7, Groundwater and Soils, for impacts related to soil and groundwater contamination along the pipeline route.

3.12.2.3 Public Emergency Services

The LAFD provides emergency response and fire protection services to the Port. Two larger fireboats and three smaller fireboats are strategically placed within the Harbor for quick response. The nearest fire boat station (Fire Boat #1) is located within the Fish Harbor region at the Port, approximately 1.5 miles (2.4 km) north of the Marine Terminal. Fire stations equipped with fire trucks are also located within the Port, and nearby in the communities of Wilmington and San Pedro.

The Los Angeles Police Department (LAPD), the Port Police, and the USCG collectively provide security services to the Port. Domestic maritime security requirements are the primary responsibility of the Federal Department of Homeland Security and are implemented in the Port by the USCG (see Section 3.12.2.5, Homeland Security). Both the USCG and the Port Police have committed substantial resources to personnel and equipment to enhance Port security.

A detailed discussion of emergency public services, including fire and police protection, is provided in Section 3.13, Utilities and Public Services.

3.12.2.4 Port of Los Angeles Risk Management Plan

The Risk Management Plan, an amendment to the Port Master Plan (PMP), was adopted in 1983, per California Costal Commission (CCC) requirements. The Risk Management Plan is maintained and enforced by the Port to ensure new development is consistent with applicable policies and criteria. The purpose of the RMP is to provide siting criteria relative to vulnerable resources and the handling and storage of potentially hazardous cargo such as crude oil, petroleum products, and chemicals. The Risk Management Plan provides guidance for future development of the Port to minimize or eliminate the hazards to vulnerable resources from accidental releases. The hazard footprints generated as a result of the proposed Plains Crude Oil Marine Terminal, tank farm facilities, and Pipeline Project do not result in the long-term overlap of any existing, planned, or permitted vulnerable resources (see Section 3.12.4.1 for more information on the Port risk management). The proposed Project would be consistent with this Plan.

3.12.2.5 Homeland Security

3.12.2.5.1 Terrorism Risk

Prior to the events of September 11, 2001, the prospect of a terrorist attack on a U.S. port facility or a commercial vessel in a U.S. port would have been considered highly speculative under the California Environmental Quality Act (CEQA) and not analyzed. The climate of the world today has added an additional unknown factor for consideration; i.e., terrorism. There are limited data available to indicate the likelihood of a terrorist attack aimed at the Port or the proposed Project and, therefore, the probability component of the analysis described above contains a considerable amount of uncertainty. Nonetheless, this fact does not invalidate the analysis presented herein. A terrorist action could be the cause of events described in this section such as hazardous materials release and/or explosion. The potential impact of those events would remain as described herein.

3.12.2.5.2 Application of Risk Principles

Terrorism risk can be generally defined by the combined factors of threat, vulnerability, and consequence. In this context, terrorism risk represents the expected consequences of terrorist actions taking into account the likelihood that these actions will be attempted, and the likelihood that they will be successful. Of the three elements of risk, the threat of a terrorist action cannot be directly affected by activities in the Port. The vulnerability of the Port and of individual cargo terminals can be reduced by implementing security measures. The expected consequences of a terrorist action can also be affected by certain measures such as emergency response preparations.

3.12.2.5.3 Terrorism Risk associated with Commercial Vessels

Commercial vessels within the Port could be subject to terrorist action while at berth or during transit. These vessels could be subject to several types of actions, including an attack from the land, from the surface of the water, or from beneath the surface of the water, and from the air. During their transit within the port, these large vessels are highly restricted in their maneuverability.

There have been very few examples of terrorist actions attempted against large commercial vessels since September 11, 2001. On October 6th, 2002, a terrorist attack was attempted against the French-flagged crude oil tanker *Limburg.* At the time the *Limburg* was carrying 397,000 bbl of crude oil from Iran to Malaysia. The ship was attacked off the coast of Yemen by a small boat laden with explosives. The *Limburg* caught fire and approximately 90,000 bbl of crude oil leaked into the Gulf of Aden. The *Limburg* did not sink. She was salvaged, repaired and returned to service under the new name *Maritime Jewel*.

3.12.2.6 Security Measures at the Port of Los Angeles

Numerous security measures have been implemented in the Port in the wake of the terrorist attacks of September 11, 2001. Federal, state, and local agencies, as well as private industry, have implemented and coordinated many security operations and physical security enhancements. The result is a layered approach to Port security that includes the security program of the LAHD.

3.12.2.6.1 Security Regulations

The Maritime Transportation Security Act (MTSA) of 2003 resulted in maritime security regulations in Title 33 CFR Parts 101-106. These regulations apply to terminals in the Port including the Berth 408 terminal. Title 33 Part 105 requires that terminals meet minimum security standards for physical security, access control, cargo handling security, and interaction with berthed vessels. These regulations require that terminal operators submit a Facility Security Plan (FSP) to the Coast Guard Captain of the Port for review and approval prior to conducting cargo operations. The requirements for submission of the security plans became effective on December 31, 2003. Operational compliance was required by July 1, 2004.

The International Ship and Port Facility Security (ISPS) Code was adopted by the International Maritime Organization (IMO) in 2003. This code requires both ships and ports to conduct vulnerability assessments and to develop security plans with the purpose of: preventing and suppressing terrorism against ships; improving security aboard ships and ashore; and reducing risk to passengers, crew, and port personnel on board ships and in port areas, for vessels and cargo. The ISPS Code applies to all vessels 300 gross tons or larger and ports servicing those regulated vessels and is very similar to the MTSA regulations.

The USCG is responsible for enforcement of the MTSA and ISPS Code regulations discussed above. Due to the parallel nature of the MTSA and ISPS requirements, compliance with the MTSA is tantamount to compliance with the ISPS. If either the terminal or a vessel berthed at the terminal is found to be not in compliance with these security regulations, the USCG may not permit cargo operations, and the terminal and/or vessel operators may be subject to fines. In accordance with its responsibilities for land-based security under Title 33 CFR Part 105, the USCG may impose additional control measures related to security.

In July 2005, the Port Tariff was modified to require that all Port terminals subject to MTSA regulations to fully comply with these regulations, and to provide the Port with a copy of their approved FSP.

3.12.2.6.2 Terminal Security Measures

The Berth 408 terminal is subject to USCG maritime security regulations discussed in Section 3.12.2.6.1. In compliance with these regulations, the Berth 408 terminal will be required to submit a Facility Security Assessment (FSA) and FSP to the Coast Guard Captain of the Port for review and approval. The Berth 408 FSP would need to include the following:

- Designating a Facility Security Officer (FSO) with a general knowledge of current security threats and patterns, risk assessment methodology, and with the responsibility for implementing and periodically updating the FSP and Assessment and performing an annual audit for the life of the Project;

- Conducting an FSA to identify site vulnerabilities, possible security threats, consequences of an attack, and facility protective measures;
- Developing an FSP based on the FSA with procedures for responding to transportation security incidents; notifying and coordinating with local, state, and federal authorities, preventing unauthorized access; implementing measures and equipment to prevent or deter dangerous substances and devices; and conducting training and evacuation;
- Implementing scalable security measures to provide increasing levels of security at increasing Maritime Security (MARSEC) levels for facility access control, restricted areas, cargo handling, vessel stores and bunkers, and monitoring;
- Conducting security exercises at least once each calendar year and drills at least every 3 months; and
- Mandatory reporting of all security breaches and incidents.

Security training is conducted for the FSO of the Terminal operator and associated security personnel the Terminal operator's employees. This consists of awareness training and basic security guard training; there are annual refresher courses. Labor is trained by the Pacific Maritime Association.

3.12.2.6.3 Vessel Security Measures

All vessels 300 gross tons or larger that are flagged by IMO signatory nations adhere to the ISPS Code standards discussed in Section 3.12.2.6.1. These requirements include:

- Ships must develop security plans that address monitoring and controlling access; monitoring the activities of people, cargo, and stores; and ensuring the security and availability of communications;
- Ships must have a Ship Security Officer (SSO);
- Ships must be provided with a ship security alert system. These systems transmit ship-to-shore security alerts to a competent authority designated by the Flag State Administration, which may communicate the company name, identify the ship, establish its location, and indicate that the ship's security is under threat or has been compromised. For the west coast, this signal is received by the Coast Guard Pacific Area Command Center in Alameda, California;
- International port facilities that ships visit must have a security plan, including focused security for areas having direct contact with ships;
- Ships may have certain equipment onboard to help maintain or enhance the physical security of the ship;
    - Monitoring and controlling access;
    - Monitoring the activities of people and cargo;
    - Ensuring the security and availability of communications; and,

- Completing a Declaration of Security signed by the FSO and SSO, which ensures that areas of security overlapping between the ship and facility are adequately addressed.

Vessels flagged by nations which are not IMO signatory are subject to special USCG vessel security boarding prior to entering port.

3.12.2.6.4 Security Credentialing

The Transportation Worker Identification Credential (TWIC) program is a TSA and USCG initiative that will include issuance of a tamper-resistant biometric credential to maritime workers requiring unescorted access to secure areas of port facilities and vessels regulated under the MTSA. The TWIC program will minimize the potential for unauthorized handling of containers that contain hazardous materials and provide additional shoreside security at the terminal. In order to obtain a TWIC, an individual must successfully pass a security threat assessment conducted by TSA. This assessment will include a criminal history check and a citizenship or immigration status check of all applicants. The Port is currently involved in initial implementation of the TWIC program including a series of field tests at selected Port terminals.

3.12.2.6.5 Port of Los Angeles Security Initiatives

The LAHD is not subject to the international or federal security regulations discussed in Section 3.12.2.6.1. However, all terminal tenants at the Port are subject to these regulations. The Port has a number of security initiatives underway. These initiatives include significant expansion of the Los Angeles Port Police that will result in additional police vehicles on the streets and police boats on the water. The initiatives in this area include:

- Expanding Port Police enhancement of its communications capabilities
- Establishing a 24-hour two-vessel presence.
- Establishing a vehicle and cargo inspection team.
- Establishing a Port Police substation in Wilmington.
- Enhancing recruiting and retention of Port Police personnel.
- Expanding Port Police communications capabilities to include addition of dedicated tactical frequencies.
- Enhancing security at Port owned facilities.

In the area of homeland security, the Port will continue to embrace technology, while focusing its efforts on those areas of particular interest to the Port. Current Port homeland security initiatives include:

- Upgrading security at the World Cruise Center.
- Expanding the waterside camera system in the port.
- Establish restricted areas for noncommercial vehicles and vessels.
- Installing additional shore-side cameras at critical locations.

- Working with TSA to implement the TWIC program.
- Promoting increased scanning at overseas ports.
- Updating long range security plans for the Port.
- Developing a security awareness training program.
- Enhancing outreach to constituents.

3.12.3 Applicable Regulations

Laws and regulations are currently in place to regulate the safe operation of marine terminals, vessels calling at marine terminals, and emergency response/contingency planning, as well as to regulate hazardous materials and hazardous wastes. Responsibilities for enforcing or executing these laws and regulations fall to various international, federal, state, and local agencies. The various agencies and their responsibilities are summarized below, followed by a discussion of applicable hazardous materials regulations and other applicable requirements governing use at the site. See also Section 3.7, Groundwater and Soils, for a discussion of applicable regulations for soils and groundwater contamination.

3.12.3.1 Agencies

International Agencies

International Maritime Organization (IMO)

IMO is the major authority with jurisdiction over the movement of goods at sea. This is accomplished through a series of international protocols. Individual countries must approve and adopt these protocols before they become effective. The International Convention for the Prevention of Pollution from Ships (MARPOL 73/78 and amendments) governs the movement of oil and specifies tanker construction standards and equipment requirements. Regulation 26 of Annex I of MARPOL 73/78 requires that every tanker of 150 tons gross tonnage and above carry on board a shipboard oil pollution emergency plan approved by IMO. The U.S. implemented MARPOL 73/78 with passage of the Act of 1980 to Prevent Pollution from Ships. The IMO has also issued *Guidelines for the Development of Shipboard Oil Pollution Emergency Plans* to assist tanker owners in preparing plans that comply with the cited regulations and to assist governments in developing and enacting domestic laws which give force to and implement the cited regulations (IMO 1992). Plans that meet the 1990 Oil Pollution Act (OPA 90) and the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (California SB 2040) requirements also meet IMO requirements. Traffic Separation Schemes (TSS) must be approved by the IMO (see Section 3.9, Marine Transportation, for discussion of TSS).

The IMO adopted an amendment to the International Convention for Safety of Life at Sea (SOLAS) with provisions entitled *Special Measures to Enhance Maritime Safety*, which became effective in 1996. These provisions allow for operational testing during the Port state examinations to ensure that masters and crews for both U.S. and international vessels are familiar with essential shipboard procedures relating to ship safety. The USCG Marine Safety Office conducts the Port state examinations as part of their vessel inspection program.

Oil Companies International Marine Forum

A set of comprehensive minimum standards for offshore lightering, now in its third edition, has been developed by the Oil Companies International Marine Forum (OCIMF), an international group of vessel owners and charter operations. The guidelines contain advice on lightering procedures and arrangements, as well as specifications for mooring, fenders, and cargo transfer hoses. Industry guidelines for lightering have been established by at least two industry groups, and most individual companies have developed their own internal guidelines.

In the U.S., a supplement to the OCIMF guidelines was developed by the Industry Taskforce on Offshore Lightering (ITOL), a highly effective cooperative organization that promotes industry self-policing and, in partnership with the USCG, continuous improvement in lightering.

Federal Agencies

A number of federal laws regulate safety of marine terminals and vessels. These laws address, among other things, design and construction standards, operational standards, and spill prevention and cleanup. Regulations to implement these laws are contained primarily in CFR Titles 33 (Navigation and Navigable Waters), 40 (Protection of Environment), and 46 (Shipping).

The most recent act to address spill prevention and response, OPA 90, was enacted to expand prevention and preparedness activities, improve response capabilities, ensure that shippers and oil companies pay the costs of spills that do occur, and establish an expanded research and development program. OPA 90 also establishes a $1 billion Oil Spill Liability Trust Fund, funded by a tax on crude oil received at refineries. A Memorandum of Understanding (MOU) was established to divide areas of responsibility. The USCG is responsible for tank vessels and marine terminals, the U.S. Environmental Protection Agency (USEPA) for tank farms, and the Research and Special Programs Administration (RSPA) for pipelines. Each of these agencies has developed regulations for their area of responsibility.

All facilities and vessels that have the potential to release oil into navigable waters are required by OPA 90 to have up-to-date oil spill response plans and to submit such to the appropriate federal agency for review and approval. Of particular importance in OPA 90 is the requirement for facilities and vessels to demonstrate that they have sufficient response equipment under contract to respond to and clean up a worst-case spill.

Other key laws addressing oil pollution include:

- Federal Water Pollution Control Act of 1972;
- Clean Water Act of 1977;
- Water Quality Act of 1987;
- Act of 1980 to Prevent Pollution from Ships;

- Resource Conservation and Recovery Act (RCRA) of 1978;
- Hazardous and Solid Waste Act of 1984; and
- Refuse Act of 1899.

Responsibilities for implementing and enforcing the federal regulations addressing terminals, vessels, and pollution control fall to a number of agencies, as described in the following sections.

U.S. Coast Guard

The USCG, through CFR Title 33 (Navigation and Navigable Waters) and Title 46 (Shipping), is the federal agency responsible for vessel inspection, marine terminal operations safety, coordination of federal responses to marine emergencies, enforcement of marine pollution statutes, marine safety (navigation aids, etc.), and operation of the National Response Center (NRC) for spill response. USCG is also the lead agency for offshore spill response. The USCG implemented a revised vessel boarding program in 1994 designed to identify and eliminate substandard ships from U.S. waters. The program pursues this goal by systematically targeting the relative risk of vessels and increasing the boarding frequency on high risk (potentially substandard) vessels. Each vessel's relative risk is determined through the use of a matrix that factors the vessel's flag, owner, operator, classification society, vessel particulars, and violation history. Vessels are assigned a boarding priority from I to IV, with priority I vessels being the potentially highest risk. The USCG is also responsible for reviewing marine terminal Operations Manuals and issuing Letters of Adequacy upon approval. The USCG issued regulations under OPA 90 addressing requirements for response plans for tanker vessels, offshore facilities, and onshore facilities that could reasonably expect to spill oil into navigable waterways.

Based on several studies that show the use of double-hull vessels will decrease the probability of releases when tanker vessels are involved in accidents, the USCG issued regulations addressing double-hull requirements for tanker vessels. The regulations establish a timeline for eliminating single-hull vessels from operating in the navigable waters or the Exclusive Economic Zone (EEZ) of the U.S. after January 1, 2010, and double-bottom or double-sided vessels by January 1, 2015. Only vessels equipped with a double hull, or with an approved double containment system will be allowed to operate after those times. The phase-out timeline is a function of vessel size, age, and whether it is currently equipped with a single hull, double bottom, or double sides. The phase out began in 1995 with 40-year-old or older vessels equipped with single hulls between 5,000 and 30,000 gross tons, 28 year or older vessels equipped with single hulls over 30,000 gross tons, and 33 year or older vessels equipped with double bottoms or sides over 30,000 gross tons. All new tankers delivered after 1993 must be double hulled. Double-bottom or double-sided vessels can essentially operate 5 years longer than single-hull vessels.

The USCG oversees lightering operations outside port areas through six general mechanisms: vessel design requirements; operational procedures; personnel qualifications; oil spill contingency planning and equipment requirements; vessel inspection; and monitoring. Three separate sets of regulations have been promulgated by the USCG regarding lightering activities. One set applies to lightering in inshore waters. For this purpose, inshore waters mean all waters inside of 12 nautical miles from the coast, including all internal waters (i.e., lakes, bays, sounds, and rivers). The second set of regulations applies to lightering in all offshore waters, except for designated lightering zones. Offshore, for this purpose, means 12-200 miles (19-322 km) off the coast. The third, and most comprehensive, set of regulations applies in designated lightering zones that are more than 60 miles (97 km) off the coast. The Coast Guard Authorization Act of 1996 requires that the USCG coordinate with the Marine Board of the National Research Council (NRC) to conduct studies on the risks of oil spills from lightering off the U.S. coasts.

U.S. Environmental Protection Agency

The USEPA is responsible for the National Contingency Plan and acts as the lead agency in response to an onshore spill. USEPA also serves as co-chairman of the Regional Response Team, which is a team of agencies established to provide assistance and guidance to the on-scene coordinator (OSC) during the response to a spill. The USEPA also regulates disposal of recovered oil and is responsible for developing regulations for Spill Prevention, Control, and Countermeasures (SPCC) Plans. SPCC Plans are required for non-transportation-related onshore and offshore facilities that have the potential to spill oil into waters of the U.S. or onto adjoining shorelines. The proposed terminal at Pier 400 would be required to prepare and maintain a SPCC Plan.

Department of Commerce through the National Oceanic and Atmospheric Administration

The National Oceanic and Atmospheric Administration (NOAA) provides scientific support for oil or other hazardous materials spill response and contingency planning, including assessments of the hazards that may be involved, predictions of movement and dispersion of oil and hazardous substances through trajectory modeling, and information on the sensitivity of coastal environments to oil and hazardous substances. They also provide expertise on living marine resources and their habitats, including endangered species, marine mammals and National Marine Sanctuary ecosystems, and information on actual and predicted meteorological, hydrological, and oceanographic conditions for marine, coastal, and inland waters, and tide and circulation data for coastal waters.

Department of the Interior

The Department of the Interior (DOI), through its various offices, provides expertise during hazardous materials spills in a number of areas, as described below:

- U.S. Fish and Wildlife Service (USFWS) – Anadromous and certain other fishes and wildlife, including endangered and threatened species, migratory birds, and certain marine mammals; waters and wetlands; and contaminants affecting habitat resources.
- U.S. Geological Survey (USGS) – Geology, hydrology (groundwater and surface water), and natural hazards.

Department of Defense

The Department of Defense (DoD), through the U.S. Army Corps of Engineers (USACE), is responsible for reviewing all aspects of a project and/or spill response activities that could affect navigation. The USACE has specialized equipment and personnel for maintaining navigation channels, removing navigation obstructions, and accomplishing structural repairs.

Department of Homeland Security

The Department of Homeland Security is discussed in Section 3.12.2.5.

State Agencies

California State Lands Commission

Chapter 1248 of the Statutes of 1990 (SB 2040), the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act, established a comprehensive approach to prevention of and response to oil spills. The CSLC Marine Facilities Division is responsible for governing marine terminals. Through California Code of Regulations (CCR) §§ 2300 through 2571, the Marine Facilities Division established a comprehensive program to minimize and prevent spills from occurring at marine terminals, and to minimize spill impact should one occur. These regulations established a comprehensive inspection-monitoring plan whereby CSLC inspectors monitor transfer operations on a continuing basis. The standards generated by the proposed Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) provide specific requirements for subsequent audits and engineering inspections.

CSLC's marine terminal regulations are similar to, but more comprehensive than federal regulations in terms of establishing an exchange of information between the terminal and vessels, information that must be contained in the Declaration of Inspection, requirements for transfer operations, and information that must be contained in the Operations Manual. All marine terminals are required to submit updated Operations Manuals to CSLC for review and approval. CSLC regulations also require that prior to the commencement of oil transfer, a boom shall be deployed to contain any oil that might be released. Marine terminals subject to high velocity currents, where it may be difficult or ineffective to pre-deploy a boom, are required to provide sufficient boom, trained personnel, and equipment so that at least 600 ft (183 m) of boom can be deployed for containment within 30 minutes.

A requirement that each marine oil terminal operator must implement a marine oil terminal security program is contained in Section 2430 of CCR Title 2, Division 3, Chapter 1, Article 5.1. At a minimum, each security program must:

- Provide for the safety and security of persons, property, and equipment on the terminal and along the dockside of vessels moored at the terminal;
- Prevent and deter the carrying of any weapon, incendiary, or explosive on or about any person inside the terminal, including within his or her personal articles;

- Prevent and deter the introduction of any weapon, incendiary, or explosive in stores or carried by persons onto the terminal or to the dockside of vessels moored at the terminal; and
- Prevent or deter unauthorized access to the terminal and to the dockside of vessels moored at the terminal.

The Marine Facilities Division has also issued regulations on the following:

- Marine Terminal Personnel Training and Certification;
- Structural Requirements for Vapor Control Systems at Marine Terminals; and
- Marine Oil Terminal Pipelines.

California Department of Fish and Game

The Office of Oil Spill Prevention and Response (OSPR) was created within the California Department of Fish and Game (CDFG) to adopt and implement regulations and guidelines for spill prevention, response planning, and response capability. Final regulations regarding oil spill contingency plans for vessels and marine facilities were issued in November 1993, and last updated in January 2008. These regulations are similar to, but more comprehensive than the federal regulations. The regulations require that all tank vessels, barges, and marine facilities develop and submit their comprehensive oil spill response plans to OSPR for review and approval.

OSPR's regulations require that marine facilities and vessels be able to demonstrate that they have the necessary response capability on hand or under contract to respond to specified spill sizes, including a worst-case spill. The regulations also require that a risk and hazard analysis be conducted on each facility. This analysis must be conducted in accordance with procedures identified by the American Institute of Chemical Engineers (AIChE).

SB 2040 established financial responsibility requirements and required that Applications for Certificate of Financial Responsibility be submitted to OSPR. California's requirement for financial responsibility is in excess of the federal requirements.

SB 2040 also requires the OSPR to develop a State Oil Spill Contingency Plan. In addition, each major harbor was directed to develop a Harbor Safety Plan addressing navigational safety, including tug escort for tankers.

Other navigation-related rules and recommendations are outlined in Section 3.9, Marine Transportation.

California Coastal Commission

The California Coastal Commission (CCC) (whose responsibilities include all of California's coastal shoreline, including ports and harbors, except for the San Francisco Bay) has oil spill statutory authority for the Ports of L.A. and Long Beach under the following two statutes: California Coastal Act of 1976 and Lempert-

Keene-Seastrand Oil Spill Prevention and Response Act of 1990. Responsibilities include:

- Review of coastal development projects related to energy and oil infrastructure for compliance with the Coastal Act and consistency with the Coastal Zone Management Act;
- Attendance at statewide and regional Harbor Safety Committee Area committee and subcommittee meetings (e.g., dispersants, sensitive sites, Area Contingency Plan update, oiled wildlife operations);
- Review of regulations for oil spill prevention and response, and input on these regulations' consistency with Coastal Act regulations and policies;
- Review of oil spill contingency plans for marine facilities located in the coastal zone, and oil spill response plans for facilities located on the outer continental shelf;
- Participation in the State Interagency Oil Spill Committee (SIOSC), SIOSC Review Subcommittee, and Oil Spill Technical Advisory Committee meetings and assignments;
- Participation in studies that will improve oil spill prevention, response, and habitat restoration;
- Participation in oil spill drills; and
- Participation in the development of planning materials for oiled wildlife rehabilitation facilities.

3.12.3.2 Regulations and Policies

Lempert-Keene-Seastrand Oil Spill Prevention and Response Act, (Oil Spill Prevention and Response Act [OSPRA], 8670 Gov. Code Chapter 7.4)

This Act requires preparation of a State oil spill contingency plan to protect marine waters. It also empowers a deputy director of the CDFG to take steps to prevent, remove, abate, respond, contain, and clean up oil spills. Notification is required to the Governor's Office of Emergency Services, which in turn notifies the response agencies, of all oil spills in the marine environment, regardless of size. Oil Spill Contingency Plans must be prepared and implemented. The Act creates the Oil Spill Prevention and Administration Fund and the Oil Spill Response Trust Fund. Fees into the first fund are paid by marine terminal operators on each barrel of oil delivered through the marine terminal and by pipeline operators for pipelines transporting oil into the state across, under, or through marine waters. Fees into the second fund are paid by operators of marine terminals, pipelines, and refineries. The Lempert-Keene Act also directs authority to the CSLC for oil spill prevention from and inspection of marine facilities (Public Resources Code, §§PRC 8750, et seq).

California Coastal Act of 1976 (Public Resources Code, Division 20)

The California Coastal Act of 1976 (Public Resources Code, Division 20) created the CCC, with the responsibility of granting development permits for coastal projects and for determining consistency between Federal and State coastal management programs. Section 30232 of the California Coastal Act addresses hazardous materials spills and states that "Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur."

Also in 1976, the State Legislature created the California State Coastal Conservancy to take steps to preserve, enhance, and restore coastal resources and to address issues that regulation alone cannot resolve.

California Pipeline Safety Act of 1981

This Act gives regulatory jurisdiction to the California State Fire Marshal (CSFM) for the safety of all intrastate hazardous liquid pipelines and all interstate pipelines used for the transportation of hazardous or highly volatile liquid substances. The law establishes the governing rules for interstate pipelines to be the Federal Hazardous Liquid Pipeline Safety Act and Federal pipeline safety regulations.

Overview of California Pipeline Safety Regulations

California Government Code sections 51010 through 51018 provide specific safety requirements that are more stringent than the Federal rules. These include:

- Periodic hydrostatic testing of pipelines, with specific accuracy requirements on leak rate determination;
- Hydrostatic testing by State-certified independent pipeline testing firms;
- Pipeline leak detection; and
- Requirement that all leaks be reported.

The Code requires that pipelines include leak prevention and cathodic protection, with acceptability to be determined by the CSFM. All new pipelines must be designed to accommodate the passage of instrumented inspection devices, i.e., smart pigs.

Oil Pipeline Environmental Responsibility Act (Assembly Bill 1868)

This Act requires every pipeline corporation qualifying as a public utility and transporting crude oil in a public utility oil pipeline system to be held strictly liable for any damages incurred by "any injured party which arise out of, or are caused by, the discharge or leaking of crude oil or fraction thereof....". The law applies only to public utility pipelines for which construction would be completed after January 1, 1996, or that part of an existing utility pipeline that is being relocated after the above date and is more than three miles (4.8 km) in length.

Area Contingency Plan

There are seven Area Committees along coastal California, and each Area Committee is responsible for oil spill response and preparedness planning within a specific geographic area. The LA/LB South Area Committee includes Los Angeles and Orange Counties. The Area Committees are each chaired by a U.S. Coast Guard representative and include oil spill response representatives from Federal, State, and local government agencies. The State Office of OSPR is the lead non-Federal agency.

The LA/LB South Area Committee developed a site-specific oil spill response plan called the Area Contingency Plan. The plan provides clear directives on oil spill response, including the organization of incident command, planning and response roles and responsibilities, response strategies, and logistics. In addition, site-specific response plans are described for various coastal segments where there are species and other resources of concern. Each of the seven Area Contingency Plans is updated annually, so that the plans are current and accurate.

The plan provides site-specific information on resources of concern, local contacts, access to sites, and containment strategies.

Hazardous Material Release Response Plans and Inventory Law (California Health and Safety Code, Chapter 6.95)

This law is designed to reduce the occurrence and severity of hazardous materials releases. This state law requires businesses that handle more than 500 pounds, 55 gallons, or 200 cubic ft of hazardous materials to develop a Release Response Plan for hazardous material emergencies. In addition, the business must prepare a Hazardous Materials Inventory of hazardous materials stored or handled at the facility above these thresholds, as well as store hazardous materials in a safe manner. Before a new certificate of occupancy is issued to a business that must comply with this law, the local agency must find that the business is in compliance with this law or the certificate will be denied. Both the Release Response Plan and the Hazardous Materials Inventory must be supplied to the Certified Unified Program Agency (CUPA) for the program. In this case, the CUPA is the LAFD.

Hazardous Waste Control Law (California Health and Safety Code, Chapter 6.5)

This law establishes criteria for defining hazardous waste and its safe handling, storage, treatment, and disposal. The law is designed to provide cradle-to-grave management of hazardous wastes, as well as to reduce the occurrence and severity of hazardous material releases. The Los Angeles County Fire Department (LACFD) administers the program.

Aboveground Storage of Petroleum (California Health and Safety Code, Chapter 6.67)

This state law regulates construction, installation, operation, and monitoring of aboveground petroleum storage tanks. This law is designed to prevent release of hazardous materials into the environment by either leakage from tanks and associated pipelines or from overfilling and spillage. As such, the program works to reduce the occurrence of hazardous material releases.

Los Angeles Municipal Code (Fire Protection – Chapter 5, Section 57, Divisions 4 and 5)

These portions of the Los Angeles Municipal Code regulate the construction of buildings and other structures used to store flammable hazardous materials, and the storage of these same materials. These sections ensure that the business is equipped properly and operates in a safe manner and in accordance with all applicable laws and regulations. Permits are issued by the LAFD. The Code also requires maintaining emergency response plans including evacuation plans, approved by the LAFD.

Los Angeles Municipal Code (Public Property – Chapter 6, Article 4)

This portion of the Los Angeles Municipal Code regulates the discharge of materials into the sanitary sewer and storm drains. It requires the construction of spill-containment structures to prevent the entry of forbidden materials, such as hazardous materials, into sanitary sewers and storm drains.

Port of Los Angeles Risk Management Plan

Potential health and safety impacts are associated with activities in the Port area involving the transfer, handling, and storage of hazardous materials in liquid bulk form. Hazards presented by these materials during an accidental release include possible fire and explosion, and the possible release of toxic materials to the atmosphere. To minimize the impacts of accidents on vulnerable resources in the Port area, the California Coastal Commission and LAHD have developed a RMP, which is an amendment to Port Master Plan (PMP). The RMP contains policies to guide future development in the Port in an effort to eliminate the danger of such accidents to vulnerable resources. This is achieved mainly through physical separation as well as through facility design factors, fire protection, and other risk management methods.

3.12.3.3 Other Requirements

In addition, various plans are applicable to proposed Project operations, including the Release Response Plan prepared in accordance with the Hazardous Material Release Response Plans and Inventory Law (California Health and Safety Code, Chapter 6.95) administered by the LAFD.

California regulates the management of hazardous wastes through the Health and Safety Code Sections 25100, et seq., and through the California Code of Regulations (CCR), Title 22, Division 4.5, Environmental Health Standards for the Management of Hazardous Wastes, as well as CCR Title 26, Toxics.

The Safety Element of the City of Los Angeles' General Plan addresses the issue of protection of its people from unreasonable risks associated with natural disasters, such as fires, floods, and earthquakes. The Safety Element provides a contextual framework for understanding the relationship between hazard mitigation, response to natural disaster, and initial recovery from a natural disaster.

The transport of hazardous materials in containers on the street and highway system is regulated by the California Department of Transportation (Caltrans) procedures and the Standardized Emergency Management System, prescribed under Section 8607 of the California Government Code. Compliance with other federal, state, and local laws and regulations (e.g., driver training and licensing) govern transport of cargo on the street and highway system and during rail transport. The shippers package the hazardous materials in the containers and provide labeling in compliance with Caltrans requirements.

Numerous facilities handle, store, or transport hazardous materials in the Port. Activities that involve hazardous liquid bulk cargoes (e.g., fuels) at the Port are governed by the Port RMP (LAHD 1983). Hazardous materials inside cargo containers fall under the primary jurisdiction of the federal Department of Homeland Security and USCG (33 Code of Federal Regulations [CFR] Part 126) while the containers are at sea, in Port waters, and in waterfront facilities. Terminal cargo operations involving hazardous materials are governed by LAFD in accordance with regulations of state and federal departments of transportation (49 CFR Part 176).

3.12.4 Impacts and Mitigation Measures

3.12.4.1 Methodology

General

Four steps have been undertaken to assess the safety impacts and the risk of upset associated with the proposed Project and its alternatives: (1) develop a range of potential upset scenarios associated with the Project; (2) estimate the likelihood of the upset scenarios occurring; (3) estimate the consequences of the scenarios, should they occur; and (4) determine the significance of risk based on the probability of occurrence and the severity of consequences.

The risk-of-upset analysis evaluates outcomes of potential upset scenarios, which are the culmination of several events that result in a hazard to the public and/or environment. Some upset scenarios could lead to a significant impact to public safety (e.g., an overpressure in a storage tank results in tank rupture, an oil leak, and subsequent fire that reaches a residence and results in an injury). Other upset scenarios do not create a significant impact to safety but create a significant impact to the environment (e.g., an overpressure in a storage tank results in tank rupture, oil leak, and damage to an endangered species habitat). Parts of a given scenario have different likelihoods or probabilities. Probabilities and consequences of various project-related upset events and scenarios are assessed in this section.

The impact analysis quantifies the probability of an accident scenario due to the proposed Project or alternative from both the tank vessel traffic (baseline and project-related data on vessel traffic in Section 3.9, Marine Transportation, is used in this analysis), and the oil facilities (i.e., the Marine Terminal, tank farms, and pipelines).

Various outcomes or results of upset scenarios are also assessed (e.g., spill volumes from a leak and fate of the oil after a spill). Oil spill volumes are assessed from the proposed Project or alternative facilities' physical and operational data. Using available oil spill trajectory modeling tools, predictions are made as to which areas (e.g., coastline) can be affected by spills. Any deficiency in the project applicant's ability to prevent or respond to upset conditions is factored in.

Expected probabilities (frequencies) of equipment failure and upset scenarios are evaluated using available statistical databases on the frequency of equipment and component failure.

Risk of Upset Due to Terrorism

Analysis of risk of upset is based primarily on potential frequencies of occurrence for various events and upset conditions as established by historical data. The climate of the world today has added an additional unknown factor for consideration i.e., terrorism. There are no data available to indicate how likely or unlikely a terrorist attack aimed at the Port or the proposed Project would be, and therefore the probability component of the analysis described above cannot be evaluated accurately. Nonetheless, this fact does not invalidate the analysis contained herein. Terrorism can be viewed as a potential trigger that could initiate events described in this section such as tanker breach, pipeline rupture, tank rupture, or crude oil fire. The potential impact of those events, once triggered by whatever means, would remain as described herein. The project applicant would also be required to develop a Terminal Security Plan for the Marine Terminal which would be approved by the U.S. Coast Guard and the California State Lands Commission (Title 33 CFR Part 105).

Public Safety Analysis

Sensitive public receptors are those locations such as residences, schools, daycare centers, etc. which might have persons present for extended periods of time, and thus would be potentially affected by a nearby catastrophic event. In the event of an accident in the vicinity of a sensitive receptor, consequences of the accident could be much greater than at other locations. Sensitive receptors near the proposed Project facilities and along the proposed pipeline routes are assessed from the following information: population densities along the pipelines routes from U.S. Census Bureau block group information and number of persons on roadways from California Department of Transportation (CalTrans).

Potential impacts to the public are determined by delineating "hazard footprints" for the type of accidents that can potentially occur. It is then determined if the hazard footprints would reach the sensitive receptors or vulnerable resources identified in the area, as well as the number of injuries and/or fatalities that could occur. Types of hazards evaluated include radiant heat from a fire, flammable gas cloud from a release, and blast overpressure and flying debris from an explosion. Depending on the properties of the released material, crude oil typically does not produce explosions or flammable vapor clouds.

For incidents that may impact public safety, a risk matrix is used to evaluate the expected frequencies of scenarios versus the severity of potential consequences to determine the level of significance (see Figure 3.12-5). The potential for significant safety impacts increases proportionally to the frequency of occurrence and potential

Figure 3.12-5. Risk Matrix

Consequences	*Probability*	Extraordinary- >1,000,000 years	Rare >10,000 <1,000,000 years	Unlikely >100 <10,000 years	Likely >1 and <100 years	Frequent (>1/year)
	Disastrous (> 100 severe injuries or >357,142 bbl)					
	Severe (up to 100 severe injuries or 2,380–357,142 bbl)					
	Major (up to 10 severe injuries or 238–2,380 bbl)					
	Minor (a few minor injuries or 10-238 bbl)					
	Negligible (no minor injuries or <10 bbl)					

Note: Incidents that fall in the shaded area of the risk matrix would be classified as significant.
Sources: Santa Barbara County 1995; Aspen Environmental Group 1996.

consequences of an event. Frequency is typically classified into five categories (frequent, likely, unlikely, rare, and extraordinary) based on a predefined expected level of occurrence. The severity of consequence is also classified into five categories (negligible, minor, major, severe, and disastrous) based on the potential safety impact on the public. Table 3.12-4 specifies values in each category of consequence and frequency classification typically used in the industry. Incidents that fall in the shaded area of the risk matrix would be classified as significant. The risk matrix approach follows the Los Angeles Fire Department (LAFD) risk management guidelines that were originally developed for the California Risk Management and Prevention Program (RMPP). The RMPP used the combination of accident frequency and consequences to define the significance of a potential accident in terms of impacts to public safety (i.e., potential injuries and/or fatalities). In 1995, Santa Barbara County modified these guidelines for its own use in environmental analysis, adding criteria to address the significance of oil spills and environmental hazards. The potential significance of impacts to public safety and the environment are evaluated using the risk matrix approach. The extent of environmental damage is evaluated in the relevant issue areas (e.g., biological resources, water quality, etc.).

Table 3.12-4. Criticality and Frequency Classifications

Criticality Classification		
Classification	*Description of Public Safety Hazard*	*Environmental Hazard - Oil Spill Size*
Negligible	No significant risk to the public, with no minor injuries	Less than 10 bbl (420 gal)
Minor	At most a few minor injuries	10–238 bbl (420–10,000 gal)
Major	Up to 10 severe injuries	238–2,380 bbl (10,000–100,000 gal)
Severe	Up to 100 severe injuries or up to 10 fatalities	2,380–357,142 bbl (100,000–15,000,000 gal)
Disastrous	More than 100 severe injuries or more than 10 fatalities	Greater than 357,142 bbl (15,000,000 gal)
Frequency Classification		
Classification	*Frequency per year*	*Description of the Event*
Extraordinary	> once in 1,000,000 years	Has never occurred but could occur
Rare	between once in 10,000 and once in 1,000,000 years	Occurred on a worldwide basis, but only a few times
Unlikely	Between once in a 100 and once in 10,000 years	Is not expected to occur during the project lifetime
Likely	Between once per year and once in 100 years	Would probably occur during the project lifetime
Frequent	Greater than once in a year	Would occur once in a year on average
Sources: Santa Barbara County 1995; Aspen Environmental Group 1996.		

Upset Scenarios

Marine Vessel or Tanker Scenarios

Offshore marine impacts would be associated with oil spills into the marine environment, which could cause impacts to marine resources. Historical data available from the USCG Oil Spill into the U.S. Waters database, Oil Tanker Spill Statistics available from ITOPF, and the USCG NRC database are used. The databases contain information on spills from vessels, classified by the amount of oil spilled, vessel type (e.g., tanker, barge), location (e.g., coastal, open ocean, harbors), cause (e.g., collision, grounding, hull failure), and other classifications. The frequencies and spill volumes are examined utilizing the historical data and standard statistical approaches. These are also evaluated in Section 3.9, Marine Transportation.

Marine Terminal Scenarios

These scenarios involve tanker disconnection during transfer and pump seal failure, and subsequent oil spill. An operator error, severe weather event, collision of a passing vessel into the moored tanker, or equipment malfunction could lead to a disconnection of the transfer hoses/arms between the tanker and the terminal. The CSLC has been tracking oil spills from California marine terminals since 1992. A total of 128 spills, varying from a few teaspoons to 1,092 gallons (26 bbl), occurred during the 10 years reported from 1992 through 2001. This equates to approximately 13 spills per year. Terminals were the responsible party for approximately 57 percent of the spills, or about seven terminal spills per year, while vessels were responsible for the remaining 43 percent. An updated CSLC (2007) evaluation of marine terminal oil spills shows that the rate of oil spills at California marine terminals continues to decline. For the period 1994-2006, California marine terminal oil spills declined from a high of six per 1,000 transfers to two per 1,000 transfers. Given changes in petroleum product handling procedures and vapor collection systems, disasters such as the Sansinena, discussed above, are very unlikely.

The proposed Project would include fire water pumps located on Face C of Pier 400. This would be outside the tank dike area near a Vapor Recovery System. The Marine Terminal would have 4 fire hydrants, one foam tank, 4 foam monitors, and two water monitors. Also, the terminal, ship, and fire boats would be able to interconnect for fire fighting purposes. Based on the fire protection plan that was prepared by the project applicant for the proposed Project, Tank Farm Site 1 would have 14 fire hydrants, 5 foam monitors, 1 foam tank, and 1 portable fire extinguisher.

Crude Pipeline Scenarios

Pipeline Ruptures. These scenarios involve a rupture (spill greater than 100 bbl) of the proposed crude pipelines. Ruptures have significantly lower frequency rates and higher volumes of spills than leaks.

Likely causes of the ruptures involve earthquakes, corrosion, and third-party damage. The full rupture scenario assumes a total rupture of a pipeline, resulting in drainage of the pipeline content between the two closest valves.

In the event of a pipeline rupture, the project applicant leak detection system (Supervisory Control and Data Acquisition System [SCADA]) would be capable of detecting a rupture within two minutes for the offloading system and 5 minutes of occurrence for the delivery system, isolating the ruptured segment by closing motor-operated valves, and shutting down the pumps (a description of the proposed SCADA system is provided below). These detection times are consistent with estimated SCADA leak detection time based on studies presented by the National Transportation Safety Board (NTSB) (2005) and Zhang et al (2000) that showed leak detection times ranging from 2 to 5 minutes for all leaks larger than 2 percent of the pipeline flow rate. Once the pipeline is shutdown, the oil would continue to spill until the oil was drained from the affected line.

If the project applicant-proposed SCADA system is not fully operational or is overridden by an operator, it is assumed that the pumping would continue for 30 minutes before a rupture would be detected based on the proposed pipeline monitoring and line balancing procedures. This would be consistent with the observed spill duration of the 1997 Platform Irene oil spill where operators overrode the SCADA system and restarted the pipeline until line balancing determined that there was a pipeline integrity failure (i.e., the correct amount of oil was not arriving at the final destination). How an operator responds to SCADA system alarms and automatic shutdowns also has an impact on the size of the oil spill. Given the relatively short lengths of the proposed pipelines and easy ability to rapidly inspect the pipeline rights-of-way, it is highly unlikely that the SCADA system would be overridden by the operator.

The frequency of a release (leak or rupture) is primarily a function of the construction of the pipeline, the maintenance and operational practices, as well as third party damage. The volume of the subsequent release is a function of the training of the operators as well as the design, construction, and maintenance of the leak detection system. The operators' actions are accounted for in the pipeline failure frequency analysis by assigning a high probability of operator error, particularly related to the operation of the SCADA system.

Pipeline Leaks. Pipeline leaks (spills less than 100 bbl) are similar to ruptures described above, except that they address smaller sized releases from the pipeline. This distinction has been made between leaks and ruptures to account for the different failure frequencies that exist between ruptures and leaks. Pipeline leaks are most common as a result of corrosion, erosion, or third party damage to the pipeline. The proposed Project's pipeline leak detection system would use a volume based monitoring system, as well as pressure monitoring as specified in the Project description. Because pressure would not change significantly due to a smaller leak, volume monitoring is used to assist in the detection of small leaks. Typically, a small corrosion-induced leak would have a leak rate of 1 to 2 barrels per hour. Small leaks are difficult to detect using a SCADA system; therefore it was assumed that a leak would require approximately 10 to 12 hours to detect using normal volume balancing procedures under worst-case conditions. In the event that a potential leak is detected, the pipeline would be shut down until it could be fully inspected. Typically, pipeline leaks have much smaller spill volumes than pipeline ruptures (CSFM 1993), thus evading rapid detection.

Pipeline Leak Detection System. A leak detection system would be installed for all pipelines systems. The system would automatically alert the operator if a leak occurs so that appropriate actions can be taken to minimize the spill volume and duration. The system would be designed to protect the public and the environment from the consequences of a pipeline failure and uncontrolled spill by greatly minimizing the frequency of a pipeline failure and spill.

The overall Leak Detection Systems would be designed in accordance with API Standard 1130, "Computational Pipeline Monitoring", with performance in accordance with API Standard 1149, "Pipeline Variable Uncertainties and Their Effects on Leak Detectability". Specifically, the project would utilize a Real Time Transient Model (RTTM) system to monitor the pipelines, as defined in API 1130. This method employs numerous monitored variables and a sophisticated computer model to identify upsets or potential leaks. The reason for monitoring different variables is to increase the likelihood of prompt leak detection. The input to the computer would include operating parameters for temperature, pressure, flow, viscosity and density, and include equipment input such as pump start/stop and valve open/close signals. The output from all of the sensors would be compared against a baseline model. Values that differ from the modeled case would indicate a potential leak. The control center operators, who are responsible for monitoring the system at all times, would respond to all potential leak conditions by verifying the condition and taking appropriate action.

In addition to the RTTM system, two additional monitoring and analysis methodologies would be employed to verify pipeline integrity: Volumetric Balancing (modeling for fluctuations in line pack, as well as the basic volumetric balance calculations) and Pressure/Flow Monitoring (monitors for rapid changes in the pressure and/or flow rate).

As noted earlier, the proposed pipeline system would be monitored and controlled by the PLAMT operators at the Marine Terminal Control Building. The applicant anticipates using commercially available pipeline software to perform the leak detection functions. The system would reside in the Control Building on a dedicated processor (with dedicated screen) and collect data from the SCADA system. The data polling cycle (request and time combined) to all field locations is estimated to be 1-5 seconds or less.

The expected performance of the leak detection system, as defined by the API standards referenced above, is given in Figure 3.12-6. This figure graphically represents the leak detection time vs. the leak flow rate as a percent of the design pipeline flow rate. The figure indicates that the system would be able to detect a potential leak as small as 0.71 percent of the design flow in 5 minutes or less. At the design flow rate for the vessel unloading pipeline system (Berth to Site 2) of 100,000 barrels per hour, this relates to a flow rate of 11.8 barrels per minute. For the delivery system pipelines (Site 2 to customers), the design flow rate of 45,000 barrels per hour yield a detection rate of 5.3 barrels per minute. These flow rates are shown in Figure 3.12-7. Leaks of less than 300 barrels per hour would be detected through line balancing, with an approximate detection time of 10 to 12 hours.

Figure 3.12-6. SCADA System Leak Detection Performance Curves

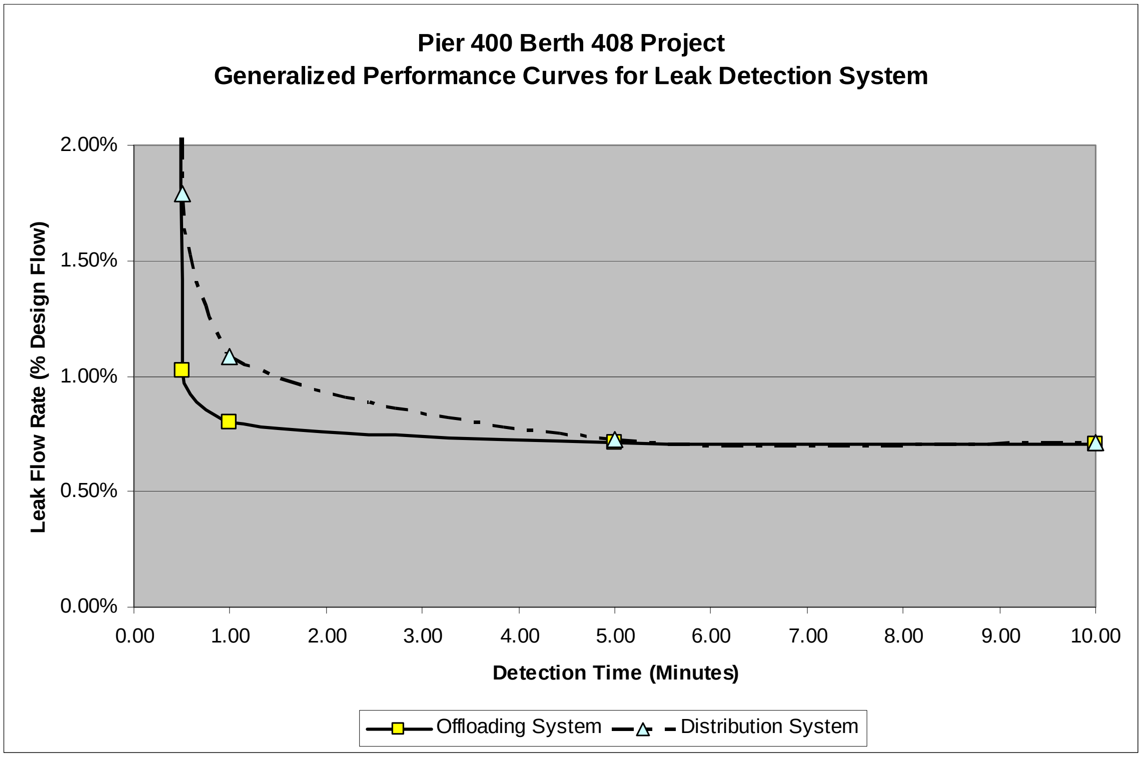
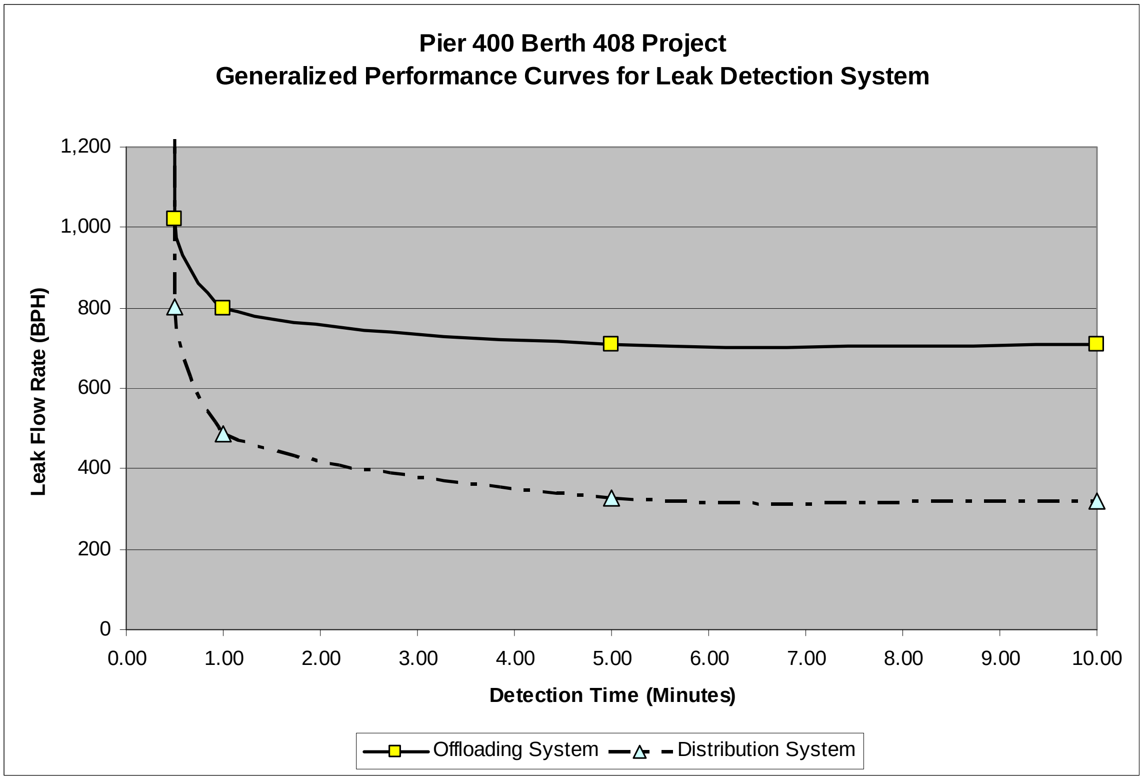


Figure 3.12-7. SCADA System Leak Detection Performance Curves



It should be noted that these performance curves are for periods when the pipeline is in operation. When the pipeline system is in a shutdown condition, the leak detection system would continue to monitor for leaks by tracking the pressure and temperature of the system. Any unexpected changes would trigger alarms and alert the pipeline operators of the potential problem. The systems' ability to detect a leak during this period would increase dramatically as a result of the flow rate variable being removed from the system modeling.

If a leak is detected, the system would be designed to quickly isolate the leak and minimize the amount of a release. In addition to continuous monitoring, the SCADA system will provide the pipeline controllers with the ability to remotely control important aspects of systems operation, including starting and stopping pumps, opening and closing valves, switching into and out of storage tanks and facility emergency shutdowns. The SCADA system will be programmed to alert the pipeline system controllers any time that operational conditions fall outside established parameters. Upon detection of an irregularity, the pipeline system controllers will have the capability to shut down the affected terminal equipment or pipeline by remotely stopping pumps and closing block valves that will be part of the various systems. Additionally, Emergency Shutdown (ESD) buttons will be installed at key locations around the facilities, allowing system operators to safely halt operations in case of an emergency.

To assure optimal operations at all times, the proposed SCADA system would have multiple levels of redundancy to provide robust real-time operation, including redundant backup servers for critical applications. The system proposed would use a high-speed fiber optic communications systems and T1 communications circuits to transmit and collect data as rapidly as possible. The proposed communication infrastructure would support polling of remote devices such as pumps, meters, valves, tanks, pressure and temperature instruments numerous times each minute.

Electronic leak detection and continuous, reliable monitoring systems are only two components of an overall pipeline mechanical integrity program. Other components include: proper construction methods; pipeline coatings; cathodic protection systems; aerial/ground pipeline patrols; internal pipeline inspections (smart pigs); and external inspection of above grade pipe. Since these lines are relatively short and located in high traffic areas, any potential issues will be quickly detected. Warning signs would be posted along the right-of-way, alerting people as to the presence of the lines. A contact phone number will also be provided.

Crude Oil Fire Scenarios

With any spill of crude oil, the potential exists for a fire associated with the spill. If the crude oil spill were to catch fire, there could be a subsequent threat to public safety through thermal radiation effects and exposure to toxic combustion byproducts. Given the properties of the crude oil and partially refined products that would be delivered to the proposed Marine Terminal, the likelihood of an explosion is highly unlikely, and therefore explosions are not addressed further in this document. Petroleum products that could pose an explosion hazard are characterized by high fractions of volatile components and a low flash point (i.e., the hydrocarbons readily evaporate and form a flammable vapor cloud). The crude oil and petroleum products that have been proposed have limited volatile components, thus minimizing the potential to form a large flammable vapor cloud with a subsequent explosion. Several crude oil streams proposed as part of the proposed Project, mainly those originating in the Middle East such as Arabian Light Crude, do have relatively low flash points, but limited volumes of volatile, light-end components. Therefore, while these crude oil streams do pose a fire hazard, it is very unlikely that a flammable vapor cloud of sufficient size would be formed following a spill that could result in an explosion. In addition, the use of floating roof tanks and BACTs in proposed petroleum storage tanks eliminates the tank vapor space and all but a residual amount of vapors emanating from crude oil, which in turn, substantially reduces the potential for a large flammable vapor cloud and subsequent explosion.

A crude oil spill along the proposed pipeline route and at the tank farm(s) could have the potential for public safety impacts. The DOT Office of Pipeline Safety (OPS) database indicates that from 1985 to September 2004 one fatality and 28 injuries resulted out of a total 1,487 recorded crude oil pipeline incidents in the U.S. From 1968 to 1984, crude oil pipeline incidents resulted in eight fatalities and 12 injuries (OPS 2004).

Tank Farm Scenarios

Failures at the oil tank farm(s) could include tank ruptures or leaks, and piping and equipment (e.g., pumps) leaks or failures. In the majority of cases, tank failure does not represent a hazardous scenario because the tank dike would contain the entire volume of the tank. Hazardous consequences would follow only if the dike is damaged (e.g., due to an external event like an earthquake or a deliberate attack), with the subsequent release into the environment, or if the oil spill is followed by fire with thermal radiation effects.

Failures of pump seals, valves, or other facility components outside of the dike could lead to oil spills only when an oil transfer is occurring. Pig launcher/receiver failures could result in a release during times when pigging is being conducted.

All tanks would have a fixed cone roof tank with internal floating roof, redundant high level alarm, fixed foam fire protection system, HDPE liner for secondary containment and leak detection, and vapor collection system for drain dry operation.

Probability of Upset Events

Pipeline Failure Rates

While pipelines have historically had one of the lowest failure rates of any mode of transportation, there is still some level of risk that a pipeline could leak or rupture. In order to estimate the probability of such an event, historical data for operating liquid pipelines have been used to estimate the probability of a leak or rupture for the proposed pipeline system.

Historically, spills from pipelines have been attributed to a number of different causes, including corrosion, defects in material or welding, damage from third-party interference, natural hazards such as earthquakes or landslides, and operational errors.

Information on the number and causes of pipeline spills in the US greater than 50 barrels in size is available from the DOT Office of Pipeline Safety (OPS). These data were obtained for spills from 1985-2000. Information is available from the OPS for crude oil pipelines only, as well as for all liquid pipelines (OPS 1990, OPS 2004). In the years since 1985, crude oil made up 47 to 51 percent of the liquid spilled from pipelines, and petroleum products have made up 47 to 55 percent of the total spilled. The primary causes of incidents with the crude oil pipelines have been corrosion (between 26 and 60 percent of the failures) and outside force damage or third-party damage (between 14 to 42 percent of the total failures).

The California State Fire Marshal publishes an analysis of leak information from the 7,800 miles (12,480 km) of hazardous liquid pipelines within California for the years 1981 through 1990 (CSFM 1993). This study enables pipeline failure rates to be adjusted based on variables such as pipeline age, diameter, operating temperature, material of construction and coating type, corrosion protection type, inspection schedule, leak detection system, as well as spill cause. The study found that external corrosion was the major cause of pipeline leaks, causing about 59 percent of spills, followed by third-party damage at 20 percent. Older pipelines and those that operate at higher temperatures had significantly higher failure rates. As the OPS pipeline data are only for larger releases, the CSFM report has been used in this analysis.

Hazards and Consequences

Oil Spill Hazards - Environmental Impacts

One of the main hazards associated with a crude oil spill is the potential for contamination of the surrounding area (and associated biohazards), and in this case, the potential flow to the waters of the San Pedro Bay and the various channels of the harbor, including Los Angeles Main Channel, East Basin Channel, and Dominguez Channel.

Impacts to environmental resources are addressed in Section 3.7, Groundwater and Soils; Section 3.14, Water Quality, Sediments and Oceanography; and Section 3.3, Biological Resources.

Fire Hazards

Crude oil fire hazards strongly depend on the type or blend of crude oil being shipped through the pipeline, and the conditions at the spill site. Fire hazards associated with light and heavy crude oils are quite different and the same oil type and volume could cause drastically different consequences based on site conditions. Heavy crude oil consists of mainly heavy hydrocarbon components with low flammability, and there is some risk associated with the ignition of spilled oil and the resulting fire. While a crude oil fire could theoretically occur at any place where a spill occurs, the occurrence of a heavy crude oil fire is likely to be limited to the pump stations or areas where a significant ignition source can be found.

For fire hazards, the concern is intensity of thermal radiation and its effects on public health and safety. Data on the exposure time necessary to reach pain thresholds (CCPS 1989) indicates that relatively high thermal radiation levels can be tolerated without significant pain or injury. Therefore, there would usually be sufficient time for people to escape the immediate area of the fire before significant physical injury is suffered. Based on the CCPS and the Port RMP, exposure to a thermal radiation intensity of 5 kilowatts per square meter (kW/m^2) would result in pain if the exposure period were to exceed 13 seconds, or second degree burns after a 30 second exposure. Exposure to a thermal radiation intensity of $10kW/\ m^2$ would result in pain after 5 seconds and second degree burns after short exposure periods (i.e., 14 seconds). Exposure to $10kW/m^2$ thermal radiation intensity produces 10 percent fatalities in 60 seconds based on the Eisenberg-Probit Equation. Based on the CCPS data, thermal radiation levels of 5 and 10 kW/m^2 were selected to represent minor and moderate-to-heavy physical injury levels. A thermal radiation level of 1.5 kW/m^2 was also evaluated since this is a level that would be considered safe by the CCPS and American Petroleum Institute for all exposed individuals.

The thermal radiation hazards from hydrocarbon pool fires depend on the composition of the hydrocarbon mixture, the size and shape of the fire, the duration of the fire, its proximity to the object(s) at risk, and the thermal characteristics of the object exposed to the fire. Estimating the thermal radiation field surrounding the fire involves the following three major steps:

1. Geometric characterization of the pool fire, which involves the determination of the burning rate and the physical dimensions of the fire;

2. Characteristics of the thermal radiation properties of the fire, which involves estimating the average radiation of the flames; and

3. Calculation of radiant intensity at a given location, which depends on the path to the receptor length, flame temperature, and atmospheric relative humidity.

Affected Populations

The populations in the vicinity of the proposed Project pipelines and facilities were obtained from US Census block numbers (US Census 2003). Sensitive receptors were determined by studying aerial photos of the area, and MapInfo GIS database for schools, hospitals, and community and childcare facilities.

3.12.4.1.1 CEQA Baseline

Section 15125 of the CEQA Guidelines requires EIRs to include a description of the physical environmental conditions in the vicinity of a project that exist at the time of the NOP. These environmental conditions would normally constitute the baseline physical conditions by which the CEQA lead agency determines whether an impact is significant. For purposes of this Draft SEIS/SEIR, the CEQA Baseline for determining the significance of potential impacts under CEQA is June 2004. CEQA Baseline conditions are described in Section 2.6.2.

The CEQA Baseline represents the setting at a fixed point in time, with no project growth over time, and differs from the “No Federal Action/No Project” Alternative (discussed in Section 2.5.2.1) in that the No Federal Action/No Project Alternative addresses what is likely to happen at the site over time, starting from the baseline conditions. The No Federal Action/No Project Alternative allows for growth at the proposed Project site that would occur without any required additional approvals.

3.12.4.1.2 NEPA Baseline

For purposes of this Draft SEIS/SEIR, the evaluation of significance under NEPA is defined by comparing the proposed Project or other alternative to the No Federal Action scenario (i.e., the NEPA Baseline and No Federal Action Alternative are equivalent for this project). Unlike the CEQA Baseline, which is defined by conditions at a point in time, the NEPA Baseline/No Federal Action is not bound by statute to a “flat” or “no growth” scenario; therefore, the USACE may project increases in operations over the life of a project to properly analyze the NEPA Baseline/No Federal Action condition.

The NEPA Baseline condition for determining significance of impacts is defined by examining the full range of construction and operational activities that are likely to occur without a permit from the USACE. As documented in Section 2.6.1, the USACE, the LAHD, and the applicant have concluded that no part of the proposed Project would be built absent a USACE permit. Thus, for the case of this project, the

NEPA Baseline is identical to the No Federal Action/No Project Alternative (see Section 2.6.1). Elements of the NEPA Baseline include:

- Paving, lighting, fencing, and construction of an access road at Tank Farm Site 1 to allow temporary storage of chassis-mounted containers on the site by APM;
- Paving, fencing, and lighting at Tank Farm Site 2 to accommodate temporary wheeled container storage by APL or Evergreen; and
- Additional crude oil deliveries at existing crude oil terminals in the San Pedro Bay Ports.

Significance of the proposed Project or alternative is defined by comparing the proposed Project or alternative to the NEPA Baseline (i.e., the increment). The NEPA Baseline conditions are described in Section 2.6.1 and 2.5.2.1.

3.12.4.2 Thresholds of Significance

Criteria for determining the significance of impacts related to risk of upset are based on the *L.A. CEQA Thresholds Guid*e (City of Los Angeles 2006), and federal and state standards, regulations, and guidelines. The proposed Project or alternative would have a significant impact on Risk of Upset if it would:

RISK-1: Result in an accidental release of hazardous materials from onshore facilities or from vessels and/or contamination of soil or water that would adversely affect the health and safety of the general public or workers using the frequency/consequences matrix as shown in Figure 3.12-5 (construction phase).

RISK-2: Result in an accidental spill with the frequencies and severity of consequences that are considered significant using the frequency/consequences matrix as shown in Figure 3.12-5 (operations phase).

RISK-3: Result in an accidental release and subsequent fire or explosion that would adversely affect surrounding residents or businesses using the frequency/consequences matrix as shown in Figure 3.12-5 (operations phase).

RISK-4: Construction or operation activities would substantially interfere with existing emergency response plans or evacuation plans.

RISK-5: Project-related terminal modifications would result in a measurable increase in the probability of a terrorist attack, which would result in adverse consequences to the proposed Project site and nearby areas.

3.12.4.3 Impacts and Mitigation

3.12.4.3.1 Proposed Project

3.12.4.3.1.1 Construction Impacts

Impact RISK-1: Construction of the proposed Project would have the potential for accidental releases of hazardous materials.

During Project construction, lubricants or fuels used for construction machinery could be spilled during normal usage or during refueling. However, all equipment is assumed to be in good working order, as would be required under the SCAQMD ATC permit. Best management practices (BMPs) and Los Angeles Municipal Code regulations (Chapter 5, Section 57, Division 4 and 5; Chapter 6, Article 4) would govern construction and demolition activities. Federal and state regulations that govern the storage of hazardous materials in containers (i.e., the types of materials and the size of packages containing hazardous materials) and the separation of containers holding hazardous materials, would limit the potential adverse impacts of contamination to a relatively small area. In addition, standard BMPs would be used during construction and demolition activities to minimize runoff of contaminants and clean-up any spills, in compliance with the State General Permit for Storm Water Discharges Associated with Construction Activity (Water Quality Order 99-08-DWQ) and Project-specific Storm Water Pollution Prevention Plan (SWPPP) (see Section 3.14 Water Quality, Sediments, and Oceanography for more information).

A support vessel would be used to assist with construction of the Marine Terminal; however, the boat is significantly smaller than the tankers that would be unloading at Pier 400. Similarly, other vessels like the pile-driving barge, barges for materials, and the tugs, as well as equipment on the barges (pile-driver, cranes, generators) that would contain fuel tanks, lube oils, hydraulic fluids would have the potential to contribute to spills but at a much lower magnitude than the proposed crude oil tankers. The support vessel would adhere to the LAHD safe navigation rules, and the construction would be a temporary activity. Also, support vessel construction activity would not involve the handling of hazardous materials, and refueling of the vessel would be done according to the LAHD's policies. Given the small potential spill volumes associated with the construction equipment, potential impacts would be considered negligible or minor, and would be considered insignificant using the risk matrix criteria presented in Figure 3.12-5.

Construction of facilities and pipelines may potentially result in damage to underground facilities, hazardous material pipelines, electrical lines, or other cables. However, the USA Underground Alert Service or a similar service would be contacted to avoid impacts to other underground facilities during digging or trenching activity. The USA Underground Alert Service clearly marks the location of all underground utilities and pipelines and also provides detailed information, such as burial depth and potential hazards.

CEQA Impact Determination

Implementation of normal construction standards, including NPDES BMPs, and all other above mentioned regulations and practices, would minimize the potential for an accidental release of hazardous materials or fuels during construction activities. Maximum potential spill volumes would also be considered negligible. Therefore, proposed Project construction activities would result in a less than significant risk of upset.

Mitigation Measures

No mitigation is required.

Residual Impacts

A less than significant impact is anticipated.

NEPA Impact Determination

Implementation of normal construction standards, including NPDES BMPs, and all other above mentioned regulations and practices, would minimize the potential for an accidental release of hazardous materials or fuels during construction activities. Maximum potential spill volumes would also be considered negligible. Therefore, proposed Project construction activities would result in a less than significant risk of upset.

Mitigation Measures

No mitigation is required.

Residual Impacts

A less than significant impact is anticipated.

3.12.4.3.1.2 Operational Impacts

Impact RISK-2.1: An accidental crude oil spill from a tanker would result in risks to the public and/or environment.

During tanker transit, all allisions, collisions, and groundings could result in a spill of crude oil. Crude oil tankers and barges contribute about 4 percent to the total number of spills into navigable waters; however, by volume they represent about 50 percent of the total volume of spills (API 2002). About 0.2 percent of total oil tanker transits worldwide (out of 41,000 per year) result in an incident (e.g., collision, grounding), and less than 2 percent of those incidents result in an oil spill (Etkin 2001).

Open Ocean Transit Oil Spills. Spill probabilities for open ocean vessel transit were evaluated based on USCG recommendations for open ocean allisions, collisions, and groundings. While the probability of an open ocean incident is lower than in the vicinity of a port due to greater vessel spacing, the conditional probability of an oil spill resulting from an accident is higher due to greater vessel speeds. The probabilities of various events for open ocean tanker accidents are given in Table 3.12-5.

Using the Risk Matrix approach shown in Figure 3.12-8 and the spill probabilities presented in Table 3.12-5, potential impacts from a release of crude product from a tanker during ocean transit would be considered a significant impact in the absence of mitigation. The probabilities of these events are considered Unlikely for larger spills, but the consequences range from Severe to Disastrous for larger spills. The consequences associated with small oil spills would be considered Minor, and insignificant using the Risk Matrix approach.

Figure 3.12-8. Risk Matrix of Crude Oil Tanker Spills – Open Ocean

Consequences \ *Probability*	*Extraordinary >1,000,000 years*	*Rare >10,000 <1,000,000 years*	*Unlikely >100 <10,000 years*	*Likely >1 and <100 years*	*Frequent (>1/year)*
Disastrous (>357,142 bbl)			**>30% Loss of Cargo (i.e., Large)**		
Severe (2,380–357,142 bbl)			**10% Loss of Cargo (i.e., Moderate)**		
Major (238–2,380 bbl)					
Minor (10-238 bbl)				**Small Oil Spill**	
Negligible (<10 bbl)					

Notes: Incidents that fall in the shaded area of the risk matrix would be classified as significant. Incidents include both unmitigated and mitigated scenarios since all probabilities fall in the unlikely probability category.

Oil Spills within the Port of Los Angeles Waters. Various incident rates were reported (see Table 3.9-3 in Section 3.9, Marine Transportation) ranging from 0.02 to 0.2 percent frequency of occurrence per transit. The San Pedro Bay Ports have recorded annual incident rates ranging from 0.02 to 0.07 percent per transit, which is consistent with industry observations. The average incident rate over the period 1997-2005 was 0.046 percent per transit. The vessel traffic increase due to the proposed Project would be up to 201 tankers per year. Using the more conservative accident and spill probabilities listed in this section, project-related tankers would have oil spill probabilities within LAHD-controlled waters as shown in Table 3.12-6.

Table 3.12-5. Frequencies of Open Ocean Transit Oil Spills

Event	*Frequency Per Transit* [1]	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*
Single Hulled Vessels		**2010**		**2015**		**2025-2040**	
Allisions, collisions, and groundings	3.12×10^{-4}	4.02×10^{-2}	24.8	4.59×10^{-2}	21.8	6.27×10^{-2}	15.9
Small Spill	7.80×10^{-5}	1.01×10^{-2}	99	1.15×10^{-2}	87	1.57×10^{-2}	64
10 percent Loss of Cargo (250,000 bbl)	2.73×10^{-4}	3.52×10^{-3}	284	4.01×10^{-3}	249	5.49×10^{-3}	182
30 percent Loss of Cargo (750,000 bbl)	2.73×10^{-5}	3.52×10^{-3}	284	4.01×10^{-3}	249	5.49×10^{-3}	182
100 percent Loss of Cargo (2,500,000 bbl)	2.34×10^{-5}	3.02×10^{-3}	331	3.44×10^{-3}	291	4.70×10^{-3}	213
Double Hulled Vessels		**2010**		**2015**		**2025-2040**	
Allisions, collisions, and groundings	3.12×10^{-4}	4.02×10^{-2}	24.8	4.59×10^{-2}	21.8	6.27×10^{-2}	15.9
Small Spill	1.56×10^{-5}	2.01×10^{-3}	497	2.29×10^{-3}	436	3.14×10^{-3}	319
10 percent Loss of Cargo (250,000 bbl)	5.46×10^{-6}	7.04×10^{-4}	1,420	8.03×10^{-4}	1,246	1.10×10^{-3}	911
30 percent Loss of Cargo (750,000 bbl)	5.46×10^{-6}	7.04×10^{-4}	1,420	8.03×10^{-4}	1,246	1.10×10^{-3}	911
100 percent Loss of Cargo (2,500,000 bbl)	4.68×10^{-6}	6.04×10^{-4}	1,656	6.88×10^{-4}	1,454	9.41×10^{-4}	1,063

Notes:

1. This frequency is the chance of a vessel experiencing the listed event during a single transit.
2. This frequency is the chance of the expected Project vessels experiencing the listed event during a single year of transits.
3. Based on the annual Project frequency, this column indicates how often the listed event could be expected to occur for project-related vessels.

Sources: USCG 2003; FEMA 1989.

Table 3.12-6. Frequencies of Accidents and/or Oil Spills within the Port of Los Angeles Waters

Event	*Frequency Per Transit* [1]	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*
Single Hulled Vessels		**2010**		**2015**		**2025-2040**	
Allisions, collisions, and groundings	4.60×10^{-4}	5.93×10^{-2}	16.9	6.76×10^{-2}	14.8	9.25×10^{-2}	10.8
Oil Spill (any size)	1.15×10^{-4}	1.48×10^{-2}	67	1.69×10^{-2}	59	2.31×10^{-2}	43
Small Oil Spill	1.15×10^{-4}	1.48×10^{-2}	68	1.69×10^{-2}	59	2.31×10^{-2}	43
Moderate Oil Spill (238-1,200 bbl)	2.30×10^{-7}	2.97×10^{-5}	33,704	3.38×10^{-5}	29,577	4.62×10^{-5}	21,631
Large Oil Spill (>1,200 bbl)	1.15×10^{-8}	1.48×10^{-6}	674,082	1.69×10^{-6}	591,541	2.31×10^{-6}	432,620

Notes:

1. This frequency is the chance of a vessel experiencing the listed event during a single transit.
2. This frequency is the chance of the expected Project vessels experiencing the listed event during a single year of transits.
3. Based on the annual Project frequency, this column indicates how often the listed event could be expected to occur for project-related vessels.

The worst-case oil spill that could occur from a Project-related tanker would be the entire tanker contents of the largest tanker, or 2.5 million bbl. A catastrophic failure of the tanker with the release of full cargo would constitute a "disastrous" consequence per the Risk Matrix significance criteria. For single-hulled tankers, the probability of a spill would be Rare, but would be considered Disastrous, which would be considered a significant impact in the absence of mitigation. For double-hulled tankers, the probability of a complete loss of the tanker contents would be considered "Extraordinary" and would be less than significant.

Using the Risk Matrix approach in Figure 3.12-9 and the spill probabilities presented in Table 3.12-6, potential impacts from a release from a tanker while in LAHD-controlled waters would be considered a significant impact in the absence of mitigation.

Figure 3.12-9. Risk Matrix of Crude Oil Tanker Spills – Port of Los Angeles Waters

	Probability				
Consequences	*Extraordinary >1,000,000 years*	*Rare >10,000 <1,000,000 years*	*Unlikely >100 <10,000 years*	*Likely >1 and <100 years*	*Frequent (>1/year)*
Disastrous (>357,142 bbl)	**Double Hull Large Oil Spill**	**Single Hull Large Oil Spill**			
Severe (2,380–357,142 bbl)					
Major (238–2,380 bbl)		**Moderate Oil Spill (all designs)**			
Minor (10-238 bbl)			**Double Hull Small Oil Spill**	**Single Hull Small Oil Spill**	
Negligible (<10 bbl)					

Notes:

Incidents that fall in the shaded area of the risk matrix would be classified as significant.

Unmitigated case represented by single hulled vessels, while mitigated represented by double hulled vessels.

The owner or operators of tanker vessels are required to have an approved Tank Vessel Response Plan on board and a qualified individual within the U.S. with full authority to implement removal actions in the event of an oil spill incident, and to contract with the spill response organizations to carry out cleanup activities in case of a spill. The existing oil spill response capabilities in the San Pedro Bay Ports are sufficient to isolate with containment boom and recover the maximum possible spill from an oil tanker within the port.

Various studies have shown that double-hull tank vessels have lower probability of releases when tanker vessels are involved in accidents. Because of these studies, the USCG issued regulations addressing double-hull requirements for tanker vessels. The regulations establish a timeline for eliminating single-hull vessels from operating in the navigable waters or the Exclusive Economic Zone of the U.S. after January 1, 2010, and double-bottom or double-sided vessels by January 1, 2015. Only vessels equipped with a double hull, or with an approved double containment system will be allowed to operate after those times. It is unlikely that single-hull vessels will utilize the proposed Project terminal facilities given the current proposed Project schedule and the planned phase-out of these vessels.

Assuming that a majority of vessels that would visit the proposed terminal would be of a double-hull design, oil spill probabilities within LAHD controlled waters can be estimated as shown in Table 3.12-7.

Again, using the Risk Matrix approach shown in Figure 3.12-9 and the spill probabilities presented in Table 3.12-7, potential impacts from a release of petroleum from a tanker while in LAHD-controlled waters would be considered a less than significant impact, in the absence of potential impacts on sensitive or endangered species. This less than significant impact for oil spills reflects the LAHD's better-than-average safety record, the types of vessels that would visit the proposed Marine Terminal, and the available spill response capabilities. However, the Cabrillo Shallow Water Habitat (1,900 ft [580 meters] away) and the Pier 400 Least Tern Habitat (2,400 ft [730 meters] away) are very close to the Marine Terminal, and a spill within the Port would impact sensitive resources and result in the degradation of the habitat. Therefore, potential impacts associated with oil spills resulting from a vessel accident would be significant.

Fuel Barge Spills. The proposed Project would require periodic barge trips to supply the terminal with marine gas oil (MGO) for refueling of crude oil tankers that visit the terminal. The number of trips would range from six per year in 2010, eight per year starting in 2015 and 12 per year in 2025 and thereafter. The barges would originate at a nearby San Pedro Bay bulk liquid terminal. These intraport transfers of MGO would slightly increase the frequency of spills within the port complex. Based on the projected terminal fuel needs, small spill frequencies would range from 6.90×10^{-4}/yr (once every 1,450 years) in 2010 to 1.38×10^{-3}/yr (once every 725 years) in 2025 onward. Large spill frequencies would range from 6.90×10^{-8}/yr (once every 14,500,000 years) in 2010 to 1.38×10^{-7}/yr (once every 7,250,000 years) in 2025 onward. These spill frequencies represent a slight increase over the Project tanker spill frequency in San Pedro Bay Port waters and represent a less than significant risk.

Table 3.12-7. Frequencies of Oil Spills within the Port of Los Angeles Waters for Majority Double-Hull Tank Vessels

Event	*Frequency Per Transit* [1]	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*
Double Hulled Vessels		**2010**		**2015**		**2025-2040**	
Allisions, collisions, and groundings	$4.60 x 10^{-4}$	$5.93 x 10^{-2}$	16.9	$6.76 x 10^{-2}$	14.8	$9.25 x 10^{-2}$	10.8
Oil Spill (any size)	$2.30 x 10^{-5}$	$2.97 x 10^{-3}$	337	$3.38 x 10^{-3}$	296	$4.62 x 10^{-3}$	216
Small Oil Spill	$2.30 x 10^{-5}$	$2.96 x 10^{-3}$	338	$3.37 x 10^{-3}$	296	$4.61 x 10^{-3}$	217
Moderate Oil Spill (238-1,200 bbl)	$4.60 x 10^{-8}$	$5.93 x 10^{-6}$	168,520	$6.76 x 10^{-6}$	147,885	$9.25 x 10^{-6}$	108,155
Large Oil Spill (>1,200 bbl)	$2.30 x 10^{-9}$	$2.97 x 10^{-7}$	3,370,408	$3.38 x 10^{-7}$	2,957,705	$4.62 x 10^{-7}$	2,163,098

Notes:

1. This frequency is the chance of a vessel experiencing the listed event during a single transit.
2. This frequency is the chance of the expected Project vessels experiencing the listed event during a single year of transits.
3. Based on the annual Project frequency, this column indicates how often the listed event could be expected to occur for project-related vessels.

Marine Terminal Unloading Oil Spills. Accidents and incidents during bunkering, lightering, and loading operations are responsible for 57 percent of tanker spills (Etkin 2001). Unloading spills are generally small given the manned nature of the unloading activity and presence of observation personnel in the immediate vicinity of the tanker unloading operations. Statistics for the 1974-2004 period on worldwide accidental oil spills by oil-cargo (tanker ships, tank barges, and combination oil-cargo/non-oil-cargo) vessels collected by the International Tanker Owners Pollution Federation (ITOPF 2005) reveal that 53.8 percent are transfer spills, 20.9 percent are vessel-accident spills, and the remaining 25.3 percent are unknown types. Of the transfer spills, 34.3 percent are directly related to loading/unloading operations. The vast majority (84 percent) of the spills are relatively small spills of 50 bbl or less. For loading/unloading operations, this percentage increases to 88.8 percent, with only 0.9 percent of the loading/unloading spills exceeding 5,000 bbl (the balance of spills between 50 and 5,000 bbl amounts to 10.3 percent).

Berth 408 will be the first crude oil marine terminal specifically designed to MOTEMS, and will be substantially different than any of the existing bulk liquid marine terminals in San Pedro Bay. Berth 408 will be designed to prevent accidents and crude oil spills from a variety of loads from external events including:

Load Generated By	MOTEMS Reference
• Wind	• 3105F.3.1
• Wave	• 3105F.3.1
• Passing Vessel	• 3105F.3.2
• Seiche	• 3105F.3.3
• Tsunami	• 3105F.3.4

Given the safety features that are incorporated into the proposed Project, it is unlikely that a spill during unloading would adversely affect the marine environment. The facility would be designed to protect the environment in the immediate vicinity of unloading operations. The dock platform would be constructed with a concrete curb around its outer edge. This curb would prevent any run off which may accumulate on the dock surface. This run off would drain into a containment sump. The containment sump would have automatic monitoring equipment to verify sump levels. The contents of the sump would be periodically inspected and the contents would be managed in accordance with approved written procedures.

Before any discharge operation can begin, the unloading vessel would be totally enclosed by a spill containment boom. This boom would be capable of containing any oil from any source inside the boom. If any oil is observed within the boom, all operations would be stopped. In addition to this boom, the terminal would have additional spill boom accessible for launching should an event occur where the primary boom is not sufficient to contain the oil. The booms would be deployed by terminal personnel using boom boats which would be moored in the water at the terminal.

A tsunami could also lead to an oil spill at the terminal site if a moored vessel were present. While in transit, the hazards posed to crude oil tankers from tsunamis are insignificant, and in most cases, imperceptible until the tsunami reaches shallow water and begins to build in height (open ocean tsunamis are generally only a few meters in height, but can increase to many meters when they reach shallow coastal waters). However, while docked, a tsunami striking the port could cause significant ship movement, potential loading arm failure, and even a hull breach if the ship is pushed against the wharf or is set adrift and strikes other objects or wharves.

Various estimates of tsunami run-up heights, primarily from distant sources, have been developed for the proposed Project area. Synolakis (2003) estimated a 100-year run-up height of 8 ft and a 500-year run-up height of 15 ft for the Port area. More recently, Borrero et al. (2005) estimated that a tsunami of approximately 13 ft could occur as the result of a large, submarine landslide located 10 miles southwest of the Port. Run-up heights within the port vary widely, depending on wharf orientation and exposure, but are generally less than the heights noted above.

A report prepared by the firm of Moffatt and Nichol (2007), for the Port, studied historical and future tsunami risk at the port. (The entire report is included in this Draft SEIS/SEIR as Appendix M.) Historical tsunamis have mainly resulted from distant earthquakes (e.g., Alaska, Chile, etc.) with modest water level changes experienced in the Port. While there is some potential for a tsunami-related crude oil spill, tsunamis created by distant seismic events offer sufficient warning time to allow a crude oil carrier to leave the port for deeper water.

Moffatt and Nichol (2007) also evaluated the potential for locally generated tsunamis in the Southern California Continental Borderland (SCCB) resulting from seismicity and subsea landslides. A tsunami generated in the SCCB would have the potential to create substantially larger water level fluctuations than a distant tsunamigenic source, and would arrive with very little warning (generally less than 30 minutes). A modeling analysis prepared for the San Pedro Bay Ports shows that a landslide- or earthquake-related tsunami would have the potential to overtop certain wharves, including the proposed Pier 400 terminal site. See Section 3.5, Geology, for additional information.

The shoreline structures and unloading equipment are designed to operate within a range of motion that includes the 8-ft extreme tidal range in the Port plus the vessel's change in draft as a result of unloading. Therefore, a smaller moderate tsunami would have little effect on a ship at berth. However, a large tsunami (on the order of the 500 year, 15 ft event) would likely damage the loading arms and potentially the ship.

The Energy Information Administration (EIA) (2005) reported impacts to marine terminal facilities associated with the December 24, 2004 Sumatra M_W 9.3 earthquake and subsequent tsunami. Indonesia's PT Arun Liquefied Natural Gas (LNG) facility in Banda Aceh, Sumatra, was not damaged by the tsunami even though the maximum runup height observed at Banda Aceh was approximately 30 ft. An oil transfer facility approximately 30 miles to the east of Banda Aceh received relatively minor damage, with only one crude oil storage tank being moved off its foundation by the estimated 16-ft waves. An oil tanker was unloading when the tsunami struck, but the crew was able to move the ship offshore (the EIA report did not comment if there was an oil spill).

In 2006, a tanker unloading at the ExxonMobil terminal was pulled from the dock by the wake of a passing ship. The transfer hoses were stretched and the tanker surged back into the berth damaging a dozen beams. While the loading hoses did not fail, the incident raised concerns about older terminals that are not designed according to MOTEMS. Berth 408 is designed to accommodate the maximum load caused by the wakes of passing ships (MOTEMS 3105F.3.2). Therefore, this type of incident would not result in a potential accidental spill.

Loading arm failure frequencies for the proposed Project were estimated based on the failure probability of the various loading arm components, as well as external stresses (e.g., wind, tides, tsunami, mooring failures, etc.) that could cause a loading arm failure. The frequency of a small spill was estimated to be 2.17×10^{-3} per year, or about once every 460 years. A large failure, which would also require a failure of all emergency systems and procedures, was estimated to be 5.85×10^{-5} per year, or once every 17,100 years. Using the risk matrix in Figure 3.12-10, the small spill would be considered Unlikely/Minor, while the large spill would be considered Rare/Major. In light of the applicant-proposed spill containment procedures, both of these spill scenarios would be less than significant.

Figure 3.12-10. Risk Matrix of Crude Oil Unloading Spills

		Probability				
		Extraordinary >1,000,000 years	*Rare >10,000 <1,000,000 years*	*Unlikely >100 <10,000 years*	*Likely >1 and <100 years*	*Frequent (>1/year)*
Consequences	Disastrous (>357,142 bbl)					
	Severe (2,380–357,142 bbl)					
	Major (238–2,380 bbl)		**Large Loading Arm Spill**			
	Minor (10-238 bbl)			**Small Loading Arm Spill**		
	Negligible (<10 bbl)					

Note: Incidents that fall in the shaded area of the risk matrix would be classified as significant.

CEQA Impact Determination

Using the Risk Matrix approach shown in Figure 3.12-8 and the spill probabilities presented in Table 3.12-5, potential impacts from a release of crude product from a tanker during ocean transit would be considered a significant impact in the absence of mitigation. The probabilities of these events are considered Unlikely for larger spills, but the consequences range from Severe to Disastrous for larger spills. The consequences associated with small oil spills would be considered Minor, and insignificant using the Risk Matrix approach.

Again, using the Risk Matrix approach shown in Figure 3.12-9 and the spill probabilities presented in Table 3.12-7, potential impacts from a release of petroleum from a tanker while in LAHD-controlled waters would be considered a less than significant impact, in the absence of potential impacts on sensitive or endangered species. This less than significant impact for oil spills reflects the LAHD's better-than-average safety record, the types of vessels that would visit the proposed Marine Terminal, and the available spill response capabilities. However, the Cabrillo Shallow Water Habitat (1,900 ft [580 meters] away) and the Pier 400 Least Tern Habitat (2,400 ft [750 meters] away) are very close to the Marine Terminal, and a spill within the Port would impact sensitive resources and result in the degradation of the habitat. Therefore, potential impacts associated with oil spills resulting from a vessel accident would be significant.

Loading arm failure frequencies for the proposed Project were estimated based on the failure probability of the various loading arm components, as well as external stresses (e.g., wind, tides, tsunami, mooring failures, etc.) that could cause a loading arm failure. The frequency of a small spill was estimated to be 2.17×10^{-3} per year, or about once every 460 years. A large failure, which would also require a failure of all emergency systems and procedures, was estimated to be 5.85×10^{-5} per year, or once every 17,100 years. Using the risk matrix in Figure 3.12-10, the small spill would be considered Unlikely/Minor, while the large spill would be considered Rare/Major. In light of the applicant-proposed spill containment procedures, both of these spill scenarios would be less than significant.

Based on the probability of crude oil spills during vessel transit and in Port waters, potential oil spill impacts are considered significant.

Mitigation Measures

MM 4I-2 from the Deep Draft FEIS/FEIR (USACE and LAHD 1992; see Section 3.12.1.1) would apply. This measure requires that all facility operators handling hazardous liquid in bulk be a member of the CCW cooperative or equivalent OSRO approved by the USCG.

MM RISK-2.1a: Double-Hulled Vessels. The proposed Project shall limit crude oil deliveries to double-hulled vessels. USCG regulations will require double-hulled vessels for all areas within the Exclusive Economic Zone of the U.S. starting in 2015. This measure will bar the Project from accepting deliveries from single-hulled vessels at any time after commencement of the Project.

MM RISK-2.1b: Quick-Release Couplings. Loading arms shall be equipped with USCG-approved quick-release couplings. A crude oil flow control system shall be interlocked at the coupling that will automatically stop flow prior to disconnection.

Residual Impacts

While applicant-proposed Project design and implementation of **MM 4I-2**, **MM RISK-2.1a,** and **MM RISK-2.1b** would effectively limit offloading spills to a less than significant level, the risk of an oil spill in Port waters and in transit from foreign ports remains significant. There are no additional feasible mitigation measures to reduce this impact, and therefore, the potential risk would be significant and unavoidable.

NEPA Impact Determination

Based on the probability of crude oil spills during vessel transit and in Port waters, potential oil spill impacts are considered significant.

Mitigation Measures

Implement mitigation measures **MM 4I-2**, **MM RISK-2.1a**, and **MM RISK-2.1b.**

Residual Impacts

While applicant-proposed Project design and implementation of **MM 4I-2**, **MM RISK-2.1a** and **MM RISK-2.1b** would effectively limit offloading spills to a less than significant level, the risk of an oil spill in Port waters and in transit from foreign ports remains significant. There are no additional feasible mitigation measures to reduce this impact, and therefore, the potential risk would be significant and unavoidable.

Impact RISK-2.2: An accidental oil spill from the proposed Project pipelines would pose a risk to the marine environment.

Project Pipeline Characteristics

The proposed pipeline system consists of pipelines, tanks, and ancillary systems, as outlined in Tables 2-3 through 2-7 (see Section 2.4.2, Facility Design and Configuration). As described in the Methodology section above, and based on the CSFM data, pipeline-specific failure rates can be estimated for the proposed pipeline system based on the proposed construction specifications and operating parameters. Environmental hazards associated with an accidental spill from the crude oil storage tanks are not evaluated under this impact since all spilled oil would be fully contained within the tank farm dikes, and thus would pose no hazard to the surrounding waters or other sensitive land uses. Potential hazards associated with tank farm spills and fires are evaluated under **Impact RISK-3.2** below.

The proposed Project pipeline physical and operational characteristics are outlined in Table 3.12-8. The entire pipeline system would have cathodic protection and be controlled by a SCADA system. The project applicant plans to initially have internal inspection (smart-pigging) done every five years on all sections of the system. In addition, the project applicant would smart-pig the existing pipelines (e.g., 36-inch KMEP pipelines) prior to commencing operations. Based on the analysis of the smart-pigging results, cathodic protection surveys and internal corrosion data, the project applicant would make adjustments to the smart-pigging schedule (i.e., increase the frequency) as required by the Plains Pipeline Integrity Management Program (this program outlines the type and frequency of pipeline testing). Based on the pipeline characteristics and the CSFM database, failure rate for each Project pipeline was determined.

Table 3.12-8. Proposed Project Pipeline Characteristics[1]

Pipeline	*Year Installed*	*Length (ft)*	*Diameter/Wall Thickn.(in)*	*Operating Pressure (psig)*	*Coating[2]*	*Pipe Spec.*	*Pipe Type[2]*
1. Berth 408 to Pier 400 Terminal to Tank Farm Site 2	New	20,650	42/0.75	740	FBE or Pritec®	API 5L X-56	ERW
2a. Tank Farm Site 2 to South KMEP pipeline	New	1,800	36/0.375	740	FBE or Pritec®	API 5L X-56	ERW
2b. Tank Farm Site 2 to North KMEP pipeline	New	1,800	36/0.375	740	FBE or Pritec®	API 5L X-60	ERW
2c. Connection to ExxonMobil SW Terminal	New	100	36/0.375	740	FBE or Pritec®	API 5L X-60	ERW
3. Mormon Island to Site A	New	14,000	36/0.375	740	FBE or Pritec®	API 5L X-52	ERW
4. Site A to Valero Refinery	New	7,200	24/0.375	740	FBE or Pritec®	API 5L X-52	ERW
5. Site A to 16" Plains Pipeline	New	1,000	16/0.375	740	FBE or Pritec®	API 5L X-52	ERW
6. South KMEP pipeline to ExxonMobil [3]	1994	3,900	36/0.438	740	FBE	API 5L X-65	DSA W
7. North KMEP pipeline to Mormon Island [3]	1994	2,300	36/0.720	740	FBE/ PROTE GOL®	API 5L X-65	DSA W

Notes:
1. Pipeline construction parameters are preliminary, and are subject to change during the detailed design and construction phases of the proposed Project.
2. FBE = fusion bonded epoxy, ERW = Electronic resistance welded, DSAW = Double submerged arc welded.
3. The South KMEP (6) and North KMEP (7) pipelines are existing permitted pipelines that currently carry crude products. Current operating conditions would not change as a result of the proposed Project.

For the purposes of comparing spill frequencies with the significance criteria, the pipeline spill frequencies were estimated using the latest information on crude oil pipeline failure rates available from the CSFM (1993). The CSFM presented a set of hazardous liquid pipeline incident rates for all pipelines and uses. These incident rates, however, reflect average failure rates for all pipelines, and do not account for specific pipeline designs of the higher failure rates noted for crude oil pipelines. A review of the CSFM shows that the following pipeline design and operation parameters can have a significant effect on pipeline incident rates:

- Pipeline Age
- Pipeline Diameter
- Pipe Specification

- Pipe Type
- Normal Operating Temperature
- Normal Operating Pressure
- Supervisory Control and Data Acquisition (SCADA) System
- Cathodic Protection System
- Coating Type
- Internal Inspection
- Standard Metropolitan Statistical Area

Based on the CSFM data, failure rates can be estimated for the proposed Project based on the pipeline characteristics presented in Table 3.12-8. These failure rates are given in Table 3.12-9 and represent the pipeline failure rate under continuous operation and have not been corrected for batch operations.

Table 3.12-9. Proposed Project Pipeline Failure Rates

Project Pipeline	*Unit Failure Rate per 1000 mile per yr*	*Failure Rate, Total (per year)*	*Failure Rate, Ruptures (per year)*	*Failure Rate, Leaks (per year)*	*Probability Spill Reaching Water (per year)*
1. Berth 408 to Pier 400 Terminal to Tank Farm Site 2	0.0142	$5.54x10^{-5}$	$1.11x10^{-5}$	$4.42x10^{-5}$	$7.78x10^{-7}$
2a. Tank Farm Site 2 to South KMEP pipeline	0.0142	$4.82x10^{-6}$	$9.69x10^{-7}$	$3.86x10^{-6}$	$9.69x10^{-8}$
2b. Tank Farm Site 2 to North KMEP pipeline	0.0142	$4.82x10^{-6}$	$9.69x10^{-7}$	$3.86x10^{-6}$	$9.69x10^{-8}$
2c. Connection to ExxonMobil SW Terminal	0.0142	$2.68x10^{-7}$	$5.38x10^{-8}$	$2.14x10^{-7}$	$5.38x10^{-9}$
3. Mormon Island to Site A	0.0142	$3.75x10^{5}$	$7.54x10^{-6}$	$3.00x10^{5}$	$7.54x10^{-7}$
4. Site A to Valero Refinery	0.0142	$1.93x10^{-5}$	$3.88x10^{-6}$	$1.54x10^{-5}$	$3.88x10^{-7}$
5. Site A to 16" Plains Pipeline	0.0156	$2.95x10^{-6}$	$5.93x10^{-7}$	$2.36x10^{-6}$	$4.74x10^{-7}$
6. South KMEP pipeline to ExxonMobil[1]	0.728	$5.37x10^{-4}$	$1.08x10^{-4}$	$4.30x10^{-4}$	$3.24x10^{-5}$
7. North KMEP pipeline to Mormon Island[1]	0.728	$3.17x10^{-4}$	$6.37x10^{-5}$	$2.53x10^{-4}$	$6.37x10^{-6}$

Notes:

1. The South KMEP (6) and North KMEP (7) pipelines are existing permitted pipelines that currently carry crude products. Current operating conditions would not change as a result of the proposed Project.

Project Pipeline Spill Volumes

Worst-case spill volumes were calculated using the methodology outlined in Section 3.12.4.1 in the Crude Pipeline Scenarios sub-section. Table 3.12-10 lists the proposed Project pipeline segments, worst-case spill volumes, spill frequency rates, and the potential environment where the spilled oil could be released.

Table 3.12-10. Plains Pipeline System Failure Rates and Worst Case Oil Spill Volumes

Pipeline Segment (Diameter)	*Length (ft)*	*Nominal Pumping Rate (bph)*	*Major Oil Spill Rates (per year)*	*Drainage Volume (bbl)*	*Detection Time (min)*	*Total Spill (bbl)*	*Potentially Affected Environment[1]*
1. Berth 408 to Pier 400 Terminal to Tank Farm Site 2	20,650	100,000	$1.11x10^{-5}$	247	2	3,850	SPB[2] waters
2a. Tank Farm Site 2 to South KMEP pipeline	1,800	45,000	$9.69x10^{-7}$	2,173	5	5,923	Industrial Land
2b. Tank Farm Site 2 to North KMEP pipeline	1,800	85,000	$9.69x10^{-7}$	2,173	5	9,256	Industrial Land
2c. Connection to ExxonMobil SW Terminal	100	85,000	$5.38x10^{-8}$	121	5	7,204	Industrial Land
3. Mormon Island to Site A	14,000	45,000	$7.54x10^{-6}$	16,899	5	20,649	Land, East Basin Channel
4. Site A to Valero Refinery	7,200	45,000	$3.88x10^{-6}$	3,781	5	7,531	Land, Dominguez Channel
5. Site A to 16" Plains Pipeline	1,000	20,000	$1.46x10^{-6}$	226	5	1,893	Industrial Land
6. South KMEP pipeline to ExxonMobil[3]	3,900	45,000	$1.08x10^{-4}$	4,525	5	8,275	Industrial Land
7. North KMEP pipeline to Mormon Island[3]	2,300	85,000	$6.37x10^{-5}$	2,757	5	9,840	Land, East Basin Channel

Notes:
1. Possible affected environment – identifies that oil could be spilled into the noted environment if the spill occurs from some portion of the pipeline adjacent to the resource.
2. SPB = San Pedro Bay; bph = barrels per hour; bbl = barrels.
3. The South KMEP (6) and North KMEP (7) pipelines are existing permitted pipelines that currently carry crude products. Current operating conditions would not change as a result of the proposed Project.

Spill volumes from the proposed Project pipelines were determined using the methodology described above. The spill volume from the proposed 42-inch pipeline between Pier 400 and Tank Farm Site 2 was adjusted to account for site specific conditions. The proposed 42-inch pipeline is almost entirely within the man-made Pier 400 landfill peninsula. The landfill has a flat relief and thus if a pipeline rupture occurs, the full volume of the pipeline would not drain. This pipeline would be located underground on level terrain, thus the volume released from the pipeline would be due to pumping before pump shutdown and due to pipeline fluid decompression.

The latter is assumed to be 0.75 percent of the total pipeline volume between the isolation valves according to the CSFM (CSFM 1993). The leak detection time was assumed to be five minutes for all pipeline segments, except for the segment from the berth to the Tank Farm Site 2 at Pier 400, where it was assumed at to be two minutes. This is because during tanker unloading the latter segment would be monitored by Plains personnel and observed for potential problems more closely than other segments of the pipeline. Additionally, as stated in the proposed Project description, tanker unloading through this pipeline segment would begin at a slower rate to assure that there are no leaks or other problems.

As shown in Table 3.12-10, the maximum spill volumes estimated for the pipeline system segments range from over 20,649 bbl (867 thousand gallons) to approximately 1,893 bbl (79 thousand gallons). These potential worst-case spill volumes from the proposed Project pipelines would be considered Severe and Major, respectively (see Risk Matrix in Figure 3.12-11), if this amount of oil is spilled onto water or near a sensitive biological resource.

The project applicant would use many safety measures including spill response measures and design features to prevent accidents, spills and to protect environment. These measures are discussed in Section 2.4 and Appendix E of the Draft SEIS/SEIR.

Figure 3.12-11. Risk Matrix for Pipeline Crude Oil Spills into Port of Los Angeles Waters

Consequences	*Probability*				
	Extraordinary- >1,000,000 years	*Rare >10,000 <1,000,000 years*	*Unlikely >100 <10,000 years*	*Likely >1 and <100 years*	*Frequent (>1/year)*
Disastrous (> 100 severe injuries or >357,142 bbl)					
Severe (up to 100 severe injuries or 2,380-357,142 bbl)	**1W, 2aW, 2bW, 2cW, 3W, 4W**				
Major (up to 10 severe injuries or 238-2,380 bbl)	**5W**				
Minor (a few minor injuries or 10-238 bbl)					
Negligible (no minor injuries or <10 bbl)					

Notes:

The numbers in the above matrix correspond to the Pipeline segment numbers in Table 3.12-10.
Incidents that fall in the shaded area of the risk matrix would be classified as significant.
W = "Spill into Water" scenario.
*The South KMEP (6) and North KMEP (7) pipelines are existing permitted pipelines that currently carry crude products. Current operating conditions would not change as a result of the proposed Project.

However, regardless of the proposed Project's safety design features, the potential for accidental spills still exists. The probability and consequences of spills from the proposed Project pipelines have been mapped on the Risk Matrix (see Figure 3.12-11). The numbers designate the pipeline segments as per Table 3.12-10. The probabilities in this figure represent the combined probability of a pipeline rupture and the spill reaching the water. The numbers designate the pipeline segments as per Table 3.12-10. In Figure 3.12-11, impacts from spills are designated with the modifier 'W' to indicate a spill to a water body.

Spills from the proposed 42-inch pipeline from Berth 408 to the Tank Farm Site 2 can potentially enter the waters of the Harbor and San Pedro Bay, with worst-case spill of over 3,850 bbl. This would be a Severe consequence. However, a failure frequency rate of a spill from this pipeline is very low given the safety features and the protected environment of Pier 400 where third-party damage, and thus the probability of a pipeline failure, is highly unlikely. The risk of spills to water from this pipeline would be considered Extraordinary/Severe and thus less than significant due to the very low likelihood of a pipeline failure occurring in a location where the oil could reach the water.

Although the pipeline segments from the tank farms to the ExxonMobil Terminal (including the new 36-inch pipeline and the existing KMEP pipeline) could experience a spill at a probability of once in a 15,000 year period, this pipeline segment is located relatively far from any water (i.e., distances ranging between 100 and 500 meters) and thus spills would not be expected to make their way into the water environment. These pipelines have a relatively low failure probability due to the short distance and batch operation of the pipelines. Thus, the probability of a spill from this segment entering the water would be Extraordinary, and considered less than significant.

Spills from the existing 36-inch Mormon Island pipeline that crosses over East Basin Channel could be released into the channel and eventually into the rest of the Harbor and San Pedro Bay. However, the release probability from the short portion of this pipeline that is in the vicinity of the Channel would not increase appreciably over baseline, and thus less potential impacts would be than significant.

Spills from the proposed 24-inch pipeline could be released into the Dominguez Channel and into the northern portion of the Harbor, but only if the spill were to occur near the channel crossing. The probability of a release from the short portions of this pipeline that are in the vicinity of water would be Extraordinary, and thus less than significant.

A failure of pipeline segment 3 represents the greatest hazard in terms of potential spill volume. Given the relatively long length of this pipeline segment, and the large 36-inch diameter, a worst-case spill of approximately 20,000 bbl is possible, which is approximately double the spill volume of any other pipeline segment. This pipeline also traverses fairly close to Port waters near Slip 5 and the East Channel Basin. However, the likelihood of a spill reaching Port waters is considered Extraordinary, and thus less than significant.

CEQA Impact Determination

As shown in Figure 3.12-11, the probability of spills into water from all proposed Project pipelines (i.e., proposed Pipeline Segments 1, 2a, 2b, 2c, 3, 4, and 5) would have a frequency that is considered Extraordinary. Therefore, for all proposed pipelines, potential impacts would be considered less than significant due to the low probability that a pipeline-related spill would reach the Port waters in any appreciable volume. In addition, the project will be required to meet the requirements of **MM 4I-3** from the 1992 Deep Draft FEIS/FEIR, which requires spill containment to prevent oil from reaching the water.

Potential spills from the two existing KMEP (6 and 7) pipeline segments that would be utilized as part of the proposed Project have the greatest potential in reaching Port waters. The probability of a spill reaching Port waters is considered Rare, but with Severe consequences suggesting significant impacts. However, these two existing pipeline segments are part of the CEQA/NEPA Baseline and potential increases in spill risk over baseline associated with the proposed Project is negligible. Because the two existing pipelines currently contain petroleum products (crude oil or cutter stock), the frequency of a spill is essentially unchanged by the proposed Project. The maximum spill volume is based on current operating conditions (for example, peak throughput, pressure, and temperature) which will not change as part of the proposed Project. Therefore, the proposed Project would have the same failure frequency and same maximum spill volume as baseline conditions and the impacts are considered less than significant.

Oil spills would affect biological and water resources, however, there are no public safety hazards from an oil spill unless it ignites (impacts from a spill and fire are discussed in the next impact discussion). Therefore, the public safety impacts from project-related pipeline spills would be less than significant.

Mitigation Measures

No mitigation is required. However, as noted, the proposed Project will be required to meet the requirements of **MM 4I-3** from the 1992 Deep Draft FEIS/FEIR, which requires that the overland transportation corridor be designed so that spills along the corridor would be contained and not allowed to run off into the water.

Residual Impacts

Less than significant impact.

NEPA Impact Determination

As shown in Figure 3.12-11, the probability of spills into water from all proposed Project pipelines (i.e., proposed Pipeline Segments 1, 2a, 2b, 2c, 3, 4, and 5) would have a frequency that is considered Extraordinary. Therefore, for all proposed pipelines, potential impacts would be considered less than significant due to the low probability that a pipeline-related spill would reach the Port waters in any appreciable volume. In addition, the project will be required to meet the requirements of **MM 4I-3** from the 1992 Deep Draft FEIS/FEIR, which requires spill containment to prevent oil from reaching the water.

Oil spills would affect biological and water resources, however, there are no public safety hazards from an oil spill unless it ignites (impacts from a spill and fire are discussed in the next impact discussion). Therefore, the public safety impacts from project-related pipeline spills would be less than significant.

Potential spills from the two existing KMEP (6 and 7) pipeline segments that would be utilized as part of the proposed Project have the greatest potential in reaching Port waters. The probability of a spill reaching Port waters is considered Rare, but with Severe consequences suggesting significant impacts. However, these two existing pipeline segments are part of the CEQA/NEPA Baseline and potential increases in spill risk over baseline associated with the proposed Project is negligible. Because the two existing pipelines currently contain petroleum products (crude oil or cutter stock), the frequency of a spill is essentially unchanged by the proposed Project. The maximum spill volume is based on current operating conditions (for example, peak throughput, pressure, and temperature) which will not change as part of the proposed Project. Therefore, the proposed Project would have the same failure frequency and same maximum spill volume as baseline conditions and the impacts are considered less than significant.

Mitigation Measures

No mitigation is required. However, as noted, the proposed Project will be required to meet the requirements of **MM 4I-3** from the 1992 Deep Draft FEIS/FEIR, which requires that the overland transportation corridor be designed so that spills along the corridor would be contained and not allowed to run off into the water.

Residual Impacts

Less than significant impact.

Impact RISK-3.1: Potential pipeline oil spills with subsequent fires would result in risks to the public and environment.

Project Pipeline Spills

To determine the nature and magnitude of damage and contamination associated with a land-based oil spill, the area in which the oil would spread must be estimated. To simulate the spreading of an oil spill on land, a multi-component spreading/evaporating/boiling pool model that is part of the SuperChems consequence modeling software was used. This model simulates the symmetrical spread and evaporation of fluids on flat surfaces. The spreading is based on conservation equations for incompressible fluid flow. Initially, the flow is dominated by gravity effects and at later stages by gravity-viscous effects. Mathematical equations are used to calculate the oil pool temperature and the liquid regression rate as the oil spreads within the adjacent area. The heat balance takes into effect evaporative cooling, ground conduction of heat, and warming by solar radiation. This model is based on volumetric flow rates resulting from a spill, area and location of diking, ground surface characteristics, and meteorological conditions.

Crude Oil Fire Hazards

The proposed Project has proposed to accept crude oil shipments with widely varying physical properties and volatility from a wide range of sources. To address potential fire and explosion hazards, a range of oil types were evaluated for the safety analysis. The crude oil stocks ranged from the heaviest and less volatile oil (Maya from Mexico) to a lighter crude oil with the most volatile content (Arabian Light from Saudi Arabia). Several less volatile intermediary products, such as gas oil, will also be shipped through the terminal. In order to obtain a worst-case estimate of potential worst-case hazards, the crude oil pool fire analysis utilized the Saudi Arabia Light crude for all spill and fire modeling. To accurately assess the fire potential, a modeling analysis was conducted to assess the potential for crude oil ignition in the event that the oil is spilled and forms a pool. A multi-component pool model was used to estimate the evaporation rate of each component of the crude oil. A dispersion model was then used to estimate the vapor equilibrium above the oil spill surface and to estimate potential flammable vapor zones.

The modeling analysis also considered the effect of pipeline operating pressure and temperature on the volatility of the crude oil types. The high pressure and temperature of the pipeline could result in oil being sprayed when the release occurs through a small hole or crack, which increases the likelihood of ignition and a subsequent pool fire.

Several pipeline and tank pool fire scenarios were considered and analyzed for this study, which included potential spill sizes ranging from 1,900 to 41,238 bbl. These scenarios were simulated using the SuperChems consequence modeling software package developed at Arthur D. Little, Inc. It should be noted that any fire that occurs would likely be restricted to the location of the spill. A flammable vapor cloud moving downwind from a spill of heavy crude is not expected to occur since the small quantities of flammable vapors contained in this oil would disperse very rapidly. However, modeling results showed that a spill of light crude could result in a flammable vapor hazard zone of up to 165 meters from the center of a spill.

Modeling was made based on the following worst-case assumptions:

- Ambient temperature 305°K (90°F);
- Discharge temperature of 303°K (85°F);
- Wind speed 1 m/s, and 10 m/s;
- Unlimited pool radius;
- Average flame temperature of 1,048°K (1,427°F); and
- Burning rate of 0.215 millimeters/second (mm/s) of the oil pool depth.

These worst-case modeling assumptions would have the effect of overestimating potential consequences and risk, thus providing a conservative estimate of risk. Potential consequences in an accident would likely be less severe. However, for the purpose of providing an absolute worst-case estimate of consequences and risk, worst-case assumptions were used in the analysis.

Results of the fire pool modeling, provided in the risk modeling results tables (see Appendix R), indicate that thermal radiation hazards vary with the size of the spill, assuming spill size is proportional to spill rate. For the smaller spills in the risk modeling results tables, it was assumed that the entire volume was spilled within a one-hour period. Radiative properties of the fire were based on a detailed analysis of Saudi Arabian Light crude oil and assumed a high pentane and light end fraction. This information was used to simulate the fractionation of the burning hydrocarbon mixture, and the progressive decrease in thermal radiation intensity over time. Different meteorological conditions were also simulated to obtain a conservative estimate of thermal radiation hazards.

All proposed Project pipelines have very low failure and spill frequencies because these are either new or relatively new pipelines (the existing KMEP pipelines were constructed in 1994) that have effective anticorrosion coatings, leak detection system, and a comprehensive internal inspection program. The probability of a pipeline rupture and ignition of the crude oil is also improbable. Based on the DOT OPS database, less than five percent of crude oil spills resulting from a pipeline rupture have ignited and resulted in a large pool fire. Therefore, for each scenario, the probability of a large crude oil fire was estimated based on the pipeline rupture probability (see Table 3.12-9) times an ignition probability of 4.9 percent. Ruptures of the proposed Project pipelines accompanied with fire would be considered Extraordinary events (see Risk Matrix in Figure 3.12-12, scenario numbers are per Table 3.12-10). The distance to the closest sensitive receptor or residence from any point on the pipeline right-of-way is over 2,000 ft (610 m), which means that there would be no sensitive receptors within the fire impact zones. The majority of the proposed Project pipeline right-of-way lies within the Port or the industrial areas surrounding the port, that have low population densities, where people are present only part of the day (e.g., LAHD workers, visitors and employees of companies operating in the Port), resulting in fewer numbers of people that could be exposed to thermal radiation hazards. Based on the population density in this area, the number of people that could be exposed to a thermal radiation level of 5 kW/m^2 would be on the order of one to two dozen. Since the 5 kW/m^2 thermal radiation would result in injury to about 10 percent of the exposed population (CCPS 1989) the expected number of injuries would be limited to less than three for segment 2b. Thus potential consequences associated with these scenarios would be considered Minor (see Risk Matrix in Figure 3.12-12). Pipeline segments 1, 2a, 2c, 3 and 5 would pass close to areas with larger residential and commercial populations. For this reason, potential consequences associated with these pipelines would be considered Major since an oil spill and fire could result in 3-5 injuries.

The new 24-inch pipeline (Segment 4) passes in the vicinity of several large office buildings (within the worst case impact zone), and thus higher population densities would be at risk in case of a spill-and-fire event from this pipeline. For this pipeline segment, more than 50 people could be exposed to thermal radiation levels exceeding 5 kW/m^2, with between 3 and 10 injuries. Thus the consequences of spill and fire would be Major (see Risk Matrix in Figure 3.12-12).

Figure 3.12-12. Risk Matrix for Pipeline Failure Thermal Radiation Hazards

		Probability				
Consequences		*Extraordinary- >1,000,000 years*	*Rare >10,000 <1,000,000 years*	*Unlikely >100 <10,000 years*	*Likely >1 and <100 years*	*Frequent (>1/year)*
	Disastrous (> 100 severe injuries or >357,142 bbl)					
	Severe (up to 100 severe injuries or 2,380-357,142 bbl)					
	Major (up to 10 severe injuries or 238-2,380 bbl)	**1F, 2aF, 2cF, 3F, 4F, 5F**				
	Minor (a few minor injuries or 10-238 bbl)	**2bF**				
	Negligible (no minor injuries or <10 bbl)					

Notes:

The numbers in the above matrix correspond to the Pipeline segment numbers in Table 3.12-11. Incidents that fall in the shaded area of the risk matrix would be classified as significant.

F = “Crude oil spill and fire” scenario. Environmental risk evaluated in Figure 3.12-11.

*The South KMEP (6) and North KMEP (7) pipelines are existing permitted pipelines that currently carry crude products. Current operating conditions would not change as a result of the proposed Project.

CEQA Impact Determination

Because the probabilities of a spill and subsequent fire from the proposed Project pipelines are low (Rare or Extraordinary) and spill-and-fire event consequences would either be Minor or Major for all pipelines (see Risk Matrix in Figure 3.12-12), risks from oil spill and subsequent fires from the proposed Project pipelines would have less than significant public safety impacts.

Mitigation Measures

No mitigation is necessary.

Residual Impacts

Less than significant impact.

NEPA Impact Determination

Because the probabilities of a spill and subsequent fire from the proposed Project pipelines are low (Rare or Extraordinary) and spill-and-fire event consequences would either be Minor or Major for all pipelines (see Risk Matrix in Figure 3.12-12), risks from oil spill and subsequent fires from the proposed Project pipelines would have less than significant public safety impacts.

Mitigation Measures

No mitigation is necessary.

Residual Impacts

Less than significant impact.

Impact RISK-3.2: Potential tank farm spills and subsequent fires would result in risks to the public and environment.

The applicant is proposing to construct two tank farms with up to 16 crude oil storage tanks with a total crude oil capacity of 4.0 million bbl, one 50,000-bbl crude oil surge tank, and one MGO tank with a capacity of 15,000 bbl. The proposed Project tanks and tank farm parameters are summarized in Table 3.12-11.

Table 3.12-11. Proposed Project Tank and Tank Farm Parameters

Facility	*Frequency of Spill and Fire Event per year (years to event)*	*Site Area (acres)*	*Number/Type of Tanks*	*Nominal Volume (bbl)*	*Tank Diameter (ft)*	*Tank Height (ft)*	*Dike Area [1] (sq. ft.)*
Tank Farm Site 1	6.54×10^{-5} (15,300)	10.77	1 MGO	15,000	52	46.5	260,000
			1 Surge	50,000	90	51.5	
			2 Working	250,000	202	51.5	
Tank Farm Site 2	1.78×10^{-4} (5,578)	37.0	14 Working	250,000	202	51.5	1,628,000

Note: 1. Areas are approximate.

The proposed tank farms would have shipping pumps, pipeline pig launchers and receivers, fire protection systems, flow control equipment, and emission control systems. Releases from the tanks represent the worst-case scenarios for the tank farms. Releases from the other equipment (such as valves and pumps) would not result in large release volumes as compared to releases from tank failures.

Releases from tanks and subsequent fire scenarios at the tank farm facilities were modeled following the same methodology as for the releases and fires from pipelines. The modeling results are presented in the risk modeling results tables (see Appendix R).

The probability of a release from a failed tank with a subsequent fire would range from once every 5,578 years at Tank Farm Site 2 to once in 15,300 years at Tank Farm Site 1. This would place probability categories in the Unlikely to Rare category (see Risk Matrix in Figure 3.12-13). Spills from tank ruptures would be contained

Figure 3.12-13. Risk Matrix for Tank Farm Failure Thermal Radiation Hazards

	Probability				
Consequences	*Extraordinary- >1,000,000 years*	*Rare >10,000 <1,000,000 years*	*Unlikely >100 <10,000 years*	*Likely >1 and <100 years*	*Frequent (>1/year)*
Disastrous (> 100 severe injuries or >357,142 bbl)					
Severe (up to 100 severe injuries or 2,380-357,142 bbl)					
Major (up to 10 severe injuries or 238-2,380 bbl)					
Minor (a few minor injuries or 10-238 bbl)		**Tank Farm Site 1**	**Tank Farm Site 2**		
Negligible (no minor injuries or <10 bbl)					

Notes: The numbers in the above matrix correspond to the tank farm site numbers in Table 3.12-11. Incidents that fall in the shaded area of the risk matrix would be classified as significant.

within the tank dikes (a dike rupture is a very improbable event and would be in the Extraordinary probability category, and therefore insignificant). Radiation from the pool fires within the dikes could affect any population in the vicinity of a tank farm. However, the proposed Project tank farm sites are relatively distant from populated areas. The only populations that would potentially be exposed to any risks from these facilities are the proposed Project employees, Port employees, or employees of the companies/organizations that operate in the vicinity of the Project facilities. There would be no direct thermal radiation hazards in surrounding residential areas since these areas are all located well beyond the maximum thermal radiation hazard zone. The proposed Project tanks will be equipped with automatic fire suppression systems, and are designed to withstand a certain amount of heat from adjacent tanks, therefore, a cascading tank failure due to fire is highly unlikely.

The population density in the vicinity of Tank Farm Site 1 would be quite low with limited public or worker exposure potential and only few minor injuries possible, which is considered a Minor consequence. The impacts of releases from the proposed Project tanks accompanied by a fire would result in less than significant public safety impacts for Tank Farm Site 1. As noted in the Port Risk Management Analysis for the proposed Project, the hazard footprints generated as a result of the proposed Plains Crude Oil Marine Terminal, Tank Farms, and Pipelines Project do not result in the long-term overlap of any existing, planned, or permitted vulnerable resources. Given the characteristics of petroleum products that would be handled by the project, there is minimal potential for vapor cloud explosions and flying debris from an explosion. Multi-component pool modeling of a light crude oil spill indicate that flammable vapors would not collect in sufficient quantity to sustain a vapor cloud detonation, and tank farm safety measures would also further minimize fire and explosion hazards.

CEQA Impact Determination

The tank farm sites would be equipped with sophisticated fire suppression apparatus that would minimize the impacts of spill resulting in a fire. The risk of an accidental release of a hazardous substance from an oil spill and subsequent fire or explosion that would substantially impact surrounding residents or businesses is less than significant at both tank farm sites.

Mitigation Measures

In accordance with **MM 4I-4** from the Deep Draft FEIS/FEIR (USACE and LAHD 1992), the proposed Project would have built-in fire protection measures and would be designed to meet the requirements of the Uniform Fire Code and NFPA 30 standards. These standards require fixed fire monitoring and suppression systems for facilities handling crude oil. The proposed Project is designed to meet or exceed all applicable codes and standards.

The proposed Project would also be equipped to use seawater for fire protection in addition to fresh water supplied to the facilities, in accordance with **MM 4I-5** from the Deep Draft FEIS/FEIR (USACE and LAHD 1992). Specific equipment and flow rates would be included in the Fire Protection Plan to be approved by the Los Angeles Fire Department (LAFD).

No additional mitigation is necessary.

Residual Impacts

Less than significant impact.

NEPA Impact Determination

The tank farm sites would be equipped with sophisticated fire suppression apparatus that would minimize the impacts of spill resulting in a fire. The risk of an accidental release of a hazardous substance from an oil spill and subsequent fire or explosion that would substantially impact surrounding residents or businesses is less than significant at both tank farm sites.

Mitigation Measures

Other than the requirements of **MM 4I-4** and **MM 4I-5** from the Deep Draft FEIS/FEIR (USACE and LAHD 1992), no mitigation is necessary.

Residual Impacts

Less than significant impact.

Impact RISK-4: The proposed Project would not substantially interfere with existing emergency response plans or evacuation plans.

Emergency response and evacuation planning is a shared responsibility between the LAPD, LAFD, Port Police, and USCG.

The primary change in facility operations would be an increase in petroleum throughput; however, this increase would not interfere with existing emergency response plans or evacuation plans, as described below.

CEQA Impact Determination

The proposed Project would be subject to emergency response and evacuation systems implemented by the LAFD. During Project activities, the LAFD would require that adequate vehicular access be provided and maintained. The LAFD would review all plans (see Los Angeles Municipal Code requirements described above), prior to development to ensure that applicable access is maintained, and the construction contractor would be required to ensure compliance with these measures. The project emergency response plan would be incorporated into the overall response plan for the port prior to project operations. Given the location of the proposed Project on the far end of Pier 400, the proposed Project would not impact existing evacuation routes or response plans. Therefore, no significant impact on emergency response plans or emergency evacuation plans would occur (impacts would be less than significant).

Mitigation Measures

No mitigation is required.

Residual Impacts

Residual impacts would be less than significant.

NEPA Impact Determination

The project emergency response plan would be incorporated into the overall response plan for the port prior to project operations. Given the location of the proposed Project on the far end of Pier 400, the proposed Project would not impact existing evacuation routes or response plans. Therefore, no significant impact on emergency response plans or emergency evacuation plans would occur (impacts would be less than significant).

Mitigation Measures

No mitigation is necessary.

Residual Impacts

Less than significant impact.

Impact RISK-5: A potential terrorist attack would result in risks to the public and environment in areas near Pier 400.

Construction

Risk of Terrorist Actions during Construction

The probability of a terrorist attack on the proposed Project facilities is not likely to appreciably change during construction compared to baseline conditions. It is possible that the increase in construction vessel traffic in the vicinity of the Berth 408 terminal could lead to a greater opportunity of a successful terrorist attack; however, existing Port security measures would counter this potential increase in unauthorized access to the terminal.

Consequences of Terrorist Attack

During construction, a terrorist action could block key road access points and waterways and result in economic disruption. Potential environmental damage could include fuel spills and the release of hazardous materials into the marine environment, with associated degradation of water quality and damage to marine biological resources. These impacts would be limited to the area surrounding the point of attack and would be contained by the relevant oil spill response contractor. A potential fire associated with a terrorist attack could result in short-term impacts to local air quality.

Operation

Risk of Terrorist Actions Associated with Project Operations

The probability of a terrorist attack on the proposed Project facilities is not likely to appreciably change over current conditions. It is possible that the increase in vessel traffic in the vicinity of the Berth 408 terminal could lead to a greater opportunity of a successful terrorist attack; however, existing Port security measures would counter this potential increase in unauthorized access to the terminal.

Consequences of Terrorist Attack

The potential consequences of a terrorist attack on the crude oil storage tanks and project-related pipelines would be similar to those identified under **Impacts RISK-2.1**, **RISK-2.2**, **RISK-3.1** and **RISK-3.2**, although it is likely that consequences would be lower due to the difficulty in causing a catastrophic failure of a storage tank or pipeline. While the mechanism of damage to these facilities would be different under a terrorist attack, the worst-case consequences would be similar. The risks associated with these impacts were all considered less than significant.

In order to address potential consequences associated with a terrorist attack on a crude oil vessel at Pier 400 (or in transit), explosion overpressure and thermal radiation hazards were estimated using the methodology outlined in Section 3.12.4.1. Several worst-case assumptions were considered in the analysis, including a worst-case hole diameter of five meters and the complete loss of the vessel contents (Sandia National Laboratories 2004). Since a hole of this size would result from a large explosion, it was assumed that there would be immediate ignition of the spilled crude oil. It was also assumed that the terrorist attack would detonate the vapor space contents of the vessel. While inerting of the vessel vapor space would likely preclude vapor detonation, it was assumed that the terrorist detonation allowed for the introduction of air in the vapor space, with subsequent ignition and detonation of the hydrocarbon vapors.

Modeling results showed that explosion overpressure and thermal radiation hazard footprints generated as a result of a terrorist attack on the proposed Crude Oil Marine Terminal, Tank Farms, and Pipelines Project do not result in an overlap of any existing, planned, or permitted vulnerable resources. The potential for limited public exposure along Port waterways is possible, which could result in a small number of injuries. The number of serious injuries, which would be limited to an area within a few hundred meters of the Pier 400 Berth, would likely be small, but consequences would still be considered major.

CEQA Impact Determination

Potential consequences of a terrorist attack on the Pier 400 facilities are considered Major since the potential for a small number of offsite injuries are possible in the event of a successful attack. Potential thermal radiation and explosion overpressure levels do not result in the overlap of any existing, planned, or permitted vulnerable resources, but the potential for limited public exposure along the Port waterways is possible. The likelihood of a successful terrorist attack, and the key here is the likelihood of both an attack occurring and that it is successful, is considered fairly low. However, potential impacts related to terrorism risk would be considered significant given the environmental and public safety consequences associated with a successful terrorist attack.

Mitigation Measures

A variety of programs are in place at the Port to reduce potential terrorist threats. The Berth 408 operators would be required to participate in these programs, thus further minimizing the risk associated with terrorism. In addition, **MM 4I-7** from the Deep Draft FEIS/FEIR (USACE and LAHD 1992) required that the Port Police provide adequate security coverage of the proposed Project area. For the proposed Project this would include vehicle barriers, site control and regular patrols. No additional mitigation is possible.

Residual Impacts

Even with the application of all possible mitigation measures, potential residual impacts related to terrorism risk would be considered significant given the environmental and public safety consequences associated with a successful terrorist attack.

NEPA Impact Determination

Potential consequences of a terrorist attack on the Pier 400 facilities are considered Major since the potential for a small number of offsite injuries are possible in the event of a successful attack. Potential thermal radiation and explosion overpressure levels do not result in the overlap of any existing, planned, or permitted vulnerable resources, but the potential for limited public exposure along the Port waterways is possible. The likelihood of a successful terrorist attack, and the key here is the likelihood of both an attack occurring and that it is successful, is considered fairly low. However, potential impacts related to terrorism risk would be considered significant given the environmental and public safety consequences associated with a successful terrorist attack.

Mitigation Measures

A variety of programs are in place at the Port to reduce potential terrorist threats. The Berth 408 operators would be required to participate in these programs, thus further minimizing the risk associated with terrorism. In addition, **MM 4I-7** from the Deep Draft FEIS/FEIR (USACE and LAHD 1992) required that the Port Police provide adequate security coverage of the proposed Project area. For the proposed Project this would include vehicle barriers, site control and regular patrols. No additional mitigation is possible.

Residual Impacts

Even with the application of all possible mitigation measures, potential residual impacts related to terrorism risk would be considered significant given the environmental and public safety consequences associated with a successful terrorist attack.

3.12.4.3.2 No Federal Action/No Project Alternative

Under the No Federal Action/No Project Alternative, proposed Project facilities would not be constructed or operated. As described in Section 2.5.2.1, the No Federal Action/No Project Alternative considers the only remaining allowable and reasonably foreseeable use of the proposed Project site: Use of the site for temporary storage of wheeled containers on the site of Tank Farm 1 and on Tank Farm Site 2. This use would require paving, construction of access roads, and installation of lighting and perimeter fencing.

In addition, for analysis purposes, under the No Federal Action/No Project Alternative a portion of the increasing demand for crude oil imports is assumed to be accommodated at existing liquid bulk terminals in the San Pedro Bay Ports, to the extent of their remaining capacities. Although additional demand, in excess of the capacity of existing marine terminals to receive it, may come in by rail, barge, or other means, rather than speculate about the specific method by which more crude oil or refined products would enter southern California, for analysis purposes, the impact assessment for the No Federal Action/No Project Alternative in this SEIS/SEIR is based on marine deliveries only up to the available capacity of existing crude oil berths. As described in Section 2.5.2.1, the impact assessment for the No Federal Action/No Project Alternative also assumes existing terminals would eventually comply with the California State Lands Commission (CSLC) Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS), that LAHD and the Port of Long Beach would renew the operating leases for existing marine terminals, and that existing terminals would comply with Clean Air Action Plan (CAAP) measures as of the time of lease renewal (i.e., 2008 for Port of Long Beach Berths 84-87, 2015 for LAHD Berths 238-240, and 2023 for Port of Long Beach Berths 76-78).

The NEPA Baseline condition coincides with the No Federal Action/No Project Alternative for this project because the USACE, the LAHD, and the applicant have concluded that, absent a USACE permit, no part of the proposed Project would be built (Section 2.6.1). All elements of the No Federal Action/No Project Alternative are identical to the elements of the NEPA Baseline. Therefore, under a NEPA determination there would be no impact associated with the No Federal Action/No Project Alternative.

Impact RISK-1: Construction of the No Federal Action/No Project Alternative would have the potential for accidental releases of hazardous materials.

During construction of the wheeled container storage yards on Pier 400 and Terminal Island, lubricants or fuels used for construction machinery could be spilled during normal usage or during refueling. However, all equipment is assumed to be in good working order, as would be required under the SCAQMD ATC permit. Best management practices (BMPs) and Los Angeles Municipal Code regulations (Chapter 5, Section 57, Division 4 and 5; Chapter 6, Article 4) would govern construction and demolition activities. Federal and state regulations that govern the storage of hazardous materials in containers (i.e., the types of materials and the size of packages containing hazardous materials) and the separation of containers holding hazardous materials, would limit the potential adverse impacts of contamination to a relatively small area. In addition, standard BMPs would be used during construction and demolition activities to minimize runoff of contaminants and clean-up any spills, in compliance with the State General Permit for Storm Water Discharges Associated with Construction Activity (Water Quality Order 99-08-DWQ) and Project-specific Storm Water Pollution Prevention Plan (SWPPP) (see Water Quality, Sediments, and Oceanography for more information).

As construction of the wheeled container storage areas would require no in-water work, there would be no risk of spillage from fuel tanks or of lube oils or hydraulic fluids from vessels in water related to construction of the storage area.

Construction of facilities and pipelines may potentially result in damage to underground facilities, hazardous material pipelines, electrical lines, or other cables. However, the USA Underground Alert Service or a similar service would be contacted to avoid impacts to other underground facilities during digging or trenching activity. The USA Underground Alert Service clearly marks the location of all underground utilities and pipelines and also provides detailed information, such as burial depth and potential hazards.

CEQA Impact Determination

Implementation of normal construction standards, including NPDES BMPs, and all other above mentioned regulations and practices, would minimize the potential for an accidental release of hazardous materials or fuels during construction activities. Therefore, construction activities associated with the No Federal Action/No Project Alternative would result in a less than significant risk of upset.

Mitigation Measures

No mitigation is required.

Residual Impacts

There would be a less than significant impact.

NEPA Impact Determination

Because the No Federal Action/No Project Alternative is identical to the NEPA Baseline in this project, under NEPA the No Federal Action/No Project Alternative would have no impact.

Mitigation Measures

No mitigation is required.

Residual Impacts

There would be no residual impact.

Impact RISK-2.1: An accidental crude oil spill from a tanker would result in risks to the public and/or environment.

The number of vessels entering the San Pedro Bay Ports under the No Federal Action/No Project Alternative would increase compared to existing conditions (i.e., the CEQA Baseline). Compared to the proposed Project, the number of vessels entering the San Pedro Bay Ports may be higher in the No Federal Action/No Project Alternative due to the need to use smaller vessels to meet the same crude oil demand; however, as stated above, for analysis purposes a lower number of vessels is used (see Section 2.5.2.1 for details). The increase in vessel trips results in an increase in vessel-related oil spill risk compared to the CEQA Baseline.

During tanker transit, all allisions, collisions, and groundings could result in a spill of crude oil. Crude oil tankers and barges contribute about 4 percent to the total number of spills into navigable waters; however, by volume they represent about 50 percent of the total volume of spills (API 2002). About 0.2 percent of total oil tanker transits worldwide (out of 41,000 per year) result in an incident (e.g., collision, grounding), and less than 2 percent of those incidents result in an oil spill (Etkin 2001).

Open Ocean Transit Oil Spills. Spill probabilities for open ocean vessel transit were evaluated based on USCG recommendations for open ocean allisions, collisions, and groundings. While the probability of an open ocean incident is lower than in the vicinity of a port due to greater vessel spacing, the conditional probability of an oil spill resulting from an accident is higher due to greater vessel speeds. The probabilities of various events for open ocean tanker accidents are given in Table 3.12-12.

Using the Risk Matrix approach shown in Figure 3.12-14 and the spill probabilities presented in Table 3.12-12, potential impacts from a release of crude product from a tanker during ocean transit would be considered a significant impact in the absence of mitigation. The probabilities of these events are considered Unlikely for larger spills, but the consequences range from Severe to Disastrous for larger spills. The consequences associated with small oil spills would be considered Minor, and insignificant using the Risk Matrix approach.

Table 3.12-12. Frequencies of Open Ocean Transit Oil Spills

Event	*Frequency Per Transit* [1]	*Annual Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Frequency* [2]	*Frequency of Event* [3] *(years)*
Single Hulled Vessels		**2010**		**2015**		**2025-2040**	
Allisions, collisions, and groundings	3.12×10^{-4}	7.39×10^{-2}	13.5	7.39×10^{-2}	13.5	7.39×10^{-2}	13.5
Small Spill	7.80×10^{-5}	1.85×10^{-2}	54	1.85×10^{-2}	54	1.85×10^{-2}	54
10 percent Loss of Cargo (70,000 bbl)	2.73×10^{-5}	6.47×10^{-3}	155	6.47×10^{-3}	155	6.47×10^{-3}	155
30 percent Loss of Cargo (210,000 bbl)	2.73×10^{-5}	6.47×10^{-3}	155	6.47×10^{-3}	155	6.47×10^{-3}	155
100 percent Loss of Cargo (700,000 bbl)	2.34×10^{-5}	5.55×10^{-3}	180	5.55×10^{-3}	180	5.55×10^{-3}	180
Double Hulled Vessels		**2010**		**2015**		**2025-2040**	
Allisions, collisions, and groundings	3.12×10^{-4}	7.39×10^{-4}E-02	13.5	7.39×10^{-2}	13.5	7.39×10^{-2}	13.5
Small Spill	1.56×10^{-5}	3.70×10^{-4}E-03	270	3.70×10^{-3}	270	3.70×10^{-3}	270
10 percent Loss of Cargo (70,000 bbl)	5.46×10^{-6}	1.29×10^{-4}E-03	773	1.29×10^{-3}	773	1.29×10^{-3}	773
30 percent Loss of Cargo (210,000 bbl)	5.46×10^{-6}	1.29×10^{-4}E-03	773	1.29×10^{-3}	773	1.29×10^{-3}	773
100 percent Loss of Cargo (700,000 bbl)	4.68×10^{-6}	1.11×10^{-4}E-03	902	1.11×10^{-3}	902	1.11×10^{-3}	902

Notes:

1. This frequency is the chance of a vessel experiencing the listed event during a single transit.
2. This frequency is the chance of the expected No Federal Action/No Project Alternative-related vessels experiencing the listed event during a single year of transits.
3. Based on the annual frequency, this column indicates how often the listed event could be expected to occur for No Federal Action/No Project Alternative-related vessel calls.

Sources: USCG 2003; FEMA 1989.

Figure 3.12-14. Risk Matrix of Crude Oil Tanker Spills – Open Ocean

Consequences	*Probability*: *Extraordinary >1,000,000 years*	*Rare >10,000 <1,000,000 years*	*Unlikely >100 <10,000 years*	*Likely >1 and <100 years*	*Frequent (>1/year)*
Disastrous (>357,142 bbl)			**>30% Loss of Cargo**		
Severe (2,380–357,142 bbl)			**10% Loss of Cargo**		
Major (238–2,380 bbl)					
Minor (10-238 bbl)				**Small Oil Spill**	
Negligible (<10 bbl)					

Notes:
Incidents that fall in the shaded area of the risk matrix would be classified as significant.
Incidents include both unmitigated and mitigated scenarios since all probabilities fall in the unlikely probability category.

Oil Spills within the San Pedro Bay Ports Waters. Various incident rates were reported (see Table 3.9-3 in Section 3.9, Marine Transportation) ranging from 0.02 to 0.2 percent frequency of occurrence per transit. The San Pedro Bay Ports have recorded annual incident rates ranging from 0.02 to 0.07 percent per transit, which is consistent with industry observations. The average incident rate over the period 1997-2005 was 0.046 percent per transit. The vessel traffic increase due to the No Federal Action/No Project Alternative would be up to 267 tankers per year. Using the more conservative accident and spill probabilities listed in this section, project-related tankers would have oil spill probabilities within LAHD-controlled waters as shown in Table 3.12-13.

The worst-case oil spill that could occur from a No Federal Action/No Project Alternative-related tanker would be the entire tanker contents of the largest tanker, or 0.7 million bbl. A catastrophic failure of the tanker with the release of full cargo would constitute a “disastrous” consequence per the risk matrix significance criteria. For single-hulled tankers, the probability of a spill would be Rare, but would be considered Disastrous, which would be considered a significant impact in the absence of mitigation. For double-hulled tankers, the probability of a complete loss of the tanker contents would be considered “Extraordinary” and would be less than significant.

Using the Risk Matrix approach in Figure 3.12-15 and the spill probabilities presented in Table 3.12-13, potential impacts from a release from a tanker while in LAHD-controlled waters would be considered a significant impact in the absence of mitigation.

Table 3.12-13. Frequencies of Accidents and/or Oil Spills within the Port of Los Angeles Waters

Event	*Frequency Per Transit* [1]	*Annual Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Frequency* [2]	*Frequency of Event* [3] *(years)*
Single Hulled Vessels		**2010**		**2015**		**2025-2040**	
Allisions, collisions, and groundings	4.60×10^{-4}	1.09×10^{-1}	9.2	1.09×10^{-1}	9.2	1.09×10^{-1}	9.2
Oil Spill (any size)	1.15×10^{-4}	2.73×10^{-2}	37	2.73×10^{-2}	37	2.73×10^{-2}	37
Small Oil Spill	1.15×10^{-4}	2.72×10^{-2}	37	2.72×10^{-2}	37	2.72×10^{-2}	37
Moderate Oil Spill (238-1,200 bbl)	2.30×10^{-7}	5.45×10^{-5}	18,345	5.45×10^{-5}	18,345	5.45×10^{5}	18,345
Large Oil Spill (>1,200 bbl)	1.15×10^{-8}	2.73×10^{-6}	366,905	2.73×10^{-6}	366,905	2.73×10^{6}	366,905

Notes:

1. This frequency is the chance of a vessel experiencing the listed event during a single transit.
2. This frequency is the chance of the expected No Federal Action/No Project Alternative-related vessels experiencing the listed event during a single year of transits.
3. Based on the annual frequency, this column indicates how often the listed event could be expected to occur for No Federal Action/No Project Alternative-related vessels.

Figure 3.12-15. Risk Matrix of Crude Oil Tanker Spills – Port of Los Angeles Waters

		Probability				
Consequences		*Extraordinary >1,000,000 years*	*Rare >10,000 <1,000,000 years*	*Unlikely >100 <10,000 years*	*Likely >1 and <100 years*	*Frequent (>1/year)*
	Disastrous (>357,142 bbl)	**Double Hull Large Oil Spill**	**Single Hull Large Oil Spill**			
	Severe (2,380–357,142 bbl)					
	Major (238–2,380 bbl)		**Moderate Oil Spill (all designs)**			
	Minor (10-238 bbl)			**Double Hull Small Oil Spill**	**Single Hull Small Oil Spill**	
	Negligible (<10 bbl)					

Notes:

Incidents that fall in the shaded area of the risk matrix would be classified as significant.

Unmitigated case represented by single hulled vessels, while mitigated represented by double hulled vessels.

The owner or operators of tanker vessels are required to have an approved Tank Vessel Response Plan on board and a qualified individual within the US with full authority to implement removal actions in the event of an oil spill incident, and to contract with the spill response organizations to carry out cleanup activities in case of a spill. The existing oil spill response capabilities in the San Pedro Bay Ports are sufficient to isolate with containment boom and recover the maximum possible spill from an oil tanker within the port.

Various studies have shown that double-hull tank vessels have lower probability of releases when tanker vessels are involved in accidents. Because of these studies, the USCG issued regulations addressing double-hull requirements for tanker vessels. The regulations establish a timeline for eliminating single-hull vessels from operating in the navigable waters or the Exclusive Economic Zone of the U.S. after January 1, 2010, and double-bottom or double-sided vessels by January 1, 2015. Only vessels equipped with a double hull, or with an approved double containment system will be allowed to operate after those times. These regulations apply equally to vessel calls at existing berths at the San Pedro Bay Ports. It is likely that single-hull vessels would represent a small proportion of vessel calls at existing berths at San Pedro Bay Ports over the time period analyzed in this Draft SEIS/SEIR, given the time period analyzed and the planned phase-out of these vessels.

Assuming that a majority of vessels that would visit the existing terminals for which incremental tanker calls are analyzed in the No Federal Action/No Project Alternative would be of a double-hull design, oil spill probabilities within LAHD controlled waters can be estimated as shown in Table 3.12-14.

Again, using the Risk Matrix approach shown in Figure 3.12-15 and the spill probabilities presented in Table 3.12-14, potential impacts from a release of petroleum from a tanker while in LAHD-controlled waters would be considered a less than significant impact, in the absence of potential impacts on sensitive or endangered species. This less than significant impact for oil spills reflects the Port's better-than-average safety record, the types of vessels that would visit the existing terminals, and the available spill response capabilities at both the San Pedro Bay Ports. However, the Cabrillo Shallow Water Habitat (1,900 ft [580 meters] away) and the Pier 400 Least Tern Habitat (2,400 ft [730 meters] away) are very close to the Glenn Anderson Ship Channel through which vessels arriving at LAHD Berths 238-240 would travel, and a spill within the Port would impact sensitive resources and result in the degradation of the habitat. Therefore, potential impacts associated with oil spills resulting from a vessel accident would be significant.

Fuel Barge Spills. Under the No Federal Action/No Project Alternative, no fuel barges would be required. Therefore, there would be no impact due to fuel movements associated with tanker refueling.

Marine Terminal Unloading Oil Spills. Similar to the proposed Project, accidental oil spills could occur during vessel unloading at the berth. The number of tanker calls associated with the No Federal Action/No Project Alternative would increase by up to 267 tankers per year due to the need to use smaller vessels to meet the throughput demand. Under this alternative, terminals receiving crude oil shipments would employ the same safety, security, and spill prevention measures as the proposed Project, with the exception of LAHD Berths 238-240. The State Lands Commission has characterized LAHD Berths 238-240, in particular among the currently existing crude oil berths at the San Pedro Bay Ports, as having components that do not meet current design standards or are aging and potentially deficient (CSLC 2007).

Tsunamis

A tsunami could lead to an oil spill at any of the existing terminal sites if a moored vessel were present. While in transit, the hazards posed to crude oil tankers from tsunamis are insignificant, and in most cases, imperceptible until the tsunami reaches shallow water and begins to build in height (open ocean tsunamis are generally only a few meters in height, but can increase to many meters when they reach shallow coastal waters). However, while docked, a tsunami striking the port could cause significant ship movement, potential loading arm failure and even a hull breach if the ship is pushed against the wharf or is set adrift and strikes other objects or wharves.

Based on recent studies (e.g., Synolakis et al. 1997; Borrero et al. 2001), the CSLC has developed tsunami run-up projections for the Ports of Los Angeles and Long Beach of 8.0 ft (2.4 m) and 15.0 ft (4.6 m) above mean sea level, at 100- and 500-year intervals, respectively, as a part of MOTEMS (CSLC 2004). However, these

Table 3.12-14. Frequencies of Oil Spills within the Port of Los Angeles Waters for Majority Double-Hull Tank Vessels

Event	*Frequency Per Transit* [1]	*Annual Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Frequency* [2]	*Frequency of Event* [3] *(years)*
Double Hulled Vessels		**2010**		**2015**		**2025-2040**	
Allisions, collisions, and groundings	4.60×10^{-4}	1.09×10^{-1}	9.2	1.09×10^{-1}	9.2	1.09×10^{-1}	9.2
Oil Spill (any size)	2.30×10^{-5}	5.45×10^{-3}	183	5.45×10^{-3}	183	5.45×10^{-3}	183
Small Oil Spill	2.30×10^{-5}	5.44×10^{-3}	184	5.44×10^{-3}	184	5.44×10^{-3}	184
Moderate Oil Spill (238-1,200 bbl)	4.60×10^{-8}	1.09×10^{-5}	91,726	1.09×10^{-5}	91,726	1.09×10^{-5}	91,726
Large Oil Spill (>1,200 bbl)	2.30×10^{-9}	5.45×10^{-7}	1,834,526	5.45×10^{-7}	1,834,526	5.45×10^{-7}	1,834,526

Notes:

1. This frequency is the chance of a vessel experiencing the listed event during a single transit.
2. This frequency is the chance of the expected No Federal Action/No Project Alternative-related vessels experiencing the listed event during a single year of transits.
3. Based on the annual frequency, this column indicates how often the listed event could be expected to occur for No Federal Action/No Project Alternative related vessels.

projections do not incorporate consideration of the localized landfill configurations, bathymetric features, and the interaction of the diffraction, reflection, and refraction of the tsunami wave propagation within the Los Angeles/Long Beach Port Complex in its predictions of tsunami wave heights.

Most recently, a model has been developed for the Los Angeles/Long Beach Port Complex that incorporates these additional factors (Moffatt & Nichol 2007). A copy of the detailed model report is provided in Appendix M. The Port Complex model uses a methodology to generate a tsunami wave from several different potential sources, including local earthquakes, remote earthquakes, and local submarine landslides. This model indicates that a reasonable maximum source for future tsunami events at the proposed Project site would be a submarine landslide along the nearby Palos Verdes Peninsula. A tsunami generated by such a geologic event would have the potential to create substantially larger water level fluctuations than a distant tsunamigenic source and would arrive with very little warning (generally less than 30 minutes).

However, based on the Port Complex model, none of the terminals for which higher usage is analyzed for the No Federal Action/No Project Alternative (i.e., LAHD Berths 238-240, Port of Long Beach Berths 76-78, or Port of Long Beach Berths 84-87) would likely be inundated by a tsunami under maximum likely or theoretical maximum worst case scenarios (see Section 3.5.4.3.2). However, higher current loads would be transferred from the vessel to the terminal structure during a tsunami or seiche.

The Energy Information Administration (EIA) (2005) reported impacts to marine terminal facilities associated with the December 24, 2004 Sumatra M_W 9.3 earthquake and subsequent tsunami. Indonesia's PT Arun Liquefied Natural Gas (LNG) facility in Banda Aceh, Sumatra, was not damaged by the tsunami even though the maximum runup height observed at Banda Aceh was approximately 30 ft. An oil transfer facility approximately 30 miles to the east of Banda Aceh received relatively minor damage, with only one crude oil storage tank being moved off its foundation by the estimated 16-ft waves. An oil tanker was unloading when the tsunami struck, but the crew was able to move the ship offshore (the EIA report did not comment if there was an oil spill).

Marine Oil Terminal Engineering and Maintenance Standards

In accordance with MOTEMS, annual walk-down inspections must be completed at all marine terminals. In addition, MOTEMS related audits must be completed every three years for above water structures; every one to six years for underwater structures (based on the results of the annual inspection); and following significant events, such as earthquakes, flooding, fire, or vessel impact. Structural upgrades would subsequently occur, as necessary, based on the results of the audits. However, there is no established time frame for completion of the upgrades. The schedule would be determined by the California State Lands Commission, in combination with the terminal operator. Therefore, in the absence of established structural upgrade scheduling, aging marine terminals, such as LAHD Berths 238-240 and Port of Long Beach Berths 76-78 and 84-87, would potentially be operating out of compliance with MOTEMS for at least some of the period subsequent to 2010. By comparison, new facilities at Pier 400 would be in compliance with all applicable MOTEMS from initiation of proposed Project operations.

Spill Probability

Accidents and incidents during bunkering, lightering, and loading operations are responsible for 57 percent of tanker spills (Etkin 2001). Unloading spills are generally small given the manned nature of the unloading activity and presence of observation personnel in the immediate vicinity of the tanker unloading operations. Statistics for the 1974-2004 period on worldwide accidental oil spills by oil-cargo (tanker ships, tank barges, and combination oil-cargo/non-oil-cargo) vessels collected by the International Tanker Owners Pollution Federation (ITOPF 2005) reveal that 53.8 percent are transfer spills, 20.9 percent are vessel-accident spills, and the remaining 25.3 percent are unknown types. Of the transfer spills, 34.3 percent are directly related to loading/unloading operations. The vast majority (84 percent) of the spills are relatively small spills of 50 bbl or less. For loading/unloading operations, this percentage increases to 88.8 percent, with only 0.9 percent of the loading/unloading spills exceeding 5,000 bbl (the balance of spills between 50 and 5,000 bbl amounts to 10.3 percent).

Similar to the proposed Project, accidental oil spills could occur during vessel unloading at the berth. The number of tanker calls associated with the No Federal Action/No Project Alternative would increase by up to 267 tankers per year, due to the need to use smaller vessels to meet the throughput demand.

Loading arm failure frequencies for existing LAHD Berths 238-240 and Port of Long Beach Berths 76-78 and 84-87 were estimated based on the probability of the various loading arm components, as well as external stresses (e.g., wind, tides, tsunami, mooring failures, etc.) that could cause a loading arm failure. The increased frequency of a small spill was estimated to be 2.22×10^{-3} per year, or about once every 450 years. A large failure, which would also require a failure of all emergency systems and procedures, was estimated to be 6.01×10^{-5} per year, or once every 16,650 years. Using the Risk Matrix in Figure 3.12-16, the small spill would be considered Unlikely/Minor, while the large spill would be considered Rare/Major.

CEQA Impact Determination

Using the Risk Matrix approach shown in Figure 3.12-14 and the spill probabilities presented in Table 3.12-12, potential impacts from a release of crude product from a tanker during ocean transit would be considered a significant impact in the absence of mitigation. The probabilities of these events are considered Unlikely for larger spills, but the consequences range from Severe to Disastrous for larger spills. The consequences associated with small oil spills would be considered Minor, and insignificant using the Risk Matrix approach.

Again, using the Risk Matrix approach shown in Figure 3.12-15 and the spill probabilities presented in Table 3.12-14, potential impacts from a release of petroleum from a tanker while in LAHD-controlled waters would be considered a less than significant impact, in the absence of potential impacts on sensitive or endangered species. This less than significant impact for oil spills reflects the Port's better-than-average safety record, the types of vessels that would visit the proposed Marine Terminal, and the available spill response capabilities. However, the Cabrillo Shallow Water Habitat (700 meters away) and the Pier 400 Least Tern Habitat (750 meters

Figure 3.12-16. Risk Matrix of Crude Oil Unloading Spills

Consequences	*Probability*				
	Extraordinary >1,000,000 years	*Rare >10,000 <1,000,000 years*	*Unlikely >100 <10,000 years*	*Likely >1 and <100 years*	*Frequent (>1/year)*
Disastrous (>357,142 bbl)					
Severe (2,380–357,142 bbl)					
Major (238–2,380 bbl)		**Large Loading Arm Spill**			
Minor (10-238 bbl)			**Small Loading Arm Spill**		
Negligible (<10 bbl)					

Note: Incidents that fall in the shaded area of the risk matrix would be classified as significant.

away) are very close to the Marine Terminal, and a spill within the Port would impact sensitive resources and result in the degradation of the habitat. Therefore, potential impacts associated with oil spills resulting from a vessel accident would be significant.

Loading arm failure frequencies for the proposed Project were estimated based on the probability of the various loading arm components, as well as external stresses (e.g., wind, tides, tsunami, mooring failures, etc.) that could cause a loading arm failure. The frequency of a small spill was estimated to be 2.22×10^{-3} per year, or about once every 450 years. A large failure, which would also require a failure of all emergency systems and procedures, was estimated to be 6.01×10^{-5} per year, or once every 16,650 years. Using the Risk Matrix in Figure 3.12-16, the small spill would be considered Unlikely/Minor, while the large spill would be considered Rare/Major. Based on these probabilities, impacts would be less than significant.

Based on the probability of crude oil spills during vessel transit and in Port waters, potential oil spill impacts are considered significant.

Mitigation Measures

No mitigation measures could be applied to reduce the risk, as the No Federal Action/No Project Alternative does not involve a discretionary action by the LAHD under which relevant mitigations could be applied. However, it should be noted that **MMs RISK-2.1a** and **RISK-2.1b** would eventually apply to all bulk liquid petroleum terminals in California. Double-hulled tankers will be required by USCG regulations in 2015, while loading arm quick release couplings are be required by MOTEMS and will be required during State Tidelands lease renewal. Therefore, all marine terminals in California will likely be require to comply with these mitigation measures within the next 10 years.

Residual Impacts

The risk of an oil spill in Port waters and in transit from foreign ports remains significant. No mitigation measures would apply to reduce this impact, and therefore, the potential risk would be significant and unavoidable.

NEPA Impact Determination

Because the No Federal Action/No Project Alternative is identical to the NEPA Baseline in this project, under NEPA the No Federal Action/No Project Alternative would have no impact.

Mitigation Measures

No mitigation is required.

Residual Impacts

There would be no residual impact.

Impact RISK-2.2: No accidental oil spill would occur from pipelines that would pose a risk to the marine environment.

As the No Federal Action/No Project Alternative does not include construction of any pipelines, no accidental oil spill would occur that would pose a risk to the marine environment. Therefore, no impact would occur under CEQA.

CEQA Impact Determination

There would be no impact under CEQA.

Mitigation Measures

No mitigation is required.

Residual Impacts

There would be no residual impact.

NEPA Impact Determination

Because the No Federal Action/No Project Alternative is identical to the NEPA Baseline in this project, under NEPA the No Federal Action/No Project Alternative would have no impact.

Mitigation Measures

No mitigation is required.

Residual Impacts

There would be no residual impact.

Impact RISK-3.1: Potential pipeline oil spills with subsequent fires that would result in risks to the public and environment would not occur.

As the No Federal Action/No Project Alternative does not include construction of any pipelines, no pipeline oil spills with subsequent fires would occur that would result in risks to the public and environment. Therefore, no impact would occur under CEQA.

<u>CEQA Impact Determination</u>

There would be no impact under CEQA.

Mitigation Measures

No mitigation is necessary.

Residual Impacts

There would be no residual impact.

<u>NEPA Impact Determination</u>

Because the No Federal Action/No Project Alternative is identical to the NEPA Baseline in this project, under NEPA the No Federal Action/No Project Alternative would have no impact.

Mitigation Measures

No mitigation is required.

Residual Impacts

There would be no residual impact.

Impact RISK-3.2: Potential tank farm spills and subsequent fires that would result in risks to the public and environment would not occur.

As the No Federal Action/No Project Alternative does not include construction of any tank farms, no pipeline oil spills with subsequent fires would occur that would result in risks to the public and environment. Therefore, no impact would occur under CEQA.

CEQA Impact Determination

There would be no impact under CEQA.

Mitigation Measures

No mitigation is necessary.

Residual Impacts

There would be no residual impact.

NEPA Impact Determination

Because the No Federal Action/No Project Alternative is identical to the NEPA Baseline in this project, under NEPA the No Federal Action/No Project Alternative would have no impact.

Mitigation Measures

No mitigation is required.

Residual Impacts

There would be no residual impact.

Impact RISK-4: The No Federal Action/No Project Alternative would not substantially interfere with existing emergency response plans or evacuation plans.

As no pipelines, tank farms, or other facilities would be constructed under the No Federal Action/No Project Alternative (other than the additional storage yards that would be associated with the existing terminals at Tank Farm Sites 1 and 2), existing emergency response plans or evacuation plans would not be substantially interfered with. No impacts would occur under CEQA.

CEQA Impact Determination

There would be no impact under CEQA.

Mitigation Measures

No mitigation is necessary.

Residual Impacts

There would be no residual impact.

<u>NEPA Impact Determination</u>

Because the No Federal Action/No Project Alternative is identical to the NEPA Baseline in this project, under NEPA the No Federal Action/No Project Alternative would have no impact.

Mitigation Measures

No mitigation is required.

Residual Impacts

There would be no residual impact.

Impact RISK-5: A potential terrorist attack that would result in risks to the public and environment in areas near Pier 400 would not occur.

As no pipelines, tank farms, or other facilities would be constructed under the No Federal Action/No Project Alternative (other than the additional storage yards that would be associated with existing terminals at Tank Farm Sites 1 and 2), no potential terrorist attacks that would result in risks to the public and environment in areas near Pier 400 would occur. No impacts would occur under CEQA.

<u>CEQA Impact Determination</u>

There would be no impact under CEQA.

Mitigation Measures

No mitigation is necessary.

Residual Impacts

There would be no residual impact.

<u>NEPA Impact Determination</u>

Because the No Federal Action/No Project Alternative is identical to the NEPA Baseline in this project, under NEPA the No Federal Action/No Project Alternative would have no impact.

Mitigation Measures

No mitigation is required.

Residual Impacts

There would be no residual impact.

3.12.4.3.3 Reduced Project Alternative

Under the Reduced Project Alternative, as described in Section 2.5.2.2, construction and operation at Berth 408 would be identical to the proposed Project with the exception of the lease cap limiting throughput in certain years. However, as explained in Section 2.5.2.2, the lease cap would not change the amount of crude oil demanded in southern California, and therefore the analysis of the Reduced Project Alternative also includes the impacts of marine delivery of incremental crude oil deliveries to existing liquid bulk terminals in the San Pedro Bay Ports in years where demand exceeds the capacity of the lease-limited Berth 408.

As described in Section 2.5.2.2, the impact assessment for the Reduced Project Alternative also assumes existing terminals would eventually comply with the MOTEMS, that the LAHD and the Port of Long Beach would renew the operating leases for existing marine terminals, and that existing terminals would comply with CAAP measures as of the time of lease renewal (i.e., 2008 for Port of Long Beach Berths 84-87, 2015 for LAHD Berths 238-240, and 2023 for Port of Long Beach Berths 76-78).

3.12.4.3.3.1 Construction Impacts

Impact RISK-1: Construction of the Reduced Project Alternative would have the potential for accidental releases of hazardous materials.

During Reduced Project construction, lubricants or fuels used for construction machinery could be spilled during normal usage or during refueling. However, all equipment is assumed to be in good working order, as would be required under the SCAQMD ATC permit. Best management practices (BMPs) and Los Angeles Municipal Code regulations (Chapter 5, Section 57, Division 4 and 5; Chapter 6, Article 4) would govern construction and demolition activities. Federal and state regulations that govern the storage of hazardous materials in containers (i.e., the types of materials and the size of packages containing hazardous materials) and the separation of containers holding hazardous materials, would limit the potential adverse impacts of contamination to a relatively small area. In addition, standard BMPs would be used during construction and demolition activities to minimize runoff of contaminants and clean-up any spills, in compliance with the State General Permit for Storm Water Discharges Associated with Construction Activity (Water Quality Order 99-08-DWQ) and Project-specific Storm Water Pollution Prevention Plan (SWPPP) (see Water Quality, Sediments, and Oceanography for more information).

A support vessel would be used to assist with construction of the Marine Terminal; however, the boat is significantly smaller than the tankers that would be unloading at Pier 400. Similarly, other vessels like the pile-driving barge, barges for materials, and the tugs, as well as equipment on the barges (pile-driver, cranes, generators) that would contain fuel tanks, lube oils, hydraulic fluids would have the potential to contribute to spills but at a much lower magnitude than the proposed crude oil tankers. The support vessel would adhere to the Port safe navigation rules, and the construction would be a temporary activity. Also, support vessel construction activity would not involve the handling of hazardous materials, and refueling of the vessel would be done according to the Port's policies. Given the small potential spill volumes associated with the construction equipment, potential impacts would be considered negligible or minor, and would be considered insignificant using the risk matrix criteria presented in Figure 3.12-5.

Construction of facilities and pipelines may potentially result in damage to underground facilities, hazardous material pipelines, electrical lines, or other cables. However, the USA Underground Alert Service or a similar service would be contacted to avoid impacts to other underground facilities during digging or trenching activity. The USA Underground Alert Service clearly marks the location of all underground utilities and pipelines and also provides detailed information, such as burial depth and potential hazards.

CEQA Impact Determination

Implementation of normal construction standards, including NPDES BMPs, and all other above mentioned regulations and practices, would minimize the potential for an accidental release of hazardous materials or fuels during construction activities. Maximum potential spill volumes would also be considered negligible. Therefore, Reduced Project Alternative construction activities would result in a less than significant risk of upset.

Mitigation Measures

No mitigation is required.

Residual Impacts

A less than significant impact is anticipated.

NEPA Impact Determination

Implementation of normal construction standards, including NPDES BMPs, and all other above mentioned regulations and practices, would minimize the potential for an accidental release of hazardous materials or fuels during construction activities. Maximum potential spill volumes would also be considered negligible. Therefore, Reduced Project Alternative construction activities would result in a less than significant risk of upset.

Mitigation Measures

No mitigation is required.

Residual Impacts

A less than significant impact is anticipated.

3.12.4.3.3.2 Operational Impacts

Impact RISK-2.1: An accidental crude oil spill from a tanker would result in risks to the public and/or environment.

The number of vessels entering the San Pedro Bay Ports under the Reduced Project Alternative would increase due to the need to use smaller vessels to meet the same crude oil demand. This larger number of vessel trips results in an increase in vessel-related oil spill risk.

During tanker transit, all allisions, collisions, and groundings could result in a spill of crude oil. Crude oil tankers and barges contribute about 4 percent to the total number of spills into navigable waters; however, by volume they represent about 50 percent of the total volume of spills (API 2002). About 0.2 percent of total oil tanker transits worldwide (out of 41,000 per year) result in an incident (e.g., collision, grounding), and less than 2 percent of those incidents result in an oil spill (Etkin 2001).

Open Ocean Transit Oil Spills. Spill probabilities for open ocean vessel transit were evaluated based on USCG recommendations for open ocean allisions, collisions, and groundings. While the probability of an open ocean incident is lower than in the vicinity of a port due to greater vessel spacing, the conditional probability of an oil spill resulting from an accident is higher due to greater vessel speeds. The probabilities of various events for open ocean tanker accidents are given in Table 3.12-15.

Using the Risk Matrix approach shown in Figure 3.12-17 and the spill probabilities presented in Table 3.12-15, potential impacts from a release of crude product from a tanker during ocean transit would be considered a significant impact in the absence of mitigation. The probabilities of these events are considered Unlikely for larger spills, but the consequences range from Severe to Disastrous for larger spills. The consequences associated with small oil spills would be considered Minor, and insignificant using the Risk Matrix approach.

Oil Spills within the Port of Los Angeles Waters. Various incident rates were reported (see Table 3.9-3 in Section 3.9, Marine Transportation) ranging from 0.02 to 0.2 percent frequency of occurrence per transit. The San Pedro Bay Ports have recorded annual incident rates ranging from 0.02 to 0.07 percent per transit, which is consistent with industry observations. The average incident rate over the period 1997-2005 was 0.046 percent per transit. The vessel traffic increase due to the Reduced Project Alternative would be up to 132 tankers per year. Using the more conservative accident and spill probabilities listed in this section, project-related tankers would have oil spill probabilities within LAHD-controlled waters as shown in Table 3.12-16.

The worst-case oil spill that could occur from a Project-related tanker would be the entire tanker contents of the largest tanker, or 2.5 million bbl. A catastrophic failure of the tanker with the release of full cargo would constitute a "disastrous" consequence per the Risk Matrix significance criteria. For single-hulled tankers, the probability of a spill would be Rare, but would be considered Disastrous, which would be considered a significant impact in the absence of mitigation. For double-hulled tankers, the probability of a complete loss of the tanker contents would be considered "Extraordinary" and would be less than significant.

Using the Risk Matrix approach in Figure 3.12-18 and the spill probabilities presented in Table 3.12-16, potential impacts from a release from a tanker while in LAHD-controlled waters would be considered a significant impact in the absence of mitigation.

The owner or operators of tanker vessels are required to have an approved Tank Vessel Response Plan on board and a qualified individual within the US with full authority to implement removal actions in the event of an oil spill incident, and to contract with the spill response organizations to carry out cleanup activities in case of a spill. The existing oil spill response capabilities in the San Pedro Bay Ports are sufficient to isolate with containment boom and recover the maximum possible spill from an oil tanker within the port.

Figure 3.12-17. Risk Matrix of Crude Oil Tanker Spills – Open Ocean

		Probability				
		Extraordinary >1,000,000 years	*Rare >10,000 <1,000,000 years*	*Unlikely >100 <10,000 years*	*Likely >1 and <100 years*	*Frequent (>1/year)*
Consequences	Disastrous (>357,142 bbl)			**>30% Loss of Cargo (i.e., Large)**		
	Severe (2,380–357,142 bbl)			**10% Loss of Cargo (i.e., Moderate)**		
	Major (238–2,380 bbl)					
	Minor (10-238 bbl)				**Small Oil Spill**	
	Negligible (<10 bbl)					

Notes:

Incidents that fall in the shaded area of the risk matrix would be classified as significant.

Incidents include both unmitigated and mitigated scenarios since all probabilities fall in the unlikely probability category.

Figure 3.12-18. Risk Matrix of Crude Oil Tanker Spills – Port of Los Angeles Waters

	Probability					
Consequences		*Extraordinary >1,000,000 years*	*Rare >10,000 <1,000,000 years*	*Unlikely >100 <10,000 years*	*Likely >1 and <100 years*	*Frequent (>1/year)*
	Disastrous (>357,142 bbl)	**Double Hull Large Oil Spill**	**Single Hull Large Oil Spill**			
	Severe (2,380–357,142 bbl)					
	Major (238–2,380 bbl)		**Moderate Oil Spill (all designs)**			
	Minor (10-238 bbl)			**Double Hull Small Oil Spill**	**Single Hull Small Oil Spill**	
	Negligible (<10 bbl)					

Notes:
Incidents that fall in the shaded area of the risk matrix would be classified as significant.
Unmitigated case represented by single hulled vessels, while mitigated represented by double hulled vessels.

Various studies have shown that double-hull tank vessels have lower probability of releases when tanker vessels are involved in accidents. Because of these studies, the USCG issued regulations addressing double-hull requirements for tanker vessels. The regulations establish a timeline for eliminating single-hull vessels from operating in the navigable waters or the Exclusive Economic Zone of the U.S. after January 1, 2010, and double-bottom or double-sided vessels by January 1, 2015. Only vessels equipped with a double hull, or with an approved double containment system will be allowed to operate after those times. It is unlikely that single-hull vessels will utilize the reduced Project terminal facilities given the current Project schedule and the planned phase-out of these vessels.

Assuming that a majority of vessels that would visit the reduced project alternative terminal would be of a double-hull design, oil spill probabilities within LAHD controlled waters can be estimated as shown in Table 3.12-17.

Table 3.12-15. Frequencies of Open Ocean Transit Oil Spills

Event	*Frequency Per Transit* [1]	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*
Single Hulled Vessels		**2010**		**2015**		**2025**		**2040**	
Allisions, collisions, and groundings	$3.12x10^{-4}$	$4.02x10^{-2}$	24.8	$4.12x10^{-2}$	24.3	$1.09x10^{-1}$	9.2	$1.15x10^{-1}$	8.7
Small Spill	$7.80x10^{-5}$	$1.01x10^{-2}$	99	$1.03x10^{-2}$	97	$2.73x10^{-2}$	37	$2.88x10^{-2}$	35
10 percent Loss of Cargo (250,000 bbl)	$2.73x10^{-5}$	$3.52x10^{-3}$	284	$3.60x10^{-3}$	278	$9.56x10^{-3}$	105	$1.01x10^{-2}$	99
30 percent Loss of Cargo (750,000 bbl)	$2.73x10^{-5}$	$3.52x10^{-3}$	284	$3.60x10^{-3}$	278	$9.56x10^{-3}$	105	$1.01x10^{-2}$	99
100 percent Loss of Cargo (2,500,000 bbl)	$2.34x10^{-5}$	$3.02x10^{-3}$	331	$3.09x10^{-3}$	324	$8.19x10^{-3}$	122	$8.63x10^{-3}$	116
Double Hulled Vessels		**2010**		**2015**		**2025**		**2040**	
Allisions, collisions, and groundings	$3.12x10^{-4}$	$4.02x10^{-2}$	24.8	$4.12x10^{-2}$	24.3	$1.09x10^{-1}$	9.2	$1.15x10^{-1}$	8.7
Small Spill	$1.56x10^{-5}$	$2.01x10^{-3}$	497	$2.06x10^{-3}$	486	$5.46x10^{-3}$	183	$5.76x10^{-3}$	174
10 percent Loss of Cargo (250,000 bbl)	$5.46x10^{-6}$	$7.04x10^{-4}$	1,420	$7.21x10^{-4}$	1,388	$1.91x10^{-3}$	523	$2.01x10^{-3}$	496
30 percent Loss of Cargo (750,000 bbl)	$5.46x10^{-6}$	$7.04x10^{-4}$	1,420	$7.21x10^{-4}$	1,388	$1.91x10^{-3}$	523	$2.01x10^{-3}$	496
100 percent Loss of Cargo (2,500,000 bbl)	$4.68x10^{-6}$	$6.04x10^{-4}$	1,656	$6.18x10^{-4}$	1,619	$1.64x10^{-3}$	611	$1.73x10^{-3}$	579

Notes:

1. This frequency is the chance of a vessel experiencing the listed event during a single transit.
2. This frequency is the chance of the expected Project vessels experiencing the listed event during a single year of transits.
3. Based on the annual Project frequency, this column indicates how often the listed event could be expected to occur for project-related vessels.

Sources: USCG 2003; FEMA 1989.

Table 3.12-16. Frequencies of Accidents and/or Oil Spills within the Port of Los Angeles Waters

Event	*Frequency Per Transit* [1]	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*
Single Hulled Vessels		**2010**		**2015**		**2025**		**2040**	
Allisions, collisions, and groundings	4.60×10^{-4}	5.93×10^{-2}	16.9	6.07×10^{-2}	16.5	1.61×10^{-1}	6.2	1.70×10^{-1}	5.9
Oil Spill (any size)	1.15×10^{-4}	1.48×10^{-2}	67	1.52×10^{-2}	66	4.03×10^{-2}	25	4.24×10^{-2}	24
Small Oil Spill	1.15×10^{-4}	1.48×10^{-2}	68	1.51×10^{-2}	66	4.02×10^{-2}	25	4.24×10^{-2}	24
Moderate Oil Spill (238-1,200 bbl)	2.30×10^{-7}	2.97×10^{-5}	33,704	3.04×10^{-5}	32,938	8.05×10^{-5}	12,422	8.49×10^{-5}	11,783
Large Oil Spill (>1,200 bbl)	1.15×10^{-8}	1.48×10^{-6}	674,082	1.52×10^{-6}	658,762	4.03×10^{-6}	248,447	4.24×10^{-6}	235,655

Notes:

1. This frequency is the chance of a vessel experiencing the listed event during a single transit.
2. This frequency is the chance of the expected Project vessels experiencing the listed event during a single year of transits.
3. Based on the annual Project frequency, this column indicates how often the listed event could be expected to occur for project-related vessels.

Table 3.12-17. Frequencies of Oil Spills within the Port of Los Angeles Waters for Double-Hull Tank Vessels

Event	*Frequency Per Transit* [1]	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*	*Annual Project Frequency* [2]	*Frequency of Event* [3] *(years)*
Double Hulled Vessels		**2010**		**2015**		**2025**		**2040**	
Allisions, collisions, and groundings	4.60×10^{-4}	5.93×10^{-2}	16.9	6.07×10^{-2}	16.5	1.61×10^{-1}	6.2	1.70×10^{-1}	5.9
Oil Spill (any size)	2.30×10^{-5}	2.97×10^{-3}	337	3.04×10^{-3}	329	8.05×10^{-3}	124	8.49×10^{-3}	118
Small Oil Spill	2.30×10^{-5}	2.96×10^{-3}	338	3.03×10^{-3}	330	8.03×10^{-3}	124	8.47×10^{-3}	118
Moderate Oil Spill (238-1,200 bbl)	4.60×10^{-8}	5.93×10^{-6}	168,520	6.07×10^{-6}	164,690	1.61×10^{-5}	62,112	1.70×10^{-5}	58,914
Large Oil Spill (>1,200 bbl)	2.30×10^{-9}	2.97×10^{-7}	3,370,408	3.04×10^{-7}	3,293,808	8.05×10^{-7}	1,242,236	8.49×10^{-7}	1,178,27 3

Notes:

1. This frequency is the chance of a vessel experiencing the listed event during a single transit.
2. This frequency is the chance of the expected Project vessels experiencing the listed event during a single year of transits.
3. Based on the annual Project frequency, this column indicates how often the listed event could be expected to occur for project-related vessels.

Again, using the Risk Matrix approach shown in Figure 3.12-18 and the spill probabilities presented in Table 3.12-17, potential impacts from a release of petroleum from a tanker while in LAHD-controlled waters would be considered a less than significant impact, in the absence of potential impacts on sensitive or endangered species. This less than significant impact for oil spills reflects the Port's better-than-average safety record, the types of vessels that would visit the reduced project alternative Marine Terminal, and the available spill response capabilities. However, the Cabrillo Shallow Water Habitat (1,900 ft [580 meters] away) and the Pier 400 Least Tern Habitat (2,400 ft [730 meters] away) are very close to the Marine Terminal, and a spill within the Port would impact sensitive resources and result in the degradation of the habitat. Therefore, potential impacts associated with oil spills resulting from a vessel accident would be significant.

Fuel Barge Spills. The reduced project alternative would require periodic barge trips to supply the terminal with marine gas oil (MGO) for refueling of crude oil tankers that visit the terminal. The number of trips would range from six per year in 2010,eight per year starting in 2015 and eight per year in 2025 and thereafter. The barges would originate at a nearby San Pedro Bay bulk liquid terminal. These intraport transfers of MGO would slightly increase the frequency of spills within the port complex. Based on the projected terminal fuel needs, small spill frequencies would range from $6.90x10^{-4}$/yr (once every 1,450 years) in 2010 to $9.20x10^{-4}$/yr (once every 1,090 years) in 2025 onward. Large spill frequencies would range from $6.90x10^{-8}$/yr (once every 14,500,000 years) in 2010 to $9.20x10^{-8}$/yr (once every 10,870,000 years) in 2025 onward. These spill frequencies represent a slight increase over the Project tanker spill frequency in the San Pedro Bay Ports waters and represent a less than significant risk.

Marine Terminal Unloading Oil Spills. Accidents and incidents during bunkering, lightering, and loading operations are responsible for 57 percent of tanker spills (Etkin 2001). Unloading spills are generally small given the manned nature of the unloading activity and presence of observation personnel in the immediate vicinity of the tanker unloading operations. Statistics for the 1974-2004 period on worldwide accidental oil spills by oil-cargo (tanker ships, tank barges, and combination oil-cargo/non-oil-cargo) vessels collected by the International Tanker Owners Pollution Federation (ITOPF 2005) reveal that 53.8 percent are transfer spills, 20.9 percent are vessel-accident spills, and the remaining 25.3 percent are unknown types. Of the transfer spills, 34.3 percent are directly related to loading/unloading operations. The vast majority (84 percent) of the spills are relatively small spills of 50 bbl or less. For loading/unloading operations, this percentage increases to 88.8 percent, with only 0.9 percent of the loading/unloading spills exceeding 5,000 bbl (the balance of spills between 50 and 5,000 bbl amounts to 10.3 percent).

Given the safety features that are incorporated into the reduced project alternative, it is unlikely that a spill during unloading would adversely affect the marine environment. The facility would be designed to protect the environment in the immediate vicinity of unloading operations. The dock platform would be constructed with a concrete curb around its outer edge. This curb would prevent any run off which may accumulate on the dock surface. This run off would drain into a containment sump. The containment sump would have automatic monitoring equipment to verify sump levels. The contents of the sump would be periodically inspected and the contents would be managed in accordance with approved written procedures.

Before any discharge operation can begin, the unloading vessel would be totally enclosed by a spill containment boom. This boom would be capable of containing any oil from any source inside the boom. If any oil is observed within the boom, all operations would be stopped. In addition to this boom, the terminal would have additional spill boom accessible for launching should an event occur where the primary boom is not sufficient to contain the oil. The booms would be deployed by terminal personnel using boom boats which would be moored in the water at the terminal.

A tsunami could also lead to an oil spill at the terminal site if a moored vessel were present. While in transit, the hazards posed to crude oil tankers from tsunamis are insignificant, and in most cases, imperceptible until the tsunami reaches shallow water and begins to build in height (open ocean tsunamis are generally only a few meters in height, but can increase to many meters when they reach shallow coastal waters). However, while docked, a tsunami striking the port could cause significant ship movement, potential loading arm failure and even a hull breach if the ship is pushed against the wharf or is set adrift and strikes other objects or wharves.

Various estimates of tsunami run-up heights, primarily from distant sources, have been developed for the Project area. Synolakis (2003) estimated a 100-year run-up height of 8 ft and a 500-year run-up height of 15 ft for the Port area. More recently, Borrero et al. (2005) estimated that a tsunami of approximately 13 ft could occur as the result of a large, submarine landslide located 10 miles southwest of the Port. Run-up heights within the port vary widely, depending on wharf orientation and exposure, but are generally less than the heights noted above.

A report prepared by the firm of Moffatt and Nichol (2007), for the Port of Long Beach, studied historical and future tsunami risk at the port. Historical tsunamis have mainly resulted from distant earthquakes (e.g., Alaska, Chile, etc.) with modest water level changes experienced in the Port. While there is some potential for a tsunami-related crude oil spill, tsunamis created by distant seismic events offer sufficient warning time to allow a crude oil carrier to leave the port for deeper water.

Moffatt and Nichol (2007) also evaluated the potential for locally generated tsunamis in the Southern SCCB resulting from seismicity and subsea landslides. A tsunami generated in the SCCB would have the potential to create substantially larger water level fluctuations than a distant tsunamigenic source, and would arrive with very little warning (generally less than 30 minutes). A modeling analysis prepared for the San Pedro Bay Ports shows that a landslide- or earthquake-related tsunami would have the potential to overtop certain wharves, including the Pier 400 terminal site. See Section 3.5, Geology, for additional information.

The shoreline structures and unloading equipment are designed to operate within a range of motion that includes the 8-ft extreme tidal range in the Port plus the vessel's change in draft as a result of unloading. Therefore, a smaller moderate tsunami would have little effect on a ship at berth. However, a large tsunami (on the order of the 500 year, 15 ft event) would likely damage the loading arms and potentially the ship.

The Energy Information Administration (EIA) (2005) reported impacts to marine terminal facilities associated with the December 24, 2004 Sumatra M_W 9.3 earthquake and subsequent tsunami. Indonesia's PT Arun Liquefied Natural Gas (LNG) facility in Banda Aceh, Sumatra, was not damaged by the tsunami even though the maximum runup height observed at Banda Aceh was approximately 30 ft. An oil transfer facility approximately 30 miles to the east of Banda Aceh received relatively minor damage, with only one crude oil storage tank being moved off its foundation by the estimated 16-ft waves. An oil tanker was unloading when the tsunami struck, but the crew was able to move the ship offshore (the EIA report did not comment if there was an oil spill).

Loading arm failure frequencies for the reduced project alternative were estimated based on the probability of the various loading arm components, as well as external stresses (e.g., wind, tides, tsunami, mooring failures, etc.) that could cause a loading arm failure. The frequency of a small spill was estimated to be 2.43×10^{-3} per year, or about once every 410 years. A large failure, which would also require a failure of all emergency systems and procedures, was estimated to be 6.56×10^{-5} percent chance per year, or once every 15,245 years. Using the Risk Matrix in Figure 3.12-19, the small spill would be considered Unlikely/Minor, while the large spill would be considered Rare/Major. In light of the applicant-proposed spill containment procedures, both of these spill scenarios would be less than significant.

Figure 3.12-19. Risk Matrix of Crude Oil Unloading Spills

		Probability				
Consequences		*Extraordinary >1,000,000 years*	*Rare >10,000 <1,000,000 years*	*Unlikely >100 <10,000 years*	*Likely >1 and <100 years*	*Frequent (>1/year)*
	Disastrous (>357,142 bbl)					
	Severe (2,380–357,142 bbl)					
	Major (238–2,380 bbl)		**Large Loading Arm Spill**			
	Minor (10-238 bbl)			**Small Loading Arm Spill**		
	Negligible (<10 bbl)					

Note: Incidents that fall in the shaded area of the risk matrix would be classified as significant.

CEQA Impact Determination

Using the Risk Matrix approach shown in Figure 3.12-17 and the spill probabilities presented in Table 3.12-15, potential impacts from a release of crude product from a tanker during ocean transit would be considered a significant impact in the absence of mitigation. The probabilities of these events are considered Unlikely for larger spills, but the consequences range from Severe to Disastrous for larger spills. The consequences associated with small oil spills would be considered Minor, and insignificant using the Risk Matrix approach.

Again, using the Risk Matrix approach shown in Figure 3.12-18 and the spill probabilities presented in Table 3.12-17, potential impacts from a release of petroleum from a tanker while in LAHD-controlled waters would be considered a less than significant impact, in the absence of potential impacts on sensitive or endangered species. This less than significant impact for oil spills reflects the Port's better-than-average safety record, the types of vessels that would visit the proposed Marine Terminal, and the available spill response capabilities. However, the Cabrillo Shallow Water Habitat (1,900 ft [580 meters] away) and the Pier 400 Least Tern Habitat (2,400 ft [730 meters] away) are very close to the Marine Terminal, and a spill within the Port would impact sensitive resources and result in the degradation of the habitat. Therefore, potential impacts associated with oil spills resulting from a vessel accident would be significant.

Loading arm failure frequencies for the reduced project alternative were estimated based on the probability of the various loading arm components, as well as external stresses (e.g., wind, tides, tsunami, mooring failures, etc.) that could cause a loading arm failure. The frequency of a small spill was estimated to be 2.43×10^{-3} per year, or about once every 410 years. A large failure, which would also require a failure of all emergency systems and procedures, was estimated to be 6.56×10^{-5} percent chance per year, or once every 15,245 years. Using the Risk Matrix in Figure 3.12-19, the small spill would be considered Unlikely/Minor, while the large spill would be considered Rare/Major. In light of the applicant-proposed spill containment procedures, both of these spill scenarios would be less than significant.

Based on the probability of crude oil spills during vessel transit and in Port waters, potential oil spill impacts are considered significant.

Mitigation Measures

Implement **MMs 4I-2, RISK-2.1a,** and **MM RISK-2.1b.**

Residual Impacts

While applicant-proposed reduced project alternative design and implementation of **MM 4I-2, MM RISK-2.1a,** and **MM RISK-2.1b** would effectively limit offloading spills to a less than significant level, the risk of an oil spill in Port waters and in transit from foreign ports remains significant. There are no additional feasible mitigation measures to reduce this impact, and therefore, the potential risk would be significant and unavoidable.

NEPA Impact Determination

Based on the probability of crude oil spills during vessel transit and in Port waters, potential oil spill impacts are considered significant.

Mitigation Measures

Implement **MM 4I-2**, **MM RISK-2.1a,** and **MM RISK-2.1b.**

Residual Impacts

While applicant-proposed reduced project alternative design and implementation of **MM 4I-2**, **MM RISK-2.1a** and **MM RISK-2.1b** would effectively limit offloading spills to a less than significant level, the risk of an oil spill in Port waters and in transit from foreign ports remains significant. There are no additional feasible mitigation measures to reduce this impact, and therefore, the potential risk would be significant and unavoidable.

Impact RISK-2.2: Potential accidental oil spills from the Reduced Project Alternative pipelines and/or tanks would pose a risk to the marine environment.

Worst-case impacts would be identical to the proposed Project. Under the Reduced Project Alternative, peak pipeline throughput and potential spill rates would remain unchanged. Environmental hazards associated with an accidental spill from the crude oil storage tanks are not evaluated under this impact since all spilled oil would be fully contained within the tank farm dikes, and thus would pose no hazard to the surrounding waters or other sensitive land uses. Potential hazards associated with tank farm spills and fires are evaluated under Impact 3-2 below. As with the proposed Project, impacts would be less than significant; therefore, no mitigation measures are required (see proposed Project Figure 3.12-11).

CEQA Impact Determination

As shown in Figure 3.12-11, the probability of spills into water from all new pipeline segments that are part of the Reduced Project Alternative would have a frequency that is considered Extraordinary, and thus impacts to the marine environment and biological resources would be considered less than significant due to the low probability that a pipeline-related spill would reach the Port waters in any appreciable volume.

Oil spills would affect biological and water resources, however, there are no public safety hazards from an oil spill unless it ignites (impacts from a spill and fire are discussed in the next impact discussion). Therefore, the public safety impacts from project-related pipeline spills would be less than significant.

Mitigation Measures

No mitigation is required. However, the Reduced Project Alternative would be required to meet the requirements of **MM 4I-3** from the 1992 Deep Draft FEIS/FEIR, which requires that the overland transportation corridor be designed so that spills along the corridor would be contained and not allowed to run off into the water.

Residual Impacts

Less than significant impact.

NEPA Impact Determination

As shown in Figure 3.12-11, the probability of spills into water from all new pipeline segments that are part of the Reduced Project Alternative would have a frequency that is considered Extraordinary, and thus impacts to the marine environment and biological resources would be considered less than significant due to the low probability that a pipeline-related spill would reach the Port waters in any appreciable volume.

Oil spills would affect biological and water resources, however, there are no public safety hazards from an oil spill unless it ignites (impacts from a spill and fire are discussed in the next impact discussion). Therefore, the public safety impacts from project-related pipeline spills would be less than significant.

Mitigation Measures

No mitigation is required. However, the Reduced Project Alternative would be required to meet the requirements of **MM 4I-3** from the 1992 Deep Draft FEIS/FEIR, which requires that the overland transportation corridor be designed so that spills along the corridor would be contained and not allowed to run off into the water.

Residual Impacts

Less than significant impact.

Impact RISK-3.1: Potential pipeline oil spills with subsequent fires would result in risks to the public and environment.

Worst-case impacts would be identical to the proposed Project. Under the Reduced Project Alternative, peak pipeline throughput and potential spill rates would remain unchanged. Consequences associated with a crude oil fire and thermal radiation exposure would also remain unchanged (see proposed Project Figure 3.12-12). Impacts would be less than significant; therefore, no mitigation measures are required

CEQA Impact Determination

Because the probabilities of a spill and subsequent fire from the reduced project alternative pipelines are low (Rare or Extraordinary) and spill-and-fire event consequences would either be Minor or Major for all pipelines (see Risk Matrix in Figure 3.12-12), risks from oil spill and subsequent fires from the reduced project alternative pipelines would have less than significant public safety impacts.

Mitigation Measures

No mitigation is necessary.

Residual Impacts

Less than significant impact.

NEPA Impact Determination

Because the probabilities of a spill and subsequent fire from the Reduced Project Alternative pipelines are low (Rare or Extraordinary) and spill-and-fire event consequences would either be Minor or Major for all pipelines (see Risk Matrix in Figure 3.12-12), risks from oil spill and subsequent fires from the Reduced Project Alternative pipelines would have less than significant public safety impacts.

Mitigation Measures

No mitigation is necessary.

Residual Impacts

Less than significant impact.

Impact RISK-3.2: Potential Reduced Project Alternative tank farm spills with subsequent fires would result in risks to the public and environment.

Worst-case impacts would be identical to the proposed Project. The probability of a release from a failed tank with a subsequent fire would range from once every 5,578 years at Tank Farm Site 2 to once in 15,300 years at Tank Farm Site 1. This would place probability categories in the Unlikely to Rare category (see Risk Matrix in Figure 3.12-13). Spills from tank ruptures would be contained within the tank dikes (a dike rupture is a very improbable event and would be in the Extraordinary probability category, and therefore insignificant). Radiation from the pool fires within the dikes could affect any population in the vicinity of a tank farm. However, the reduced project alternative tank farm sites are relatively distant from populated areas. The only populations that would potentially be exposed to any risks from these facilities are the Project employees, Port employees, or employees of the companies/organizations that operate in the vicinity of the Project facilities. There would be no direct thermal radiation hazards in surrounding residential areas since these areas are all located well beyond the maximum thermal radiation hazard zone.

The population density in the vicinity of Tank Farm Site 1 would be quite low with limited public or worker exposure potential and only few minor injuries possible, which is considered a Minor consequence. The impacts from releases from the reduced project alternative tanks accompanied by a fire would result in less than significant public safety impacts for Tank Farm Site 1. As noted in the Port Risk Management Analysis for the reduced project alternative, the hazard footprints generated as a result of the proposed Plains Crude Oil Marine Terminal, Tank Farms, and Pipelines Project do not result in the long-term overlap of any existing, planned, or permitted vulnerable resources.

CEQA Impact Determination

The tank farm sites would be equipped with sophisticated fire suppression apparatus that would minimize the impacts of spill resulting in a fire. The risk of an accidental release of a hazardous substance from an oil spill and subsequent fire or explosion that would substantially impact surrounding residents or businesses is less than significant at both tank farm sites.

Mitigation Measures

Other than the requirements of **MM 4I-4** and **MM 4I-5** from the Deep Draft FEIS/FEIR (USACE and LAHD 1992), no mitigation is necessary.

Residual Impacts

Less than significant impact.

NEPA Impact Determination

The tank farm sites would be equipped with sophisticated fire suppression apparatus that would minimize the impacts of spill resulting in a fire. The risk of an accidental release of a hazardous substance from an oil spill and subsequent fire or explosion that would substantially impact surrounding residents or businesses is less than significant at both tank farm sites.

Mitigation Measures

Other than the requirements of **MM 4I-4** and **MM 4I-5** from the Deep Draft FEIS/FEIR (USACE and LAHD 1992), no mitigation is necessary.

Residual Impacts

Less than significant impact.

Impact RISK-4: The Reduced Project Alternative would not substantially interfere with existing emergency response plans or evacuation plans.

Impacts would be identical to the proposed Project. Impacts would be less than significant; therefore, no mitigation measures are required.

CEQA Impact Determination

The reduced project alternative would be subject to emergency response and evacuation systems implemented by the LAFD. During Project activities, the LAFD would require that adequate vehicular access be provided and maintained. The LAFD would review all plans (see Los Angeles Municipal Code requirements described above), prior to development to ensure that applicable access is maintained, and the construction contractor would be required to ensure compliance with these measures. The project emergency response plan would be incorporated into the overall response plan for the port prior to project operations. Given the location of the reduced project alternative on the far end of Pier 400, the reduced project alternative would not impact existing evacuation routes or response plans. Therefore, no significant impact on emergency response plans or emergency evacuation plans would occur (impacts would be less than significant).

Mitigation Measures

No mitigation is required.

Residual Impacts

There would be less than significant residual impacts.

NEPA Impact Determination

The project emergency response plan would be incorporated into the overall response plan for the port prior to project operations. Given the location of the reduced project alternative on the far end of Pier 400, the reduced project alternative would not impact existing evacuation routes or response plans. Therefore, no significant impact on emergency response plans or emergency evacuation plans would occur (impacts would be less than significant).

Mitigation Measures

No mitigation is necessary.

Residual Impacts

Less than significant impact.

Impact RISK-5: A potential terrorist attack would result in risks to the public and environment in areas near Pier 400.

Under the Reduced Project Alternative, terrorism risk would essentially remain unchanged for most Project components. Potential terrorist attacks on the crude oil tankers and pipeline system would remain the same, while there would be fewer tank farms that would be vulnerable to attack. The significance of potential terrorist attacks would remain the same as those presented the proposed Project, which were considered significant.

CEQA Impact Determination

Potential consequences of a terrorist attack on the Pier 400 facilities are considered Major since the potential for a small number of offsite injuries are possible in the event of a successful attack. Potential thermal radiation and explosion overpressure levels do not result in the overlap of any existing, planned, or permitted vulnerable resources, but the potential for limited public exposure along the Port waterways is possible. The likelihood of a successful terrorist attack, and the key here is the likelihood of both an attack occurring and that it is successful, is considered fairly low. However, potential impacts related to terrorism risk would be considered significant given the environmental and public safety consequences associated with a successful terrorist attack.

Mitigation Measures

A variety of programs are in place at the Port to reduce potential terrorist threats. The Berth 408 operators would be required to participate in these programs, thus further minimizing the risk associated with terrorism. In addition, **MM 4I-7** from the Deep Draft FEIS/FEIR (USACE and LAHD 1992) required that the Port Police provide adequate security coverage of the Project area. For the Reduced Project Alternative, as with the proposed Project, this would include vehicle barriers, site control and regular patrols. No additional mitigation is possible.

Residual Impacts

Even with the application of all possible mitigation measures, potential residual impacts related to terrorism risk would be considered significant given the environmental and public safety consequences associated with a successful terrorist attack.

<u>NEPA Impact Determination</u>

Potential consequences of a terrorist attack on the Pier 400 facilities are considered Major since the potential for a small number of offsite injuries are possible in the event of a successful attack. Potential thermal radiation and explosion overpressure levels do not result in the overlap of any existing, planned, or permitted vulnerable resources, but the potential for limited public exposure along the Port waterways is possible. The likelihood of a successful terrorist attack, and the key here is the likelihood of both an attack occurring and that it is successful, is considered fairly low. However, potential impacts related to terrorism risk would be considered significant given the environmental and public safety consequences associated with a successful terrorist attack.

Mitigation Measures

A variety of programs are in place at the Port to reduce potential terrorist threats. The Berth 408 operators would be required to participate in these programs, thus further minimizing the risk associated with terrorism. In addition, **MM 4I-7** from the Deep Draft FEIS/FEIR (USACE and LAHD 1992) required that the Port Police provide adequate security coverage of the proposed Project area. For the Reduced Project Alternative, as for the proposed Project, this would include vehicle barriers, site control and regular patrols. No additional mitigation is possible.

Residual Impacts

Even with the application of all possible mitigation measures, potential residual impacts related to terrorism risk would be considered significant given the environmental and public safety consequences associated with a successful terrorist attack.

3.12.4.3.4 Summary of Impact Determinations

The following Table 3.12-18 summarizes the CEQA and NEPA impact determinations of the proposed Project and its alternatives related to Risk of Upset and Hazardous Materials, as described in the detailed discussion in Sections 3.12.4.3.1 through .3.12.4.3.3

Table 3.12-18: Summary Matrix of Potential Impacts and Mitigation Measures for Risk of Upset/Hazardous Materials Associated with the Proposed Project and Alternatives

Alternative	*Environmental Impacts*	*Impact Determination*	*Mitigation Measures*	*Impacts after Mitigation*
3.12 Risk of Upset/Hazardous Materials				
Proposed Project	**RISK-1:** Construction of the proposed Project would have the potential for accidental releases of hazardous materials.	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	RISK-2.1: An accidental crude oil spill from a tanker would result in risks to the public and/or environment.	CEQA: **Significant** impact NEPA: **Significant** impact	**MM 4I-2:** Clean Coastal Waters Cooperative **MM RISK-2.1a:** Double Hulled Vessels **MM RISK-2.1b:** Quick-Release Couplings **MM 4I-2** **MM RISK-2.1a** **MM RISK-2.1b**	CEQA: **Significant** and unavoidable impact NEPA: **Significant** and unavoidable impact
	RISK-2.2: An accidental oil spill from the proposed Project pipelines would pose a risk to the marine environment.	CEQA: Less than significant impact NEPA: Less than significant impact	**MM 4I-3:** Onshore Oil Spill Containment **MM 4I-3**	CEQA: Less than significant impact NEPA: Less than significant impact
	RISK-3.1: Potential pipeline oil spills with subsequent fires would result in risks to the public and environment.	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact

Table 3.12-18: Summary Matrix of Potential Impacts and Mitigation Measures for Risk of Upset/Hazardous Materials (continued)

Alternative	*Environmental Impacts*	*Impact Determination*	*Mitigation Measures*	*Impacts after Mitigation*
3.12 Risk of Upset/Hazardous Materials (continued)				
Proposed Project (continued)	**RISK-3.2:** Potential tank farm spills and subsequent fires would result in risks to the public and environment.	CEQA: Less than significant impact NEPA: Less than significant impact	**MM 4I-4**: Built-In Fire Protection Measures **MM 4I-5**: Use of Seawater for Fire Protection **MM 4I-4** **MM 4I-5**	CEQA: Less than significant impact NEPA: Less than significant impact
	RISK-4: The proposed Project would not substantially interfere with existing emergency response plans or evacuation plans.	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	RISK-5: A potential terrorist attack would result in risks to the public and environment in areas near Pier 400.	CEQA: **Significant** impact NEPA: **Significant** impact	**MM 4I-7:** Port Police Protection **MM 4I-7**	CEQA: **Significant** and unavoidable impact NEPA: **Significant** and unavoidable impact
No Federal Action/No Project Alternative	**RISK-1:** Construction of the No Federal Action/No Project Alternative would not have the potential for accidental releases of hazardous materials.	CEQA: Less than significant impact NEPA: No Impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: No Impact
	RISK-2.1: An accidental crude oil spill from a tanker would result in risks to the public and/or environment	CEQA: **Significant** impact NEPA: No Impact	Mitigation not applicable Mitigation not required	CEQA: **Significant** and unavoidable impact NEPA: No Impact
	RISK-2.2: No accidental oil spill would occur from pipelines that would pose a risk to the marine environment.	CEQA: No impact NEPA: No Impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No Impact
	RISK-3.1: Potential pipeline oil spills with subsequent fires that would result in risks to the public and environment would not occur.	CEQA: No impact NEPA: No Impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No Impact

Table 3.12-18: Summary Matrix of Potential Impacts and Mitigation Measures for Risk of Upset/Hazardous Materials (continued)

Alternative	*Environmental Impacts*	*Impact Determination*	*Mitigation Measures*	*Impacts after Mitigation*
3.12 Risk of Upset/Hazardous Materials (continued)				
No Federal Action/No Project Alternative (continued)	**RISK-3.2:** Potential tank farm spills and subsequent fires that would result in risks to the public and environment would not occur.	CEQA: No impact NEPA: No Impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No Impact
	RISK-4: The No Federal Action/No Project Alternative would not substantially interfere with existing emergency response plans or evacuation plans.	CEQA: No impact NEPA: No Impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No Impact
	RISK-5: A potential terrorist attack that would result in risks to the public and environment in areas near Pier 400 would not occur.	CEQA: No impact NEPA: No Impact	Mitigation not required Mitigation not required	CEQA: No impact NEPA: No Impact
Reduced Project Alternative	**RISK-1:** Construction of the Reduced Project Alternative would have the potential for accidental releases of hazardous materials.	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	RISK-2.1: An accidental crude oil spill from a tanker would result in risks to the public and/or environment.	CEQA: **Significant** impact NEPA: **Significant** impact	**MM 4I-2** **MM RISK-2.1a** **MM RISK-2.1b** **MM 4I-2** **MM RISK-2.1a** **MM RISK-2.1b**	CEQA: **Significant** and unavoidable impact NEPA: **Significant** and unavoidable impact
	RISK-2.2: Potential accidental oil spills from the Reduced Project Alternative pipelines and/or tanks would pose a risk to the marine environment.	CEQA: Less than significant impact NEPA: Less than significant impact	**MM 4I-3** **MM 4I-3**	CEQA: Less than significant impact NEPA: Less than significant impact
	RISK-3.1: Potential pipeline oil spills with subsequent fires would result in risks to the public and environment.	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact

Table 3.12-18: Summary Matrix of Potential Impacts and Mitigation Measures for Risk of Upset/Hazardous Materials (continued)

Alternative	*Environmental Impacts*	*Impact Determination*	*Mitigation Measures*	*Impacts after Mitigation*
3.12 Risk of Upset/Hazardous Materials (continued)				
Reduced Project Alternative (continued)	**RISK-3.2:** Potential Reduced Project Alternative tank farm spills with subsequent fires would result in risks to the public and environment.	CEQA: Less than significant impact NEPA: Less than significant impact	**MM 4I-4** **MM 4I-5** **MM 4I-4** **MM 4I-5**	CEQA: Less than significant impact NEPA: Less than significant impact
	RISK-4: The Reduced Project Alternative would not substantially interfere with existing emergency response plans or evacuation plans.	CEQA: Less than significant impact NEPA: Less than significant impact	Mitigation not required Mitigation not required	CEQA: Less than significant impact NEPA: Less than significant impact
	RISK-5: A potential terrorist attack would result in risks to the public and environment in areas near Pier 400.	CEQA: **Significant** impact NEPA: **Significant** impact	**MM 4I-7** **MM 4I-7**	CEQA: **Significant** and unavoidable impact NEPA: **Significant** and unavoidable impact

This table is meant to allow easy comparison between the potential impacts of the proposed Project and its alternatives with respect to this resource. Identified potential impacts may be based on Federal, State, or City of Los Angeles significance criteria, Port criteria, and the scientific judgment of the report preparers.

For each type of potential impact, the table describes the impact, notes the CEQA and NEPA impact determinations, describes any applicable mitigation measures, and notes the residual impacts (i.e., the impact remaining after mitigation). All impacts, whether significant or not, are included in this table.

3.12.4.4 Mitigation Monitoring

Potentially significant public health and safety impacts would occur during proposed Project construction and operation. The following measures would be incorporated into contract specifications to ensure impacts are minimized to the greatest extent feasible.

Mitigation Measures from the 1992 Deep Draft Final EIS/EIR that are Applicable to the Proposed Project:

Impact RISK-2.1: An accidental crude oil spill from a tanker would result in risks to the public and/or environment.	
MM 4I-2: Clean Coastal Waters Cooperative.	
Measure	Facility operator handling hazardous liquid in bulk at proposed Project sites shall be a member of the Marine Spill Response Corporation (MSRC) cooperative, or equivalent Oil Spill Response Organization (OSRO) approved by the U.S. Coast Guard.
Timing	Prior to operations.
Methodology	LAHD shall ensure that the project design incorporates adequate secondary containment along pipeline corridor to prevent oil runoff into the water.
Responsible Parties	Facility operators; LAHD.
Impact RISK-2.2: An accidental oil spill from the proposed Project pipelines would pose a risk to the marine environment.	
MM 4I-3: Onshore Oil Spill Containment.	
Measure	The overland pipeline transportation corridor shall be designed so that spills along the corridor would be contained and not allowed to run off into the water.
Timing	Prior to operations.
Methodology	LAHD shall ensure that the facility operators at all proposed Project sites are members of the MSRC cooperative, or equivalent.
Responsible Parties	Facility operators; LAHD.
Impact RISK-3.2: Potential tank farm spills and subsequent fires would result in risks to the public and environment.	
MM 4I-4: Built-In Fire Protection Measures.	
Measure	Facilities handling crude oil or petroleum products shall have built-in fire protection measures that satisfy the requirements outlined in the applicable Fire Codes (see Appendix E under "Fire Prevention, Detection, and Suppression System").
Timing	To be incorporated into the facility design.
Methodology	LAHD shall ensure that Fire Protection Measures are incorporated into all facility design plans.
Responsible Parties	LAHD.

MM 4I-5: Use of Seawater for Fire Protection.	
Measure	Besides fresh water supplied to the facilities, the proposed Project facilities shall also be equipped to use seawater for fire protection.
Timing	To be incorporated into all facility design plans.
Methodology	LAHD shall ensure that this Fire Protection Measures to use seawater for fire protection is incorporated into the building design.
Responsible Parties	LAHD.
Impact RISK-5: A potential terrorist attack would result in risks to the public and environment in areas near Pier 400.	
MM 4I-7: Port Police Protection.	
Measure	The Port Police shall provide adequate security coverage of the proposed Project area.
Timing	Prior to proposed Project operation.
Methodology	LAHD shall ensure that the Port Police provide adequate security coverage to the proposed Project areas.
Responsible Parties	LAHD.

Mitigation Measures Developed in this Draft SEIS/SEIR Specific to the Proposed Project:

Potentially significant public health and safety impacts would occur during proposed Project construction and operation. The following measures would be incorporated into contract specifications to ensure impacts are minimized to the greatest extent feasible.

Impact RISK-2.1: Potential oil releases from a crude oil tanker could result in risks to the public and/or environment.	
MM RISK-2.1a: Double-Hulled Vessels.	
Measure	The proposed Project shall limit crude oil deliveries to double-hulled vessels.
Timing	During proposed Project operations.
Methodology	The proposed Project operator would be responsible for assuring that only double-hulled vessels would be allowed to call at the new Pier 400 terminal. The LAHD would perform periodic inspections to ensure that this measure was being followed.
Responsible Parties	Proposed Project operator; LAHD.
Residual Impacts	Overall, the risk of an oil spill is considered significant. While applicant-proposed Project design measures and implementation of this measure would be expected to effectively limit offloading spills to a less than significant level, the risk of an oil spill in Port waters and in transit from foreign ports remains sufficiently high. There is no additional feasible mitigation to reduce this impact, and therefore, the potential risk would be considered significant and unavoidable.
MM RISK-2.1b: Quick-Release Couplings.	
Measure	Loading arms shall be equipped with USCG-approved quick-release couplings. A crude oil flow control system shall be interlocked at the coupling that will automatically stop flow prior to disconnection.
Timing	Prior to and during Project operations.
Methodology	The project applicant shall include specifications for these couplings in the proposed Project design. The LAHD shall review the design plans and periodically inspect to ensure the presence of the couplings during operations.
Responsible Parties	Project applicant; LAHD.
Residual Impacts	Overall, the risk of an oil spill is considered significant. While applicant-proposed Project design measures and implementation of this measure would be expected to effectively limit offloading spills to a less than significant level, the risk of an oil spill in Port waters and in transit from foreign ports remains sufficiently high. There is no additional feasible mitigation to reduce this impact, and therefore, the potential risk would be considered significant and unavoidable.