

Appendix H: Leak Prevention, Detection, and Response Addendum

Wickland Pipelines LLC

John Wayne Airport Jet Fuel Pipeline and Fuel Storage Tanks

Leak Prevention, Detection, and Response

Addendum



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1. Introduction

Leak prevention, detection, and response are critical in tank farm and pipeline projects and are integrated into all aspects of pipeline design, construction, maintenance, and operations. Modern pipelines are engineered systems and are highly regulated to protect against all types of failure and damage throughout the entire lifetime of the pipeline system. Redundant safety features are integrated into the pipeline system well before the pipeline is constructed and continue through all aspects of pipeline operation and regulatory compliance.

This document will summarize the main components of leak prevention, detection, and response for the John Wayne Airport Jet Fuel Pipeline Project, specifically:

System and Operations Summary - A brief overview of pipeline operations and the SCADA system are provided to illustrate how the pipeline system is managed.

Leak Prevention - Leak prevention is paramount in pipeline engineering, design, and construction to create a robust system that is built to the highest standards and that integrates safety into all aspects of design. Leak prevention is also applied during pipeline operations as well as pipeline operator compliance. Compliance with government entities is key, as it not only assures the pipeline operator that they are doing everything possible for leak prevention, but also allows for third party oversight of how the pipeline operator approaches safety.

Leak Detection - The pipeline's leak detection system is the computational tool that is continuously monitoring pipeline status for any anomalies associated with pressure or flow. Tank leak detection uses both the SCADA system and a simple but effective physical monitoring system.

Leak Response - Leak response will occur according to a Spill Prevention Plan, which is a federally-reviewed document that outlines how to respond to any type of incident should one occur. Included in this are descriptions of the certified oil spill response organization, which specializes in rapid mobilization and response to any type of incident. Repairs and remediation are effectuated following a leak and are discussed in detail in this section.



2. System and Operations Summary

Wickland Pipelines LLC (Wickland), headquartered in Sacramento, California, is proposing to construct additional jet fuel storage tanks and an California Public Utilities Commission (CPUC) regulated common carrier jet fuel pipeline connecting the John Wayne Airport (Airport) in Orange County, California to an existing products pipeline operated by Kinder Morgan Energy Partners (KMEP). This project will provide airline companies (Airlines) operating at the Airport with an enhanced jet fuel storage and transportation system (SNA Pipeline). The proposed SNA Pipeline will increase airport-related jet fuel storage capabilities, while allowing Airlines to access jet fuel from all Long Beach area refineries and terminals without the need for highway truck transportation resulting in the elimination of 44 individual tanker truck trips per day.

The key design features of the project include:

1. The design, installation and operation of the pipeline will comply with or exceed the rigorous safety standards established by the US Department of Transportation's (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA), the Office of The California State Fire Marshal (CSFM), and the American Petroleum Institute (API). The pipeline and tank system will be built to comply with the following design codes and requirements:
 - Orange County Building Code, latest revision
 - Federal Occupational Safety and Health Standards Act (OSHA)
 - California State Industrial Safety Orders
 - ASME B31.4 Liquid Transportations Systems for Hydrocarbons
 - US DOT 49 CFR 195 Transportation of Hazardous Liquids by Pipelines
 - National Fire Protection Association and California State Fire Code standards
2. The use of the significantly more expensive HDD method of installation for nearly 20% of the pipeline's length significantly reduces the potential for damage or rupture due to third party activities.
3. All underground piping will be externally coated with a layer of fusion bonded epoxy (FBE) external coating. All HDD piping will have a second layer of abrasion coating.
4. The entire pipeline system will undergo extensive testing during installation. Compared to the standard of 10% of welds requiring radiographic inspection, 100% of the pipeline welds will be radiographically inspected by a qualified, certified technician, employed by an independent inspection company. Pipeline welders will be required to pass an ASME B31.3 piping code-defined qualification test for the specific type of welding. The pipeline will be hydrostatically pressure tested and the coating system tested for continuity.
5. The new storage tanks will be welded, tested, and inspected according to API 650.



6. The pipeline and storage tanks will have independent cathodic protection systems that include stand-alone galvanic systems consisting of high potential magnesium sacrificial anodes bonded to the steel. The pipeline and tanks will be electrically isolated from all foreign metallic structures with insulating flange kits. Test lead wires from the piping and tanks and anodes will be run to test stations for future monitoring of the system.
7. The SNA Pipeline will employ state-of-the-art computer-based leak detection monitoring using industry adopted software to run the system. The pipeline leak detection system will consist of two major elements: instrumentation and a SCADA (supervisory control and data acquisition) computer with associated software and communications links. The pressure balance method of leak detection, also known as rarefaction wave monitoring, acoustic, negative pressure, or expansion wave, is based on the analysis of changes in pressure in the pipeline system. The utilization of SCADA systems in pipeline monitoring allows the greatest amount of data to be collected, analyzed, and acted upon in the shortest amount of time.
8. The new storage tanks will utilize an extremely durable high density polyethylene (HDPE) liner sump placed underneath the tanks and a layer of roller compacted sand. Leak detection monitoring stand pipes will be used to allow for frequent leak detection inspection.
9. The Pipeline System will routinely be internally inspected in accordance with DOT and CSFM regulatory standards; however an accelerated inspection schedule will occur with internal inspections occurring during Year 1 (within the first 90 days of startup), Year 3, and Year 6 of pipeline operations followed by standard intervals. Tools known as smart pigs will be used to inspect and record information about the internal conditions of the pipeline, including restrictions and deformations of the pipe, as well as metal loss and corrosion.
10. The storage tanks need to be internally inspected by a certified third party once every five years in accordance to API 653. This will identify any modifications required of the storage tanks.
11. The pipeline and tanks will be operated in accordance with DOT, CSFM, and EPA published operating standards and recommended practices. The pipeline will comply with all Federal, State and City requirements and will adopt specific operating plans and practices including an Oil Spill Response Plan, Operations and Maintenance Manual, Control Room Management Plan, Public Awareness Program, Cathodic Protection Operations and Maintenance Manuals, and an Integrity Management Plan. These manuals will be retained and available in the local pipeline operations control center.

2.1. Operator Overview

Wickland Pipelines LLC's team of experienced technical, legal, and environmental specialists, who are headquartered in Sacramento, California, has developed and operated numerous pipelines and terminal facilities on the US West Coast and around the world, including two recent airport pipeline projects:



- **San Jose, California.** Wickland Pipelines LLC secured all pipeline rights-of-way, regulatory permits, and entitlements necessary to build a 2-mile long common carrier pipeline and secured 105,000 barrels of jet fuel storage as part of a new fuel delivery system to the San Jose International Airport. WPL successfully completed construction of the 8-inch pipeline under budget and ahead of schedule in November 2010. WPL operates the pipeline facilities, including two 1,500 bph pumps, and delivers 100% of the SJC Airport's jet fuel requirements by pumping typically three days per week.
- **Sacramento, California.** Wickland Pipelines LLC secured all pipeline rights-of-way, regulatory permits, and entitlements necessary to build a 10-mile long common carrier pipeline and 125,000 barrel airport storage facility to supply jet fuel to the Sacramento International Airport. WPL successfully completed construction of the 12-inch pipeline under budget and ahead of schedule in 2005. Similar to the proposed SNA pipeline, the pipeline delivers 100% of the SMF Airport's jet fuel requirements during weekly deliveries of the center cut of jet fuel from a Kinder Morgan pipeline.

The SJC and SMF Pipelines have both been in operations with zero incidents of leaks. Wickland worked closely with the state and local agencies when designing both pipelines, and continue to liaise with them regarding safe pipeline operations.

2.2. SNA Pipeline System

Wickland proposes to construct a 12-inch diameter underground pipeline approximately five miles in length. The proposed SNA Pipeline would connect to the existing KMEP products pipeline at a location near the planned intersection of Edinger Avenue and Tustin Ranch Road and would proceed southwest to the new proposed fuel farm on Airport property in close proximity to the existing Airport fuel tank farm. The new proposed fuel farm would consist of two new 32 feet high, 98 feet diameter (37,000 barrel working capacity) tanks located in a secondary containment area with six foot high walls.

All of the piping to be installed for the 5 mile pipeline will be below grade. A portion of the pipeline will be installed by the use of the Horizontal Directional Drill (HDD) method. As a result, it is estimated that close to 5,700 feet of the pipeline length will be below grade by 25 to 50 feet. The 12" pipeline will be continuously monitored and is of substantial integrity by design, and installed using a substantial level of quality control.

The SNA Pipeline and tank system will be used solely to deliver jet fuel to the Airport, and will be capable of continuously delivering jet fuel to the new tank farm at a design rate of 120 barrels (5,040 gallons) per minute. At current demand levels, it is anticipated that the pipeline will operate about 5 to 6 hours one day per week and deliver fuel to the two proposed tanks at the Airport fuel farm.



2.3. Pipeline Operations Overview

The existing KMEP pipeline runs from the Long Beach area to San Diego and traverses through many municipalities, including Orange County and the City of Tustin. The KMEP pipeline is continually operating 24 hours per day at flow rates of approximately 3,500 bph to 7,000 bph. Because it is a multi-product pipeline and operates on weekly product cycles, it typically delivers gasoline 2-3 days per week, diesel fuel 2-3 days per week, and jet fuel 1-2 days per week. These batches are inserted into the pipeline immediately after each other so that the pipeline can operate continuously in order to meet the fuel demands of Orange and San Diego counties. The proposed SNA Pipeline will tee off of the existing KMEP pipeline through a series of valves and metering equipment so that jet fuel flows directly into the SNA Pipeline as a closed system.

Once the SNA Pipeline is constructed, the Airlines operating at the John Wayne Airport will schedule delivery volumes through KMEP. Because the KMEP pipeline delivers jet fuel only once per week, the fuel volumes requested by the Airlines must be large enough to meet their weekly requirements. These delivery volumes of jet fuel will be inserted into the KMEP pipeline system at the pipeline source and will be transferred with a larger volume of jet fuel intended for other airports, including San Diego International Airport.

As the batch of jet fuel in the KMEP pipeline approaches the connection point with the SNA Pipeline, KMEP's SCADA system will alert them as to the exact location of fuel along their pipeline system. Using sophisticated sampling equipment, the KMEP SCADA system will measure that the product passing the SNA connection point is pure jet fuel and the transfer into the SNA Pipeline will begin. An automated valve on the SNA Pipeline will open and an automated valve on the KMEP pipeline will subsequently close either entirely for Full Flow transfer or partially for Stripping transfer. The flow of jet fuel will be diverted into the SNA Pipeline and directed toward one of the two new Airport receiving tanks.

The delivery of jet fuel to the Airport is expected to last approximately four to eight hours. Once the entire delivery volume is transferred into the SNA Pipeline, the system will begin to shut down operations. The KMEP pipeline valve will open to restart flow in that pipeline system, and then the SNA Pipeline valve will close to cease flow in that pipeline system. The KMEP pipeline will continue to operate until the next SNA Pipeline delivery the following week, and the SNA Pipeline will be in Leak Detection and Standby modes until the next delivery.

Based on current fuel demand levels of the Airlines, it is anticipated that the pipeline will operate for four to ten hours per delivery. KMEP schedules jet fuel deliveries on their pipeline four times per month, or 48 times per year. As such, the SNA Pipeline will be in Standby mode approximately 97% of the time and in Fuel Transfer mode approximately 3% of the time.



2.3.1. Pipeline Operating Modes

The SNA Pipeline shall support the following modes of operation:

Leak Detection: Leak detection during operation of the Pipeline System. This occurs continuously, whether the pipeline is delivering fuel or is idle between deliveries. Leak Detection is performed by the SCADA system and will be described in detail below.

Startup: Initial filling of the pipeline. This occurs immediately following construction of the pipeline and after the system has been hydrostatically tested with water, cleaned, and dried.

Standby: The pipeline is filled with product and isolation valves at both ends are closed while the system is being continuously monitored. This will be described in more detail below.

Fuel Transfer: Fuel is transferred from the KMEP pipeline to the Airport Tank farm. Transfer operations are controlled by KMEP. Following receipt of a “ready to receive” signal from the SNA Pipeline, KMEP will reposition their pipeline valves to initiate and terminate the transfer operation. There are two modes of operation for transfer of fuel from the KMEP pipeline to the SNA Pipeline: Full Flow and Stripping. In either mode of operation, no trans-mix is to enter the SNA Pipeline.

- Full Flow – The entire flow in the KMEP Pipeline is diverted into the SNA Pipeline.
- Stripping – A portion of the flow in the KMEP pipeline is diverted into the SNA Pipeline.

Pigging: Launching and recovering a pig through the pipeline. Pigging will be discussed in more detail below.

Emergency Shutdown (ESD): An unplanned shutdown of the Pipeline System by closing the isolation valve at the KMEP pipeline tie-in and the isolation valve at the Airport Tank farm. ESDs will be discussed in more detail below.

2.3.2. SCADA System Description

Although ultimately controlled by operators, the SNA Pipeline and new tanks will be monitored and protected by a programmed SCADA system. KMEP will control their mainline and connection isolation valves, the flow control valve, and turbine meter and meter proving operations at the SNA Pipeline tie-in and metering station in Tustin. These operations will be controlled through a GE Fanuc 9030 PLC controlled solely by the KMEP system operator. The Wickland operator is responsible for the control of all other pipeline components. The Wickland control system will consist of two Allen Bradley ControlLogix PLC’s (one at the Tustin metering station and the other at the Airport receiving facility).



The tanks at the Airport, including the tank 'high' and 'high-high' alarms, will be controlled by the fuel farm operators at the Airport.

The KMEP PLC will provide the following information to the Wickland control system via Modbus TCP (Ethernet):

- Flow rate
- Totalized flow (per IEEE standard 754).
- Custody Transfer Ticket information
- Valve position (fully open, fully closed) for each valve under KMEP control
- Strainer differential pressure
- Pipeline pressure
- Pipeline temperature

The Wickland PLC will provide a “Ready to receive” signal to the KMEP control system via a hardwired dry contact (closed contact). Loss of this closed contact signal shall be equivalent to an emergency shutdown signal. The Airport tank farm PLC will provide a “Ready to receive” signal to the Wickland tank farm PLC via a hardwired dry contact (closed contact). Loss of this closed contact signal shall be equivalent to an emergency shutdown signal.

Loss of any of the following signals will result in a pipeline system shutdown by opening of the “ready to receive” contact output from the Wickland PLC to the KMEP PLC:

- Loss of Power for more than 15 seconds at either the KMEP tie-in or the Airport tank farm. This will be sensed by a time delay relay on one leg of the three phases that feeds 480 VAC power to that site’s motor operated valves (the same phase used to power the PLC cabinets).
- Loss of the Sump Tank Level Not High-High contact signal (Tie-in and Airport)
- Any of the MOVs in the main flow of the pipeline not fully open (closed contact signals when fully open)
- Loss of the “Ready to receive” from the Airport tank farm
- Loss of communications signal between the two Wickland PLC’s (Tustin tie-in and Airport facility)

The two Wickland Allen Bradley ControlLogix PLCs will be programmed using Allen Bradley’s RS Logix 5000 software. Control of the various MOVs under Wickland’s control will be strictly manual operations (via the two HMIs) with the exception of an emergency shutdown condition. In the event of an emergency shutdown condition, all the pipeline inline MOVs will be driven fully closed.



Communication between Wickland's two PLCs will be via a dedicated leased phone line using Allen Bradley's proprietary DF1 serial communications protocol. Communication between KMEP's "master" PLC and Wickland's "slave" PLC at the KMEP tie-in will be via a dedicated Ethernet cable (Modbus TCP).

A turbine meter and a meter prover will be utilized to verify custody transfer. The turbine meter shall have its own line thermometer and well, temperature transmitter and well, line pressure gauge and tap, verified/certified line thermometer and well, verified/certified line pressure gauge and pressure transmitter, PT and tap. A densitometer will be located on the KMEP pipeline upstream of the KMEP/Wickland connection to detect the passage of the product interfaces. The design, specification, and location of the densitometer are the responsibility of KMEP.

The Airport tank farm control system will provide an emergency shutdown signal that shall be hardwired to a fire-safe valve provided with emergency power. The signal shall be initiated by any of the following conditions:

- Operator action (Wickland or SNA tank farm)
- High-High Level in the storage tanks

A flow meter will be provided so that the flows at both the KMEP tie-in and Airport can be compared for the purposes of detecting leakage from the pipeline. This will be described in more detail below.

A backpressure-regulating valve shall be provided to perform the following functions:

- Limit the pressure in the SNA tank farm piping to ≤ 100 psig, and
- Limit the pressure in the SNA Pipeline upstream of the Airport to ≥ 50 psig



3. Leak Prevention

Wickland philosophy is to develop and adhere to a strict preventative maintenance program that begins during pipeline design and construction and carries through to pipeline operations, internal and external audits by governmental agencies, and numerous other best practices. By carefully managing conditions that have the potential to result in pipeline damage or a leak, Wickland has been able to operate the SMF and SJC Pipelines without any incidents.

Modern pipelines are much safer and much less prone to failure and leaks relative to older pipelines. This is due in large part to more stringent regulatory requirements for pipeline design, construction, inspection and integrity management. Modern pipelines are built to withstand extreme stresses and to resist corrosion and have expected lifetimes of 75 to 100 years. According to statistics compiled by PHMSA, the major causes of hazardous liquid pipeline leaks between the years 1998 and 2012 are:

- Materials, welding, or equipment failure
- Corrosion
- Excavation damage

(Other causes of damage, such as flooding, high winds, and other natural forces, are much less significant compared to the above causes. Even of the small number of incidents occurring from natural forces, damage resulting from earthquakes represents a very insignificant portion of all pipeline damage.)

Failure of pipeline materials, welds, and equipment and pipeline corrosion are two factors that cause the most significant portion of total pipeline-related property damage. This is in large part due to aging pipeline infrastructure that was built prior to modern regulations and that has not been maintained to modern standards. For new pipeline installations, recent developments in pipeline materials, construction methods, monitoring, and maintenance methods have helped prevent, detect, and correct material, weld, equipment, and corrosion defects. Although material and weld failure and pipeline corrosion is much less common in modern pipelines, equipment failure can still occur. However, equipment failure typically occurs at locations that are aboveground, inside of manned facilities, and within secondary containment and therefore does not result in environmental damage.

The other major cause of pipeline leaks is third party damage, which typically results from other utilities performing unauthorized excavation near a pipeline. Unauthorized excavation is illegal and causes the majority of pipeline accident-related injuries. Fortunately, damage related to excavation has decreased in recent years due to "call before you dig" initiatives, enhanced right of way patrolling techniques, and public awareness campaigns.



3.1. Engineering Features

Multiple engineering methods are utilized prior to pipeline and tank construction to ensure the systems operate as safely as possible. These include system engineering and cathodic protection engineering.

3.1.1. System Engineering

The entire pipeline and tank systems are designed by experienced pipeline and tank engineers who work exclusively on petroleum product transfer and storage projects. Wickland has worked with numerous engineers in the past and selected the most qualified firm for design of the SNA Pipeline and Airport storage tanks. All engineering is subject to quality control and quality assurance, and all final engineering drawings are stamped by a professional engineer (PE) specific to the drawing type (e.g. civil, mechanical, fire protection, etc). Civil PE's in California are required to be knowledgeable in seismic and earthquake design.

As part of their analysis, the engineers will perform hydraulic modeling of the SNA Pipeline and KMEP pipeline systems to ensure that all pressures are within acceptable ranges. Based on this information, the pipeline system between the KMEP tie-in and the Airport tanks will be an ANSI/ASME 600# system with a maximum operating pressure of 1440 psig. As such, the flanges and fittings used in the SNA Pipeline system will be rated to extremely high pressures

3.1.2. Cathodic Protection Engineering

The cathodic protection (CP) system for both the SNA Pipeline and new Airport storage tanks will be designed by NACE International (formerly the National Association of Corrosion Engineers) certified cathodic protection engineers. Cathodic protection is one of the most effective methods for mitigating corrosion of steel structures in soil and water. The theory and application of CP is well established, widely used, and has been in existence for many years. The Pipeline Safety Act of 1972 made the application of CP on pipelines transporting hazardous material mandatory for safety concerns, however natural gas and oil companies had already been using CP for economic, as well as safety reasons since the 1940's. The EPA has enacted rules for mandatory cathodic protection of all new steel fuel storage tanks.

CP engineering will be integrated into the project's overall engineering analysis. This includes incorporating CP engineering lifecycle calculations for the pipeline and tanks with operation and design parameters (e.g. operating pressures and pipe wall thicknesses) to ensure that the pipeline and tanks are protected for the designed life of the structures per federally-mandated integrity management practices in 49 CFR Part 195. Pipeline CP systems are generally unaffected by groundwater conditions, however detailed geotechnical surveys will be performed to assess the relative corrosivity of the soil and groundwater at multiple locations along the pipeline right of way. In areas that may have potentially



more corrosive soil or groundwater conditions, the CP system will be designed to allow more current to overcome the expected higher current densities. This may include additional or more frequent sacrificial anodes, or pipeline coatings specific to the variable underground environment. Soil and groundwater corrosivity, operational parameters, and physical design features are among the multiple factors used to design a CP system resilient to last to the end of the century. If a change in groundwater or soil corrosivity is detected during the ongoing maintenance of the CP system, additional sacrificial anodes may be added to mitigate the potential increase in corrosion.

3.2. Design Features

The pipeline system will feature a number of design features to prevent leaks and to minimize the impacts of any leaks. These include:

- The pipeline main line piping will be made of carbon steel and have a minimum thickness of 0.375 inches, which is 50% thicker than the required wall thickness for a 12" pipe operating in a 600# system.
- Although federal regulations require a minimum of three feet of pipeline cover, the SNA Pipeline main line piping shall have approximately five feet of cover in trenched areas and will have an average cover much greater than five feet due to use of multiple HDDs.
- Flanged connections and valves on aboveground piping and equipment skids shall be located within a concrete containment area at least ten feet within the fenced perimeter. The containment area shall be capable of holding the contents of the protected piping and equipment with freeboard. Provision shall be included for draining the contents.
- Double block and bleed valves will be used in applications where a valve defines a custody transfer boundary. Double block and bleed valves are the most widely used valves in these applications because they provide two sealed locations rather than one, and they have small indicator tubing that allows valve failure to be seen before a larger leak develops.
- For valves that are in the pipeline flow path, e.g., between the delivery skid at the KMEP tie-in and the Airport, the minimum valve stroke times shall be 30-45 seconds. This is a balance between the ability to shut pipeline operations down in case of an emergency and to minimize surge effects on the pipeline during normal operations.
- Thermal relief valves will be provided as required by code, to protect portions of piping from over-pressure due to solar heating of static fuel in the isolated piping segments.
- No underground pipe flanges are allowed.
- Insulated connections (either insulating fittings or insulated aboveground flanges) shall be provided to isolate the Wickland cathodic protection system from the KMEP pipeline and Airport tank farm systems.



- The pipeline shall be capable of being shutdown in an emergency by closing isolation valves at both the KMEP tie-in and the Airport tank farm.
- The flow control valve will be designed to default to the “closed” position upon loss of power or loss of signal.
- Power operated isolation valves will be provided at each end of the pipeline on the Wickland pipeline pig launching and pig receiving skids that are hardwired into the emergency shutdown scheme. The valves, motor operators, and cabling must be “fire-safe” and will be located with the other pipeline facilities.
- Additional manual isolation valves will be provided at the station boundaries (the location may be different than the physical site boundary).
- Security fencing will be provided at the KMEP pipeline tie-in. The Airport is a secure facility and additional fencing is not required.

At the KMEP pipeline tie-in metering skid, additional safety design features include:

- Closed clean oil collection systems having a collection tank and transfer pump will be provided to collect fuel from operation of the double block and bleed valves, the meter prover, the pig launcher, thermal relief valves, and system drains.
- Transfer pump will be provided for the clean oil collection tanks to deliver the contents back into the pipeline or to a vacuum truck. The transfer pumps will be operated automatically based on the level in the clean oil collection tank. The transfer pumps shall be located within a spill containment area. The clean oil collection tanks will be provided with local level indication, level indication within the Wickland control system, and high-level alarms for the operator, and automatic controls and level switches for operation of the associated transfer pump. The pump controls shall also provide for manual operation of the pump and blocking of its operation during pipeline maintenance.

At the SNA Airport receiving station, design features include closed clean oil collection systems and transfer pumps as described above, as well as over-pressure protection for the tank farm and associated piping. The SNA tank farm is capable of accepting full flow from the pipeline at full design pressure through both the normal receipt line and the overpressure safety line.

At both the KMEP tie-in and at the SNA Airport, the Wickland equipment systems are skid-mounted assemblies that will be set on foundations, providing inlet and outlet piping with all utilities brought to a centralized location on the skid assembly. Design features for the equipment skids include:

- The system piping, structural support steel and construction will be in complete adherence to all specifications, codes and regulations. The design and equipment configuration of the structural



assembly, piping and electrical will fall within the required specifications. All aspects of operations, complete access to all equipment for service, precise measurement and controls, personnel and environmental safety will be adhered to in the design of the system.

- The units will be built to Wickland approved drawings. The systems will be designed to have sufficient rigidity for support both vertically and laterally, resulting in no noticeable vibration in any part of the installed system, under normal operating conditions. The design load of the systems will meet the requirements of Seismic Zone four (4) with a wind speed of one hundred (100) MPH.
- The systems assemblies shall have means for lifting and mounting to designed foundations.
- All main line and drain piping on the systems shall be carbon steel Schedule 40 Grade B, A106 Seamless. All flanges will be standard bore, ASTM A105, Grade 1, ASA, B16.5. All weld fittings, shall be ASTM A234 – ASA B16.9. All studs and nuts shall be in compliance with ASTM A193 and ASTM A194 Grade b-7. All gaskets shall be FLEXITALLIC, 304 SST. All threadlets, socklets and weldlets shall be 3000#. All screwed fittings 2” and smaller, shall be 2000#, A105 carbon steel. All piping 2” and smaller shall be schedule 80. All screwed valves shall be 800# forged steel. All structural welding shall conform to American Welding Societies, “Structural Welding Code-Steel” AWS D1.1. All seams between or around beams, gusset plates, braces, splices and fillers shall be completely seal welded.
- All pipe welding shall conform to ANSI B31.3 NS specifications with (100%) of the welds being X-Rayed. After assembly the complete systems will be hydro-tested to a pressure equal or greater to 1 ½ times the designed maximum working pressure and will be witnessed and recorded.
- The electrical materials and equipment will be designed, fabricated and inspected in accordance with the latest revision of the NEMA, ANSI, IEEE and IE standards and shall bear the Underwriters Laboratory label or equal. All electrical equipment designs shall conform to the requirements of NEC for Class I, Division II, Group C and D.

Design features for the new storage tanks at the Airport will include:

- The tanks will be constructed with solid cone roofs. No external floating roofs shall be utilized in the tank farm design. This will reduce the chance of ignition in the case of a lightning strike.
- The tanks will be equipped with an internal floating roof with South Coast Air Quality Management District approved seals and all other SCAQMD control requirements. The floating roof seals shall have electrical shunts at the seal space to further reduce the chance of ignition in the case of a lightning strike.
- In conformity with all applicable FAA requirements, a red obstruction lighting system shall be installed in the new tank farm.



- An emergency fire foam system shall be installed in accordance with NFPA-11, and shall include dedicated lines tied to each storage tank. The foam shall be delivered to four foam chambers mounted on each tanks' rim. In addition, separate foam monitors that are capable of being directed at any burning object within the tank farm will be installed.
- The tanks will be painted with a non-reflective paint to minimize glare.
- The tanks will be located in a secondary containment area that utilizes six foot high concrete walls and an HDPE geomembrane liner. The secondary containment area will be sized to hold the contents of one full tank plus the 25-year, 24-hour rainfall event total. Internal walls will be utilized to contain smaller spills to one portion of the secondary containment area.
- To minimize internal corrosion, the entire interior of the tanks will be coated with a thin film epoxy.
- The tanks will have a radar-based gauging system and a standalone/independent high high level switch. The operator will have a software based high level switch linked to the tank gauging system. The stand-alone high-high level switch will shut the battery limit block valve and stop product flow from the pipeline.
- Tanks will have double containment leak detection system that will allow for visual inspection. This will be described in more below.

3.2.1. Cathodic Protection and Coating

The cathodic protection systems for both the tanks and the pipeline shall use galvanic (sacrificial) anode current systems, reference electrodes, and field test stations. Field test stations shall be provided for measurement of anode current and pipe to soil potential. Permanent reference electrodes shall be placed at test stations installed in paved areas where contact to the soil is not possible.

Underground piping is coated with a layer of extremely resilient fusion bonded epoxy (FBE) so the bare metal of the pipe is not in contact with the soil, which can lead to accelerate corrosion. Although the CP system is in place to sacrificially fail in place of the pipe, pipeline coating is still an important design feature. Pipe coating is performed at specialized coating factories and the pipe is delivered pre-coated. At junctions between pipes where welding occurs, special shrink sleeves are applied that overlap the factory coating. This creates a continuous barrier for the entire length of the pipeline that completely isolates the metal in the pipe from the soil. The coating shall be a single thick layer of FBE for all pipe to be trenched and a double layer of FBE and abrasion coating for all pipe to be horizontally directionally drilled. Coating is inspected prior to the pipe being backfilled using specialized electrical equipment to ensure that there are no flaws or anomalies along the entire pipe surface.



3.2.2. Welding and Inspection

The pipeline and tanks will be fabricated from smaller pieces of pipe or steel sheets and welded together. Welding procedures are regulated by government code and trade organization procedures, including those in 49 CFR Part 195, API 650, and ANSI. All welding shall be performed by qualified welders using qualified welding procedures in conformance with applicable regulations, specifications, and standards (Section 6 of API 1104, 20th ed. or Section IX of the ASME Boiler and Pressure Vessel Code). No welder may weld with a welding process unless, within the preceding 6 calendar months the welder has engaged in welding with that process and had one weld tested and found acceptable under Section 12 of API 1104, 20th ed. and ANSI B31.4. Each arc burn must be repaired as described in CFR Part 195.226 (b). Construction records shall be maintained for the life of the facility, including the total number of girth welds and the number nondestructively tested, including the number rejected and the disposition of each rejected weld.

Following the completion of welds, third party inspectors perform non-destructive testing on the welds to ensure the welds were performed the mandated level of quality. The third-party inspectors are required to be certified by the American Society of Non-Destructive Testing. Normal industry practice is to non-destructively test (typically via x-ray) 10% of the welds along a pipeline system. Wickland's practice is to non-destructively test 100% of the pipeline welds.

3.2.3. Hydrostatic Testing

Hydrostatic testing is a mandated procedure (49 CFR Part 195 for pipelines and API 650 for tanks) that involves filling new pipelines or tanks completely with water under high pressure to ensure that the newly-constructed systems are completely liquid tight at pressures above normal operational pressures. Hydrostatic tests are performed by certified third-party organizations and are subject to review and observation by governmental agencies (e.g. CSFM for pipelines). Aboveground or trenched pipelines are tested for four hours at a pressure of 125% or greater of the maximum operating pressure of the pipeline. Pipelines that are installed through HDDs are tested for an additional four hours at 110% or greater of the maximum operating pressure of the pipeline. After testing is complete and the results are certified, the pipeline and tanks are drained and dried and deemed ready for service.

3.2.4. Internal Investigations

Pipelines are subject to internal line investigations every five years. Typically this is performed through smart pigs, which are devices that are inserted into the pipeline and pushed with the flow of product from one end of the pipeline to the other. Smart pigs record vast amounts of data along the pipeline and are equipped with tracking and measurement devices so each data point is associated exactly with the location and orientation in the pipe. The instruments are not only able to measure wall thickness to assess



if any pipe loss has occurred, but also able to measure whether there are any locations where the coating on the outside of the pipe has been damaged. Surface pitting and corrosion, as well as cracks and weld defects in steel pipelines are easily detected using Magnetic Flux Leakage (MFL) pigs. Other smart pigs use ultrasonics to detect pipe defects. Caliper pigs measure the "roundness" of the pipeline to determine areas of crushing or other deformations. Some smart pigs combine technologies such as MFL and Caliper into a single tool.

Per federal regulations, pipeline operators typically hydrostatically test their pipelines before startup (Year 0) and then smart pig their pipelines in five year increments following startup (Year 5, Year 10, etc). Wickland had decided to hydrostatically test the pipeline prior to startup in Year 0 and then to not only smart pig the pipeline within the first three months of startup (Year 1) but also to smart pig the pipeline in Year 3 and Year 6. Following this accelerated internal investigation program, Wickland will resume to a five year investigation interval.

Similar to the pipeline, the tanks require periodic inspection in accordance to API 653. Inspection intervals are determined by the tank's service history, however API 653 sets maximum internal duration standards for various inspection types. Monthly routine in-service inspections of tank condition are performed and documented by the owner or operator of the tanks. External inspections occur at least every five years by a certified third party inspector while the tank remains in service. Internal inspections occur at least every ten years by a certified third party and require the tank to be taken out of service. Third party inspections assess the tank bottom, shell, and roof thicknesses and corrosion rates, as well as any potential settlement of the tank. Inspections can be performed through a number of methods, including visually and ultrasonically or through penetrant, radiographic, or vacuum methods. Inspections will identify any modifications required of the storage tanks. Additional cathodic protection surveys also occur in accordance to API 651.

3.3. Operations and On-going Maintenance

Only highly-trained qualified operators are allowed to operate facilities during a pipeline receipt. Procedures required of operators to maintain safe operations, include:

- Maintaining constant communication between Wickland, KMEP, and Airport operators prior to, during, and after pipeline deliveries.
- Pre- and post-pipeline delivery inspections of all equipment.
- Manning the Airport tank farm 24-hours per day.
- Maintaining a policy of open communication between managers, operators, and contractors.
- Ensuring all employees are current with the Wickland Operator Qualification (OQ) program. The OQ program is mandated per 49 CFR 195 and requires operators to have had written, oral, or on



the job training for all tasks covered in the program. An operator must be qualified on a task before the operator can perform that task.

- Ensuring all employees are current with the Wickland Control Room Management (CRM) plan. The CRM plan is mandated per 49 CFR 195 and requires operators and managers to track and assess how operators interact with SCADA systems to ensure false alarms do not adversely affect operators. Additionally, the plan establishes work hour limits and requires training for operators and managers to understand the affects of fatigue and how to mitigate for fatigue.

The maintenance of the pipeline will typically involve only minor intrusive activities. As described in more detail below, the pipeline will be protected with a cathodic protection system to protect the system from corrosion. Four times per year, the test stations located along the pipeline will need to be accessed to confirm the system is operating as designed. The inspections take approximately 5 minutes at each test station including deploying approved traffic control systems. The other maintenance activity is the periodic smart pigging of the line that was described above. Smart pigging is a redundant test that confirms that the cathodic protection system is functioning properly and that the pipeline is not experiencing corrosion or other defects. In the rare event the smart pig detects an abnormality, the line will need to be inspected to determine the extent and cause of the abnormality. The inspection procedure will be to excavate the pipe and if it is determined that there is a problem that needs repairs, the pipe will be repaired as detailed in the Leak Response section of this document.

Part of Wickland's legal agreements with the Cities and County will be through franchise agreements. In cases of emergency repairs, franchise agreements issued by cities and counties for pipeline rights-of-way in public streets usually contain the following requirements:

- That the pipeline shall be maintained by the franchisee in a good, workman like manner, and shall be operated and maintained in conformity with all applicable laws and regulations.
- That the franchisee shall obtain an encroachment permit before performing any ordinary or emergency repair and/or remediation work.
- Most jurisdictions have expedited procedures for emergency operations. Pipeline franchises typically allow a franchisee to immediately commence excavation and encroachment activities in cases of emergency affecting public health, safety or welfare or the preservation of life or property. In these situations, franchisees are required to file for encroachment permits contemporaneously with the emergency work undertaken, or as soon thereafter as is possible.
- That all maintenance, repair and replacement work undertaken by the franchisee be conducted in such a manner as to minimize any hindrance to the use of the street for purposes of travel.
- That after any maintenance, repair or replacement work is completed, the street shall, at the franchisee's cost, be restored and placed in as good a condition as it was before the maintenance, repairs or replacement occurred. It is usually also specifically stipulated that the street



restoration will be in accordance with the jurisdiction's current street specifications and all applicable laws, and will be done to the satisfaction of the public works department.

- That the franchisor may step in and take over any work in the event that the franchisee fails to complete said work in a timely fashion. In the event the franchisor must undertake such action, the franchisee must reimburse the franchisor for the cost of doing the work.

Pipeline right-of-way is usually obtained on private property by way of an easement, license or long term lease. Most, if not all, of the above described terms and conditions are also usually found in these documents.

3.4. Compliance

Jet fuel pipelines and storage tanks mandate oversight from multiple agencies in the local, state, and federal levels. For pipelines, the highest level of oversight is from the US Department of Transportation's (DOT) Pipeline and Hazardous Material Safety Administration (PHMSA). While PHMSA oversees pipeline operators, the California State Fire Marshall (CSFM) acts as an agent to PHMSA to provide more direct and local oversight. The CSFM reviews engineering plans prior to construction, acts as an inspector during construction, provides oversight of third party inspection during construction such as non-destructive testing of welds and hydrostatic testing, approves the as-built construction drawings, and performs periodic audits of Wickland's operations, including equipment and maintenance records, SCADA system data logs, required spill response drills, and operation and maintenance manuals. Wickland has an excellent record with the CSFM through a history of pipeline projects and audits.

Aboveground storage tanks are overseen by the Certified Unified Program Agency (CUPA) in the County of Orange. The CUPA implements the California Aboveground Petroleum Storage Act (APSA).

The APSA requires the owner or operator of a tank facility, with an aggregate storage capacity $\geq 1,320$ gallons of petroleum, to prepare and implement a Spill Prevention, Control, and Countermeasure (SPCC) SPCC plan in accordance with federal law, 40 CFR 112.

3.4.1. Damage Prevention

Information for Wickland Pipelines LLC and for the SNA Pipeline, including company contact information and pipeline location, will be provided to Underground Service Alert of Southern California (DigAlert). DigAlert is the One Call Notification Center that supports all of Southern California. Any entity, whether public or private, planning on performing any type of underground work, such as digging or excavation, are required to submit their proposed dig locations to DigAlert 48 hours prior to excavation in what is often referred to as 'call before you dig'. This notifies any underground utility operators in the area and requires them to mark the ground surface above their utility location to avoid any conflicts.



As an operator in the area, Wickland will be required to mark the SNA Pipeline and to liaise with any entity planning underground work. During construction of the SNA Pipeline, Wickland will develop detailed as-built drawings of the exact location of all pipeline welds, bends, and other underground features using GPS. This information will be vital when responding to dig requests. Wickland operators are mandated to inspect the pipeline right of way approximately every two weeks, however Wickland's practice is to do much more frequent right of way inspections to ensure that no unauthorized digging is occurring near the pipeline.

To further avoid third party damage to the pipeline during underground trenched construction, reflective marking warning tape will be installed approximately two feet below the ground surface and two feet above the pipeline along the entire pipeline alignment. This warning tape will be marked with "Caution Buried Pipeline".

3.4.2. Public Awareness

Wickland has a Public Awareness plan in accordance with 49 CFR Part 195 and under guidance of API 1162. The targets of the public awareness include the general public in the vicinity of the pipeline, as well as local emergency responders, contractors, and public officials. The goals of the public awareness plan include:

- Use of a one-call notification system (DigAlert) prior to excavation and other damage prevention activities
- Possible hazards associated with unintended releases from a hazardous liquid pipeline facility
- Physical indications that such a release may have occurred
- Steps that should be taken for public safety in the event of a hazardous liquid pipeline release
- Procedures to report such an event

The public awareness campaign is conducted in both English and Spanish and performed through Wickland-created handouts in person, mailings, and event sponsorships.

3.4.3. Cathodic Protection

Wickland's Cathodic Protection Operations and Maintenance Manual is reviewed prior to pipeline startup by the CSFM. Annual inspections are performed by a certified third party inspector. Readings at all aboveground and belowground test stations and aboveground connection points are measured and compared to past readings to ensure the cathodic protection system is operating as intended. Inspection records are reviewed periodically by the CSFM. Additionally, Wickland performs biweekly external inspections of the cathodic test stations and performs quarterly measurements at each station.



3.4.4. Integrity Management

Federal and State regulations require that hazardous liquid pipeline operators develop and implement an Integrity Management (IM) program to provide enhanced protection to pipeline segments that could affect high consequence areas (HCAs) in the event of failure. HCAs are populated areas, unusually sensitive environmental areas, sole source drinking water supplies, and commercially navigable waterways. These enhanced protections take the form of measures to prevent leaks, failures and incidents, and measures to mitigate the effects of leaks, failures and incidents. Pipeline integrity is assured by means of controls and programs that prevent or minimize the likelihood of a leak, failure, incident, rupture or accident.

Timely leak detection is a critical part of prompt leak mitigation, since the operator's response to leaks does not begin until the leak is detected. Operators are required, by the IM rule, to have a means to detect leaks. Operators must also perform a critical, investigative, risk-based evaluation of their leak detection capabilities. The operator's evaluation of its leak detection capabilities must consider, at a minimum, the following factors:

1. Length and size of the pipeline
2. Type of product carried
3. The pipeline's proximity to the high consequence area
4. The swiftness of leak detection
5. Location of nearest response personnel
6. Leak history
7. Risk assessment results

While the IM rule focuses on additional protections for HCAs, operators also have an obligation to detect and respond to leaks in non-HCAs. Normally, the same leak detection systems and procedures are used to detect leaks on both HCAs and non-HCAs on the same pipeline.

PHMSA oversight program for IM includes specific inspection protocols that guide inspectors to examine the operator's leak detection capabilities and periodic evaluations, including the basis for any decision to modify the means of leak detection currently employed on a pipeline. PHMSA inspectors are trained and instructed to inspect the following characteristics of an operator's program for evaluating leak detection capabilities:

1. Inclusion of all seven of the required system risk evaluation factors identified above. If all required factors are not considered, a basis for excluding the evaluation factor(s) must be documented.
2. Inclusion of all seven factors specifically pertaining to the leak detection evaluation, including risk assessment results. If all required factors are not considered, a basis for excluding the



evaluation factor(s) must be documented.

3. Identification and evaluation of a sufficient spectrum of leak scenarios to adequately determine the overall effectiveness of leak detection capability (e.g., “most likely” in addition to “maximum possible”).
4. Consideration of additional important evaluation factors such as:
 - current leak detection method for the HCAs;
 - use of SCADA systems;
 - thresholds for leak detection;
 - flow and pressure measurement;
 - specific procedures for lines that are idle but still under pressure;
 - additional leak detection means for areas in close proximity to sole source water supplies; and,
 - leak detection testing (such as physical withdrawal of product from the pipeline).
5. Evaluation of all modes of line operations including slack line, idled line, static conditions, and the impact of special or unique operating modes.
6. If a computation pipeline monitoring technique is part of the leak detection system, design, maintenance, controller training, and record keeping aspects of API 1130 must be addressed in system design and maintenance practices.
7. Evaluation of leak detection performance during transient conditions, and a strategy to manage any related short-term reduced or inhibited performance.
8. Evaluation of the operational availability and reliability of the leak detection systems, and the operator’s process to manage system failures.
9. Consideration of enhancements to existing leak detection capability.
10. Consistent application of a risk-based decision making process for leak detection.
11. A documented basis for all operator reactions credited in the leak detection evaluation (e.g. operational procedures and/or training material).
12. Measures applied to assure that required actions are accomplished and prudently restored if varying modes of pipeline operations require controllers or other personnel to engage /activate or mute/disable certain attributes of the overall leak detection capabilities.
13. Integration of emergency response procedures and incident mitigation plans with associated leak detection indications.
14. Adequate guidance in documented work processes to assure that operating personnel have the authority and responsibility to initiate response actions, up to and including shutdown of the pipeline if warranted.



15. Assurance that supervision is always promptly available for contact if procedures require that operating personnel contact supervision prior to initiating response actions and/or shutting down the pipeline.

PHMSA's inspectors review operator plans and procedures for conducting the evaluation and check if the considerations itemized above have been considered by the operator. If the operator's leak detection evaluation has been completed, PHMSA's inspectors critically review the technical basis for the evaluations, including the conclusions and recommendations.

3.4.5. Tank System

The new JWA jet fuel storage tanks are subject to the requirements of the California Aboveground Petroleum Storage Act (APSA). The APSA requires the owner or operator of a tank facility, with an aggregate storage capacity $\geq 1,320$ gallons of petroleum, to prepare and implement a Spill Prevention, Control, and Countermeasure (SPCC) plan in accordance with federal law, 40 CFR 112.

Each owner or operator of a tank facility subject to APSA shall:

- Prepare a SPCC plan prepared in accordance with Part 112 of Title 40 of the Code of Federal Regulations (40 CFR 112);
- Conduct periodic inspections of the storage tank to assure compliance with 40 CFR 112; and
- In implementing the SPCC plan, fully comply with the latest version of the regulations contained in 40 CFR 112. The U.S. EPA Oil Pollution Prevention Regulation, (40 CFR 112), addresses non-transportation related facilities. The main requirement of facilities subject to the regulation is the preparation and implementation of a SPCC plan to prevent any discharge of oil into waters of the United States.

Preparation of the SPCC plan is the responsibility of the facility owner/operator, but it must be certified by a Professional Engineer. By certifying the SPCC Plan, the Professional Engineer, having examined the facility attests that:

- The PE is familiar with the requirements of part 112;
- He or his agent has examined the facility;
- The Plan has been prepared in accordance with good engineering practices, to include
- Consideration of applicable industry standards, and the requirements of part 112;
- Procedures for required inspections and testing have been established; and
- The Plan is adequate for the facility.

The SPCC Plan should clearly address three areas:



- 1) Operating procedures to prevent the occurrence of oil discharges
- 2) Control measures to prevent a discharge from entering navigable waters
- 3) Countermeasures to contain, clean up, and mitigate the effects of an oil discharge that impacts navigable waters



4. Leak Detection Systems

The new pipeline and tanks will be operated using a state-of-the-art leak detection system (LDS) and will comply with all federal, state and local operating and safety standards. As described in this document, the LDS is one component of Wickland's preventative maintenance program, which includes well engineered systems, well trained personnel, internal and external audits, emergency response drills as well as multiple other best practices and adherence to regulatory requirements.

4.1. Pipeline Leak Detection

The supervisory control and data acquisition (SCADA) system is a computer-based communications system that monitors, processes, transmits, and displays data for the pipeline controller. The SCADA system collects real-time data from field instruments using Remote Terminal Units (RTUs), Programmable Logic Controllers (PLCs), and other electronic measurement devices of the pipeline system. The data generated by the SCADA is one of the components that will be used by the Wickland Leak Detection System to aid in assessing the potential for a product release in the SNA Pipeline. The SCADA system will provide real time data on fuel flow, operating pressure, temperature, leak detection status and emergency shutdown systems. This information is logged, graphed, archived, and compared with historic data, and is periodically reviewed in person by CSFM staff.

The Wickland SCADA uses pipeline operational data to calculate predicted operational parameters under normal conditions. Using established algorithms, these predictions are compared to measured parameters to identify a pressure or flow anomaly that could indicate a leak. Pipeline components are constantly polled and data transmitted to the control console through the SCADA system. The SCADA system then provides the needed data to a monitoring computer running the leak detection algorithm and being monitored by the pipeline controller. The Wickland LDS operates by providing an alarm and displaying other related data to the controller who, in turn, investigates the reason for an alarm and initiates a response if the anomaly could represent a product release.

Flow measurement and pressure are the most important process variables in the operation and control of pipelines; therefore, turbine flow meters are one of the most important instruments installed on a system. Turbine meters are accurate flow-measuring devices with rotors that sense the velocity of flowing liquid in a closed conduit. The SNA Pipeline will have two turbine flow meters, one at the KMEP pipeline tie-in and a second one at the Airport receiving skid. Additionally, multiple pressure indicators will be located at both ends of the pipeline. The combination of two flow meters and multiple pressure indicators establishes a detailed hydraulic 'fingerprint' of the pipeline system during normal flow conditions and normal idle conditions. Deviations from this 'fingerprint' are instantaneously recognized by the LDS algorithm, which then helps determine both the approximate size and location of the leak.



Because the SNA Pipeline utilizes multiple HDDs and only transfers fuel 3% of the time, an 'internal' leak system is much more appropriate than an 'external' system. The internal leak system monitors pressures in standby mode. The system in standby mode is pressurized at 300 psi. Should the SCADA system measure a possible release scenario during Standby mode, an alarm will be triggered and an automated call to the Wickland phone system will be made describing the alarm condition. The first call is sent to the operator on duty who will acknowledge the alarm and immediately proceed with investigating the cause. Additional automated calls will be sent out to other Wickland personnel, including the Wickland 24-hour phone service which results in a live operator dialing all Wickland employees.

The operator will first investigate if the alarm is from an actual release of jet fuel. Operators account for and manage for a thermally-caused pressure drop in pipeline operations, as most drops in pressure are due thermal effects (e.g. the jet fuel in the pipeline cooling due to low temperatures and therefore causing a decrease in pressure). Thermal pressure drops occur very gradually and can easily be distinguished from a pipeline leak. The SCADA system continuously reads and archives pressure and flow trending data in one second intervals and part of the operator's duty is to review and understand this information in real time and in historical context. Thermal expansion and contraction is subject to the effects of daily and seasonal temperature fluctuations, groundwater temperatures, and other factors that are predictable. Part of the operator's responsibility that is subject to federal oversight is to maintain pressure relief devices in good working order and to keep the pipeline above a minimum pressure by pumping up the line. Maintaining pipeline pressures between a set minimum and maximum not only allows for safe pipeline conditions during Standby mode, but also reduces the amount of potential false alarms due to thermal effects. In addition to leak detection on the pipeline, the SCADA system monitors the clean oil collection tanks. Alarms associated with an increase in levels in the clean oil collection tanks would most likely be the result of the failure of a small valve or fitting and the release would be contained in the clean oil collection system and secondarily by the concrete equipment pads.

External LDS can utilize fiber optic or other small diameter piping placed in parallel with the 12-inch diameter jet fuel pipeline to either sense a possible release either directly or indirectly. This can occur through hydrocarbon sensors in the small diameter piping or through sensing of physical damage to the small diameter piping. However, where a significant portion of the pipeline is installed through directionally drilling, these systems are limited and in some instances may not allow for continuous coverage of the entire pipeline. External systems can have long lead times between when the vapor enters the cable and when the system alarms. This can be a period of several hours in addition to the time required for the product to migrate to the cable itself. Further, if these systems are exposed to hydrocarbons from another source they become damaged and require replacement.



4.1.1. Pipeline SCADA Logic

The volume balance method of leak detection, also known as line balance, compensated volume balance, or mass balance, is based on measuring the discrepancy between the incoming (receipt) and outgoing (delivery) product volumes of a particular pipeline segment per API 1130. The pressure balance method of leak detection, also known as rarefaction wave monitoring, acoustic, negative pressure, or expansion wave, is based on the analysis of changes in pressure in the pipeline system. By combining these two methods, the system's SCADA logic will continuously assess whether a rapid depressurization, rapid inflow increase, rapid outflow decrease, and rapid increase in the difference between inflow and outflow are associated with the onset of a leak.

Wickland's control engineers will develop logic tables for the Pipeline System that will be the basis for programming the software logic for the SCADA system. Simplified preliminary SCADA logic tables are presented below for the three preliminary operating modes, all of which include Leak Detection Mode.

- Standby Mode
- Fuel Transfer Mode (Startup and Shutdown)
- Fuel Transfer Mode



Standby Mode / Leak Detection Mode: Both KMEP MOV and WPL MOV Closed

<u>Component</u>	<u>Status</u>	<u>Status</u>	<u>Status</u>	<u>Status</u>
KMEP MOV	CLOSED	CLOSED	CLOSED	No signal from any one component
WPL MOV	CLOSED	CLOSED	CLOSED	
PT-1	>95 psig	<95 psig	N/A	
PT-2	>95 psig	<95 psig	N/A	
M-1	N/A	N/A	N/A	
M-2	N/A	N/A	N/A	
LIT-1	Stable Level	N/A	Increasing Level	
LIT-2	Stable Level	N/A	Increasing Level	
DISPLAY STATUS	NORMAL	ALARM CONDITION	UNUSUAL OPERATING CONDITION	

Basis: the KMEP and Wickland MOVs are closed to isolate both ends of the pipeline when the pipeline is shutdown. The pressure control valve at the Airport maintains a minimum backpressure in the pipeline of 100 psig. The equivalent static pressure at the KMEP tie-in is ~100 psig as there is very little difference in elevation between the two locations. If the pressure falls significantly below this value, an alarm will occur indicating a possible release. If the levels in the clean oil collection systems are increasing, an unusual operation condition exists and must be investigated.



Fuel Transfer Mode (Startup and Shutdown) / Leak Detection Model: Either KMEP MOV or WPL MOV are open

<u>Component</u>	<u>Status</u>	<u>Status</u>	<u>Status</u>	<u>Status</u>	<u>Status</u>	<u>Status</u>
KMEP MOV	OPEN	CLOSED	OPEN	CLOSED	OPEN	No signal from any one component
WPL MOV	CLOSED	OPEN	CLOSED	OPEN	CLOSED	
PT-1	>95 psig	Both >95 psig	N/A	Either <95 psig	N/A	
PT-2	N/A		N/A		N/A	
M-1	N/A	N/A	>100 BPH for 5 minutes	N/A	N/A	
M-2	N/A	N/A	N/A	N/A	N/A	
LIT-1	Stable Level	N/A	N/A	N/A	Increasing Level	
LIT-2	Stable Level	N/A	N/A	N/A	Increasing Level	
DISPLAY STATUS	NORMAL	NORMAL	ALARM CONDITION	ALARM CONDITION	UNUSUAL OPERATING CONDITION	DATA FAILURE

Basis: With the KMEP MOV open and the WPL MOV closed or the KMEP MOV closed and WPL MOV open during startup or shutdown, there is no flow path to the Airport. Indications of an alarm condition include pressures falling below 100 psig, increasing levels in the two clean oil collection systems, or flow measured in M-1.



Fuel Transfer Mode / Leak Detection Model: Both KMEP MOV or WPL MOV are open

<u>Component</u>	<u>Status</u>	<u>Status</u>	<u>Status</u>	<u>Status</u>	<u>Status</u>	<u>Status</u>	
KMEP MOV	OPEN	OPEN	OPEN	OPEN	OPEN	No signal from any one component	
WPL MOV	OPEN	OPEN	OPEN	OPEN	OPEN		
PT-1	>650 psig with >5500 BPH or >300 psig with >3000 BPH	<650 psig with >5500 BPH for >5 minutes or <300 psig with >3000 BPH for >5 minutes	N/A	N/A	N/A		
PT-2	>100 psig	N/A	N/A	<95 psig	N/A		
M-1	In service	N/A	In service	N/A	> 6500 BPH for > 5 minutes		
M-2	>99% of M-1	N/A	<99% of M-1 for >5 minutes or <90% of M-1 for any time	N/A	N/A		
LIT-1	Stable Level	N/A	N/A	N/A	N/A		
LIT-2	Stable Level	N/A	N/A	N/A	N/A		
DISPLAY STATUS	NORMAL	ALARM CONDITION	ALARM CONDITION	UNUSUAL OPERATING CONDITION	UNUSUAL OPERATING CONDITION		DATA FAILURE

Basis: There are two operating modes for the pipeline during fuel transfer: Full Flow and Stripping Flow. Each of the modes is in a distinctively different flow range. Based on anticipated conditions, the expected conditions are:

Full Flow: 650-725 psig at 5,500-6,000 bph at the KMEP tie-in

Stripping Flow: 300-350 psig at 3,000-3,500 bph at the KMEP tie-in

When the pipeline is flowing, the two scenarios that would result in alarms and emergency shutdowns are when PT-1 measures a pressure lower than expected based on flow modeling and when M-2 measures a flow smaller than M-1. The two scenarios that would result in unusual operation conditions that require investigation are when PT-2 measures a pressure lower than minimum backpressure maintained by the pressure control valve and when M-1 measures a flow greater than expected based on flow modeling.



4.1.2. Standby Mode

Should the SCADA system measure a possible release scenario during Standby mode, an alarm will be triggered and an automated call to the Wickland phone system will be made describing the alarm condition. The first call is sent to the operator on duty who will acknowledge the alarm and immediately proceed with investigating the cause. Additional automated calls will be sent out to other Wickland personnel, including the Wickland 24-hour phone service which results in a live operator dialing all Wickland employees.

The operator will first investigate if the alarm is actually a release of jet fuel. Operators account for and manage for a thermally-caused pressure drop in pipeline operations, as most drops in pressure are due thermal effects (e.g. the jet fuel in the pipeline cooling due to low temperatures and therefore causing a decrease in pressure). Thermal pressure drops occur very gradually and can easily be distinguished from a pipeline leak. The SCADA system continuously reads and archives pressure and flow trending data in one second intervals and part of the operator's duty is to review and understand this information in real time and in historical context. Thermal expansion and contraction is subject to the effects of daily and seasonal temperature fluctuations, groundwater temperatures, and other factors that are predictable. Part of the operator's responsibility that is subject to federal oversight is to maintain pressure relief devices in good working order and to keep the pipeline above a minimum pressure by pumping up the line. Maintaining pipeline pressures between a set minimum and maximum not only allows for safe pipeline conditions during Standby mode, but also reduces the amount of potential false alarms due to thermal effects.

Because a spill resulting from a small leak during Standby mode is most often driven by pressure differences (i.e. the pressure in the pipeline causes fuel to leave the pipeline until the pressure in the pipeline is equal to ambient pressure), release volumes are small. Small leaks occurring at the KMEP tie-in or Airport receiving station equipment skids would be contained in either the clean oil collection system or in the containment pad. Additionally, gravity would not cause additional fuel to drain out of the pipeline at these locations, since the piping is all aboveground and at higher elevations than the adjacent underground piping. For small leaks occurring underground along the pipeline right of way including the HDD sections, the small amount of jet fuel initially released due to the pressure difference between the pipe and the ground would represent the bulk of total leak volume. This volume would only be approximately 5.1 bbls (214 gallons) for a pressure drop from 300 psi to 0 psi. Following pressure equalization, the rate of flow from the pipeline to the surrounding soil or groundwater due to advection or dispersion would be extremely slow due to the inherent nature of these processes in both saturated and unsaturated soil. Large leaks due to pipeline ruptures during Standby mode would be more subject to the effects of gravity and therefore result in higher spill volumes.



The operator will then begin to determine the location of the leak and begin the notification process according to the Wickland Spill Response Plan. Both of these processes are further described below.

4.1.3. Fuel Transfer Mode Emergency Shutdown

The pipeline operates in Standby mode for approximately 97% of the time and it is therefore most likely that a potential leak would occur during this operation mode. Should the SCADA system measure a possible release scenario during Fuel Transfer mode, an alarm will be triggered that will result in an emergency shutdown (ESD) scenario.

ESDs can be initiated from several sources:

- the SCADA leak detection system,
- on-screen buttons on all Wickland, Airport, and KMEP PLCs and HMIs, and
- prominently placed physical pushbuttons at the KMEP pipeline tie-in and at the Airport receiving station.

Triggering an ESD will result in an immediate loss of the 'ready to receive' signal to KMEP, which will subsequently result in a shutdown of the KMEP pumping system and an opening of their mainline valve, a close of the Wickland valve at the KMEP tie-in and a closure of the Wickland valve at the Airport. The Airport valve will be closed approximately 15 seconds after the KMEP valve in order to eliminate any pressure in the pipeline and to minimize surge effects from the valve closures. This will depressurize and isolate the SNA Pipeline system

ESDs result in SCADA system alarms that require additional steps to be cleared by the Wickland operator relative to other alarms in the system. Per Wickland's Operations and Maintenance requirements, this ensures the operator cannot clear the ESD with the assumption that it was a false alarm, but must investigate the cause and take appropriate action. Following an emergency shutdown, the pipeline will be in Standby mode and the Wickland operator will follow procedures for this condition as described above.

4.1.4. Leak Location Determination

As described above, the vast majority of leaks occur either due to material failures or from third party damage. Material failures occur most often at aboveground equipment locations. Should the SCADA system indicate that a leak has occurred and automatically shutdown operations, the first place the on-site operators will inspect will be the KMEP tie-in and the Airport tank farm equipment skids as these are the only locations with aboveground equipment. These two locations will be staffed continuously during pipeline deliveries and if a leak should occur here, the location of the leak would be able to be identified immediately.



If the SCADA system indicates that a leak has occurred and the operators have determined that the leak is not at the KMEP tie-in or at the Airport, the Wickland operator will immediately begin to investigate if the leak is the result of third party damage. The pipeline right of way is five miles long and located almost entirely within the public right of way. With assistance from the LDS algorithm and because third party damage almost always is caused by easily identified construction equipment, the Wickland operator will therefore be able to determine the exact location of possible third party damage within minutes of the SCADA system alarm by driving the pipeline right of way in the specific location that the LDS system identified as having a release. Because third party damage can be both damaging to the pipeline and a higher risk for public safety, the operator will focus on getting to the site as soon as possible.

As discussed above, leaks from other sources such as corrosion are extremely unlikely to occur due to Wickland's ongoing maintenance program and the periodic use of smart pigs. However, should the SCADA system indicate that a leak has occurred and it has been confirmed that the leak is not at an aboveground location or resulting from third party damage, the operator will use the LDS algorithm to determine the location of the leak. Typically, leak detection algorithm developers specify that the exact location of the leak can be determined within at least 1% to 2% of the total pipeline length, which for the SNA Pipeline is +/- 140 feet at 1%. Because an LDS algorithm has not yet been developed for the SNA Pipeline's SCADA system, an exact leak location range isn't know at this time, however it is anticipated that the range will be 1% to 2% of the pipeline length or less. Following securing the area around the leak for public safety purposes, Wickland will first pothole the pipeline in multiple locations around the leak using minimally-intrusive vacuum trucks and then if necessary run a smart pig through the pipeline using inert nitrogen gas both for safety reasons and as a way to remove all jet fuel from the pipeline. The smart pig will pinpoint the exact location and type of leak that has occurred.

In all scenarios, leak response will begin immediately. The response effort will include the following actions:

- Within 2 minutes, the pipeline will be depressurized and isolated.
- **Immediately** the operator will notify emergency responders **via 911** and Wickland management, who will then notify all relevant regulatory agencies, including the US Government's National Response Center (**NRC**), California's Office of Spill Prevention and Response (**OSPR**), California's Office of Emergency Management, and the Office of the California State Fire Marshall. **These notifications will occur within 15 minutes of discovery.** Typical protocol is for the National Response Center **and the Office of Spill Prevention and Response** to notify additional agencies, such as the California Environmental Protection Agency, **the local Certified Unified Program Agency, the California Department of Fish and Wildlife, the Department of Toxic Substances Control, the local water boards, and the United States Fish and Wildlife Service, and for Wickland to simultaneously notify these agencies using a report number**



provided by the NRC and OSPR. Wickland management will also contact other federal, state, and local agencies including the Airport, the affected city public works departments, and Kinder Morgan immediately following the prior notifications.

- Within 15 minutes, the exact location of the leak will be determined if the leak is aboveground or due to third party damage.
- Within 20 minutes, emergency responders will be onsite.
- Within 4 hours, a repair plan will be in place.
- Within 24 hours, the pipeline will be repaired if the leak is aboveground or due to third party damage.
- Within 24 hours, the exact location of the leak will be determined if the leak is underground (including both trenched and HDD sections) and not from third party damage.
- Within 48 hours, the pipeline will be repaired if the leak is underground and not from third party damage.

Leak response is described in more detail below.

4.2. Tank System

Leak detection for the new storage tanks is divided into two categories: acute leak detection and catastrophic leak detection. As part of both of these leak detection systems, the tanks will have accurate level gauges that will allow the tank operators to observe the liquid level in the tank in real time to assess if there are any unexpected changes.

4.2.1. Acute Leak Detection

Acute leaks could result from possible long term degradation of the tank bottom. While cathodic protection, tank inspections, and other preventative maintenance actions would drastically reduce the chances of an acute leak occurring, leak detection will be done with a visual monitoring system that is typical for above ground storage tanks and meets API 650 specifications. Visual detection systems for tanks are preferred as they are simple to monitor, not subject to electrical failure, and are generally maintenance free.

The tank leak detection system will consist of a layer of roller compacted sand underneath the tank bottom on the inside of the ringwall foundation. Near the bottom of this sand layer will be an 80 mil HDPE liner that is connected to the inside of the ringwall. The sand and liner layers will be sloped toward the center of the tank to a sump. Any leaks from the bottom of the tank will drain through the sand until reaching the liner and then drain toward the center to be collected in the sump. Four sloping two inch diameter HDPE drainpipe will connect the sump to four vertical four inch diameter standpipe



located outside of the tank's perimeter. Any leaking product collected in the sump will drain to the standpipes and be apparent through visual inspection. Frequent operator inspections of the tank farm area will include checking the standpipes for leaks. See the Attachment 1 for typical details of the tank leak detection system.

As a further safeguard to prevent leaks from going undetected, a redundant leak detection system will be installed by the Airport at Wickland's cost consisting of four groundwater monitoring wells installed outside of the containment area. These wells will be maintained by the Airport and monitored annually by the Airport.

4.2.2. Catastrophic Leak Protection

Catastrophic leak protection is necessary if a tank overtops, ruptures, or fails. Tank level sensors tied to the Airport SCADA system measures tank level in real time and produces 'high' and 'high-high' alarms as the liquid level in the tank approaches the maximum level possible. An additional physical level switch at the 'high-high' level will also be tied to the SCADA system for redundancy. A 'high' level will alarm the tank farm operator to take appropriate action and to avoid increasing the tank level any further. A 'high-high' alarm will shut down incoming pipeline operations by removing the 'ready to receive' signal given to the Wickland SCADA system. This would result in a similar shutdown scenario as that caused by an ESD alarm, as described above.

Should overtopping or tank failure occur, the secondary containment is designed to hold the contents of a failed tank (plus the rain from a 25-year, 24-hour event). Although 40 CFR 112 requires only that the containment be able to hold the liquid for a short time period, the proposed tank farm containment area shall be secondarily lined with geomembrane fabric that is designed to prohibit leakage into the subsurface. The geomembrane will be compatible with jet fuel to show no damage or loss of strength.



5. Leak Response

Should a leak occur, Wickland Pipelines will respond immediately based on the specific scenario according to a federally-reviewed spill response plan. The Wickland Spill Response Plan is design to assist Wickland as the pipeline owner and operator in protection of public safety and the environment through an active program of spill preventions, emergency response planning, and emergency response training. This is accomplished through cooperative interaction with specialized support contractors and local government agencies both prior to and during emergency situations.

Immediately following a release, the Wickland operator is trained to:

- Ensure the immediate safety of themselves, those around themselves, and the public.
- If safe to do so, relieve the pressure in the pipeline to an Airport receiving tank, close all valves, and remove all potential heat or ignition sources.
- Perform a rapid assessment of the situation, which includes identifying the location of the incident, whether the release has been stopped, the approximate volume of the release, the approximate extent of the areas affected, the potential hazards, and the weather conditions.
- Notify emergency responders and Wickland personnel (additional information is below).
- Mobilize to the spill location.
- If safe to do so, begin mitigation procedures.
- Document the situation and all actions and decisions.

Prompt and decisive notifications are critical in an emergency situation. The order of notifications typically follows:

- The Wickland operator immediately calls 911.
- The Wickland operator then calls Wickland management.
- Wickland management to immediately notify the contracted spill response organizations.
- **Immediately** the operator will notify emergency responders **via 911** and Wickland management, who will then notify all relevant regulatory agencies, including the US Government's National Response Center (**NRC**), California's Office of Spill Prevention and Response (**OSPR**), California's Office of Emergency Management, and the Office of the California State Fire Marshall. **These notifications will occur within 15 minutes of discovery.** Typical protocol is for the National Response Center **and the Office of Spill Prevention and Response** to notify additional agencies, such as the California Environmental Protection Agency, **the local Certified Unified Program Agency**, the California Department of Fish and Wildlife, the Department of Toxic Substances Control, the local water boards, and the United States Fish and Wildlife Service, and for Wickland to simultaneously notify these agencies using a report number



provided by the NRC and OSPR. Wickland management will also contact other federal, state, and local agencies including the Airport, the affected city public works departments, and Kinder Morgan immediately following the prior notifications.

- Wickland management to immediately notify other stakeholders, such as the Airport, Kinder Morgan, landowners, etc.

In the hours following the incident:

- Wickland management and operators will continue to ensure the safety of all personnel, contractors, agency officials, and the public.
- Wickland operators shall better refine the release volume..
- Wickland management will mobilize field personnel to the incident and support personnel to Wickland's main office.
- Management and operators will maintain continued communication for situation updates.
- Operators shall maintain continued contact with the response organization regarding timing, manpower, equipment, etc.
- The lead operator shall become the Incident Commander and Liaison Officer until relieved by Wickland Management and shall begin development of a Safety Plan until relieved by the response organization.
- Wickland Incident Command shall designate the response organization to be in charge of Safety and Logistics.
- Emergency responders or regulators may relieve Wickland and implement the Incident Command System compatible with Orange County's Incident Command System.
- Wickland management will coordinate with a Qualified Mechanical Contractor to initiate immediate pipeline investigation and repair.
- All Wickland personnel shall continue to document their decisions and actions, include the use of the ICS 201 and 202 forms.
- All Wickland personnel shall refer to the Wickland Spill Response Plan for further information.

5.1. Spill Response Plan and Training

Per federal regulations, Wickland has a detailed Spill Response Plan that covers all aspects of emergency response, including:

- Notifications and mobilization,
- Response organization information,
- Operations safety, response procedures,



- Response resources,
- Training information,
- Containment and control procedures, and
- Clean up procedures.

The plan is submitted to and reviewed by PHMSA on a five-year basis, or if any major changes in the plan occurs.

Wickland performs annual leak response drills with their qualified oil spill response organization. The purpose of the drill is to play out a scenario of a hypothetical leak or spill that utilizes methods covered in the Wickland Spill Response Plan. All Wickland employees participate in the drill and assume an appropriate role during the hypothetical scenario. Often, the drill takes place on site and includes the deployment of equipment from Wickland's spill response contractor.

5.2. Spill Response Contractor and Qualified Mechanical Contractors

Wickland contracts with the National Response Corporation (NRC), who is a global company that specializes in emergency response. NRC has eight offices in California and a large fleet of specialized response equipment, including absorbent material, vacuum trucks, boom, etc. NRC has been involved in major incidents in California and is able to not only supply response equipment but to also provide assistance in response commanding. With a contract for the SNA Pipeline, NRC will make its resources available to Wickland in a very short time frame, typically less than one hour.

Additionally, Wickland has close working relationships with several mechanical contracting firms that specialize in pipeline and tank construction, repair, and maintenance. These companies have offices throughout the state and are able to supply qualified workers, excavation equipment, and specialized pipeline and tank repair equipment to a location within 24 hours of notification.

5.3. Repairs and Maintenance

As part of the incident response steps described above and in the Wickland Spill Response Plan, a pipeline repair plan will begin immediately. This will be developed in conjunction with emergency responders, City and County officials, and mechanical contractors to ensure public safety is a top priority. This plan will be developed within 4 hours following the incident.

Within 15 minutes following the incident, the exact location of the leak will be known if it occurs at an aboveground fitting or through third party damage. In these situations, repairs will begin within 24 hours of discovery of the leak assuming it is safe to do so. If the leak occurs at an underground location due to reasons other than third party damage, the approximate location will be known through the SCADA



system's analysis, however the exact location will need to be determined. This will either be done through potholing the pipeline in the vicinity of the leak with vacuum trucks, or sending a Smart Pig through the pipeline with nitrogen gas. Both of these locating techniques require mobilization of third party contractors and will occur within 24 hours following the leak. In this situation, repairs will begin once the exact location is determined, which is expected to be approximately 48 hours following the discovery of the leak assuming it is safe to do so. As discussed in more detail above, once the system is depressurized the additional leakage will be minimal. For small leaks occurring underground along the pipeline right of way including the HDD sections, the small amount of jet fuel initially released due to the pressure difference between the pipe and the ground would represent the bulk of total leak volume. This volume would only be approximately 5.1 bbls (214 gallons) for a pressure drop from 300 psi to 0 psi. Following pressure equalization, the rate of flow from the pipeline to the surrounding soil or groundwater due to advection or dispersion would be extremely slow due to the inherent nature of these processes in both saturated and unsaturated soil.

Public and environmental safety will be an utmost priority during repair activities. Leak repair typically involves removing product from the pipeline, excavating the area around the pipe (approximately 4 feet on each side of the pipe), removing the affected pipeline section, welding in new pretested pipe, inspecting welds by third party non-destructive testing, and testing the pipeline. Trench dewatering is not expected due to the elevation of the bottom of the trench compared to the expected groundwater table. However if groundwater is encountered dewatering may be necessary. If dewatering is necessary in areas of the pipeline that are affected with Selenium or other contaminants the water will be removed by a licensed hazardous waste hauler and brought to a licensed recycling or disposal company. A traffic control plan will be designed by a qualified professional and submitted to the affected city for their review. Traffic controls would be implemented to block the lane or lanes of traffic affected by the repairs. Transitional coning would be used for approximately 300 feet on both ends of the repair site.. Pedestrian traffic would be rerouted away from the repair location. All jet fuel will be removed from the pipeline and replaced with inert nitrogen gas. Gas sniffers will be used to monitor air quality around all personnel and equipment to ensure that gas concentrations are below the lower explosive limits (LEL). Vacuum trucks will be used to remove soil near the pipeline.

During the initial construction of the pipeline, Wickland will hydrostatically test, certify, and correctly label a portion of pipe that is not installed with the rest of the pipeline. This pipe will be stored near the SNA pipeline and will be available for immediate use for repairs should it be necessary. In the case of a leak in a trenched portion of the SNA pipeline, the mechanical contractors will carefully dig in the area around the failure and safely remove a portion of the existing pipeline. Adjacent sections of the pipeline and coating will be inspected per 49 CFR 195 requirements. The pre-tested pipe will then be cut and welded into the existing pipeline. The welds will be non-destructively tested and the coating will be repaired or replaced. In the very unlikely case of a leak in a HDD portion of pipeline, a shored trench will



be dug to access the failure point if possible. If this is not possible, the entire horizontally drilled portion of the pipe will be cut, filled with an inert gas, and removed from service. The new pipe will need to be welded, coated, and hydrostatically tested prior to replacing the existing damaged portion of the pipe.

Resulting soil contamination from any leaks will be excavated at the same time the pipeline is being repaired. The appropriate regulatory agencies will be notified of the identified contamination. Contaminated soil will be removed using pothole suction trucks for pipeline backfill and backhoes for adjacent soil areas. The soil and backfill will be stockpiled on HDPE sheeting until testing has confirmed the levels of contaminants. The soil will be profiled and taken by licensed transporter to an appropriately licensed hazardous/non-hazardous waste recycling or disposal facility, with the approval of federal, state, or local resource and regulatory agencies. Once the soil is excavated, samples of the affected area will be taken to confirm that all hazardous soil has been removed.

In the event that the contamination has traveled past reasonable excavating capabilities, or if a leak has occurred in a section of horizontal directionally drilled pipe that is too deep to excavate, a series of monitoring wells will be installed to delineate and monitor the migration of contamination, and to determine whether groundwater has been affected. The monitoring wells will be installed under the jurisdiction of the appropriate federal, state, or local resource or regulatory agency. The results of the monitoring will dictate whether further remediation is necessary and, if required, the parameters of the remediation scope of work. The extent and type of any remediation effort will be specific to the attributes of the leak being investigated, and may include, but not necessarily be limited to, one or more of the following options:

- Passive remediation
- Vapor extraction
- Groundwater extraction
- In-situ bio-remediation
- Continued monitoring

Ultimately, the results obtained from the monitoring wells will be used to prepare an action plan that will require the approval of the Regional Water Quality Control Board and any other governmental agencies with jurisdiction over plan preparation.