3.12

RISK OF UPSET/HAZARDOUS MATERIALS

3.12.1 Introduction

3.12.2 Environmental Setting

3.12.3 Applicable Regulations

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)

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

California Pipeline Safety Act of 1981

Overview of California Pipeline Safety Regulations

Oil Pipeline Environmental Responsibility Act (Assembly Bill 1868)

Area Contingency Plan

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

Hazardous Waste Control Law (California Health and Safety Code, Chapter 6.5 and California Code of Regulations Title 22, Division 4.5)

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)

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

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

Port of Los Angeles Risk Management Plan

3.12.4 Impacts and Mitigation Measures

3.12.4.3 Impacts and Mitigation

3.12.4.3.1 Proposed Project

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

		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.

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.

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.

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~~ the 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. All vessels visiting the proposed terminal after 2010 would be required to be double-bottom or double-sided vessels, and only double-hulled vessels would be allowed starting in 2015.

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	$3.12x10^{-4}$	$4.02x10^{-2}$	24.8	$4.59x10^{-2}$	21.8	$6.27x10^{-2}$	15.9
Small Spill	$7.80x10^{-5}$	$1.01x10^{-2}$	99	$1.15x10^{-2}$	87	$1.57x10^{-2}$	64
10 percent Loss of Cargo (250,000 bbl)	$2.73x10^{-4}$	$3.52x10^{-3}$	284	$4.01x10^{-3}$	249	$5.49x10^{-3}$	182
30 percent Loss of Cargo (750,000 bbl)	$2.73x10^{-5}$	$3.52x10^{-3}$	284	$4.01x10^{-3}$	249	$5.49x10^{-3}$	182
100 percent Loss of Cargo (2,500,000 bbl)	$2.34x10^{-5}$	$3.02x10^{-3}$	331	$3.44x10^{-3}$	291	$4.70x10^{-3}$	213
Double Hulled Vessels		**2010**		**2015**		**2025-2040**	
Allisions, collisions, and groundings	$3.12x10^{-4}$	$4.02x10^{-2}$	24.8	$4.59x10^{-2}$	21.8	$6.27x10^{-2}$	15.9
Small Spill	$1.56x10^{-5}$	$2.01x10^{-3}$	497	$2.29x10^{-3}$	436	$3.14x10^{-3}$	319
10 percent Loss of Cargo (250,000 bbl)	$5.46x10^{-6}$	$7.04x10^{-4}$	1,420	$8.03x10^{-4}$	1,246	$1.10x10^{-3}$	911
30 percent Loss of Cargo (750,000 bbl)	$5.46x10^{-6}$	$7.04x10^{-4}$	1,420	$8.03x10^{-4}$	1,246	$1.10x10^{-3}$	911
100 percent Loss of Cargo (2,500,000 bbl)	$4.68x10^{-6}$	$6.04x10^{-4}$	1,656	$6.88x10^{-4}$	1,454	$9.41x10^{-4}$	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	$4.60x10^{-4}$	$5.93x10^{-2}$	16.9	$6.76x10^{-2}$	14.8	$9.25x10^{-2}$	10.8
Oil Spill (any size)	$1.15x10^{-4}$	$1.48x10^{-2}$	67	$1.69x10^{-2}$	59	$2.31x10^{-2}$	43
Small Oil Spill	$1.15x10^{-4}$	$1.48x10^{-2}$	68	$1.69x10^{-2}$	59	$2.31x10^{-2}$	43
Moderate Oil Spill (238-1,200 bbl)	$2.30x10^{-7}$	$2.97x10^{-5}$	33,704	$3.38x10^{-5}$	29,577	$4.62x10^{-5}$	21,631
Large Oil Spill (>1,200 bbl)	$1.15x10^{-8}$	$1.48x10^{-6}$	674,082	$1.69x10^{-6}$	591,541	$2.31x10^{-6}$	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.

Figure 3.12-9. Risk Matrix of Crude Oil Tanker Spills – 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 (>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.

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 $6.90x10^{-8}$/yr (once every 14,500,000 years) in 2010 to $1.38x10^{-7}$/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.

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.

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	4.60x10^{-4}	5.93 x10^{-2}	16.9	6.76 x10^{-2}	14.8	9.25 x10^{-2}	10.8
Oil Spill (any size)	2.30 x10^{-5}	2.97 x10^{-3}	337	3.38 x10^{-3}	296	4.62 x10^{-3}	216
Small Oil Spill	2.30 x10^{-5}	2.96 x10^{-3}	338	3.37 x10^{-3}	296	4.61 x10^{-3}	217
Moderate Oil Spill (238-1,200 bbl)	4.60 x10^{-8}	5.93 x10^{-6}	168,520	6.76 x10^{-6}	147,885	9.25 x10^{-6}	108,155
Large Oil Spill (>1,200 bbl)	2.30 x10^{-9}	2.97 x10^{-7}	3,370,408	3.38 x10^{-7}	2,957,705	4.62 x10^{-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.

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~~ the 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

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.

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.

MM RISK-2.1c: Oil Spill and Eelgrass Habitat. If there is an oil spill event in the marine environment, an assessment of eelgrass habitat will be conducted by a qualified biologist and appropriate coordination will be undertaken with NMFS to ensure appropriate mitigation consistent with the Southern California Eelgrass Mitigation Policy.

Residual Impacts

While applicant-proposed Project design and implementation of **MM 4I-2**, **MM RISK-2.1a,** ~~and~~ **MM RISK-2.1b**, and **MM RISK-2.1c** 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**, and **MM RISK-2.1c**.

Residual Impacts

While applicant-proposed Project design and implementation of **MM 4I-2**, **MM RISK-2.1a**, ~~and~~ **MM RISK-2.1b**, and **MM RISK-2.1c** 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	23,010 ~~20,650~~	42/0.75	740	FBE or Pritec®	API 5L X-56	ERW
2a. Tank Farm Site 2 to South KMEP pipeline	New	2,025 ~~1,800~~	36/0.375	740	FBE or Pritec®	API 5L X-56	ERW
2b. Tank Farm Site 2 to North KMEP pipeline	New	1,900 ~~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	11,200 ~~14,000~~	36/0.375	740	FBE or Pritec®	API 5L X-52	ERW
4. Site A to Valero Refinery	New	6,420 ~~7,200~~	24/0.375	740	FBE or Pritec®	API 5L X-52	ERW
5. Site A to 16" Plains Pipeline	New	990 ~~1,000~~	16/0.375	740	FBE or Pritec®	API 5L X-52	ERW
6. South KMEP pipeline to ExxonMobil[3]	1994	2,200 ~~3,900~~	36/0.438	740	FBE	API 5L X-65	DSAW
7. North KMEP pipeline to Mormon Island[3]	1994	3,900 ~~2,300~~	36/0.720	740	FBE/ PROTEGOL®	API 5L X-65	DSAW

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	$6.17x10^{-5}$ ~~$5.54 x10^{-5}$~~	$1.24x10^{-5}$ ~~$1.11x10^{-5}$~~	$4.93x10^{-5}$ ~~$4.42 x10^{-5}$~~	$8.67x10^{-7}$ ~~$7.78x10^{-7}$~~
2a. Tank Farm Site 2 to South KMEP pipeline	0.0142	$5.43x10^{-6}$ ~~$4.82 x10^{-6}$~~	$1.09x10^{-6}$ ~~$9.69 x10^{-7}$~~	$4.34x10^{-6}$ ~~$3.86 x10^{-6}$~~	$1.09x10^{-7}$ ~~$9.69x10^{-8}$~~
2b. Tank Farm Site 2 to North KMEP pipeline	0.0142	$5.09x10^{-6}$ ~~$4.82 x10^{-6}$~~	$1.02x10^{-6}$ ~~$9.69 x10^{-7}$~~	$4.07x10^{-6}$ ~~$3.86 x10^{-6}$~~	$1.02x10^{-7}$ ~~$9.69x10^{-8}$~~
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	$3.00x10^{-5}$ ~~$3.75x10^{5}$~~	$6.03x10^{-6}$ ~~$7.54 x10^{-6}$~~	$2.40x10^{-5}$ ~~$3.00x10^{5}$~~	$6.03x10^{-7}$ ~~$7.54x10^{-7}$~~
4. Site A to Valero Refinery	0.0142	$1.72x10^{-5}$ ~~$1.93 x10^{-5}$~~	$3.46x10^{-6}$ ~~$3.88 x10^{-6}$~~	$1.38x10^{-5}$ ~~$1.54x10^{-5}$~~	$3.46x10^{-7}$ ~~$3.88x10^{-7}$~~
5. Site A to 16" Plains Pipeline	0.0156	$2.92x10^{-6}$ ~~$2.95 x10^{-6}$~~	$5.87x10^{-7}$ ~~$5.93 x10^{-7}$~~	$2.33x10^{-6}$ ~~$2.36 x10^{-6}$~~	$4.69x10^{-7}$ ~~$4.74x10^{-7}$~~
6. South KMEP pipeline to ExxonMobil[1]	0.728	$3.03x10^{-4}$ ~~$5.37x10^{-4}$~~	$6.09x10^{-5}$ ~~$1.08x10^{-4}$~~	$2.42x10^{-4}$ ~~$4.30x10^{-4}$~~	$6.09x10^{-6}$ ~~$3.24x10^{-5}$~~
7. North KMEP pipeline to Mormon Island[1]	0.728	$5.37x10^{-4}$ ~~$3.17 x10^{-4}$~~	$1.08x10^{-4}$ ~~$6.37 x10^{-5}$~~	$4.30x10^{-4}$ ~~$2.53 x10^{-4}$~~	$3.24x10^{-5}$ ~~$6.37x10^{-6}$~~

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	23,010 ~~20,650~~	100,000	1.24×10^{-5} ~~1.11×10^{-5}~~	275~~247~~	2	3,608~~3,850~~	SPB[2] waters
2a. Tank Farm Site 2 to South KMEP pipeline	2,025 ~~1,800~~	45,000	1.09×10^{-6} ~~9.69×10^{-7}~~	2,444~~2,173~~	5	6,194~~5,923~~	Industrial Land
2b. Tank Farm Site 2 to North KMEP pipeline	1,900 ~~1,800~~	85,000	1.02×10^{-6} ~~9.69×10^{-7}~~	2,293~~2,173~~	5	9,377~~9,256~~	Industrial Land
2c. Connection to ExxonMobil SW Terminal	100	85,000	5.38×10^{-8}	121	5	7,204	Industrial Land
3. Mormon Island to Site A	11,200 ~~14,000~~	45,000	6.03×10^{6} ~~7.54×10^{-6}~~	13,519 ~~16,899~~	5	17,269 ~~20,649~~	Land, East Basin Channel
4. Site A to Valero Refinery	6,420 ~~7,200~~	45,000	3.46×10^{-6} ~~3.88×10^{-6}~~	3,371~~3,781~~	5	7,121~~7,531~~	Land, Dominguez Channel
5. Site A to 16" Plains Pipeline	990 ~~1,000~~	20,000	5.87×10^{-7} ~~1.46×10^{-6}~~	224~~226~~	5	1,890~~1,893~~	Industrial Land
6. South KMEP pipeline to ExxonMobil[3]	2,200 ~~3,900~~	85,000 ~~45,000~~	6.09×10^{-5} ~~1.08×10^{-4}~~	2,637 ~~4,525~~	5	9,720 ~~8,275~~	Industrial Land
7. North KMEP pipeline to Mormon Island[3]	3,900 ~~2,300~~	45,000 ~~85,000~~	1.08×10^{-4} ~~6.37×10^{-5}~~	4,525 ~~2,757~~	5	8,275 ~~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~~17,269 bbl (~~867~~ 725 thousand gallons) to approximately 1,~~893~~ 890 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.

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~~ 3,600 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.

Figure 3.12-11. Risk Matrix for Pipeline Crude Oil Spills into 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 (> 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.

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~~16,000 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~~17,269 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.

3.12.4.3.2 No Federal Action/No Project Alternative

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	3.12x10^{-4}	7.39x10^{-2}	13.5	7.39x10^{-2}	13.5	7.39x10^{-2}	13.5
Small Spill	7.80x10^{-5}	1.85x10^{-2}	54	1.85x10^{-2}	54	1.85x10^{-2}	54
10 percent Loss of Cargo (70,000 bbl)	2.73x10^{-5}	6.47x10^{-3}	155	6.47x10^{-3}	155	6.47x10^{-3}	155
30 percent Loss of Cargo (210,000 bbl)	2.73x10^{-5}	6.47x10^{-3}	155	6.47x10^{-3}	155	6.47x10^{-3}	155
100 percent Loss of Cargo (700,000 bbl)	2.34x10^{-5}	5.55x10^{-3}	180	5.55x10^{-3}	180	5.55x10^{-3}	180
Double Hulled Vessels		**2010**		**2015**		**2025-2040**	
Allisions, collisions, and groundings	3.12x10^{-4}	7.39x10^{-4}E-02	13.5	7.39x10^{-2}	13.5	7.39x10^{-2}	13.5
Small Spill	1.56x10^{-5}	3.70x10^{-4}E-03	270	3.70x10^{-3}	270	3.70x10^{-3}	270
10 percent Loss of Cargo (70,000 bbl)	5.46x10^{-6}	1.29x10^{-4}E-03	773	1.29x10^{-3}	773	1.29x10^{-3}	773
30 percent Loss of Cargo (210,000 bbl)	5.46x10^{-6}	1.29x10^{-4}E-03	773	1.29x10^{-3}	773	1.29x10^{-3}	773
100 percent Loss of Cargo (700,000 bbl)	4.68x10^{-6}	1.11x10^{-4}E-03	902	1.11x10^{-3}	902	1.11x10^{-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

		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)			**>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	$4.60x10^{-4}$	$1.09x10^{-1}$	9.2	$1.09x10^{-1}$	9.2	$1.09x10^{-1}$	9.2
Oil Spill (any size)	$1.15x10^{-4}$	$2.73x10^{-2}$	37	$2.73x10^{-2}$	37	$2.73x10^{-2}$	37
Small Oil Spill	$1.15x10^{-4}$	$2.72x10^{-2}$	37	$2.72x10^{-2}$	37	$2.72x10^{-2}$	37
Moderate Oil Spill (238-1,200 bbl)	$2.30x10^{-7}$	$5.45x10^{-5}$	18,345	$5.45x10^{-5}$	18,345	$5.45x10^{5}$	18,345
Large Oil Spill (>1,200 bbl)	$1.15x10^{-8}$	$2.73x10^{-6}$	366,905	$2.73x10^{-6}$	366,905	$2.73x10^{6}$	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				
		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)	**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~~ the 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.

3.12.4.3.3 Reduced Project Alternative

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				
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)			**>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.

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.

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

		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)	**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.

Assuming that ~~a majority of~~ the vessels that would visit the ~~r~~Reduced ~~p~~Project ~~a~~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. All vessels visiting the terminal after 2010 would be required to be double-bottom or double-sided vessels, and only double-hulled vessels would be allowed starting in 2015.

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 6.90×10^{-4}/yr (once every 1,450 years) in 2010 to 9.20×10^{-4}/yr (once every 1,090 years) in 2025 onward. Large spill frequencies would range from 6.90×10^{-8}/yr (once every 14,500,000 years) in 2010 to 9.20×10^{-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				
		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 3.12-17 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, MM RISK-2.1a,** ~~and~~ **MM RISK-2.1b**, and **MM RISK-2.1c.**

Residual Impacts

While applicant-proposed reduced project alternative design and implementation of **MM 4I-2, MM RISK-2.1a,** ~~and~~ **MM RISK-2.1b**, and **MM RISK-2.1c** 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**, and **MM RISK-2.1c.**

Residual Impacts

While applicant-proposed reduced project alternative design and implementation of **MM 4I-2**, **MM RISK-2.1a,** ~~and~~ **MM RISK-2.1b**, and **MM RISK-2.1c** 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.

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.

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.

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 <u>**MM RISK-2.1c**: Oil Spill and Eelgrass Habitat</u> **MM 4I-2** **MM RISK-2.1a** **MM RISK-2.1b** <u>**MM RISK-2.1c**</u>	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 RISK-2.1c** **MM 4I-2** **MM RISK-2.1a** **MM RISK-2.1b** **MM RISK-2.1c**	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	CEQA: Less than significant impact	Mitigation not required	CEQA: 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)				
	public and environment.	NEPA: Less than significant impact	Mitigation not required	NEPA: Less than significant impact
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

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.

MM RISK-2.1c: Oil Spill and Eelgrass Habitat.	
Measure	If there is an oil spill event in the marine environment, an assessment of eelgrass habitat will be conducted by a qualified biologist and appropriate coordination will be undertaken with NMFS to ensure appropriate mitigation consistent with the Southern California Eelgrass Mitigation Policy.
Timing	During Project operations.
Methodology	In the event of an oil spill that reaches an eelgrass bed in the Port, a post-spill survey of the affected eelgrass bed and a reference (unaffected) eelgrass bed shall be completed within 30 days and the results shall be sent to NMFS, CDFG, and USFWS. The reference eelgrass bed shall be located within Southern California, and within the Port if possible. The actual and relative area of impact shall be determined from this survey. An additional survey of the affected and reference areas shall be completed after 12 months to insure that impacts attributable to the oil spill have not exceeded the Southern California Eelgrass Mitigation Policy de minimis threshold of 10 square meters, or to document recovery of the eelgrass bed. Compensatory mitigation may be required should the post-spill or 12 month survey demonstrate loss and/or degradation of eelgrass greater than the de minimis thresholds pursuant to the Southern California Eelgrass Mitigation Policy (e.g., loss of > 10 square meters and/or 25 percent reduction in density). Compensatory mitigation shall be determined on a case-by-case basis in consultation with the resource agencies consistent with the Eelgrass Mitigation Policy.
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.