C.11 SYSTEM SAFETY AND RISK OF UPSET

This section addresses the baseline environmental conditions and describes the impacts related to safety and risk for the proposed pipeline (Sections C.11.1 through C.11.7). It then addresses the impacts of the alternative pipeline segments (Section C.11.8), and the No Project Alternative (C.11.9).

C.11.1 ENVIRONMENTAL BASELINE AND REGULATORY SETTING

This section addresses on the environmental baseline and regulatory setting for both the proposed pipeline and the alternative route segments. The following topics are discussed:

- Description of the physical environment in terms of existing safety conditions along the proposed pipeline's right-of-way (ROW)
- Ways in which that environment could be affected by the proposed project
- Ways that the environment could affect the proposed project (e.g., earthquakes)
- The physical properties of the petroleum products that will be transported by the proposed pipeline, and how those properties relate to dispersion of products if spilled in urban areas or into waterways
- Existing emergency response capabilities within the communities that would be affected by the pipeline
- Federal, State, and local laws and regulations that would apply to the proposed project and regulate its operation.

In general, the study area boundaries for the safety analysis are limited to the areas around the pipeline (and alternative segment) ROW and station facilities that could be affected by any accidental or routine impacts. According to the American Petroleum Institute, almost two-thirds of all damage from pipeline accidents occurs within 150 feet of the pipeline (IIII, 1995).

C.11.1.1 Existing Safety Conditions along the ROW

Existing Pipelines. The southern part of the Los Angeles basin has a dense network of pipelines, due to the presence of many refineries in the Wilmington/Carson area. These refineries are provided with crude oil produced in the San Joaquin Valley and offshore Santa Barbara Channel, and after they refine the crude oil, refined products are shipped to various destinations via pipeline, truck, and train. Figure C.11-1 shows the network of hazardous liquids pipelines located in this portion of the Los Angeles basin. Regarding this map, two facts should be noted:

- This map shows the streets that contain one or more hazardous liquids pipelines. Where a dark line indicates that a pipeline is present in a particular street, it is possible that more than one pipeline is present it the street.
- The map does not show the thousands of natural gas pipelines that cross this area. Small natural gas pipelines (2- or 4-inches in diameter) exist in almost every street in the area, because they serve business and residential natural gas customers.

Table C.11-1 lists all of the hazardous liquids pipelines that are located in the same streets as the proposed pipeline. Table C.11-2 lists hazardous liquids pipelines that are co-located with the alternative route segments. Note that these tables show only where a pipeline is co-located with the proposed or alternative route segments in the same street. The locations of the numerous pipeline crossings at intersections are not listed. These tables make it clear that many of the streets in which the proposed and alternative pipeline segments would be located already contain at least one hazardous liquid pipeline. See also Table C.10-5 which lists other utilities in some of the streets through which the proposed and alternative segments would pass.

Table C.11-1 Hazardous Liquids Pipelines Located in Same ROW as Proposed SFPP Pipeline

Street	Location	Pipeline Operator	Pipeline Type/Size
Del Amo Blvd.	Wilmington Ave. to Alameda St.	Chevron Mobil M-145	20-inch petroleum products 8-inch petroleum products
	Watson Station to Rancho Way	SFPP	16-inch petroleum products 24-inch petroleum products 10-inch products
Laurel Park Road	Rancho Way to Victoria St.	SCE	Two 16-inch fuel oil
Victoria Street	Santa Fe Avenue to 710 Fwy	SFPP	16-inch petroleum products
Gordon Street	Long Beach Blvd. to White Ave.	SFPP	16-inch petroleum products
White Avenue	At Gordon Street	SFPP	16-inch petroleum products
DeForest Avenue	DeForest Park to South Street	SFPP	16-inch petroleum products
South Street	DeForest to Lime Ave.	none	none
	Lime Ave. to Paramount Blvd.	Unocal	6-inch idle gasoline
Paramount Blvd.	South Street to Artesia Blvd.	GATX Arco Powerine	8-inch and 10-inch crude/gas oil 20-inch idle 8-inch crude/gas oil
Artesia Blvd.	Paramount Blvd. to Lakewood Blvd.	Golden West Refining Powerine Unocal	8-inch fuel oil 6-inch crude/gas oil 10-inch crude [unknown]
	Lakewood Blvd. to Bixby Ave.	Golden West Refining Powerine Unocal	8-inch fuel oil 6-inch crude/gas oil 10-inch crude [unknown]
	Woodruff Ave. to Studebaker Road	DFSP Brea	10-inch jet fuel Abandoned gasoline line
Studebaker Road	Artesia Blvd. to 166th Street	DFSP Brea	10-inch jet fuel Abandoned gasoline pipeline
166th Street	Studebaker Road to Norwalk Blvd.	SFPP DFSP	16-inch petroleum products 10-inch, Jet Fuel
Norwalk Blvd.	166th Street to Norwalk Station	SFPP DFSP Brea	16-inch petroleum products 10-inch jet fuel Crude pipeline

Source: CSFM and SFPP Maps

Contaminated Sites. The area through which the proposed pipeline would pass includes numerous contaminated sites due to the industrial character of the area. These sites are identified and described in Section C.5, Environmental Contamination. That section also includes a description of the contamination at and surrounding the DFSP Norwalk Tank Farm.

Figure C.11-1

Table C.11-2 Hazardous Liquids Pipelines Located in Same ROW as Alternative Route Segments

Street	Location	Pipeline Operator	Pipeline Type/Size
SANTA FE ALTERNATIVE			
Santa Fe Avenue	Alameda St. to Victoria St.	GATX	6-inch gasoline, diesel, jet fuel
CHERRY ALTERNATIVE			
Cherry Avenue	South St. to Artesia Blvd.	Arco/GATX Golden West Refining Unocal	Line 80 8-inch fuel oil 10-inch crude [unknown]
Artesia Blvd.	Cherry Ave. to Paramount Blvd.	Golden West Refining Unocal	8-inch fuel oil 10-inch crude [unknown]
PARAMOUNT ALTERNATIVE			
Garfield Avenue	Artesia Blvd. to Alondra Blvd.	Arco/GATX	Line 80
Alondra Blvd.	Garfield Ave. to Lakewood Blvd.	none	none
ALONDRA ALTERNATIVE			
Lakewood Blvd.	Artesia Blvd. to Alondra Blvd.	Arco	Line 34
Alondra Blvd.	Lakewood Blvd. to Eucalyptus Ave.	none	none
	Eucalyptus Ave. to California Ave.	Chevron	8-inch refined petroleum products 8-, 10-, and 12-inch crude 10-inch natural gas
	Chicago to Norwalk Blvd.	Chevron Brea Powerine	8-inch refined petroleum products 8-, 10- and 12- inch crude 10-inch natural gas Crude oil 6-inch and 8-inch crude/gas oil
BELLFLOWER RAIL ALTERNATIVE			
Lakewood Blvd.	Artesia Blvd. to railroad ROW	Arco	Line 34
Railroad ROW	Lakewood Blvd. to Artesia Blvd.	none	none
ARTESIA ALTERNATIVE			
Artesia Blvd.	Studebaker Road to Norwalk Blvd.	none	none
Norwalk Blvd.	Artesia Blvd. to 166^{th} Street	Brea	Crude oil
SHOEMAKER ALTERNATIVE			
Alondra Blvd.	Norwalk Blvd. to Shoemaker Ave.	DFSP Chevron Chevron	8-inch jet fuel 8-inch refined products 8- , 10- and 12-inch crude oil lines
Shoemaker Ave.	Alondra Blvd. to Excelsior Dr.	none	none

Source: CSFM and SFPP Maps

C.11.1.2 Existing Response Capabilities in the ROW Area

C.11.1.2.1 *General Response Capabilities*

This section summarizes the emergency response capabilities that currently exist along the pipeline ROW. Response capabilities for pipeline incidents exist within industry and the public agencies. Spill response plans are required by law (see Section C.11.1.3), and have been developed by the other petroleum industry pipeline operators in the area, including ARCO, Chevron, and Unocal (now Tosco).

Los Angeles County uses Hazardous Materials Emergency Response Area Plans (Area Plans) as a basis for planning and responding to pipeline spills and hazardous materials incidents. Many of the cities along the pipeline ROW also have city Hazardous Materials Management Plans (see Socioeconomics and Public Services, Section C.10.1.2).

Primary responsibility for public agency spill response lies with the Fire Departments within each county and city jurisdiction. Fire Departments situated along the proposed pipeline route are discussed in Section C.10.1 of this document. Also, a number of private spill emergency response contractors are available to assist with the clean-up of spills.

Response agencies use the Incident Command System for managing response to pipeline spills. This allows effective integration of response personnel from multiple agencies and industry. The mutual aid systems used by the two counties are based on the California Disaster and Civil Defense Master Mutual Aid Agreement. The State Office of Emergency Services (OES) responds to mutual aid requests placed through the Operational Areas. The OES assists in locating and providing additional equipment or personnel by drawing on available state and local resources. Mutual aid agreements established within each county are outlined in the respective Area Plans.

In summary, since the general area within which the proposed and alternative routes are located is used by a number of petroleum products, crude oil, and natural gas shippers, considerable equipment and manpower resources are in place to implement a large scale clean-up operation. All sections of the route are readily accessible. One benefit of collocation of utilities in one corridor is the availability of significant resources to each utility if an accident occurs (disadvantages of co-location are discussed in Section C.11, Public Utilities and Energy).

C.11.1.2.2 *SFPP's Existing Spill Response Plan*

SFPP, as an operator of a system of petroleum products pipelines in the southwestern U.S., is required to develop and maintain spill response plans in compliance with State and Federal laws. Following is a summary of the information contained in SFPP's existing plans, as required by the U.S. Department of Transportation (DOT) under 49CFR194, Response Plans for Onshore Oil Pipelines and by the California Code of Regulations (CCR) Title 14, Division 1, Sections 815-819. The portions of the document are discussed summarized in Appendix C:

- Core Oil Spill Response Plan, including Response Strategies for 5 generic spill/leak scenarios
- Line Section Oil Spill Response Appendices (relevant sections for Watson Station and Colton Terminal)
- Crisis Management Plan
- California Department of Fish and Game, Office of Oil Spill Prevention and Response (OSPR) Plan
- California Marine Waters Appendices to OSPR.

It should be noted that, according to SFPP's OSPR Plan (page 4), SFPP has existing contracts with several spill response cooperative organizations that can respond to both onshore and marine spills: Clean Bay, ACTI, and AllWaste.

C.11.1.3 Applicable Regulations, Guidelines, and Standards

Many regulations and standards exist to assure the safe operation of pipelines carrying hazardous liquids. These include mandatory rules and regulations (with agency enforcement provisions) and industry-accepted guidelines. These laws and regulations are detailed in Appendix C; they include the following.

Federal Laws and Regulations:

- U.S. Department of Transportation (US DOT) regulations in 49 CFR Part 195, "Transportation of Hazardous Liquids by Pipeline"
- Hazardous Liquid Pipeline Safety Act of 1979 (49 U.S.C. 2004)
- 40 CFR Parts 109, 110, 112, 113, and 114, (related to the need for "Oil Spill Prevention Control & Countermeasures (SPCC) Plans")
- Public Law 101-380 (H.R.) promulgated in response to the Oil Pollution Act (OPA) of 1990.
- Oil Pollution Act of 1990 (OPA). Public Law 101-380 (H.R.): August 18, 1990

California Laws and Regulations:

- Oil Pipeline Environmental Responsibility Act (AB 1868)
- Lempert-Keene-Seastrand Oil Spill Prevention and Responses (OSPR) Act (§8670 Gov. Code)
- California Pipeline Safety Act of 1981
- Other California Pipeline Safety Regulations: State of California Regulations Part 51010 through 51018 of the Government Code.

County, City, and Local Ordinances. Many local governments have existing standard ordinances applicable to oil and other pipelines that cross their jurisdictions.

Los Angeles County. Prior to issuance of any excavation permit for construction or installation of any pipeline for transmission of flammable liquids or gases which are heavier than air, approval shall be obtained from the County Fire Warden.

Other Recognized National Codes and Standards. Listed below are some of the codes and standards used in the design and installation of pipelines. Some of these are adopted in the Federal regulations discussed above.

- Safety and Corrosion Prevention Requirements - ASME, NACE, ANSI
- Fire and Explosion Prevention and Control, National Fire Protection Association (NFPA) Standards

C.11.2 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This section discusses potential system safety impacts associated with the routine and upset conditions related to construction and operation of the proposed project. Information is presented outlining significance criteria, potential hazard scenarios, probabilities and consequences associated with the hazard scenarios, a summary of the impacts, and the proposed mitigation measures. Cumulative impacts and mitigation measures are also addressed, and a summary of unavoidable significant impacts is provided.

Much of the technical information supporting this section is presented in Appendix C, System Safety Technical Appendix. Appendix C is summarized herein, but more detailed information and calculations are available in that appendix.

C.11.2.1 Definition of Significance Criteria

The study area for the Proposed Project and alternative segments includes the land and population surrounding the entire proposed pipeline route. As suggested by the CEQA guidelines, and based on EPA Guidelines for assessing hazards for impact classifications, system safety hazards can be classified by the severity of the impacts and frequency of their occurrence as indicated in Table C.11-3. The severity classification describes the level of public risk for a fatality, injury, or spill size. There are no actual relationships between columns 2 and 3 in Table C.11-3; these two columns present two separate sets of thresholds. Table C.11-4 is a matrix that describes the relationship between the frequency of a hazard occurring and the severity of that hazard's consequence. The shaded areas in Table C.11-4 show the combinations of accident likelihood and severity that have been defined as significant with respect to public safety.

In the event of an pipeline spill, impacts could affect public health and safety, as well as potentially other resources within the environment. For those other resources, the significance of impacts due to pipeline spills is addressed in the section covering the affected issue areas (e.g., spill impacts to biological resources are identified in Section C.3). The matrix described above has only been used to determine whether or not a pipeline spill has the potential for significant impacts to public health and safety.

C.11.2.2 Applicant Proposed Measures

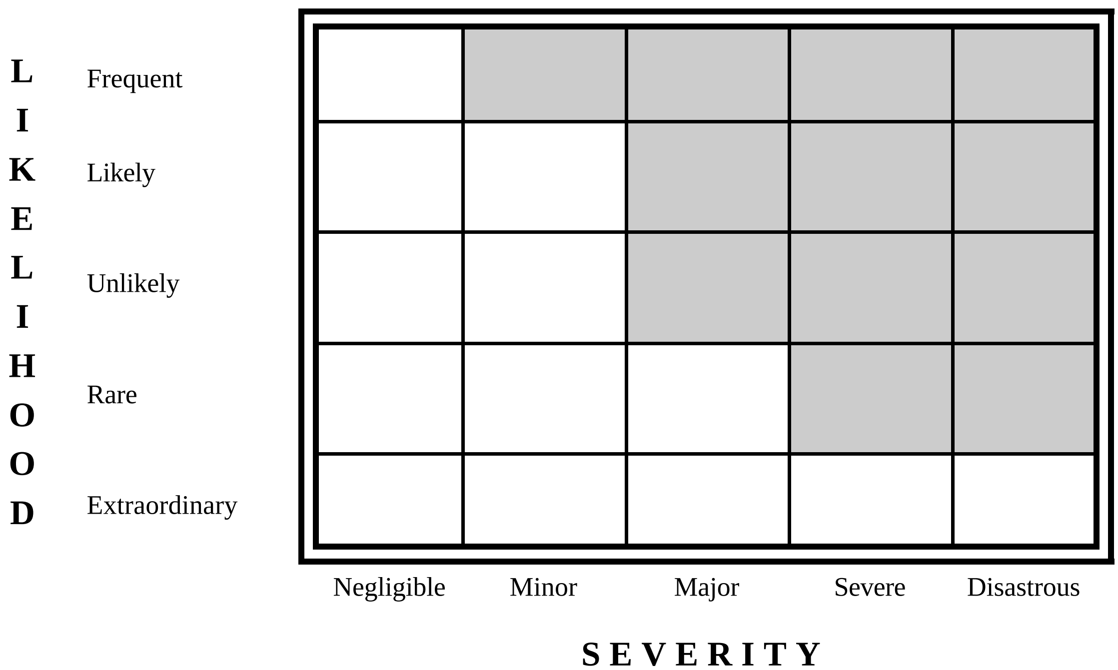
SFPP has proposed to include several safety and risk reduction measures in its design of the proposed project. Some of these measures are required by law; however they are listed here to clarify the various features of the project that will result in safety improvements. The most significant component of SFPP's safety system is its System Control and Data Acquisition (SCADA) system; that system is briefly described below; a more detailed description is included in Appendix C. Also listed below are other safety measures and design features that SFPP proposes to implement to enhance the safety of the system.

Table C.11-3 Severity and Frequency Classifications

	Classification	Description of Public Safety Hazard	Spill Size
SEVERITY	Negligible	No significant risk to the public, with no minor injuries.	Less than 10 bbl (420 gal)
	Minor	Small level of public risk, with at most a few minor injuries.	10 - 238 bbl (420 - 10,000 gal)
	Major	Major level of public risk with up to 10 severe injuries.	238 - 2,380 bbl (10,000 - 100,000 gal)
	Severe	Sever public risk with up to 100 severe injuries or up to 10 fatalities.	2,380-357,142 bbl (100,000 - 15,000,000 gal)
	Disastrous	Disastrous public risk involving more than 100 severe injuries or more than 10 fatalities.	Greater than 357,142 bbl (15,000,000 gal)

Likelihood	Type	Frequency	Description
LIKELIHOOD	Extraordinary	Less than once in one million years.	An event whose occurrence is extremely unlikely.
	Rare	Between once in ten thousand years and once in one million years.	An event which almost certainly would not occur during the project lifetime.
	Unlikely	Between once in a hundred and once in ten thousand years.	An event which is not expected to occur during the project lifetime.
	Likely	Between once a year and once in one hundred years.	An event which probably would occur during the project lifetime.
	Frequent	Greater than once a year.	An event which would occur more than once a year on average.

Table C.11-4 Hazard Scenario Risk Ranking Matrix



Note: Shaded area denotes significant impact.

C.11.2.2.1 *SFPP's SCADA System*

SFPP's existing SCADA system was installed between 1985 and 1989, and allows SFPP to operate and monitor its entire pipeline system from seven hubs (centers of pipeline operation) and provides system-wide monitoring capability from the Orange Control Center. The existing leak detection system is based on computerized surveillance of volumetric line balance and two parameter alarms: pressure and flow deviations. SFPP states that, under ideal conditions, this system can alert operators within one minute of a leak as small as 50 barrels per minute. Under less than ideal conditions, a leak of 50 barrels per hour could take 2 to 3 minutes to detect (SFPP, 11/18/97).

SFPP is planning to install a new SCADA system on its entire pipeline system, starting in mid-1998 and finishing by the end of 1999. The new system will have all pipeline monitoring and control in SFPP's Orange County Control Center. Other enhancements to the system include:

- Use of system-wide satellite communications and back-up frame-relay routing capabilities
- Installation of an off-site strategic backup control center
- Increase in data transmission rates from once per minute to once every 5 seconds (resulting in higher data resolution and as a result, better leak detection performance).

The leak detection system will consist of 3 components: (1) volumetric balance, (2) flow difference monitoring, and (3) pressure/flow monitoring. The system will be able to detect a leak a small as 1% of flow in an hour. At the maximum flow rate for the proposed pipeline of approximately 8,500 barrels per hour, this would result in the ability to detect a leak as small as 85 barrels per hour (or 1.4 barrels per minute). Figure C.11-2 shows SFPP's generalized performance curve for leak detection.

C.11.2.2.2 *Other Safety Measures*

In addition to the SCADA system described above, SFPP has committed to implementation of the following measures to reduce the size or likelihood of a pipeline spill or leak. Many of these features are listed in SFPP's California Marine Waters Appendix to the Oil Spill Core Plan (Table 2-6, page 17).

- Pipeline operations are continuously monitored by a computerized SCADA system that alerts operators to unusual pipeline conditions (high or low pressure, low flow). Includes automatic high pressure shutdown at pump stations; operators at Watson Station and Controller can shut down the pipeline remotely based on monitoring of operations. All alarms are recorded and logged at the control center. SCADA system has back-up power from a diesel generator at the central control center in Orange and back-up power from an Uninterruptible Power Supply (UPS) at each of the critical stations and terminals.
- As part of the Carson to Norwalk Pipeline Project, six remotely-activated block valves will be installed along the new pipeline segment (two at each waterway crossing), one manually-operated valve at each of the Watson and Norwalk Stations, and two manually operated valves at the Industry Station. Valves will be protected from damage by heavy equipment; area around valves will be kept clear to minimize fire danger.
- The new pipe will have factory-installed coating of a polyethylene or polypropylene material. Field coating would be provided for all field weld joints to provide a continuous coating along the pipeline.

Figure C.11-2

- Standard operating procedures and operator training have been developed and provided; shutdown and start-up of pumps and pipeline system in an orderly manner is practiced
- If a natural event (e.g., earthquake) occurs, the line would be shut down and checked for damage prior to re-starting
- The new pipe will have a cathodic protection system and a regular monitoring program to evaluate the condition of coating by analysis of rectifier current history. This system will have a maintenance and inspection program. Also, a resistance-type probe will be used to monitor internal corrosion. Electrical resistance hand probes will also be used to detect large areas that may have incurred significant external coating failure.
- The pipeline route will be inspected by a regular line rider and/or aerial inspections.
- The integrity of the pipeline will be inspected by “smart pigs” (internal pipe inspection tools). The condition of the pipe and coating will also be inspected whenever an area around the pipe is excavated.
- When the line is shut down, static pressure monitoring will facilitate leak detection.
- Mainline block valves for the project would be electrically powered and can be remotely closed from the various manned control centers. Block valves would be inspected every six months to ensure proper operation (per regulation 49 CFR 195.420).
- All field welding would be performed by qualified welders to the specifications of, and in accordance with, all applicable State and municipal ordinances, rules, and regulations, and in accordance with SFPP certified welding procedures, API 1104 and the rules and regulations of the U.S. Department of Transportation.
- Every single pipeline weld would be radiographically (i.e., X-ray) inspected by a third-party licensed technician and reviewed by a certified company inspector. Radiographs would be recorded and interpreted for acceptability according to requirements of API 1104. All rejected welds would be repaired or replaced, as necessary, and re-radiographed until compliance is achieved. The X-ray reports, as well as a record indicating the location of welds, would be kept for the life of the project.
- State-of-the-art metallurgical specifications for pipe (API 5LX-X60-grade pipe, 0.312 pipeline wall thickness) would be used.
- Installation of a prominently-colored plastic strip in the backfill, warning excavators that a pipeline lies below.
- Hydrostatic testing would be performed after construction and prior to startup. Periodic testing would also be conducted as required by the California Pipeline Safety Act and the California Fire Marshal.

Oil Spill Response. SFPP has an Oil Spill Core Plan (OSCP) that applies to all of its operations in the western U.S. (described in detail in Appendix C). This plan will also apply to the Carson to Norwalk Pipeline, after it is installed. By law, SFPP must develop, implement, and maintain a comprehensive Spill Response Program, and it must train, drill, and maintain a well-equipped emergency response team capable of executing the program. SFPP must retain a qualified oil spill response contractor, and it must develop and maintain an Emergency Response Plan for all accident scenarios which could be associated with the pipeline with contents and format as specified by the State of California Oil Spill Prevention and Response (OSPR) Act of 1990. SFPP’s plan must be updated every three years. Specifics of that plan include are described in Appendix C; the provisions of the OSCP have been taken into account in the subsequent analysis of potential hazards associated with the Proposed Project.

C.11.3 IMPACT ANALYSIS AND HAZARD SCENARIOS

These analysis of potential safety impacts is complex, and requires consideration of the physical properties of the petroleum products to be shipped, as well as a variety of probability calculations. These issues are described in detail in Appendix C, System Safety and Risk of Upset Technical Appendix, and they are summarized below.

There are three primary hazard scenarios associated with the operation of petroleum products pipelines. These scenarios are: (1) pipeline leak, (2) pipeline rupture, and (3) fires or explosions resulting from leak or rupture. Pipeline leaks and ruptures are analyzed separately because very different failure frequencies exist between these two types of pipeline failure. Each of these scenarios is discussed below.

C.11.3.1 Pipeline Leak

Pipeline leaks most commonly result from corrosion, equipment failure (especially at valves and flanges), or third-party damage to the pipeline. Pipeline leaks are distinguished from ruptures by their lower spill rate; both leaks and ruptures can result in large volumes of products spilled.

SFPP's History of Pipeline Accidents

The California State Fire Marshal retains records of pipeline leaks and spills. Table C.11-5 lists leak or spill events on SFPP's existing Carson to Norwalk pipelines from 1973 to the present. The right column in this table demonstrates the most frequent causes of pipeline failure: equipment failure (valves and gaskets) and third-party damage.

Table C.11-5 SFPP Pipeline Leaks/Spills Between Carson and Colton since 1973*

Location	Date of Spill	Product	Barrels Lost	Barrels Recovered	Cause of Release
SFPP 20/24-inch Pipeline: Carson to Colton					
Norwalk Tank Farm (Los Angeles Co.)	4/22/94	Multi-product	unknown	unknown	Sweat leak on outgoing block valve gasket (24-inch line)
Nogales Ave & Valley Blvd: (Los Angeles Co.)	1/4/96	Diesel mix	unknown	none	Valley Block Valve leak (24-inch line)
Monte Vista Ave & Central Ave (San Bernardino Co.)	12/20/88	Unleaded gasoline	224	124	Railroad derailment: moving train car hit pipeline (20-inch)
SFPP 16-inch Pipeline: Norwalk to Colton					
Railroad tracks (Orange Co.)	9/26/85	Gasoline	9.4	9.1	Third party hit
½ mi east of La Habra Booster Station (Los Angeles Co.)	6/28/73	JP-4 (jet fuel)	1,703	none	Hit by bulldozer
Railroad St. & Nogales, City of Industry (Los Angeles Co.)	3/25/82	Diesel	378	none	Third party hit
Colton Station (San Bernardino Co.)	12/17/90	Turbine (Jet-A)	20	1	Manifold valve malfunctioned

* Source: California State Fire Marshal's Office of Pipeline Safety, 11/3/97

The first row in Table C.11-5 describes a pipeline leak on SFPP's system that occurred in 1994 at the Norwalk Station. A block valve on SFPP's 24-inch pipeline leaked, resulting in contamination of approximately one acre in the southeastern corner of the station. This leak (currently being remediated; see Section C.5) extends below six single-family homes on the southern border of the station. Because other leaks have occurred at the

Norwalk Station (from both SFPP and Military sources), the DFSP Norwalk is a state-regulated cleanup site under the jurisdiction of the Regional Water Quality Control Board (RWQCB) as lead agency since most of the contamination at the site is in the groundwater. The City of Norwalk, South Coast Air Quality Management District (SCAQMD), U.S. Environmental Protection Agency (EPA), and California Department of Toxic Substances Control (DTSC) are also involved. The tank farm clean up is being monitored by a Restoration Advisory Board (RAB) that includes residents of the areas surrounding the facility, as well as representatives from various government agencies, SFPP, and the military. [See Section C.5 (Environmental Contamination) for more detail on the sources of contamination and the cleanup effort that is underway.]

SFPP's Leak Detection System. As described in Section C.11.2.2 above, SFPP will be installing a new SCADA system on its entire pipeline system between July 1998 and December 1999. The new system will be able to detect a leak as small as 1% of flow in an hour. At the maximum flow rate for the proposed pipeline of approximately 8,500 barrels per hour, this would result in the ability to detect a leak as small as 85 barrels per hour (or 1.4 barrels per minute). The old system could detect a leak of 50 barrels per minute in 2 to 3 minutes, under ideal conditions.

Leak Detection at Stations. In addition to the pipeline leak detection system described above, SFPP has other safety equipment located at stations:

- Hydrocarbon vapor detection systems are installed at Watson, Industry, and Colton Stations (no hydrocarbon vapor detection is installed at Norwalk Station). Hydrocarbon systems at Watson and Colton include separate systems of several sensors around the burner and around the manifold area.

- Pressure gauges, temperature indicators, gravitometers for measuring specific gravity, and other instruments associated with the burners at Watson and Colton Stations.

Vapor Detection. SFPP also plans to install vapor detection devices and inspection wells at each new valve site along the proposed pipeline. These devices will allow regular monitoring of sub-surface conditions around each valve for the presence of Volatile Organic Compounds (VOCs), which if found, will initiate immediate remedial action to identify and arrest the source of any leakage and to clean up any contaminated soil (SFPP, 9/23/97).

Pipeline Leak Scenario. Given the detection limits of SFPP's proposed SCADA system, a leak smaller than 85 barrels per hour may not be detectable for a period of time. Therefore, it is possible that a leak of, for example, 50 barrels per hour (less than 1% of maximum hourly flow) at a remote location (e.g., at the block valve in the utility corridor west of the Los Angeles River) could go unnoticed for a week or more, resulting in a total leak volume of 1,200 barrels per day or 8,400 barrels (over 350,000 gallons) in a week. This type of leak should be detected by other means that SFPP has committed to implementing (e.g., hydrocarbon detectors at valve boxes, visual inspections, or field checks on SCADA system alarms). However, this size leak is considered to be possible based on the limits of the proposed leak detection system, and is used as the worst-cast scenario for this analysis.

Consequences of Pipeline Leak. A pipeline leak of 8,400 barrels (50 barrels per hour continuing for a week) could contaminate a significant area of soil, and depending on the depth to groundwater, could contaminate groundwater as well.

Probability of Pipeline Leak. The probability of occurrence for pipeline accidents is discussed in detail in Appendix C. Based on nationwide historic data, the proposed pipeline would not be expected to have a leak during the proposed 50-year life of the pipeline: the leak rate is predicted to be 1 every 100 years (or 0.50 leaks during the 50-year project life). The methodology used to calculate probabilities considers a variety of factors, including the size of the pipeline, coating type, SCADA system, and operating pressures and temperatures.

However, since SFPP has been operating pipelines in the area for about 45 years, a better indication of expected leaks on the proposed pipeline may be developed from evaluating the leak history on SFPP's operating pipelines in the area. This evaluation results in an anticipated 0.83 leaks anticipated in 50 years for the 13-mile pipeline (or one leak every 60 years).

The above methods used to calculate the probability of a pipeline spill provide results ranging from 0.50 to 1.24 spills in proposed project life. The figure of 0.50 leaks in 50 years is based on national data, and 0.83 leaks is based on SFPP's operating history of two of its existing pipelines between Carson and Colton. While this figure sounds low, it should be noted that the small number relates to the length of the pipeline, and that the spill data in Table C.11-5 represents 113 miles of pipelines.

Impact Conclusion. A leak of 8,400 barrels (the scenario where a valve could leak at 50 barrels per day for a week) is considered "Severe" in the classification system of Table C.11-3, and a frequency of 0.83 in 50 years (once in 60 years) is considered to be "Likely". Therefore, based on the risk ranking matrix (Table C.11-4), a leak is a significant impact (**Class I**).

C.11.3.2 Pipeline Rupture

Rupture Scenario. This hazard involves the unlikely event of a full rupture of the proposed products pipeline, resulting in a relatively high-volume flow of products from the pipeline. One of the most likely causes of a rupture would be a large earthquake in the vicinity of the pipeline ROW. It should be noted that recently installed pipelines (i.e., built after 1960) did not rupture in the recent Loma Prieta and Northridge earthquakes, and that pipeline rupture in the Northridge earthquake (in the City of San Fernando) occurred on a crude oil pipeline that was over 50 years old. However, because California has not experienced an earthquake larger than the Northridge or Loma Prieta earthquakes in recent years, the performance of newer pipelines in very large magnitude earthquakes has not been proven. Also, the proposed Carson to Norwalk Pipeline crosses the Newport-Inglewood Fault at its western end. This fault is considered to be capable of producing a large and very damaging earthquake (see Section C.6, Geology and Soils). Therefore, in this EIR we evaluate a full pipeline rupture scenario.

The pipeline rupture scenario assumes a total rupture of the pipeline, resulting in drainage of the pipeline contents between the two closest valves. Assuming that the SCADA system effectively shuts down pumps and initiates valve closure immediately after detecting the rupture, the volume that could spill would be that remaining between the two closed valves plus any product flowing until the valves close. SFPP's Marine Waters Appendices text states that a 16-inch valve typically takes 3 minutes to close completely (page 32).

Once the pipeline is shut down, under this worst-case assumption, oil would continue to spill at a gradually decreasing flow rate until it was completely drained from the ruptured pipeline segment between the valves. The maximum spill volume at each location along the pipeline depends on the location of the pipeline rupture in relationship to the proposed isolation valves. Table C.11-6 shows the locations of each block valve and the approximate maximum size of a spill that could occur between each pair of valves.

Based on the above calculations and assumptions, the largest spill that could be expected to occur on the proposed pipeline would be 7,712 barrels, in the segment of the pipeline through the Cities of Long Beach and Bellflower. As a comparison, in SFPP's OSCP, they calculate the "worst case discharge" for the existing 16-inch pipeline to be 15,626 barrels because the block valves are 12.6 miles apart.

Table C.11-6 Potential SFPP Product Spill Volumes

Block Valve Mile Post	Location of Potential Rupture	Miles of Pipe Capable of Draining	Potential Maximum Loss	
			in bbls	in gals
0.0 - 2.07	Watson Station to West Side of Compton Creek	2.07	2,510	105,421
2.07 -2.09	In Compton Creek	0.02	24	1,019
2.09 - 3.20	East Side Compton Creek to West Los Angeles River	1.11	1,346	56,530
3.20 - 3.30	In Los Angeles River	0.10	121	5,093
3.30 - 9.66	East Side Los Angeles River to West San Gabriel River	6.36	7,712	323,901
9.66 - 9.77	In San Gabriel River	0.04	49	2,037
9.77 - 13.00	East Side San Gabriel River to Norwalk Station	3.30	4,001	168,062

The worst-case rupture would occur where the pipeline is not buried (an underground rupture would have a slower flow rate due to the soil surrounding the pipe). Therefore, the 7,712 barrel rupture scenario is considered to be just west of the San Gabriel River crossing, immediately west of the block valve but still above-ground.

Consequences. A pipeline rupture between the Los Angeles and San Gabriel Rivers, as described above, could result in product flowing into city streets and storm drains, and into the Los Angeles or San Gabriel Rivers, and, depending on river flow conditions and spill volume, even into the ocean. Also, because a rupture could result in a large pool of products in the urban environment, fire and explosion is a possibility (see Section C.11.4.3 below). The worst-case rupture scenario includes the potential for impacts in densely populated urban areas, and also the potential for products to reach the ocean.

SFPP's California Marine Waters Appendices to its OSCP states that a "Reasonable Worst Case Spill" of 2,312 barrels could result in the loss of 80% of spilled volume: 1,850 barrels could be lost to a combination of evaporation or dispersal in the river or harbor. SFPP's spill modeling shows that 10% of this spill (231 barrels) could reach the shoreline in Long Beach. As discussed in Section C.3, Biological Resources, there are a variety of bird and marine mammal species living and/or feeding in the harbor area.

Probability. The probability of a pipeline rupture is significantly smaller than the probability of a leak. As described in Appendix C, the general probability analysis for this project concludes that there is a probability that one rupture could occur every 100 years along this 13-mile pipeline route. This is considered to be "Unlikely" (as described in Table C.11-3, Frequency Classifications). At any single location, there is the probability that one pipeline rupture could occur once every 16,630 years, which is considered to be a "Rare" event.

Impact Conclusion. With the maximum spill size of 7,712 barrels (a "Severe" event) and frequency of either "Unlikely" or "Rare," a pipeline rupture is a significant impact (**Class I**).

C.11.3.3 Fires and Explosions

Scenario. A fire scenario could result from a pipeline spill and a nearby source of ignition, such as a vehicle or construction machinery. The risk of a petroleum product fire is significant, because components of refined products such as gasoline evaporate quickly, and can form flammable vapor clouds. In the event that pipeline accident results in a rupture or large leak, there is a likelihood that the product could ignite if the following two conditions exist: (1) a high concentration of flammable hydrocarbons, and (2) a source of ignition.

Consequences. A fire and explosion could cause injury or death to people close to the site, and it could also cause damage to property. It is difficult to estimate the potential extent of human injury because there are so many factors affecting the size of a fire or explosion: rate of evaporation, size of the pool of products, (controlled by weather including temperature), concentration of vapors (varying with wind and topographic conditions), etc.

Probability of Fire/Explosion. In order for a fire or explosion to occur, there would first have to be a pipeline leak or rupture. Because a leak does not generally result in a pool of products, it is not likely that a leak would cause a fire or explosion. However, a pipeline rupture could result in a fire or explosion. The likelihood of a rupture is "Unlikely" that frequency is used based on the "worst-case" assumption that all ruptures will result in fire.

Impact Conclusion. The size of these potential hazard zones (1,000 feet or more) could result in injuries to up to 10 people (severity of "Major" according to Table C.11-3). The frequency of occurrence for a pipeline rupture is "Unlikely" as described above. Therefore, given the relatively high probability of ignition for a gasoline spill in an urban area, a product fire would be considered a significant impact (**Class I**).

C.11.3.4 Other Hazards

In addition to the three potential hazard scenarios discussed above, there are a number of secondary hazards related to pipeline operation that need to be considered in this analysis. These include:

- Damage to SCADA system resulting from an earthquake, major fire, sabotage or vandalism
- Possibility of incurring damage to other utilities in the pipeline ROW during construction
- Safety impacts associated with pedestrian/vehicle collisions
- Injuries to workers.

Safety Scenarios. Following are the potential results of the above scenarios occurring:

- SCADA system failure: Since the SCADA system controls the flow of operational data to the control room (including out-of-tolerance parameters such as pressures, temperatures and vibration at pumping equipment) it is an essential element for the safe operation of the pipeline. Potential impacts from this failure can be minimized by designing the system to shut down if the SCADA system fails for any reason. SFPP's OSCP includes a Crisis Management Plan that would be activated in such a situation.

- Damage to other utilities: There is a possibility of incurring damage to other utilities (electrical or telephone cables, natural gas pipelines, petroleum pipelines) in the pipeline ROW during construction (see Section C.11, Utilities, for more information). SFPP would minimize this danger through continuing their active participation in the Underground Service Alert (USA), an organization dedicated to preventing damage to underground pipes and utilities.

- Safety impacts such as injuries to workers, and pedestrian/ vehicular collisions are not expected to be significant for this project, provided that safe work practices are applied during construction and operation of the pipeline.

C.11.4 MITIGATION MEASURES FOR SYSTEM SAFETY AND RISK OF UPSET

Following are mitigation measures recommended to reduce the potential safety impacts of the proposed pipeline. These mitigation measures cover construction, normal operation, and upset conditions. The mitigation measures are generally presented to accomplish one of the following objectives:

- Reduce the probability of occurrence of an upset event
- Reduce the severity of consequences of an accident by minimizing the released material
- Reduce the severity of consequences by effective response.

Mitigation Measures for Utility Impacts During Construction

Impacts: The pipeline could damage existing underground utilities **(Class I)**.

SS-1 SFPP shall provide structural support for underground utilities in and near the construction area during work in the trench and backfilling operations to prevent damage to such facilities during construction activities.

SS-2 SFPP shall coordinate with utility companies and use hand tools (i.e., non-motor operated equipment) in utility intensive areas and within 24 inches of underground structures. Any soil remediation or excavation work in the vicinity of the pipeline shall also require the use of hand tools within 24 inches of the pipeline.

SS-3 SFPP shall halt work in the immediate vicinity in the event of inadvertent damage to an underground utility, until the owner of the utility has been contacted and repairs have been completed.

SS-4 SFPP shall have an electrical contractor on-call at all times during construction near the potentially affected facility to repair any circuits if required by the owner in the event they are damaged during construction. The appropriate response to hazards associated with damage to natural gas pipelines will be determined in consultation with natural gas utility operators and local fire departments. Local fire departments shall be notified of the schedule for construction activities in the vicinity of natural gas and other pipelines.

SS-5 SFPP shall prepare a Fire Protection Plan (FPP) and a Hazardous Materials Management Plan for all areas along the pipeline ROW for the construction phase of the project. Contingency analysis and planning shall be conducted to identify fire situations, how to minimize their occurrence, and how to respond should they actually occur. The Plan shall be submitted to local fire departments for review and a copy shall be provided to the CPUC prior to the start of construction for review and approval. The plans shall assure that locations and conditions of storage of fuel comply with rules set forth in the Uniform Fire Code and National Fire Codes.

Mitigation Measures to Enhance Leak Detection

Impacts: The pipeline could develop a leak as a result of equipment failure, corrosion, or third-party damage **(Class I)**.

SS-6 SFPP shall develop and implement a program for routine inspection of mainline valves every six months. The valves shall be checked for mechanical integrity. Remotely activated block valves shall be checked to ensure they function automatically and properly within 60 seconds. Check valves should be checked annually to assure proper functioning. Maintenance records shall be retained for inspection by the State Fire Marshal.

SS-7 SFPP shall ensure that the existing safety and monitoring systems at all affected pump stations (Watson, Norwalk, City of Industry and Colton) will provide for safety of operations with the increased throughput resulting from implementation of the proposed project (from 350,000 BPD to 520,000 BPD). The safety and monitoring system should include, but not be limited to, the following:

- High temperature shutdown
- Overpressure protection
- Fire detectors (voting system)
- Motion detectors (speed and vibration) for pumps
- Hydrocarbon detectors with one detector to alarm and 2 to shutdown (voting system)

SS-8 Deleted (not applicable since there are no valve boxes proposed).

SS-9 SFPP shall install at least two flammable/combustible hydrocarbon detectors at each remotely operated pump, with a voting system. The pump shall be shutdown if two detectors signal an alarm at the same time.

SS-10 SFPP shall install a SCADA system that can detect a leak of 1% of maximum flow (85 bbl/hour) within 5 minutes and utilizes at least a four-tier leak detection method:

- Over/short accounting
- Pressure point monitoring
- Volumetric balance with line pack correction
- Pressure profiling

SS-11 SFPP shall develop and implement an internal corrosion prevention program in compliance with State and Federal pipeline safety standards enforced by the State Fire Marshal. Specifically, this program shall include a baseline smart pig run conducted either prior to startup or within 90 days after startup.

SS-12 SFPP shall coat the pipeline to reduce the potential for external corrosion. The documented performance of the proposed coating (Pritec or Synergy brand polyethylene type) must be provided to and approved by the California State Fire Marshal and the CPUC.

SS-13 After every 20 years of operation, SFPP shall conduct a full analysis of the pipeline components for safety and reliability. This analysis is in addition to the normal maintenance and inspection required, and should include the results of a comprehensive "smart pig" inspection, the integrity check on pump stations, heaters, storage tanks, valves, communication systems and other components. A full report on the status of the entire system, any potential deficiencies and the remedial actions should be prepared. This report should be submitted to CPUC and the California State Fire Marshal or their successors. The continued operation of the pipeline after 20 years should be dependent on these agencies' approval of the safety status as presented by the Applicant.

SS-14 A report on SFPP's Process Safety Management Analysis shall be provided to the California State Fire Marshal and the CPUC prior to operation of the pipeline.

Mitigation Measure to Minimize Spill Volume

Impact: A catastrophic event could damage the SCADA system or impair its ability to report damage **(Class II)**.

SS-15 SFPP shall install speed and vibration sensors at the Watson Station to shut down the pipeline automatically in the event that threshold acceleration should be exceeded. Such devices shall be required to detect earthquakes with intensity of 6.0 or more. The petroleum industry has some objections to automatic shutdown systems because erroneous shut down procedures have caused accidents. Should SFPP disagree with this mitigation, a report shall be prepared by SFPP clearly demonstrating, to the satisfaction of CPUC and CSFM, that these sensors would result in more products spill accidents than they would prevent.

Mitigation Measures for Spill Containment And Response

Impact: A product spill could contaminate soil, surface, or ground water **(Class I)**.

SS-16 SFPP shall develop an Urban Spill Response Plan (USRP) as a separate document to supplement its existing and approved Oil Spill Core Plan (OSCP) and California Marine Waters Appendices. The USRP shall be provided to the CPUC, the California State Fire Marshal, and all jurisdictions along the pipeline ROW for review and comment prior to its finalization. The USRP shall include the following lists or information:

- A listing of areas of archaeological sensitivity (if any) within the potentially affected spill area, incorporating any discoveries made during construction. If such areas are identified, a qualified archaeologist approved by CPUC shall monitor all clean up activities that involve excavation or grading. If the archaeologist identifies resources that cannot be avoided, the specific measures described in Mitigation Measures C-1, C-2 and C-3 shall be implemented after containment of the spill is completed.
- A listing of sensitive land uses along the Carson to Norwalk Pipeline route, including schools, residences, religious facilities, recreational lands, other land uses with large concentrations of people, and environmentally sensitive habitat areas.
- A listing of potential traffic and access concerns for each street in which the pipeline is located, including a map showing emergency egress routes to be used in the event of a pipeline accident.
- A description of the process by which SFPP would evaluate the need for compensation of businesses that experienced disruptions as a result of a pipeline accident or emergency response actions.

The USRP shall also include three Response Strategies (similar to the existing response strategies included in SFPP's Oil Spill Core Plan) to address potential accidents in the Carson to Norwalk environment:

(1) **Pipeline Failure Resulting in Product in an Urban, Controlled-Access River**, specifically describing response techniques in a lined channel and how/where access to the channel can be gained. The strategy shall list seasonal average flow rates for the Los Angeles and San Gabriel Rivers, and the relationship of these flow rates to spill response equipment feasibility and use. Calculate and present the maximum volume of petroleum products that could spill into the waterway (either directly or via storm drains) assuming that the pipeline was operating at maximum capacity, and for each of the following scenarios: (a) waterway flowing at average low flow (average flow for May through October), and (b) waterway flowing at average high flow (average flow for winter rainstorm), c) best-case and worst-case times required to close valves on either side of river

(2) **Pipeline Failure in an Urban Environment**, specifically describing response strategies requiring traffic control/diversion, prevention of product flow into storm drains, recovery of spilled product from storm drains or river systems, crowd control, and protection of users of nearby sensitive land uses (schools, hospitals, etc.). The strategy for responding to an urban spill shall specifically address and define appropriate response to fire and/or explosion. Where aspects of emergency response are handled or directed by local Fire Departments or other agencies, those agencies shall be contacted for input into the USRP.

(3) **Spill Reaching Marine Environment**, specifically identifying sensitive habitats with priority for protection, sensitive species and their potential locations in the affected marine or coastal environment. The response strategy shall include estimated time for a spill to reach the mouth of each river under each scenario. It shall list sensitive species potentially occurring in the waterway or in the harbor, and describe methods of protecting those species in the event of the worst-case spill event. It shall define specific cleanup methodology and techniques for containment and cleanup in the harbor and on the shoreline (specifically including the Anaheim Bay National Wildlife Refuge).

SS-17 Deleted (the requirements in this measure are included in State law).

SS-18 SFPP shall supply and maintain the spill containment and response equipment at locations accessible to first response personnel along the route to facilitate rapid response to a product spill. This equipment shall be located within 60 miles of the proposed pipeline.

SS-19 SFPP shall conduct a public education program consistent with 49 CFR 195.440, as enforced by the California State Fire Marshal, to help the public and affected agencies understand pipeline safety hazard. An Internet Web Site shall be created, including the contents of the pipeline safety brochure and a detailed map of the pipeline. The Web Site shall be operational prior to pipeline operation.

SS-20 Deleted (SFPP's control room is currently in operation so a start-up analysis is not required).

Mitigation Measures for Reducing Fire Hazards

Impact: A pipeline leak or spill could ignite, resulting in fire or explosion **(Class I)**.

SS-21 SFPP shall provide to local fire departments with responsibility for the Watson and Norwalk Stations additional supplies of appropriate fire-fighting foam or other agents, in quantities agreed upon by the fire departments and the California State Fire Marshal. Documentation of provisions provided by SFPP to fire departments shall be provided to the CPUC prior to operation of the pipeline.

SS-22 Deleted, since SFPP's existing spill response plans address fire during operations and are distributed to Fire Departments as required by State law.

General Mitigation Measures

SS-23 The proposed pipeline shall be used only as stated in SFPP's project description: for transportation of specified products only (gasoline, jet fuels, and diesel) and at the maximum flow rate of 8,500 barrels per hour (204,000 BPD). No exceedance of this level is allowed without appropriate environmental review and analysis, and no other material or products (whether in gas or liquid form) may be transported through this pipeline.

SS-24 To reduce likelihood of damage to the pipeline from third-party construction, and to inform adjacent landowners and residents of pipeline placement, SFPP shall install pipeline location markers in compliance with Federal and State pipeline safety standards.

C.11.5 SIGNIFICANCE OF IMPACTS

The following paragraphs summarize the impacts that have been identified in this section, and presents the impact class for each impact (based on the significance criteria in Table C.11-3 and the Hazard Scenario Risk Ranking Matrix in Table C.11-4).

Potential for pipeline leak: Because the frequency of a leak occurring is "Likely" (between once a year and once in 100 years), and the spill size could be "Major" (spill between 238 and 2,380 barrels), this impact is considered to be significant based on the matrix in Table C.11-4. Despite the many measures already proposed by SFPP, and the 24 mitigation measures described above, the risk of a leak cannot be eliminated. Therefore, the potential for pipeline leak is considered to be significant and unmitigable (**Class I**). Mitigation Measures SS-1 through SS-24 are included to minimize the potential risk of pipeline leaks to the maximum extent feasible.

Potential for pipeline rupture or fire/explosion: The frequency of these events occurring is "Unlikely" or "Rare" but the spill size could be "Major." Therefore, based on the ranking matrix in Table C.11-4, the risk of rupture and fire/explosion is also considered to be a significant impact. Again, while mitigation measures can reduce the size and likelihood of a rupture, they cannot be prevented. Therefore, the potential for pipeline rupture and for fire/explosion is considered to be significant and unmitigable (**Class I**). Mitigation Measures SS-1 through SS-24 are included above to minimize the potential risk of pipeline rupture or fire/explosion to the maximum extent feasible.

Other Safety Hazards. While these additional hazards could occur frequently, they would cause only negligible damage because SFPP's existing operational plans would reduce the potential for significant impacts. Therefore, these hazards are considered to be adverse but not significant impacts (**Class III**), Mitigation Measures SS-1 through SS-4 are included below to minimize potential impacts.

C.11.6 ANALYSIS OF POTENTIAL SECONDARY IMPACTS

The purpose of the Proposed Project is to satisfy future projected growth in the Inland Empire, Las Vegas and Arizona markets. Operation of the new pipeline will increase the overall throughput of SFPP's pipeline system from current throughput of 350,000 BPD (through 24" line only) to 520,000 BPD (320,000 BPD through 24" and 200,000 BPD through proposed 16"). This increased throughput has the potential to affect other parts of SFPP's system as well as the potential to impact areas adjacent to pipelines and truck routes leaving the Colton Terminal. The following system components would be affected:

- The 16-inch Military Line from Norwalk to Colton will experience an increase in throughput of about 17 times

- The Industry Station will have 2 pumps added and the 16-inch Military Line, which currently bypasses the station, will be re-routed to run through the station.
- The Colton Station will experience an increase in throughput of 170,000 BPD
- The Cal/Nev Pipeline System will receive an additional 52,000 BPD of products (an increase of about 49%)
- SFPP's Phoenix-West Pipeline System will expand its throughput to 200,000 BPD (an increase of about 56%)
- Trucking of petroleum products in the Inland Empire and other parts of southern California will increase by 53% (from 87,000 BPD to 133,000 BPD), resulting in an increase in truck accidents and spills.

Increased throughput in pipelines results in the potential for larger spills to occur. Increased throughput in station facilities can result in increased frequency of accidents, due to increased wear on equipment, as well as the potential for spills to be larger.

C.11.7 CUMULATIVE IMPACTS

This section considers two ways in which the proposed pipeline could result in cumulative impacts. First, other proposed or pending projects could affect the safety of the proposed project. Second, the proposed pipeline adds to the existing hazardous infrastructure, resulting in the possibility of a multiple-pipeline failure.

C.11.7.1 Cumulative Projects

Projects proposed in the Cities of Carson and Long Beach could affect the proposed project.

City of Carson. The list of cumulative projects in the City of Carson includes a Chemical Distribution Facility and possible Asphalt and Concrete Batch Plant. An accident at the Chemical Distribution company, which is located just south of the Watson Station could affect the Watson Station. The extent of the accidents' effects depend on the type of chemicals stored at the facility. The Watson Station storage tanks, piping, pumps, pipelines leaving and entering the facility and other infra-structure could be affected by an upset event at this facility. The proposed asphalt and concrete batch plant does not pose any significant threat to the pipeline or the pump station since the asphalt plant does not handle any flammable liquids.

City of Long Beach. A proposed ARCO AM/PM Mini Mart is near the proposed pipeline. Since the gas station will be handling similar products as the proposed pipeline, any pipeline rupture/fire could also affect this gas station. Since the pipeline is underground, any catastrophe at the gas station may not affect the pipeline.

C.11.7.2 Multiple Pipeline Failures

The proposed pipeline route encounters a number of existing pipelines. Tables C.11-1 and C.11-2 show the pipelines that share the ROW of the proposed project in various areas. As a result, in case of major earthquake, there is a possibility of a multiple pipeline spill. However, in the absence of a large initiating event, such as an earthquake, the probability of a multiple pipeline spill is extremely low. Based on the failure rates discussed previously, and considering the Proposed Project and the other pipelines on the route, probability of a multiple pipeline spill rupture would be approximately 1.46 in 1 million per miles per year. This would equate to a multiple pipeline spill of about once every 52,808 years along the proposed route, between Watson and Norwalk.

In the event of a multiple pipeline incident, the amount of product that would be spilled would vary depending on which pipelines were involved in a spill, as well as the location of the multiple pipeline failure. The most likely pipelines to be involved in a multiple pipeline spill are the Proposed Project and pipelines which share the pipeline ROW the most. Based on the significance criteria presented in Section C.11.2.1, the likelihood of a multiple pipeline Spill would be considered rare, while the consequences would be considered severe. Therefore, impacts associated with a multiple pipeline Spill would be considered significant (**Class I**). The impacts on other utilities and potential disruption to services as a result of co-location and accidents are discussed in Section C.10.2 (Socioeconomics and Public Services).

C.11.8 ALTERNATIVE SEGMENTS

Potential safety impacts for the proposed pipeline and the alternative segments are generally the same, since all segments are in urban areas and the mileages are not significantly different. However, the following variables can affect safety impacts:

- The density of sensitive receptors and residences along each alternative segment (primarily considered in Section C.8, Land Use and Recreation)
- The ease of access to each route for emergency response and the extent to which traffic could impair emergency response
- The length of each route (shorter pipelines are preferred if other factors are equal)
- The character of each route (i.e., railroad ROW versus city streets) and differences in accident likelihood.

While the above factors can have an effect in comparison of alternatives, the primary safety analysis relates to defining the probability of an accident occurring. Because the analysis of accident probability is based on the mileage of the proposed pipeline, the comparative mileage of the segments should be considered. There is no significant difference between the proposed route segments and the lengths of the following alternative segments:

- Cherry Alternative Segment
- Alondra Alternative Segment
- Artesia Alternative Segment.

The following alternative segments are longer than their equivalent proposed route segments:

- Bellflower Rail Alternative Segment: this segment is about 1.8 miles (about 50%) longer than the proposed route segment that it would replace. Therefore, the overall probability that an accident could occur would increase slightly if this alternative were selected. However, due to the absence of other hazardous pipelines in the rail ROW, there is a reduced likelihood that third-party accidents would occur.

- Paramount and Shoemaker Alternative Segments: these segment are 1 mile (about 300%) longer than the proposed route segment. If this segment alone were added to the proposed route, the entire route would be about 8% longer, so the overall probability of an accident occurring would increase from about one leak every 60 years to one leak every 55 years.

The Santa Fe Alternative is slightly shorter than the proposed route segment (about 0.2 miles), so the probability of an accident occurring is slightly less than that for the proposed route segment.

C.11.9 THE NO PROJECT ALTERNATIVE

If the proposed Carson to Norwalk Pipeline Project is not constructed, demand for petroleum products will still grow in the Inland Empire, Arizona, and Nevada. That demand will be served by shifting or expanding use of existing pipelines and by increased trucking of products from refineries in Los Angeles to the consumer centers.

Because the expanded use of pipelines and trucking would also be expected to occur as a secondary impact of the proposed project, safety impacts of the No Project Alternative would be similar to those described in Sections C.11.6 above. The size of potential spills on the Phoenix-West Line would be larger with greater throughput. Trucking under the No Project Alternative would be increased both in the number of trucks required and in that trucks may be required to carry products a much greater distance (from Los Angeles refineries to Inland Empire markets which would be served from Colton if the proposed project were constructed). Because truck accidents have a much higher accident and fatality rate than pipelines, the potential safety impacts of the No Project Alternative are considered to be significant (**Class I**) and not mitigable.

C.11.10 MITIGATION MONITORING PROGRAM

The mitigation monitoring program for the system safety issue area is outlined in the attached Table C.11-7.

Table C.11-7 Mitigation Monitoring Program

Impact	Mitigation Measure	Responsible Agency	Monitoring/Reporting Action	Effectiveness Criteria	Timing
Construction could impact existing utilities (Class III)	**SS-1** Structural support shall be provided for underground utilities in and near the construction area during work in the trench and backfilling operations to prevent damage to such facilities during construction activities.	CPUC, OSHA	Observe & ensure that appropriate safety precautions are used	No damage during construction to utilities in and near the construction area	During Project Construction
	SS-2 Hand tools shall be used in utility-intensive areas and within 24 inches of underground structures.	CPUC, CSFM	Observe & ensure that appropriate safety precautions are used	No damage during construction to utilities in and near the construction area	During Project Construction
	SS-3 If an underground utility is damaged during construction, work shall be halted until the utility owner has been contacted and repairs have been made.	CPUC	Document utility damage	No extended damage to utilities	During Project Construction
	SS-4 Have an electrical contractor on-call. Consult with natural gas utility operators and local fire departments regarding response.	CPUC	Verify contractor on-call. Review copies of notifications	No damage to utilities	During Project Construction (48 hours in advance for each utility)
Construction could cause fire in high hazard areas (Class III)	**SS-5** A Fire Protection Plan shall be prepared for project construction. Contingency analysis and planning shall be conducted.	CPUC/Fire Departments	Review FPP for adequacy	Approved plan is in place prior to construction	Prior to Project Construction
Spill could cause environmental damage or injury (Class I)	**SS-6** SFPP shall develop and implement a program for routine inspection of mainline valves every six months. The valves shall be checked for mechanical integrity. Remotely activated block valves shall be checked to ensure they function automatically and properly within 60 seconds.	CPUC, CSFM	Review and approve proposed maintenance and monitoring programs.	Pipeline leaks are detected as quickly as possible.	Prior to project operation
	SS-7 SFPP shall enhance the existing safety and monitoring systems at all affected pump stations (Watson, Norwalk, City of Industry and Colton) to ensure safety of operations				
	SS-8 Deleted.				
	SS-9 SFPP shall install at least two flammable/combustible hydrocarbon detectors at each remotely operated pump, with a voting system. If two detectors alarm at the same time, the pump shutdown shall occur.		Review construction plans; confirm after construction		
	SS-10 SFPP shall install current state of-the-art SCADA system (defined as having the ability to detect a leak of 1% of flow in 5 minutes)		Review proposed SCADA system requirements		
Pipeline corrosion could cause pipeline leaking or rupture and result in spill (Class I)	**SS-11** Implement internal corrosion techniques including a baseline smart pig run.	Local Fire Department	Provide copies of pigging logs to local fire departments and the CPUC. Report the deficiencies encountered and remedial actions required	No corrosion induced leaks from pipeline	During Project Operation

Impact	Mitigation Measure	Responsible Agency	Monitoring/Reporting Action	Effectiveness Criteria	Timing
Pipeline corrosion could result in spill (Class I)	**SS-12** Coat the pipeline to reduce the potential for external corrosion. The performance of the proposed coating (Pritec or Synergy brand Polyethylene type) must be documented to the satisfaction of the California State Fire Marshal and the CPUC.	CSFM	Submit copy of pipeline coating specification	No external corrosion induced leaks	Prior to project construction
Aging pipeline is more likely to rupture and cause spill (Class I)	**SS-13** After every 20 years of operation, conduct a full analysis of the pipeline components for safety and reliability purposes, including results of a "smart pig" inspection, integrity check on pump stations, heaters, storage tanks, valves, and other components.	CPUC/ CSFM	Review report submitted every 20 years; if report shows unacceptable conditions, pipeline operation shall be suspended	Report confirms overall safety and system integrity	Every 20 years of operation
	SS-14 Submit report on Process Safety Management Analysis.	CPUC/CSFM	Report to be reviewed by CPUC/CSFM prior to start of construction	Report appropriately evaluates risk and operating procedures	Prior to construction
Ground acceleration resulting from earthquakes could interfere with effective communication (Class I)	**SS-15** The Applicant shall install even speed and vibration sensors at the Watson station to shut down the pipeline automatically in the event that threshold acceleration should be exceeded. Should the Applicant disagree with this mitigation, they shall prepare a report and clearly demonstrate that these sensors would result in more oil spill accidents.	CPUC/CSFM	Design or variance review and approval	Severity of earthquake-induced damage reduced.	During final design.
Spill could cause environmental damage (Class I)	**SS-16** SFPP shall develop an Urban Spill Response Plan (see specific requirements in text).	CPUC/ Local Fire Departments/ CSFM	Review revised USRP	Spill impacts are reduced.	Prior to project operation
	SS-17 [Deleted.]				
	SS-18 Oil spill containment and response equipment shall be supplied and maintained by the Applicant at locations accessible to first response personnel along the route to facilitate rapid response to an oil spill.	Local Fire Departments	Notification to fire departments if equipment or storage locations change	Response equipment improves response capability	After project construction, prior to project operation
	SS-19 A public education program shall be conducted consistent with 49 CFR 195.440, under the supervision of the California State Fire Marshal, to help the public and agencies understand pipeline safety hazards. A Web Site shall be established.	CSFM/CPUC	Applicant to maintain log of public education efforts conducted	Public aware of pipeline safety hazards prior to operation	Prior to project operation
	SS-20 [Deleted.]				
Fire could damage pump stations (Class I)	**SS-21** Provide fire-fighting foam or other agents to local fire departments.	Local Fire Departments	Provide documentation to Local Fire Departments	Fire response is effective	Prior to operation
	SS-22 [Deleted]				
Operational change could affect risk	**SS-23** The proposed pipeline shall be used only as stated in SFPP's project description: for transportation of specified products only (gasoline, jet fuels, and diesel) and at the maximum flow rate of 8,500 barrels per hour (204,000 BPD).	CPUC	Report average daily throughput to CPUC on an annual basis	Throughput does not exceed 204,000 BPD; specified petroleum products only	During operation

Impact	Mitigation Measure	Responsible Agency	Monitoring/Reporting Action	Effectiveness Criteria	Timing
Third-party action could damage pipeline	**SS-24** Place markers in compliance with Federal and State Standards.	CPUC, CSFM	Provide documentation to local jurisdictions along ROW	Markers prevent third party accidents	Prior to operation

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