

# PXP

**Plains Exploration & Production Company**

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## **Revisions to the Point Pedernales Field DPP Tranquillon Ridge Field**

### **Supporting Information Volume Onshore Facilities**

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**Submitted to:  
The Minerals Management Service  
Pacific OCS Region**

**Submitted by:  
Plains Exploration & Production Company**

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## 1.0 Introduction

Plains Exploration and Production, Inc. (PXP), as Operator of the Point Pedernales Field, is requesting revisions to the Development and Production Plan (DPP) for the Point Pedernales Field to develop (drilling and production operations) a California State Lease (Tranquillon Ridge Field). The proposed development of the Tranquillon Ridge Field will introduce Tranquillon Ridge production into the existing Point Pedernales facilities and production operations with minimal modifications to existing facility equipment.

The original Point Pedernales Project (94-DP-027), including Platform Irene and the Lompoc Oil and Gas Plant (LOGP) facility (formerly the Heating, Separation, and Pumping [HS&P] facility) located north of the City of Lompoc, was approved by the Santa Barbara County (SBC) Board of Supervisors in 1986. The MMS approved the federal portion of the project and the California Coastal Commission (CCC) concurred in a consistency certification in 1985/1986. The facility has operated since 1987. Gas treatment facilities were installed in 1997 that allowed for the production of sales quality natural gas at the LOGP.

This section of the document provides a general description of the onshore Point Pedernales facilities that currently exist and the modifications necessary to handle the production from the Tranquillon Ridge Field. This information is included as part of the DPP supplemental information to assist the reader in understanding the activities that occur at the Point Pedernales facilities since the production from the Tranquillon Ridge Field will use these existing facilities.

The Point Pedernales facilities include the following:

- An oil and gas drilling and production platform, Platform Irene, located on outer continental shelf Lease OCS-P 0441;
- An oil dehydration and gas processing facility located 3 miles north of the City of Lompoc, known as the Lompoc Oil and Gas Plant (hereafter LOGP);
- Three pipelines, in one corridor, connecting Platform Irene with the LOGP: a 20-inch wet oil line, an 8-inch gas line, and an 8-inch produced water return line for discharge at the platform. The pipelines reach landfall just north of the Santa Ynez River and cross Vandenberg Air Force Base (VAFB) and PXP fee property;
- A power supply system consisting of an electrical substation located on Southern Pacific Railroad property at Surf, a subsea power cable from the substation to Platform Irene, and an upgraded transmission line from the Pacific Gas and Electric power line north of Lompoc to the substation;
- A 12-inch sales gas pipeline from LOGP to Righetti Valve Box and a 6-inch sales gas pipeline from Righetti Valve Box to The Gas Company gas transmission line #1010; and,
- Three onshore produced water disposal lines, one 10-inch and two 12-inch lines, used to transport wastewater from the LOGP to the Lompoc Oil Field for injection.

The proposed Tranquillon Ridge development project will utilize the above existing facilities. Tranquillon Ridge development can fit within the existing framework of facility infrastructure at Platform Irene and the LOGP. Figure 1 shows the location of the Tranquillon Ridge Field, the Point Pedernales Facilities, and other facilities that are associated with the movement of the Point Pedernales oil and gas from the LOGP.

Currently, the Point Pedernales Project is permitted to operate under the following SBC Final Development Plan (FDP) production/processing capacities: 36,000 barrels per day (BPD) of dry oil; 15 million standard cubic feet per day (MMSCFD) of natural gas with a maximum hydrogen sulfide (H<sub>2</sub>S) concentration level of 8,000 parts per million (ppm); 9.205 MMSCFD of onshore gas reinjection (only during upset conditions); and a monthly average of 2.3 liquefied petroleum gas/natural gas liquids (LPG/NGL) truck trips per day.

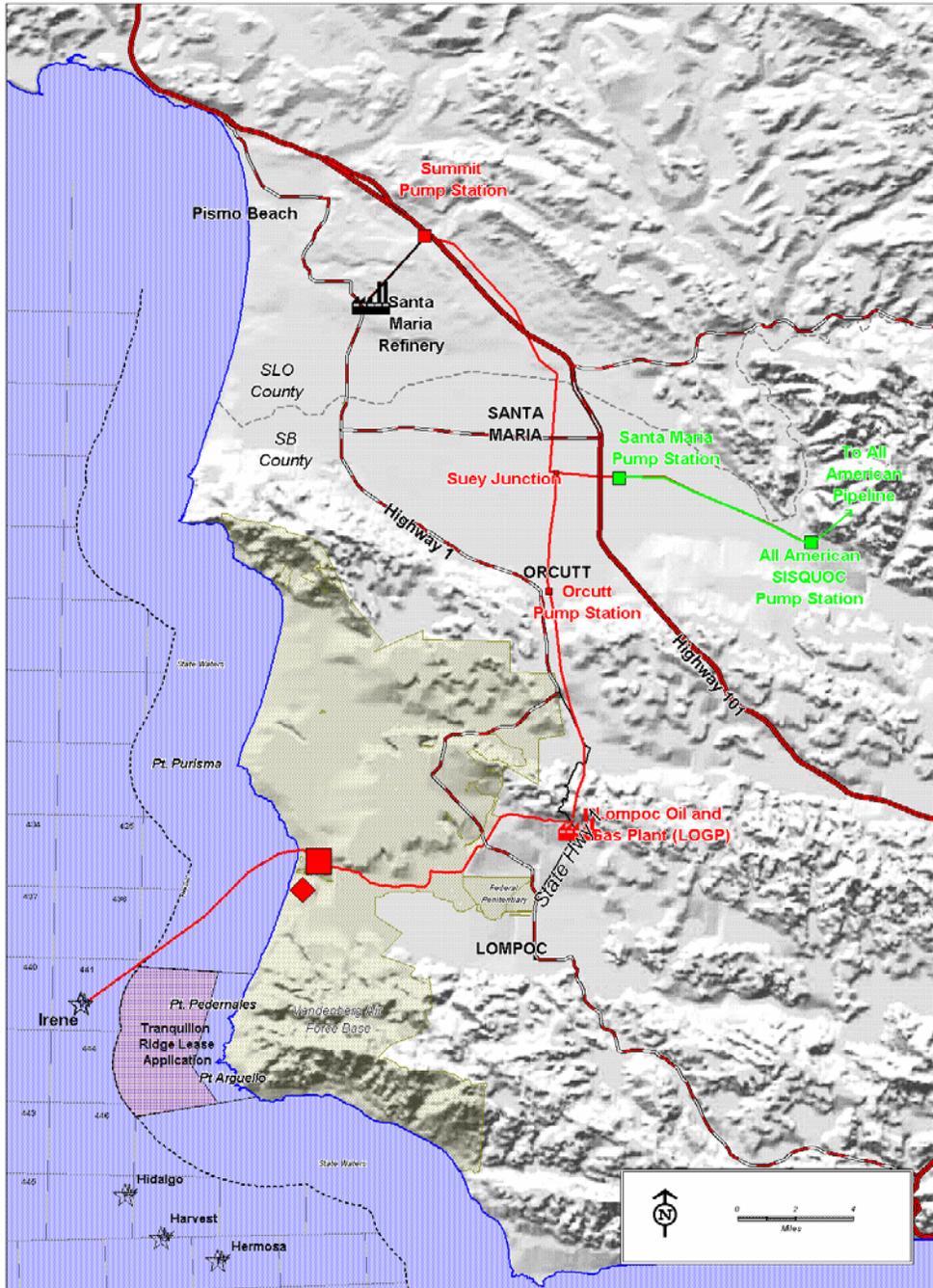
Current Point Pedernales operations include drilling and production at Platform Irene, transportation of production via pipeline from offshore to onshore, oil dehydration and gas processing at the LOGP, and shipment of product for sale or further processing by pipeline or LPG trucks.

The produced liquid from Platform Irene is a combination of crude oil, gas, and water. The gas exists as free gas or is in solution in the oil, and the water exists both as free water and emulsion in the oil. The liquid stream is transferred to the LOGP through the 20-inch emulsion pipeline. The primary function of the LOGP is to lower the basic sediment and water content of the oil stream to less than three percent (known as dehydration) so the oil can be shipped and processed at a refinery and to compress, sweeten (remove the carbon dioxide (CO<sub>2</sub>) and hydrogen sulfide [H<sub>2</sub>S]), dehydrate and process the associated gas streams for sale and use at the LOGP.

Process operations at the LOGP include oil dehydration, produced water treatment, and shipment for reinjection offshore at Platform Irene and onshore into the Lompoc Oil Field, oil reclamation, oil storage, oil shipment, gas compression, gas reinjection, gas sweetening, gas dehydration, gas sales, LPG/NGL stabilization and storage, LPG/NGL and sulfur truck loading, and NGL/crude oil blending. The oil dehydration system is used to dehydrate a current average of 60,000 to 65,000 barrels per day of oil emulsion. The produced oil is characterized as heavy oil (16 degree American Petroleum Institute [API] gravity).

The Point Pedernales Project currently includes three subsea and buried pipelines between Platform Irene and the LOGP. The total pipeline route is 22.2 miles long with approximately 12.1 miles located onshore. The pipelines include one 20-inch diameter wet crude oil line, one 8-inch produced water return line, and one 8-inch produced gas line.

**Figure 1** Location of the Tranquillon Ridge Field and Associated Point Pedernales Facilities



There are ten valve sites located on the oil pipeline, and four valve sites located on the water return and gas pipelines. Nine of the valve sites are located in underground vaults.

Valve Site #2 is an aboveground facility located on VAFB and is approximately 100 feet by 100 feet and fenced. Valve Site #2 has two block valves on each of the three pipelines.

Current pipeline operations include performing ongoing routine internal and external pipeline surveys. Pipeline surveys include, but are not limited to, smart pigging, corrosion checks, pressure tests, air and ground patrols, visual surveys using a video camera, and cathodic protection surveys. These periodic internal and external pipeline inspections are performed on a schedule specified by MMS, SBC, and Santa Barbara County Air Pollution Control District (SBCAPCD) permits. These inspections also satisfy the requirements of the Department of Transportation (DOT) and the California State Fire Marshal for the onshore portions of the pipelines.

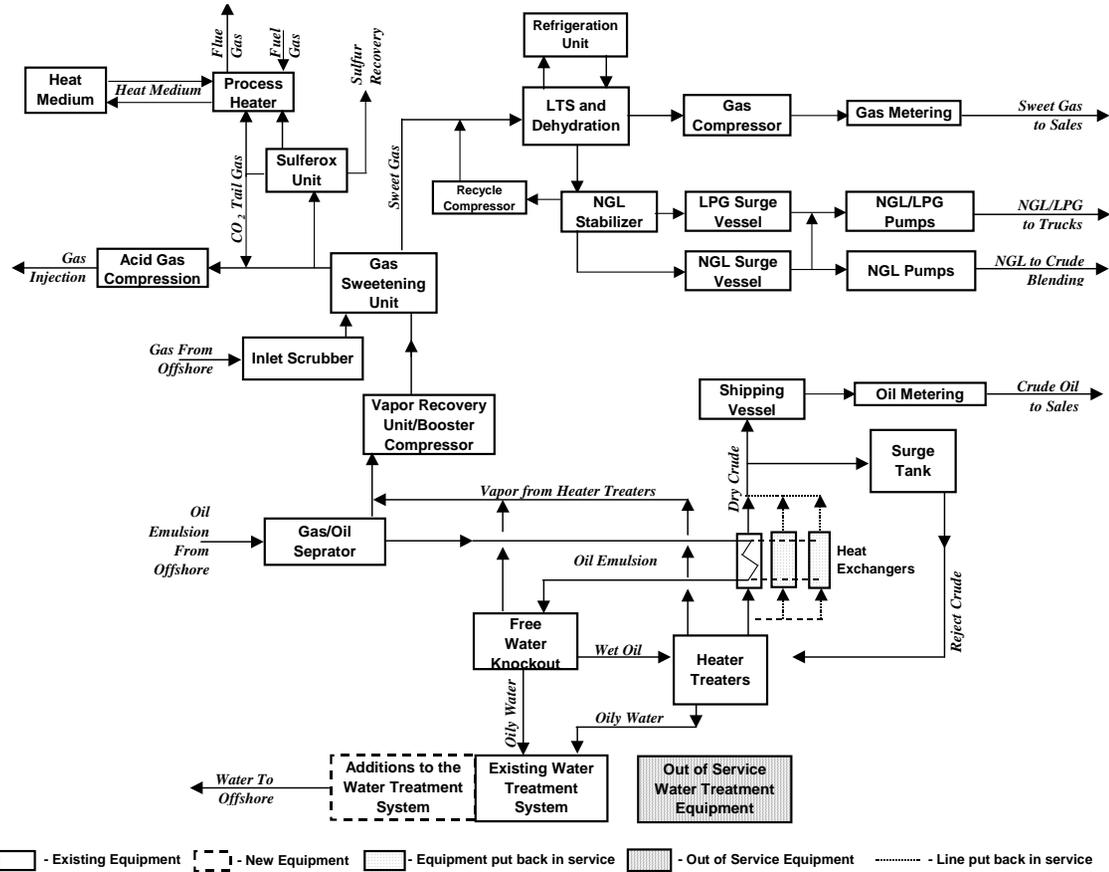
## **2.0 Onshore Oil Handling**

### **2.1 Lompoc Oil and Gas Plant (LOGP)**

Platform Irene ships its entire produced product to the LOGP. The LOGP is monitored through the August System Programmable Logic Controller (PLC) system. The control system is operated from the control room, which is manned 24 hours per day. The operator monitors operating pressures, levels, temperatures, flows, and other operating conditions. The LOGP is equipped with emergency alarms and equipment including hydrocarbon gas and hydrogen sulfide detectors, infrared fire detectors, fire hydrants, fire water line, fire monitors, foam capabilities, and other safety equipment. PXP maintains offshore and onshore spill response plans (the Point Pedernales LOGP Oil Spill Contingency Plan, Point Pedernales 20-inch Wet Oil Pipeline Spill Contingency Plan, Platform Irene Oil Spill Response Plan and the Point Pedernales Onshore Emergency Response Plan). The oil dehydration facility has operated since 1987, and the gas plant began operation in September 1997.

The LOGP receives oil/water emulsion and sour gas from Platform Irene and sour gas from the Lompoc Oil Field. Process operations at the LOGP include oil dehydration, produced water treatment, produced water injection offshore and onshore into the Lompoc Oil Field, oil reclamation, oil storage, oil shipment, gas compression, gas reinjection, gas sweetening, gas dehydration, LPG/NGL stabilization and storage, LPG/NGL truck loading, and NGL/crude oil blending. Figure 2 shows a simplified process flow diagram of the LOGP.

Figure 2 LOGP Block Flow Diagram



The existing oil processing and storage equipment at the LOGP includes heat exchangers, separators, free water knockout vessel, three heater treaters, SO<sub>2</sub> minimization scrubber, flare system, pressurized shipping vessel, wash tank, reject tanks, reclaimed oil storage tank, surge tank, vapor recovery system, gas compressors, and other miscellaneous pumps and equipment. Once the oil is dehydrated, it is sold to ConocoPhillips and shipped by pipeline from the LOGP to the Orcutt Pump Station and then to the Santa Maria Refinery, in San Luis Obispo County, for further processing.

Point Pedernales treated oil is shipped from the LOGP to Santa Maria Refinery by a system of pipelines known as the UNOCAP network, also known as Line 300, which is owned by ConocoPhillips. The oil from LOGP is transported northward through a 12-inch pipeline to the Orcutt Pump Station where it commingles with oil from the Orcutt area. It then flows northward through an 8-inch pipeline to Suey Junction where it commingles with oil from the Sisquoc and Santa Maria Pump Stations. The combined stream then flows northward through a combination 10-inch and 12-inch pipeline to the Summit Pump Station. There is also an 8-inch pipeline which roughly parallels the 10/12-inch pipeline from Suey Junction to Summit. This pipeline is currently idle; however ConocoPhillips is preparing to resubmit an application to use this line for emergency purposes. From Summit, the oil flows westward to the Santa Maria Refinery through a 12-inch pipeline. These facilities are discussed in detail in the Tosco Sisquoc SEIR (2001).

## **2.2 Modifications to Lompoc Oil and Gas Plant (LOGP)**

The following minor modifications at the LOGP will be required in order to handle production from development of the Tranquillon Ridge Field.

It may be necessary to heat the water and oil emulsion to aid in separation. If this is necessary, then PXP will return to service two existing plate and frame heat exchangers and install piping for the heat medium with the existing heater treater water outlets. All of this existing equipment is fully permitted and offset. In addition, PXP will install a new duplex feed strainer on the 20-inch pipeline inlet between the first and second plate and frame heat exchangers. One of the reasons the existing plate and frame heat exchangers are currently out of service is fouling from solid material in the emulsion stream.

The installation of a feed strainer will facilitate the removal of solids, extend the time between cleaning, and maintain the efficiency of the exchangers. The duplex design will allow cleaning of one strainer while the other is online.

Other modifications include: installing internal coalescing assemblies inside the existing free-water knockout vessel and insulating its exterior; and, installing internal coalescing assemblies and four externally adjustable baffles on the three existing heater treaters. Installing baffles in the existing free water knockout and heater treaters will expand their emulsion breaking capacity. They will also aid in the water clarification process.

Insulating the free water knockout will aid in heat retention and reduce the fuel consumption in the heater treaters.

Due to the increased use of the heater treaters for heating of the crude oil, natural gas consumption could increase by 100%. Electricity consumption at the LOGP could increase by approximately 30% due to the increased operations of the existing equipment. Increases in maintenance and service of the new equipment will not require additional new employees.

Currently there are 2.9 LPG/NGL truck trips per week (year 2000 annual average). It is expected that the Tranquillon Ridge project will generate up to two additional trips per week. All LOGP upgrades and modifications will occur within the existing boundaries of the facility. No new grading will be required. No new lighting will be required at the LOGP. Table 1 summarizes all the changes to the LOGP facility that will occur with development of the Tranquillon Ridge Field.

**Table 1 Summary of Changes to the LOGP with Development of the Tranquillon Ridge Field**

Changes with Project	During Normal Operations
Additional Employees	None
Additional LPG/NGL Truck trips	Approximately 2 per week (to a total of 5 per week <sup>a</sup> )
Additional Equipment or Equipment Modifications	1) Return to service of two heat exchangers. 2) Addition of duplex feed strainer. 3) Addition of internal coalescing assemblies inside the existing free-water knockout vessel and insulation of its exterior. 4) Addition of internal coalescing assemblies and four (4) externally adjustable baffles on the three existing heater treaters.
Additional Maintenance	To be handled by the current employees.
Additional Electrical Power Requirement	30% <sup>b</sup>
Water Disposal Onshore	No increase

*hp – horse power.*

*a. Based on the ratio of oil that could be generated to currently being produced.*

*b. The increase is due to increased operations due to production from Tranquillon Ridge.*

### 2.3 Oil Emulsion Pipeline

The oil emulsion pipeline, or the wet crude pipeline, between Platform Irene and the LOGP has a 20-inch outer diameter (OD) with a Maximum Allowable Operating Pressure (MAOP) of 1,194 pounds per square inch (psig).

Wall thickness of the pipeline is 0.625 inches onshore, 0.688 inches offshore. The steel grade is API 5L-X52 electric resistance welded (ERW) onshore and API 5L-X46 ERW offshore. The entire length of the pipeline is coated with PRITEC 70/15 (70 millimeters polyethylene, 15 millimeters butyl adhesive). The average age of the pipeline is

approximately 14 years, which includes sections replaced due to corrosion. The pipeline currently operates at a discharge temperature of 185°F.

Approximately once every 2 weeks, the 20-inch oil pipeline is batch pigged with 400 gallons of corrosion inhibitor and 400 gallons of diesel. The corrosion pill is followed by a wiper pig. Corrosion inhibitor chemical is also injected continuously. Oil residuals are frequently analyzed for metal deposits and chemical residuals. Corrosion coupons are pulled every six months at the LOGP and Platform Irene. There is a flush mounted coupon probe at Valve Site #2 for continuous corrosion monitoring of the oil pipeline, where Beta foil records corrosion potential on the pipeline.

PXP conducted a comprehensive study on the life expectancy of the Point Pedernales pipelines. The study was presented to and accepted by Santa Barbara County and their consulting engineer. It evaluated corrosion monitoring, control programs and maintenance programs. The findings of the study showed that the pipelines have an expected life, assuming no human interventions for repairs, of greater than 200 years. The investigation concluded the present program for corrosion control and monitoring has demonstrated effectiveness in controlling the corrosion penetration rate to less than 0.239 mils per year (mpy) for the oil line and 0.23 for the 8" water line and gas line for 2003 and 2004. This is better than industry standards.

The .239 mpy average gives a life expectancy, without pipeline repair or replacement of greater than 200 years for both the onshore and offshore segments of the 20" oil pipeline. The same parameters applied to the 8" water pipeline give a life expectancy of greater than 200 years for both the onshore and offshore segment.

PXP has expanded the corrosion control program and will ensure that the pipelines are maintained within acceptable corrosion penetration rates through their monitoring, corrosion inhibition and cleaning programs. In addition, periodic pipeline integrity reviews including Santa Barbara County and their consulting engineer, have been established to ensure the program is being followed.

The 20-inch crude pipeline is equipped with alarms and controls that allow operation of the equipment and protection during upset conditions. The pipeline is equipped with a shutdown valve at both the inlet and outlet. The inlet shutdown valve (SDV), SDV-171, is located at the outlet of the shipping tank prior to the pig launcher on Platform Irene. SDV-171 is actuated by the platform Emergency Shut Down (ESD) as well as interlocks on the pressure transmitter (PT), PT-171, located directly downstream of the SDV-171.

Outlet shutdown valve, SDV-40, provides automatic protection and isolation at the pipeline outlet at the LOGP facility upstream of the gas-oil separation vessel. SDV-40 is actuated manually by the "Oil Process Stop" button, and automatically by the LOGP facility ESD as well as by a number of pressure and level transmitters. Additional information on the pipeline pressure and level transmitters can be found in the Emergency Response Manual. The onshore portions of the pipelines are protected from external corrosion by a rectifier and deep-well anode bed that is installed adjacent to

Valve Site #8. Test stations are installed at one-mile intervals to monitor the performance of the system. Insulating joints have also been installed at the beach, and at the LOGP facility on each of the pipelines.

The pipeline is equipped with a leak detection system. This system is used to detect leaks when the pipeline is operating. The major component of the leak detection system is the supervisory control and data acquisition system (SCADA), which is used to monitor various operating parameters of the pipeline such as flowrates and pressures. The SCADA system collects the data, processes the data, and provides the inputs to the system alarms and automatic shutdowns. Through the remainder of the document, SCADA and leak detection system are used interchangeably.

The oil/water emulsion is metered at Platform Irene prior to shipment via the 20-inch pipeline and as received at the LOGP facility. Flow meters are located adjacent to the shut-down valves. The signal from the LOGP flow meter is transmitted to the control room where it is compared with the flow meter reading from the platform. Should the total fluid production fall outside the following limits, an alarm will sound at Platform Irene indicating a potential pipeline leak.

- 6% – more than 15 minutes or 62 barrels (based on 100,000 bpd)
- 4.5% – more than 2 hours or 375 barrels (based on 100,000 bpd)

In the event of a large release from the oil pipeline Motor Operated Valves (MOV) would close along the pipeline within a few minutes after the operator initiates the appropriate shutdown of the pipeline. The locations of MOV are addressed in the following sections. Smaller leaks would also be detected but would take a longer time depending on the size of the leak. To aid prompt leak detection, PXP conducts pipeline overflights and ROW inspections at least twice per week.

## **2.4 Modifications to Oil Emulsion Pipeline**

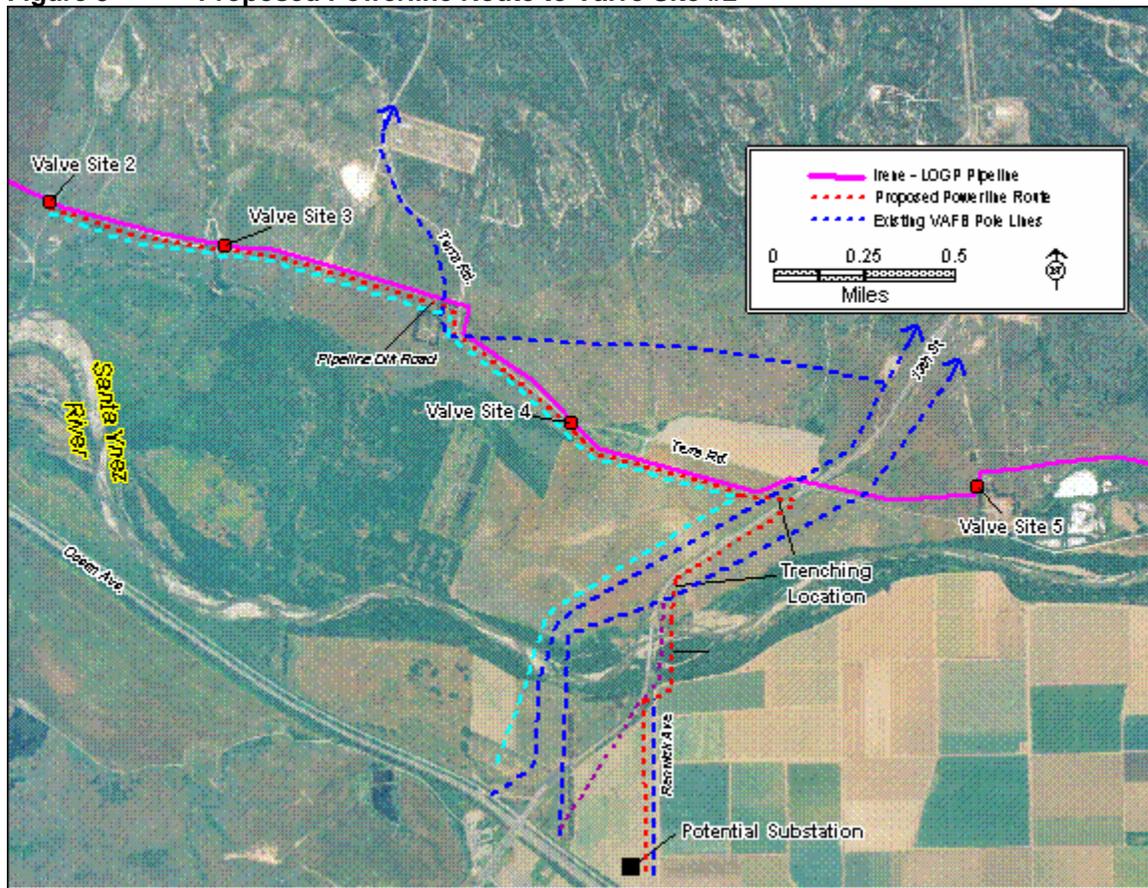
The Tranquillon Ridge development project includes the possible installation of crude oil booster pumps and upgrades to the electrical equipment at Valve Site #2. No other modifications are proposed for the Platform Irene to LOGP pipelines. Monitoring of the pipelines will continue, and sections of existing pipe will be replaced with new pipe, as required, to maintain a sufficient MAOP in order to continue operation of the Point Pedernales Project with the Tranquillon Ridge project. Only minor changes in normal operations would be necessary as a result of the production from the Tranquillon Ridge Field.

The expected volume of oil/water emulsion produced by Point Pedernales and Tranquillon Ridge combined is 90,000 bpd. Currently, the pressure rating on the 20-inch emulsion pipeline from Platform Irene to the LOGP is sufficient for the expected operation. However, during the course of Tranquillon Ridge project, if the MAOP of the 20-inch pipeline needs to be lowered (i.e., the pipeline derated to less than 1,000 psig), then operation at the pressures needed to transport 90,000 bpd of emulsion would not be

possible. In this case, three new 1,250-horsepower, electric booster pumps would be installed at Valve Site #2 in order to minimize the operating pressure of the offshore pipeline segment of the 20-inch oil pipeline. Two pumps will be operated with the third pump on standby. Apart from the power lines, all equipment modifications will be accommodated within the existing footprint of Valve Site #2 and will be integrated into the existing safety systems at the LOGP.

If the booster pumps are installed, the existing electrical system will be upgraded at Valve Site #2. Upgrading the system will consist of installing a new power line. Power is proposed to be supplied from one of two locations. The first choice is to supply power from the 115 kilovolt (kV) line that exists along Renwick Avenue in Lompoc. In this case, a substation will need to be constructed to step power down from 115 kV to 34.5 kV. The substation will be placed in the farm field on the northwest corner of Renwick Avenue and Ocean Avenues. The new power line poles will be installed along Renwick Avenue in the northerly direction. The second choice is to supply power from the existing 12 kV power line. There will be no need for the substation and the power line could be placed on the existing poles along Renwick Avenue. Figure 3 shows the route of the proposed powerline to Valve Site #2.

**Figure 3 Proposed Powerline Route to Valve Site #2**



At the northern end of Renwick Avenue the line will need to cross Santa Ynez River. The power line will cross the Santa Ynez River on a new set of poles that will be installed on both sides of the river. After crossing the river and crossing under the VAFB power line via trenching, the new power line will run along 13th Street on the east side, until the intersection with Terra Road. Once at Terra Road, the new power line will be run under 13th Street and under another VAFB power line that follows 13th Street in this location. This crossing will be done via trenching. After the power line emerges on the west side of 13th Street, it will follow Terra Road and the right of way of the Platform Irene to the LOGP pipeline route until it reaches the Valve Site #2.

For the portion of the route along Terra Road, the power line will be placed on new poles. The average height of power poles will be 60 feet and the average span between the poles will be 350 to 400 feet depending on the terrain. Installation of the power poles will require minimal grading and clearing around each installed pole as required by the fire department. Table 2 summarizes the changes to the Point Pedernales pipelines and associated facilities.

**Table 2      Summary of Changes to Valve Site #2 with Development of the Tranquillon Ridge Field<sup>a</sup>**

Changes with Tranquillon Project	During Normal Operations
Additional Equipment	1) Three 1,250 hp electrical booster pumps on 20-inch oil pipeline with an additional transformer and required switchgear. 2) New power-lines with power poles, and possibly a new substation.
Additional Maintenance	One personnel month per year for maintenance to pump station equipment.

*a. These changes will only be necessary if the 20-inch emulsion pipeline MAOP is derated.*

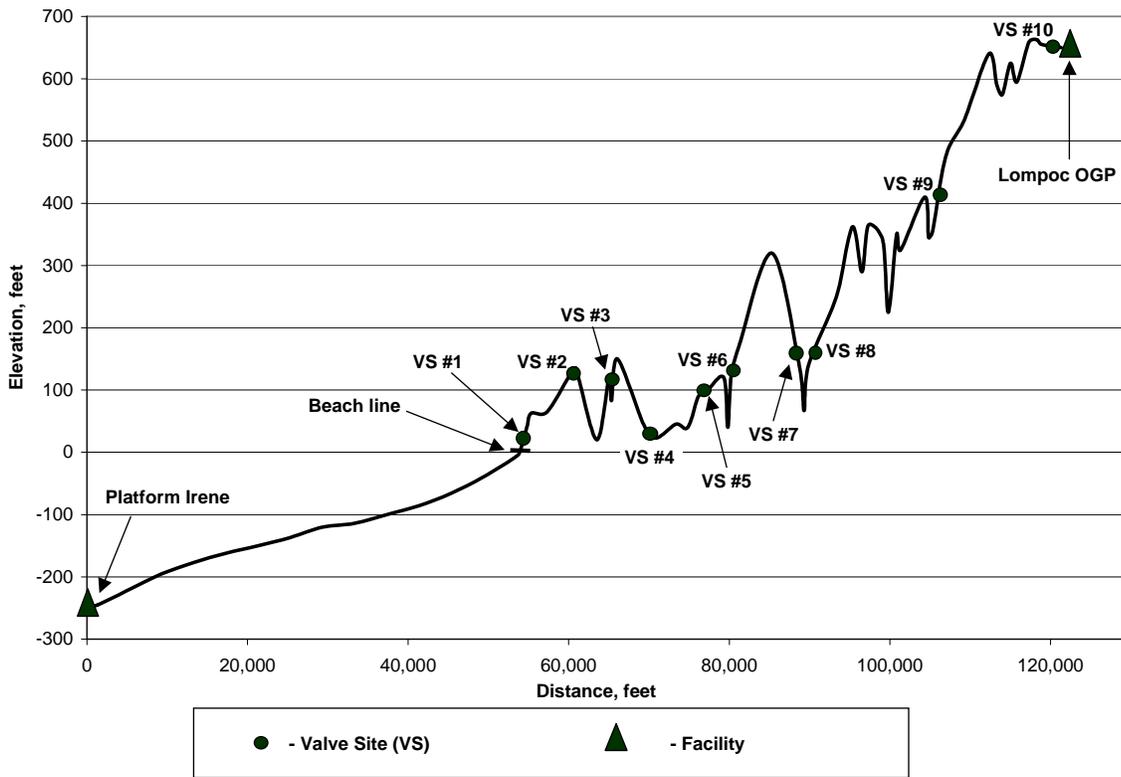
The proposed oil pipeline operating pressure profile is based on an anticipated emulsion volume of approximately 90,000 barrels per day with a water cut rate of approximately 70%. The discharge operating pressure of the pumps on Platform Irene will be approximately 750 psig to 1,000 psig. The inlet receiving pressure at the LOGP will be approximately 140 psig.

The installation and operation of the booster pumps at Valve Site #2 may only be necessary if the offshore segment of the oil pipeline is derated below the current 1,000 psig. The use of the booster pumps at Valve Site #2 will provide flexibility for the continued operation of the oil pipeline with a decrease in operating pressure for the offshore segment.

With operation of the booster pumps at Valve Site #2, the discharge operating pressure of the pumps on Platform Irene will be approximately 200 to 400 psig. The suction pressure of the booster pumps at Valve Site #2 will be approximately 150 psig. The discharge pressure of the booster pumps at Valve Site #2 will be approximately 600 psig. The inlet receiving pressure at the LOGP will be approximately 140 psig.

With inclusion of the booster pumps at Valve Site #2, there will be a decrease in the shipping pump pressure at Platform Irene. The elevation differential between Platform Irene and Valve Site #2 is only 85 feet and the distance is 61,000 feet. However the elevation differential between Valve Site #2 and the LOGP is 528 feet while the distance is only 58,000 feet. Therefore, the discharge pressure of the booster pumps at Valve Site #2 is much higher than the discharge pressure of the shipping pumps at Irene, even though Valve Site #2 is approximately at the midpoint between Platform Irene and the LOGP. Figure 4 shows the elevation profile for the 20-inch oil emulsion pipeline.

**Figure 4 Platform Irene to LOGP 20-inch Oil Emulsion Pipeline Elevation Profile**



### 3.0 Onshore Gas Handling

#### 3.1 Lompoc Oil and Gas Plant (LOGP)

The majority of the produced gas is separated from oil/water emulsion at Platform Irene and is shipped to LOGP via an 8-inch pipeline. The LOGP also receives produced gas from the Lompoc Field; this gas is shipped from the field via a separate 6-inch gas pipeline. At the LOGP, gas that remained dissolved in the oil/water emulsion is further separated from the emulsion. The vapor recovery system collects vapors from all the

tanks, including the heater treaters and other miscellaneous vessels. Gas delivered by the two gas pipelines, gases collected by the vapor recovery system, and the solution gas separated from the emulsion are combined and compressed to the inlet of the gas sweetening and processing equipment.

A portion of the produced gas from Platform Irene, which is not in solution in the liquid stream, is separated from the liquid and is transported to the inlet of the LOGP gas sweetening and processing equipment through an 8-inch pipeline. Prior to being transported to the LOGP, the produced gas is dehydrated offshore.

Gas generated within the LOGP comes from two sources. One source is the solution gas separated from the emulsion, and the other from the vapor recovery system. The vapor recovery system collects vapors from all the tanks. Gases collected by the vapor recovery system and the solution gas separated from the emulsion are combined and compressed to the inlet of the gas sweetening and processing equipment.

The existing gas sweetening and processing equipment at the LOGP consists of an amine gas sweetening skid with an associated acid gas handling (Sulferox) system, a low temperature separation (LTS) skid, LPG/NGL stabilization skid and storage, LPG truck loading, and NGL/crude oil blending.

The H<sub>2</sub>S removed from the combined inlet gas streams is reduced to mostly elemental sulfur in the associated Sulferox unit. The recovered sulfur is trucked from the LOGP. The sweetened gas then flows into the LTS skid where it is dehydrated and the NGL/LPG is removed. The raw NGL formed during this process then flows to the LPG/NGL stabilization skid. LPG gas comes off the top of the stabilizer column and is condensed and stored for transported to other facilities for further fractionation. The LPG gas has never been used at the LOGP for fuel. The stabilized NGL liquids flow to the NGL surge tank for blending into dry crude oil to the maximum extent feasible. The processed “sweet” natural gas is sold and shipped by pipeline and/or used as fuel at the LOGP.

### **3.2 Produced Gas Pipeline**

The gas separated from emulsion and dehydrated at Platform Irene is shipped to LOGP via an 8-inch pipeline. The gas pipeline is an 8.625-inch OD pipe with a wall thickness of 0.312 inch onshore and 0.438 inch offshore. The pipe is made of steel grade API 5L-X42 ERW onshore and API 5L-Grade B ERW offshore. The entire length of the gas pipeline is also coated with PRITEC 70/15 (70 mm polyethylene, 15mm butyl adhesive). The gas pipeline operates at 80°F and with a MAOP of 730 psig.

The onshore section of the pipelines is covered to a depth of at least 36 inches. Four valve sites are located along the onshore portion. MOVs are located at Valve Sites #1, 2, 8, and 10 (see Attachment A). These valves can be operated manually or remotely from the LOGP. The gas pipeline is equipped with an SDV at the inlet (Platform Irene, SDV-401) and outlet (LOGP, SDV-100). The inlet SDV is actuated by the platform ESD as well as interlocks on PT-401, located on the platform downstream of SDV-401.

The pipeline pressure, valve positions, and shutdown signals are displayed in the control room on the platform. The pipeline is also equipped with a dew point analyzer, which is used to help prevent liquids from forming in the pipeline thereby reducing corrosion.

SDV-100 provides isolation at the LOGP. SDV-100 is actuated manually by the “Gas Stop” button as well as by the LOGP ESD procedure. The LOGP isolation valve (SDV-100) will automatically close based on signals from a number of pressure transmitters located throughout the plant. Additional information on the isolation system can be found in the Emergency Response Plan and Pipeline Operations Manual.

Co-located H<sub>2</sub>S sensors have been installed along the gas pipeline in the following locations: (a) at the pipeline’s crossing of Highway 1, (b) upwind of Cabrillo High School, and (c) upwind of the north/northeast boundaries of Vandenberg Village. When any pair of the co-located sensors detects 40 ppm of H<sub>2</sub>S, the pipeline would normally be shutdown at the inlet (Platform Irene) and the situation investigated.

The onshore pipeline is cathodically protected in the same manner as the oil pipeline and has the same monitoring programs as the oil emulsion pipeline.

### **3.3 Sales Gas Pipeline**

Sales gas is shipped from the LOGP through a 12-inch sales gas pipeline to the Righetti valve site. The length of this line is approximately 6.5 miles with operating pressure ranges from 800 to 1,000 psig. The 12-inch sales gas line is API 5L-Grade B ERW pipe with 0.375-inch wall thickness. Sales gas is then shipped through a 6-inch sales gas pipeline from Righetti valve site to The Gas Company gas transmission line # 1010. The Righetti valve site is located approximately 1.3 miles northeast of the intersection of Highway 1 and Highway 135.

## **4.0 Onshore Water Handling**

### **4.1 Lompoc Oil and Gas Plant (LOGP)**

The existing water treatment equipment at the LOGP consists of the Wemco flotation cell (currently out of service), wash tank, clean water tanks, and injection pumps. After treatment through this system, the water is shipped via the 8-inch produced water return line to Platform Irene for offshore injection and shipped via onshore produced water disposal lines (one 10-inch and two 12-inch lines) to the Lompoc Oil Field for onshore injection.

At the LOGP, water that has been removed from the gross fluid stream is treated with emulsion breaking chemicals to separate the trace oil, which is contained in the water. This oil is collected and sent to the reclaim oil tank for treatment. After the water is treated to recover the hydrocarbon liquids, the treated water is reinjected into the Lompoc Oil Field and shipped out to Platform Irene via the water pipeline for reinjection.

Currently, 15,000 to 20,000 b/d of produced water is being injected at Platform Irene and 35,000 to 40,000 b/d of Point Pedernales produced water is being injected at the Lompoc Oil Field.

Another outlet for Point Pedernales produced water is offshore disposal. Prior to 1991, LOGP produced water was shipped to Platform Irene for discharge offshore. PXP retains a valid National Pollutant Discharge Elimination System (NPDES) permit authorizing discharge of produced water offshore from Platform Irene.

## **4.2 Water Return Pipeline**

The MAOP of the water return pipeline is 1,311 psig. The water pipeline pressure at the LOGP is 300 psig and the water pipeline outlet at Platform Irene is approximately 500 psig. Repairs on the 8-inch water line were conducted in Fall of 2001 to address corrosion discovered during annual surveys. The water pipeline does not have a SCADA leak detection system.

The water pipeline is 8.625-inch OD with a wall thickness of 0.312 inch onshore and 0.438 inch offshore. The pipe is made of steel grade API 5L-X42 ERW onshore and API 5L-Grade B ERW offshore. The entire length of the water pipeline is also coated with PRITEC 70/15 (70 millimeters [mm] polyethylene, 15 mm butyl adhesive). The age of the pipe is approximately 14 years. The water pipeline operates at 125°F.

The corrosion program for the 8-inch water pipeline includes the following activities:

- Continuous injection of corrosion inhibitor;
- Pigging three times per week;
- Annual smart pigging evaluations;
- Taking residual readings frequently for detection of chemical and metal deposits; and
- Pulling corrosion coupons every 6 months.

There are no anticipated changes to the corrosion control program, however, the frequency of the maintenance pigging may increase or decrease based on pipeline parameters. If, for example, the pipeline smart pigging demonstrates increased corrosion rates, then pigging would occur more frequently.

The 8-inch return water pipeline has four MOVs at Valve Sites #1, 2, 8, and 10, which can be operated locally or remotely from the LOGP. Position indication of the valves is transmitted to the August Systems' controller at the LOGP facility.

The 8-inch water pipeline is equipped with alarms and controls to provide for operation of the equipment and protection during upset conditions. The pipeline is equipped with a shutdown valve at both the inlet and outlet. Inlet shutdown valve SDV-400 is located at the outlet of the clean water tank at the LOGP facility before the shipping pumps. SDV-

400 responds solely to level controls on the clean water tank and the LOGP facility ESD. The valve position is displayed in the control room at the LOGP facility.

Inlet shutdown valve SDV-612 provides automatic protection and isolation on the pipeline on Platform Irene. SDV-612 is actuated by platform ESD as well as the high/low pressure switch, PSHL-612, located downstream of the SDV. The pressure, SDV position and shutdown signals are displayed in the control room on the platform.