2.0 Project Description

This Project Description includes general background of the Phillips Santa Maria Refinery, a detailed description of the current operations of the facility, and an explanation of the Proposed Phillips Santa Maria Refinery Throughput Increase Project (Proposed Project). The detailed description of current operations assesses the baseline for this California Environmental Quality Act (CEQA) document and provides an understanding of the elements of the Proposed Project.

2.1 Project Background

The Phillips Santa Maria Facility (SMF) was built on the Arroyo Grande mesa in southern San Luis Obispo County (SLOC) in 1955 (see Figure 2-1). The facility is surrounded by industrial, recreational, agricultural, residential land, and open space (see Table 2-1). The SMF operates 24 hours per day and 365 days per year, except when shut down for maintenance.

The SMF was previously owned by several companies, including Union Oil Company of California, Tosco, Phillips Petroleum, and ConocoPhillips (recently changing the name to Phillips 66 Company). Since 1955, the land use has been petroleum oil refining.

The SMF and the Rodeo Refinery, linked by a 200-mile pipeline, comprise the San Francisco Refinery (see Figure 2-2). The SMF mainly processes heavy, high-sulfur crude oil. Semi-refined liquid products from the SMF are sent by pipeline to the Rodeo Refinery for upgrading into finished petroleum products. Products leaving the SMF are: (1) semi-refined petroleum by pipeline; (2) solid petroleum coke by rail or haul truck; and (3) solid recovered sulfur by haul truck.

During recent years, the SMF has been changed, modified, and upgraded to modernize the process and comply with changing environmental regulations. Significant upgrades included installing emission control devices like the tail gas unit, low nitrogen oxide (NO_x) burners, tank vapor recovery, and flare vapor recovery. The water treatment plant was upgraded by installing a reverse osmosis system that replaced a water softener unit, which reduced water demand from the Refinery well water system. Also, changing the water effluent to a tankage system eliminated storing water in onsite surface impounds. The most recent major change at the site involved the permanent shut down of the petroleum coke calciner in March 2007, resulting in decreased criteria pollutants and hazardous air pollutants, and reduced water usage.

Figure 2-1 Facility Location

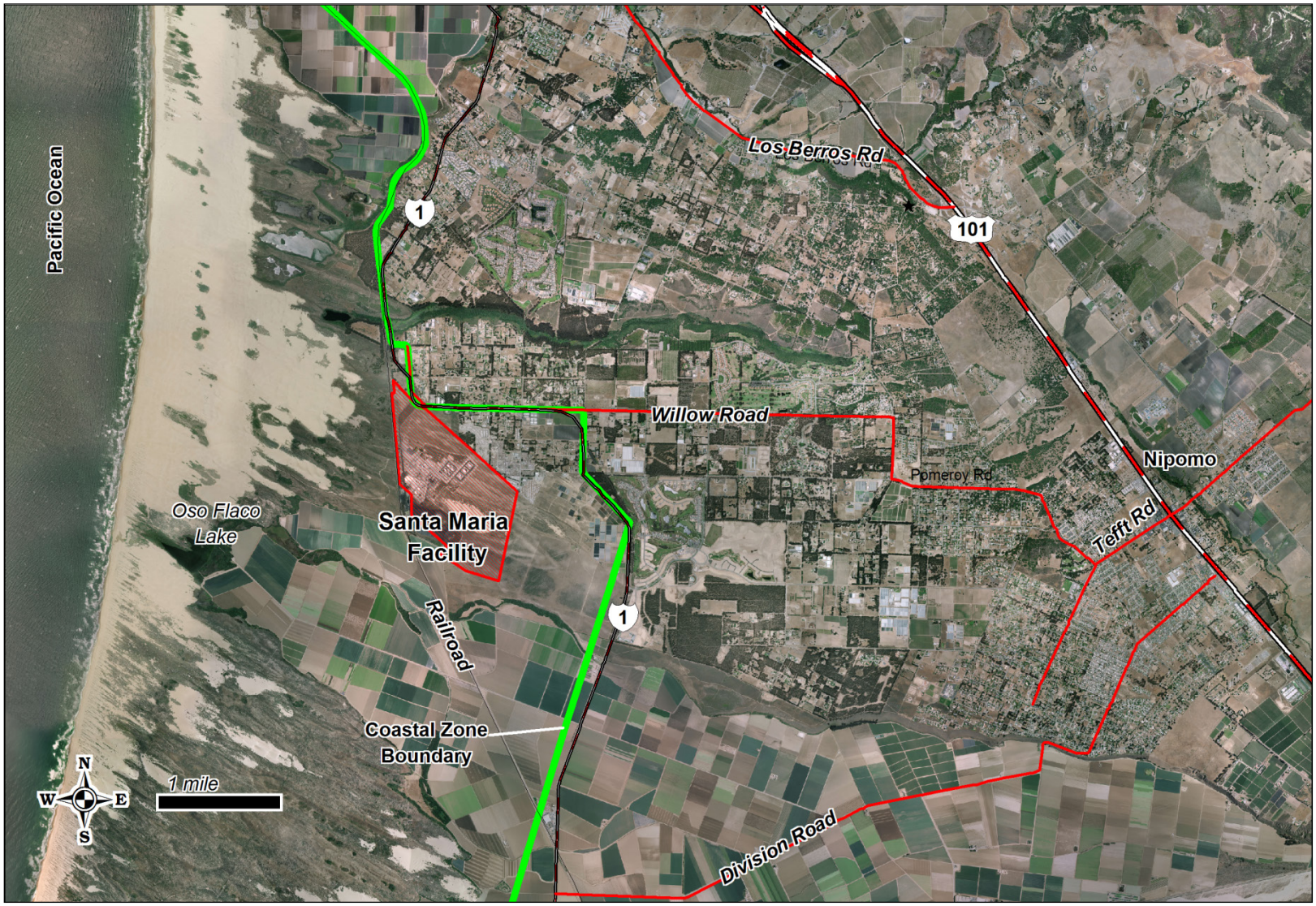


Table 2-1 General Project Site Information

Item	Description
Assessor parcel numbers	091-141-062, 092-391-021, 034, 092-401-005, 011, 013, 092-411-002, 005
Supervisorial district #	4
Planning area	South County Coastal
Land use category	IND - Industrial
Combining designation(s)	Flood Hazard Area Coastal Appealable Zone
Existing uses	Phillips Santa Maria Refinery
Topography	Coastal, dunes
Vegetation	Coastal, dune vegetation
Parcel size	2.5 square miles (~1,644 acres)
Surrounding Land Use Categories and Uses	
North	Industrial and Residential (IND and RS). Mobile home storage and residential uses.
East	Industrial, Agricultural, and Recreation (IND, AG, and REC). Vacant, farming, residential, and golf course.
South	Agricultural (AG). Farming.
West	Open Space and Recreational (OS and REC). Sensitive resource area and dune recreation.

Source: SLOC 2010

Figure 2-2 Facility Location and Pipeline Route to Rodeo Refinery

2.1.1 Current Operations

Currently the SMF processes crude oil into semi-refined liquid products, petroleum coke, elemental sulfur, and fuel gas used onsite. Primary processes at the SMF include:

- tankage for petroleum liquids;
- refining process equipment;
- petroleum coke storage and handling;
- electricity generation;
- process water treatment; and
- elemental sulfur handling.

These processes involve raw material storage, atmospheric pressure distillation, vacuum distillation, delayed coking, product storage, and product shipping. Secondary processes include a Refinery fuel gas system, a relief flare system, steam production, sulfur recovery, and oily water treatment. Additionally, Refinery fuel gas supplies a 5.8-megawatt electrical power generation system at the SMF. Figure 2-3 shows the plot plan of the SMF.

The SMF currently processes less than the San Luis Obispo County Air Pollution Control District (SLOCAPCD) permit limits of 48,000 barrels per any given day and 16,220,600 barrels per year (bpy) and close to, but less than, the current Department of Planning and Building permit limit of 44,500 barrels per day (bpd), maximum. The increased throughput proposal would rectify the differences for the permitted volumes by the Planning and Building permit and the SLOCAPCD and would make both permitted volumes the same. Table 2-2 lists historical annual crude oil throughputs.

Table 2-2 Historical Crude Oil Production

Year	Throughput (bpy)	Average (bpd)
2003	13,813,748	37,851
2004	14,352,098	39,326
2005	15,489,149	42,442
2006	14,290,448	39,157
2007	15,810,183	43,321
2008	15,249,521	41,665
2009	13,080,967	35,838

Source: Phillips 66

2.1.2 Crude Oil Classifications and Delivery to the Refinery

Crude oil is classified by weight, density, viscosity, and volatility. Thin and volatile oils are "light," whereas thick and viscous oils are "heavy." The American Petroleum Institute (API) rates light oils with a gravity of 30 to 40 degrees, which means the density is much less than that of water, 1.0 grams per cubic centimeter, and therefore these oils easily float on water. In

contrast, some heavy oils with an API gravity of less than 12 degrees are so dense that they sink in water. The API rates oil with the same density as water at 10 degrees. Table 2-3 shows the specifications of crude oil currently processed at the Santa Maria Refinery.

Figure 2-3 Santa Maria Facility Plot Plan

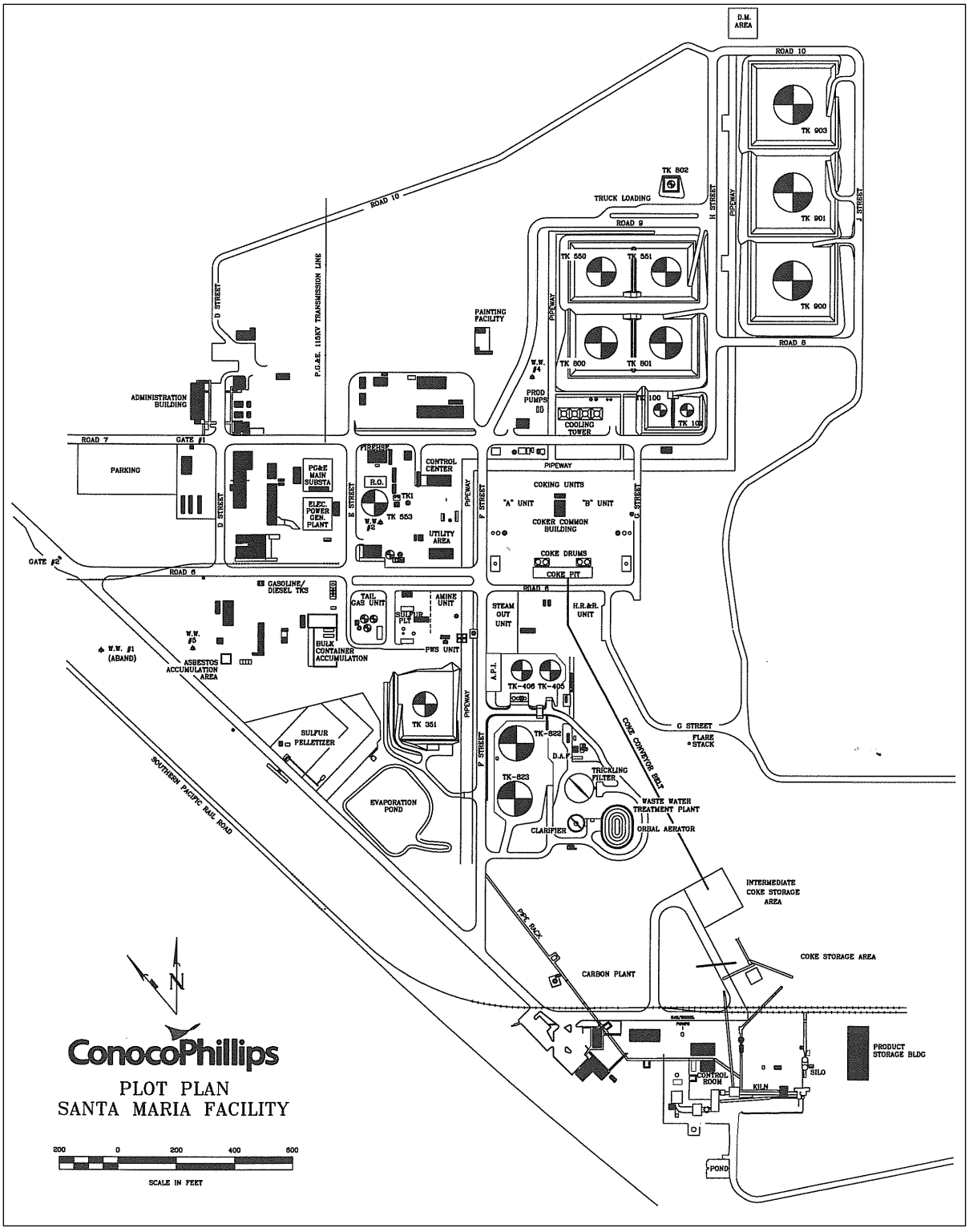


Table 2-3 Properties of Crude Oil Currently Received at the Santa Maria Facility

Characteristic	Value
Gravity, API	19
Specific Gravity at 60 degrees Fahrenheit	0.9377
Hydrogen Sulfide Concentration	< 1 parts per million by weight
Sulfur content	4.6 % by weight
Light ends (propane thru Hexanes)	Approximately 6 %
Vapor Pressure (dry equivalent, DVPE)	6.95 pounds per square inch
Kinematic Viscosity at 104 degrees Fahrenheit	245 centistokes

Source: ConocoPhillips (3/2008 sample) composite of Unit A and Unit B

The SMF receives all crude oil for processing by pipeline from various sources, including the Outer Continental Shelf (69%), Point Pedernales (18%), Orcutt Pump Station (6%), and truck deliveries to the Santa Maria Pump Station (7%). For the independent local oil producers, without pipeline access, the SMF offers a relatively close outlet to refine locally produced oil.

The bulk of the crude oil processed at the SMF is delivered via pipeline from offshore platforms in the Outer Continental Shelf of Santa Barbara County and from oil fields in the Santa Maria area. In addition, crude oil from some onshore areas, such as the Plains Exploration Arroyo Grande (Price Canyon) SLOC oil field, is delivered by truck to the Santa Maria Pump Station and then pumped into the dedicated pipeline, which carries crude oil to the SMF (see Figure 2-4).

2.1.2.1 Santa Maria Pump Station

Crude deliveries to the Santa Maria Pump Station totaled 6,556 truck trips in 2005; 4,582 in 2006; and 9,103 in 2007. Table 2-4 shows 2009 deliveries. Figure 2-5 shows the oil fields where the deliveries originate. Outer Continental Shelf crude oil is also delivered to the Santa Maria Pump Station from the Sisquoc Pipeline that in turn receives crude from the Plains All American Pipeline that collects crude from the PXP Point Arguello Project and the Exxon Las Flores Canyon Project (69%).

The Santa Maria Pump Station is in the northwest portion of Santa Barbara County near the City of Santa Maria. The pump station includes Phillips offices that are staffed during normal business hours. During off hours, the pump station is unstaffed and operated remotely from Bartlesville, Oklahoma.

Oil collected at the Santa Maria Pump Station (SMPS) is moved to the Suey Junction where it is commingled with oil traveling from the Lompoc Oil & Gas Plant (LOGP) and the Orcutt area. The oil then flows via a 10-inch and 12-inch pipeline (different sizes along route) to the Summit Pump Station and ultimately to the Santa Maria Facility.

According to the Santa Barbara County APCD permits (PTO 08218r8, 11754r2) and annual emission reports (for 2010), the SMPS has a permit throughput limit of 26,000 bbls per day that could be unloaded by truck at the Santa Maria Pump Station, and a pipeline throughput capacity

of 84,000 bbls/day as per County permit 91-DP-003. In 2010, the maximum monthly average throughput at the SMPS truck unloading rack was 6,847 bpd.

Figure 2-4 Santa Maria Facility and Pipeline Facilities South of the SMF

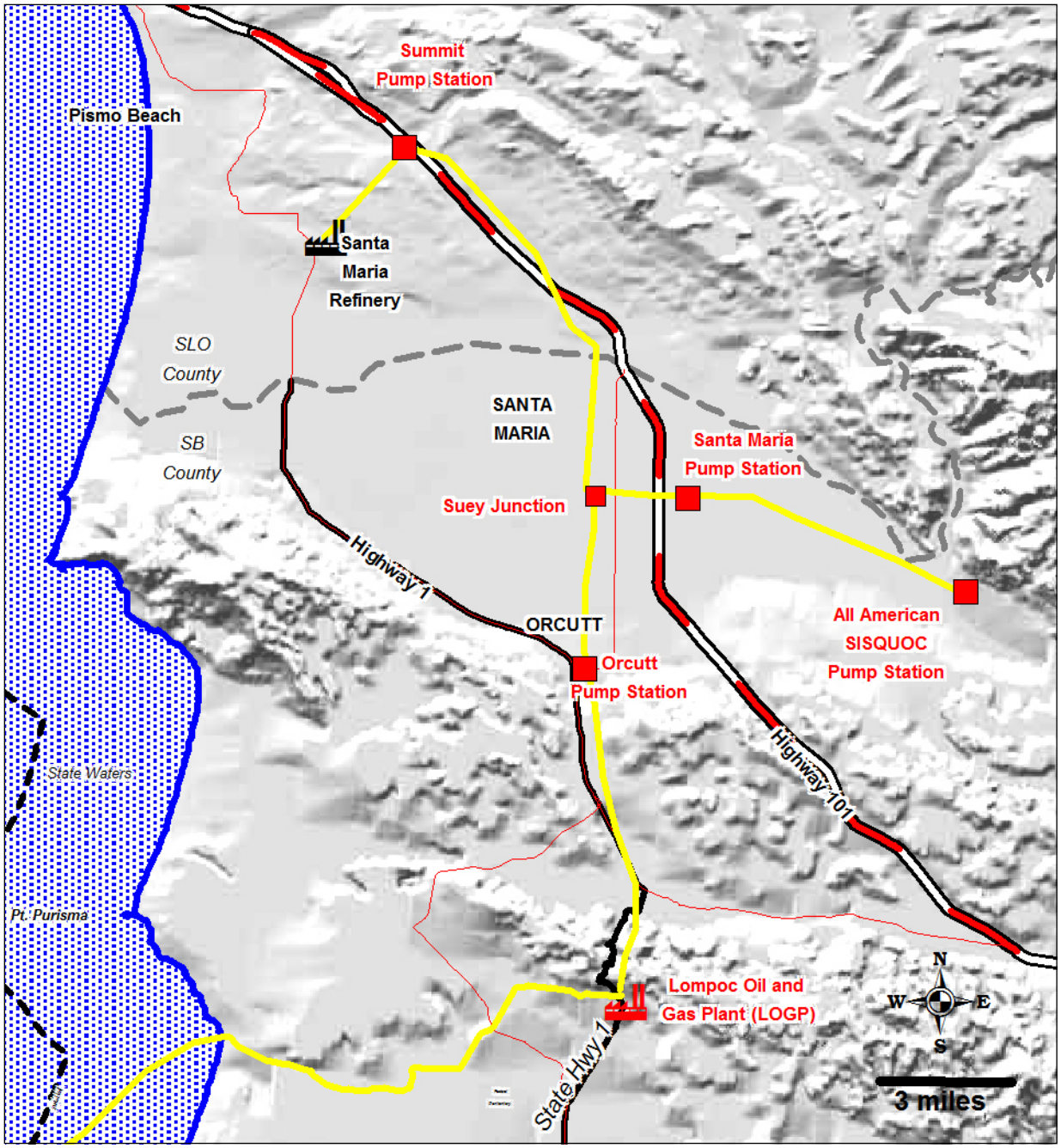


Table 2-4 Delivery Sources, Volumes, and Truck Trips to the Santa Maria Pump Station in 2009

Source	Oil Field	Volume (barrels)	Number of Trucks
Price Canyon	Arroyo Grande	314,963	1882 (27.9%)
Greka	Santa Maria Valley, Casmalia, Zaca, Cat Canyon	93,502	590 (8.7%)
Lombardi	San Ardo	106,492	673 (10%)
Tognazzini	Cat Canyon, Santa Maria	4,527	30 (0.4%)
Delaney/Tunnel	Cat Canyon	2,178	13 (0.2%)
Transition	San Ardo *	37,668	230 (3.4%)
San Ardo Rosenberg	San Ardo	460,146	2801 (41.5%)
Peshine	Casmalia	8,622	57 (0.8%)
San Ardo Ex/Mob	San Ardo	26,302	125 (1.9%)
Wickendon	Cat Canyon	12,503	84 (1.2%)
Brinan	San Ardo	246	2 (0%)
Cantin	Cat Canyon	26,247	170 (2.5%)
Thompkins	Casmalia	9,789	67 (1%)
McCool	McCool Ranch	4,845	30 (0.4%)
Total		**1,108,030**	**6,754**

* Based on conversation with DOGGR
Source: ConocoPhillips 2010

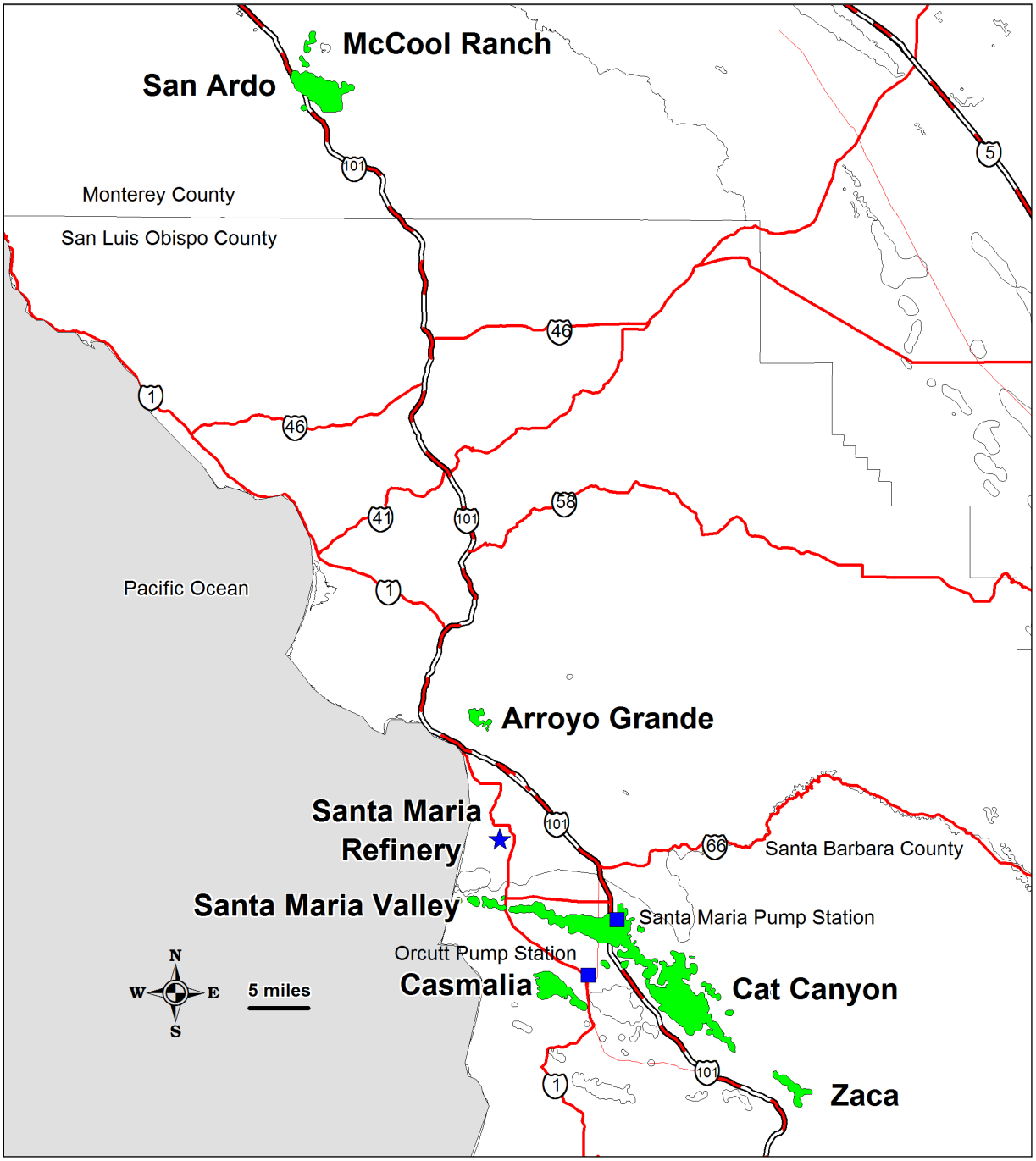
2.1.2.2 Orcutt Pump Station

As stated, approximately six percent of crude delivered to the Santa Maria Facility travels via pipeline from the Orcutt Pump Station. This station is a non-staffed facility that receives oil via pipeline from two sources: LOGP line 300 and the Gathering Line 353 from local onshore producers (6%). The crude from the LOGP is produced at Platform Irene as part of the Point Pedernales Project (18%). Crude oil travels from the Orcutt Pump Station via an 8-inch pipeline to the Suey Junction, where it is commingled with oil traveling from the Santa Maria Pump Station. The oil then flows via a 10-inch and 12-inch pipeline (different sizes along route) to the Summit Pump Station and ultimately to the Santa Maria Facility.

2.1.2.3 Summit Pump Station

SLOCAPCD Permit to Operate Number 560-2 authorizes one 1,067-barrel fixed-roof crude oil storage tank (Union Oil Tank Number 161201) for buffering and storing pumped material. Summit Pump Station does not have any pumps. Crude oil from the All American Pipeline, Point Arguello, and Santa Maria Valley passes through the Summit Pump Station en route to the Santa Maria Facility. Section 2.1.7.1, Pump Stations, discusses pump stations along the pipeline route within San Luis Obispo County from the SMF to the Rodeo Refinery.

Figure 2-5 Local Oil Fields



2.1.3 Current SMF Operations

The SMF partially refines crude oil to extract intermediates and gases, and uses the heavier crude oil components to produce petroleum coke. The SMF uses two identical coking units, Units A and B, to remove the heavier components from the crude oil. Units A and B are both Delayed Coking Units in which the crude oil is first processed through an atmospheric distillation unit, which produces gas oil, pressure distillate (naphtha), and some fuel gas. The remaining oil is sent to a vacuum distillation unit where additional gas oil is extracted. Residual oil is finally delivered to Coking Units A and B, where thermal decomposition makes it into green coke, higher-value liquid distillates, and fuel gas. Green coke produced by the Delayed Coking Units was historically further processed by a calcining operation that increased the value of the coke. The calcining unit was shut down in 2007. Therefore, only green coke is now produced at the SMF.

Gases produced in the Delayed Coking Units are sent to the Amine Units (Sulfinol) for the removal of hydrogen sulfide (H_2S). After H_2S is separated from gas, the gas can be used as fuel for the SMF and the H_2S is converted into elemental sulfur through a Claus sulfur recovery process.

Gas oil and naphtha are shipped by pipeline to the San Francisco-area Rodeo Refinery for processing into gasoline, diesel fuel, and other petroleum end-use products.

The two naphtha storage tanks at the SMF were retrofitted with domed-roof vapor recovery systems in the early 1990s to reduce the significant odor impacts. As the fluid level in a dome-covered tank drops, natural gas is bled into the head space to maintain positive pressure. Conversely, as the fluid level rises, the blanket of natural gas, which may have odorous compounds, is vented to the SMF's make-gas system where Amine Units remove the odorous compounds to produce elemental sulfur.

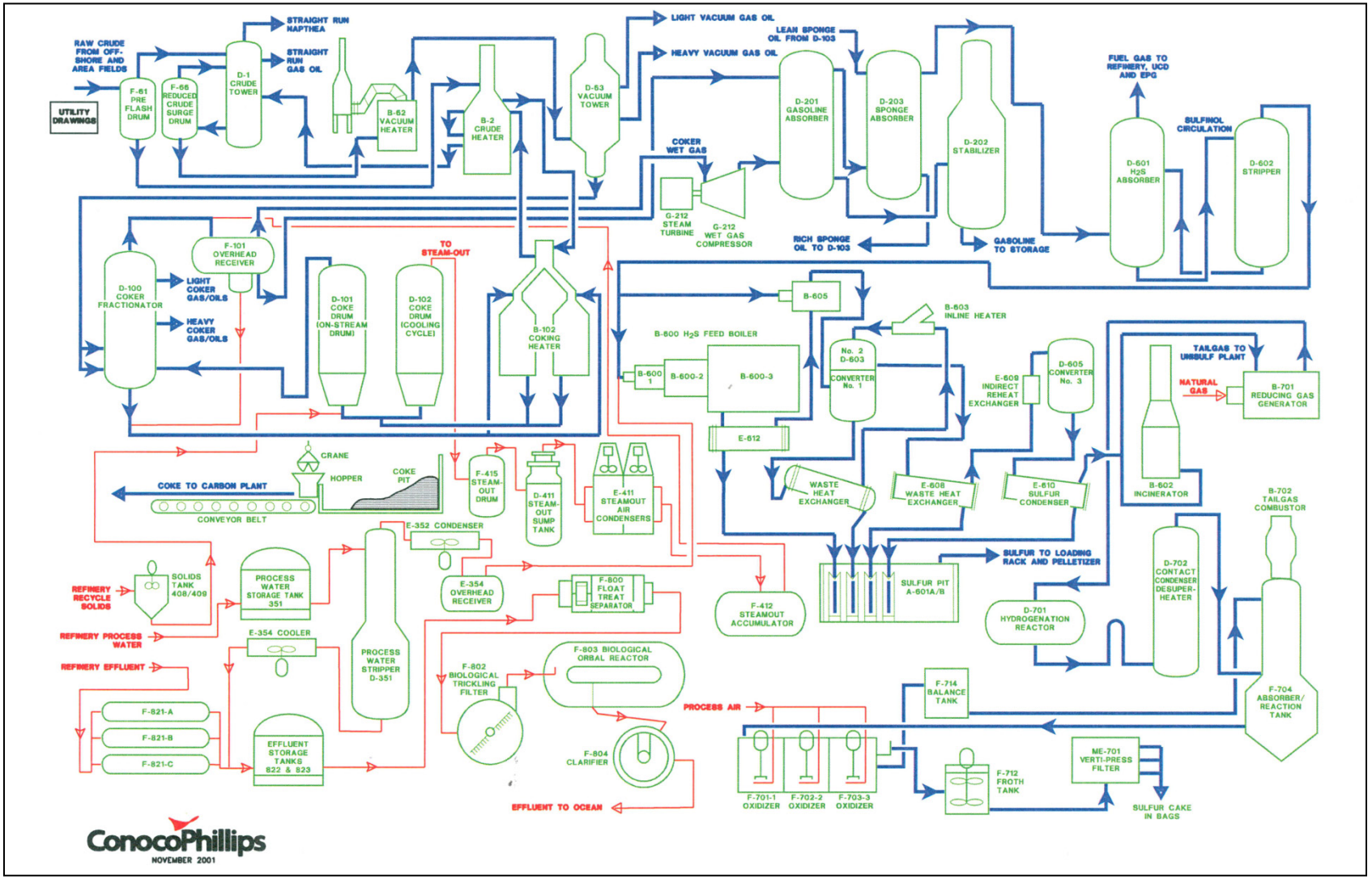
During process unit turnarounds when both process lines A and B are shut down and undergoing maintenance, a temporary flare system may incinerate off-gas from the tank farm vapor recovery system. A gas scrubbing system removes H_2S prior to incineration to meet the regulatory limit.

The capacity of each coking unit is approximately 25,000 bpd of crude oil. However, the total SMF APCD-permitted throughput is 48,000 for any given day. The processes are interconnected (see the block flow diagram in Figure 2-6). The respective processing activity locations are shown in the plot plan in Figure 2-3.

2.1.4 Fuel Gas Processing and Handling

The fuel gas treatment system allows Phillips to use gas produced from refining processes, by removing sulfur to concentrations less than the regulatory limits. Gases are collected for fuel gas from the crude units, vapor recovery systems, and other processes at SMF for sulfur removal. Refinery fuel gas is then used to power process heaters, steam boilers, and electrical generation equipment. The sulfur-removal process utilizes a sulfinol-based amine system to treat the fuel gas and is combined with a three-stage Claus system and a tail-gas treating unit (TGU).

Figure 2-6 Current Operations – Santa Maria Facility Block Flow Diagram



This produces up to 91 long tons per day of molten sulfur. A pelletizer transforms the molten sulfur into sulfur pellets. The TGU is the final sulfur-removal stage before treated off-gas is emitted to the atmosphere. In the final step of this process some of the sulfur may also be converted into a sulfur–cake byproduct.

The fuel gas and tail gas are sampled in several ways, including: (1) continuous fuel gas monitoring for H_2S content; (2) continuous sampling for total reduced sulfur; (3) weekly fuel gas sampling for total sulfur; and (4) continuous fuel gas monitoring for heat content (British thermal units) and carbon content. The fuel gas samples are taken from the main supply line to ensure the samples are representative of the gas supplied to each combustion device throughout the facility.

2.1.5 Coking Units and Coke Handling

Petroleum coke from the SMF coking units is transported to a stockpile on a conveyor belt. The stockpile is managed with front-end bucket loaders and bulldozers, which load the petroleum coke into trucks and railcars. In this process, the coke is maintained at a specific moisture content to reduce transfer and handling dust. In addition, the storage piles are frequently wetted to minimize dust emissions. Roadways (track in/out) are swept daily to further ensure minimal dust from coke handling operations.

Pursuant to an agreement with the SLOCAPCD to address particulate emissions, Phillips adopted a Coke and Sulfur Storage and Handling Plan to reduce petroleum coke inventory stockpile volumes at the SMF. The Plan sets a goal for the total petroleum coke material volume at the SMF to not exceed 7,000,000 cubic feet by January 1, 2009, and to not exceed 4,000,000 cubic feet by January 1, 2010. The current permit limit for coke storage is less than 4,000,000 cubic feet . The coke pile inventory for 2010 is 723,163 cu ft and by July 2011 Phillips reported an inventory of 1,308,134 cu ft. As a result, the historical petroleum coke transported includes both petroleum coke inventory reduction and petroleum coke produced by the crude throughput. Table 2-5 shows historical coke inventories.

Table 2-5 Historical Petroleum Coke Inventories at the SMF

Year	Coke Inventory	
	Cubic Feet	Short Tons
2007	6,292,000	151,000
2008	6,459,000	155,000
2009	5,042,000	121,000
2010	723,163	17,383

Source: Wallace physical surveys

Normal petroleum coke inventories fluctuate when market conditions change. Petroleum coke is sold to various end users, including California users who receive relatively steady deliveries by truck. Overseas users receive the petroleum coke by ships that are loaded at the Port of Los Angeles by rail cars. Multiple unit trains, typically 22 cars each carrying approximately 100 tons of green coke, transport a shipload of petroleum coke to the ports. The SMF must stockpile enough petroleum coke to fill a ship for an overseas shipment.

In 2007, the SMF transported a historically high volume of petroleum coke to reduce inventory pursuant to the SLOCAPCD agreement. Shipments of more than 400,000 tons continued in 2008 and 2009 to continue to reduce the inventory.

To meet criteria pollutant requirements, rather than implementing control technology on the petroleum coke calciner, Phillips elected to permanently shut down the facility in March 2007. This shutdown reduced facility emissions of hazardous air pollutants to less than the major source level and also led to several equipment and operating condition changes in the permit. For example, the facility installed a new boiler in the utility plant to replace steam production from the calciner waste heat boiler.

The Coke and Sulfur Storage and Handling Plan, an agreement between Phillips and the SLOCAPCD, also outlines fugitive dust mitigation measures. The objective is to minimize particulate matter generated from the coke and sulfur handling, storage, and transport areas at the SMF. The plan includes measures for spill prevention and clean-up, minimum moisture content, and pavement improvement, as well as loading and trucking procedures. If emissions from the equipment or stockpiles covered by this permit cause excessive concentration of air contaminants anywhere beyond the SMF property line, corrective steps shall be taken to control the emissions.

In February 2010, the SLOCAPCD released the South County Phase 2 Particulate Study, which states as a major finding:

> The petroleum coke piles at the Phillips facility are not a significant source of ambient PM on the Nipomo Mesa. Elemental analysis did not detect significant amounts of the tracer elements for petroleum coke at the Mesa2 monitoring site.

The report also concludes:

> In summary, the measurements and analyses presented above support a definitive conclusion that the ConocoPhillips petroleum coke storage piles were not a significant source of PM10 aerosols during the study period, despite the occurrence of strong winds and several episodes of high PM concentrations.

Water also plays a role in the management and control of dust emissions during the petroleum coke handling process. Water is distributed by Rain Bird sprinklers that are mobile to provide ample coverage over the stockpiles, sprayed on roadways by a water truck, and used in a wash system to clean each truck before it leaves the facility. The estimated current water usage for the coke handling process is 20,000 gallons per day.

2.1.6 Water Processing

All water drainage, including storm run-off, is collected and treated onsite, and then discharged to the Pacific Ocean pursuant to waste discharge requirements stipulated in Regional Water Quality Control Board Order Number R3-2007-0002 (the Order), adopted on September 12,

2007. The Order serves as the permit under the National Pollutant Discharge Elimination System (NPDES). The SMF is currently in full compliance with the permit conditions. Accommodating the crude throughput increase would not require changes to permitted design flow (0.575 MGD dry weather) in the NPDES permit (ConocoPhillips 2010). Much of the information in this section is based on the Order.

Under the permit, the SMF can discharge up to 0.57 million gallons per day (MGD) of treated wastewater from the facility to the Pacific Ocean in dry weather conditions. The treatment system receives 279 gpm (gallons per minute) (0.40 MGD) of actual dry-weather process water. Flows of typical dry weather discharge from the treatment system to the outfall sump are 266 gpm (0.38 MGD) and flows of typical wet weather discharge from the treatment system to the outfall are approximately 406 gpm (0.58 MGD). Oil is recovered from the wastewater and contact stormwater during treatment.

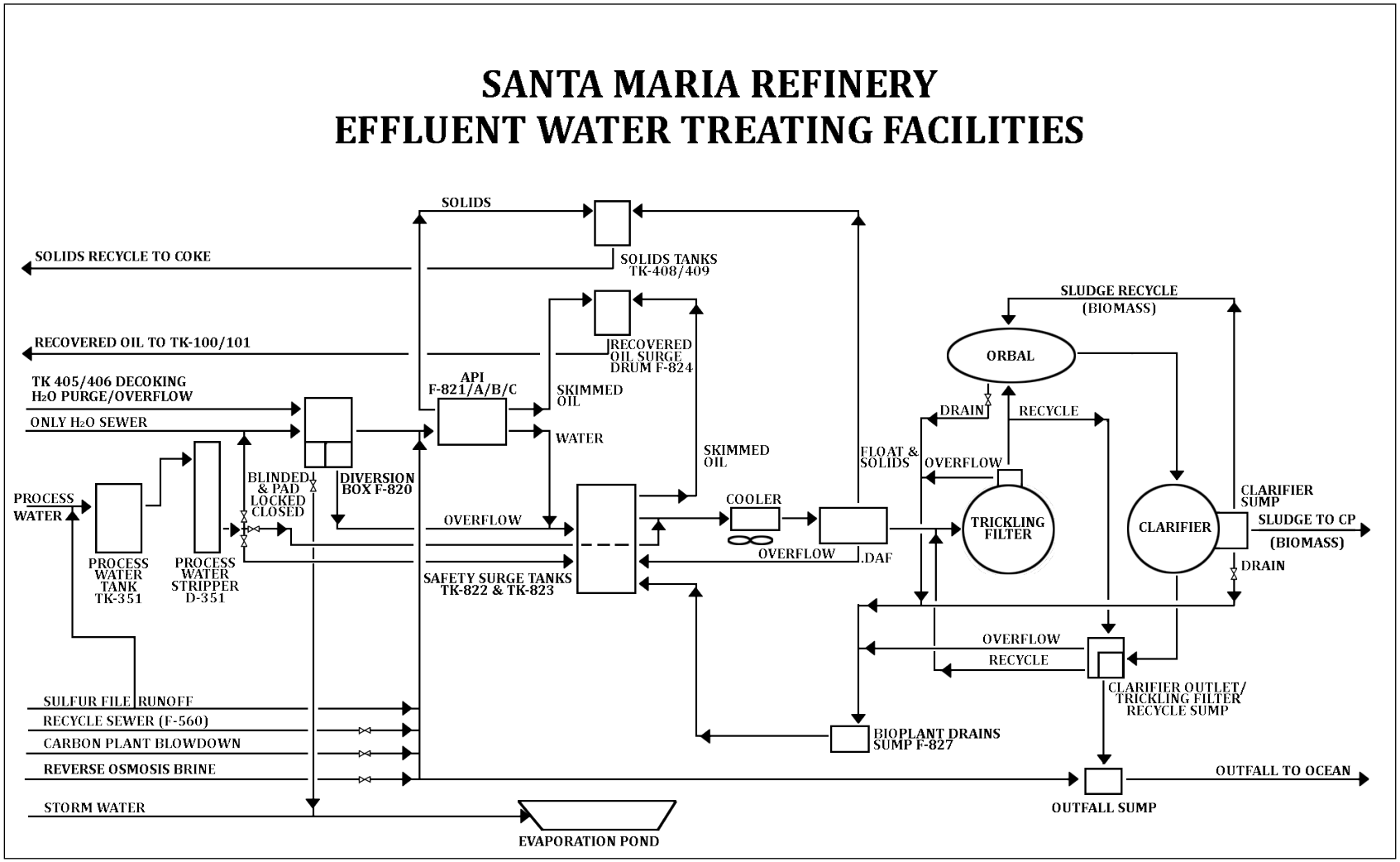
The facility maintains two separate collection systems: one for process water and contact stormwater and another for non-contact stormwater. Contact stormwater is precipitation runoff from the oil storage tank dikes, the sulfur pile, and the operating units and it potentially contains oil. Process water and contact stormwater is collected in the process water system and then flow by gravity to the water treatment system. Site remediation water from offsite underground storage tanks and remediation water from offsite wells is also treated in the water treatment system.

Water is entrained in and produced with the naturally occurring crude oil. During most stages of the refining process, process water is separated from the products and collected in various vessels throughout the SMF. The process water then goes through a process water stripper that removes volatile organics, hydrogen sulfide, and ammonia. After leaving the process water stripper, the water is combined with other oily water and then processed through the oily water treatment system.

The oily water treatment system includes three oil and water separators, two surge tanks, dissolved air floatation, a trickling filter, an Orbal aeration system, and a secondary clarifier. The system uses equipment to first separate the oil from the water, which includes API oil water separators and a dissolved air flotation unit. Next, a biological treatment unit removes any remaining hydrocarbons and ammonia and then discharges the water to the Pacific Ocean according to the NPDES permit that sets water quality standards. As part of the permit, effluent is monitored for compliance with limitations and to determine the amount, if any, that the discharger is contributing to receiving water exceedances above water quality objectives.

Precipitation runoff from streets and unimproved areas not at risk for oil spills is collected in a non-contact stormwater sewer system and flows by gravity to an evaporation pond. This non-contact stormwater is not discharged to the receiving water. Bio-matter generated during the treatment processes is recycled at the adjacent green coke handling facility. Figure 2-7 is a flow schematic of the water treatment facility.

Figure 2-7 Effluent Water Block Flow Diagram



2.1.7 Transportation of Products

Products leave the SMF as semi-refined petroleum by pipeline, as solid petroleum coke by rail or haul truck, and as recovered sulfur by haul truck. The two semi-refined liquid products, gas-oil and naphtha or petroleum distillate, travel via pipeline to the ConocoPhillips Rodeo Refinery for processing into transportation fuels. Petroleum coke is shipped via truck or railcar to customers as fuel or onto ships for export. Sulfur is shipped via truck to customers in the agricultural industry or loaded on ships for export. All products are shipped outside of SLOC. All of the fuel gas produced is recovered and used for energy at the SMF.

Table 2-6 provides truck and rail shipping data for 2003 through 2009. Major petroleum coke destinations include Mojave, Victorville, Cupertino, Fontana, Lebec, and Gorman, and Long Beach for export. Sulfur truck destinations are in the San Joaquin Valley from Bakersfield to Fresno, as well as Long Beach for export.

Table 2-6 Truck and Rail Shipping

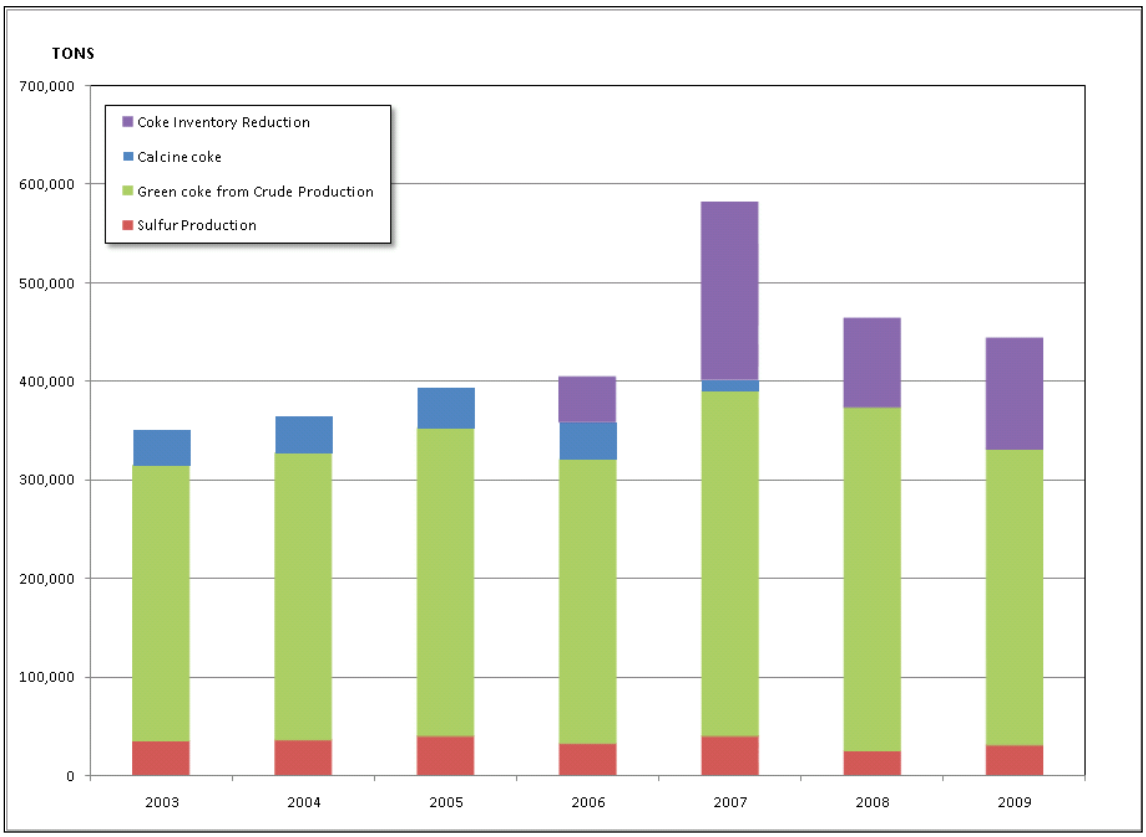
		2003*	2004*	2005*	2006	2007	2008	2009
Total Green Coke from Crude Production and Inventory Reduction	Trucks (tons)	183,024	190,157	205,222	219,202	320,439	303,396	334,562
	Trucks (quantity)	7,321	7,606	8,209	8,588	12,637	11,849	13,759
	Rail (tons)	96,076	99,820	107,729	115,067	209,166	135,000	78,347
	Total Tons	279,100	289,978	312,951	334,269	529,605	438,396	412,909
Estimated Green Coke Inventory Reduction*	Trucks (tons)	0	0	0	30,645	109,551	89,944*	114,009*
	Trucks (quantity)	0	0	0	1,226	4,382	3,598*	4,560*
	Rail (tons)	0	0	0	15,787	70,041	0	0
	Total Tons	0	0	0	46,432	179,592	89,944*	114,009*
Calcine Coke	Trucks (tons)	2,550	2,649	2,859	2,700	1,250	0	0
	Trucks (quantity)	102	106	114	110	50	0	0
	Rail (tons)	33,994	35,319	38,117	36,000	10,000	0	0
	Total Tons	36,544	37,968	40,976	38,700	11,250	0	0
Total Coke Transported	Tons (Calcine and Green)	315,644	327,945	353,927	372,969	540,855	438,396	412,909
Sulfur	Tons	34,539	35,885	38,728	31,783	39,531	24,665	30,645
	Trucks (quantity)	1,382	1,435	1,549	1,271	1,581	1,000	1,250
Total Trucks	Quantity	8,805	9,148	9,872	9,969	14,268	12,849	15,009

* Estimate based on crude throughput and coke to crude ratio of 22.85 tons/thousand barrels
Source: ConocoPhillips

Trucks making deliveries north of the SMF access U.S. Highway 101 via State Route 1 to Halcyon Road to Grand Avenue. Trucks heading south access U.S. Highway 101 by travelling through Nipomo or Guadalupe on State Route 1. State Route 166 East is accessed from U.S. Highway 101 near Santa Maria or from State Route 1 in Guadalupe.

Figure 2-8 shows the quantities of produced petroleum coke and sulfur, in tons. The figure also shows the amount of coke produced and subsequently moved from the SMF by rail or truck and the amount of coke moved from the SMF due to the coke inventory reduction program. Pursuant to the SLOC APCD agreement, the SMF has reduced coke inventory stockpile volumes to decrease particulate matter emissions. Accordingly, the SMF moved uncharacteristically large quantities of coke from 2006 through 2009 to reduce the stockpile size. In 2007, nearly 180,000 tons of coke were moved from the SMF coke storage piles to markets (see Figure 2-8).

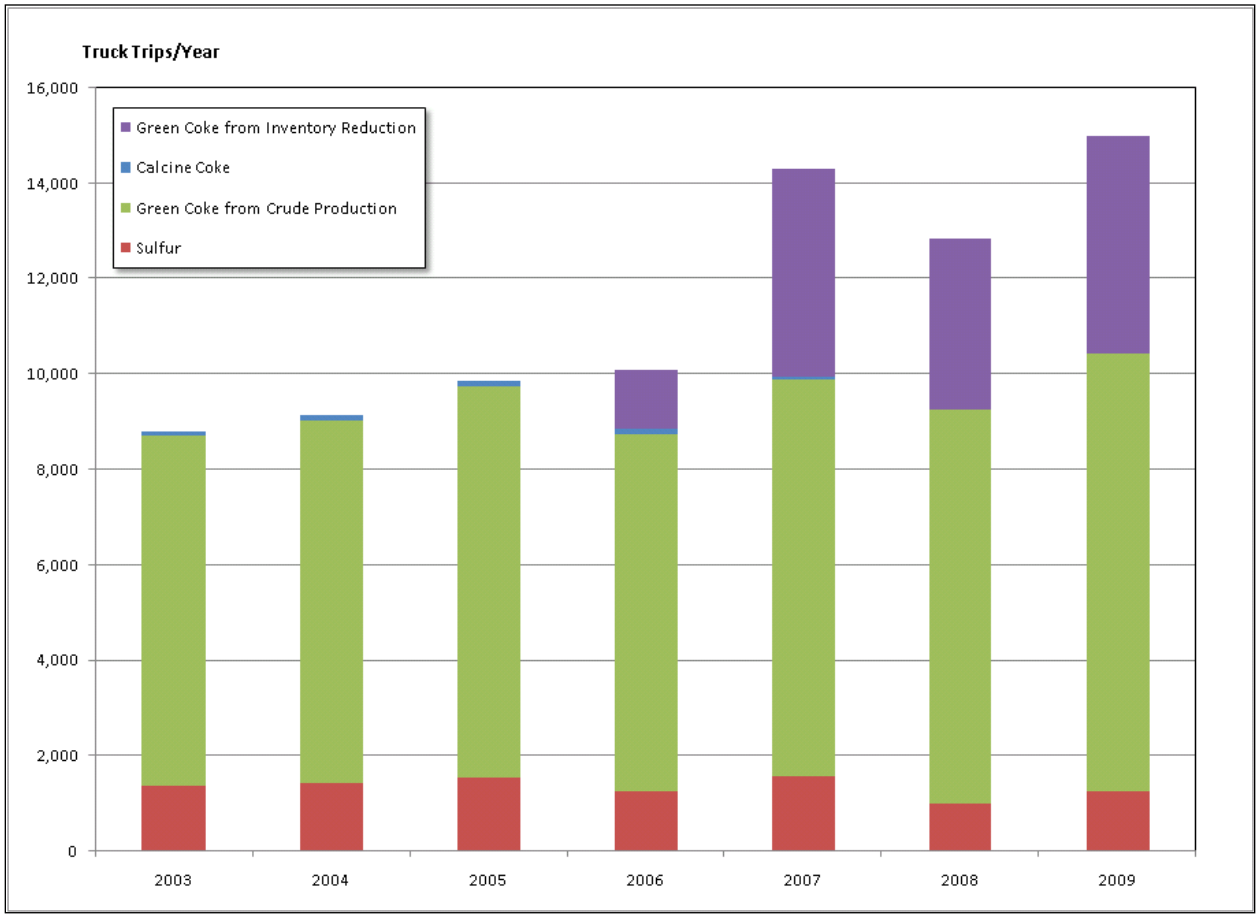
Figure 2-8 Historical Coke and Sulfur Production and Movement Levels (Tons)



Source: ConocoPhillips estimates of coke production from crude throughput based on historical ratio of 22.85 tons green coke per thousand barrels crude oil.

Figure 2-9 shows the number of truck trips associated with coke and sulfur production. In 2007, coke trips increased substantially due to the coke inventory reduction program. Also, calcined coke historically was primarily moved by rail rather than by truck (and calcined coke is no longer produced at the SMF). In addition, in 2009, more coke was transported via truck than historical averages.

Figure 2-9 Historical Green Coke and Sulfur Movement Levels (Truck Trips)



Source: ConocoPhillips estimates of coke production from crude production based on historical ratio of 22.85 tons green coke per thousand barrels crude oil.

2.1.7.1 Pump Stations

The Phillips pipeline utilizes multiple pump stations along the pipeline route from the SMF to the Rodeo SMF (see Figure 2-2). The facilities located within San Luis Obispo County are Santa Margarita, Shandon, Creston, Summit, and Cuesta pump stations (see Figure 2-10). The Santa Margarita and Shandon pump stations each consist of pumps driven by natural gas combustion engines and related storage tanks. The Summit and Cuesta pump stations only include minimal equipment such as pumps and storage tanks that may or may not be in hydrocarbon service. The Creston Pump Station is currently inactive.

The SLOCAPCD has issued operating permits (Permits to Operate) for equipment at the pump stations. The following sections discuss each of these permits.

Santa Margarita Pump Station

- SLOCAPCD Permit to Operate Number 556-5 authorizes the use of petroleum pipeline pump drivers consisting of four natural gas-fired engines, each with Johnson/Matthey 3-way

catalysts and oxygen feedback controllers. Specifically, there are two 330-horsepower (hp) Caterpillar G-379NA engines, designated G-11 and G-12, and two 575-hp Enterprise GSG-6 engines, designated G-1 and G-2, with air-to-fuel ratio controllers, carburetors, and an integrated Continental Controls Corporation system and custom manifold.

- SLOCAPCD Permit to Operate Number 404-7 authorizes one petroleum storage tank farm consisting of: (1) an external floating roof and welded shell storage tanks with double seals; (2) a fixed roof and riveted shell storage tanks; and (3) a carbon absorption vapor control system.
- SLOCAPCD Permit to Operate Number 923-1 authorizes a backup generator and fire pump system for a petroleum pipeline station consisting of: (1) one 100-kilowatt generator driven by a 156-hp diesel-fueled engine; (2) one main fire pump driven by a 287-hp diesel-fueled turbo-charged engine; and (3) one fire pump driven by a 125-hp diesel-fueled engine.

Shandon Pump Station

- SLOCAPCD Permit to Operate Number 583-3 authorizes the use of two natural gas-fired 330-hp Caterpillar G-379NA engines with Johnson-Matthey 3-way catalysts and Dynalco air-to-fuel ratio controllers.
- SLOCAPCD Permit to Operate Number 565-2 authorizes one organic liquid storage tank consisting of a pontoon-floating roof, metallic shoe primary seal, zero gap secondary wiper seal, and associated valves, flanges, pumps, and lines.
- SLOCAPCD Permit to Operate Number 921-1 authorizes a backup generator and fire pump system for a petroleum pipeline station consisting of: (1) one 100-kilowatt generator driven by a 156-hp diesel-fueled engine; and (2) one fire pump driven by a 176-hp diesel-fueled engine.

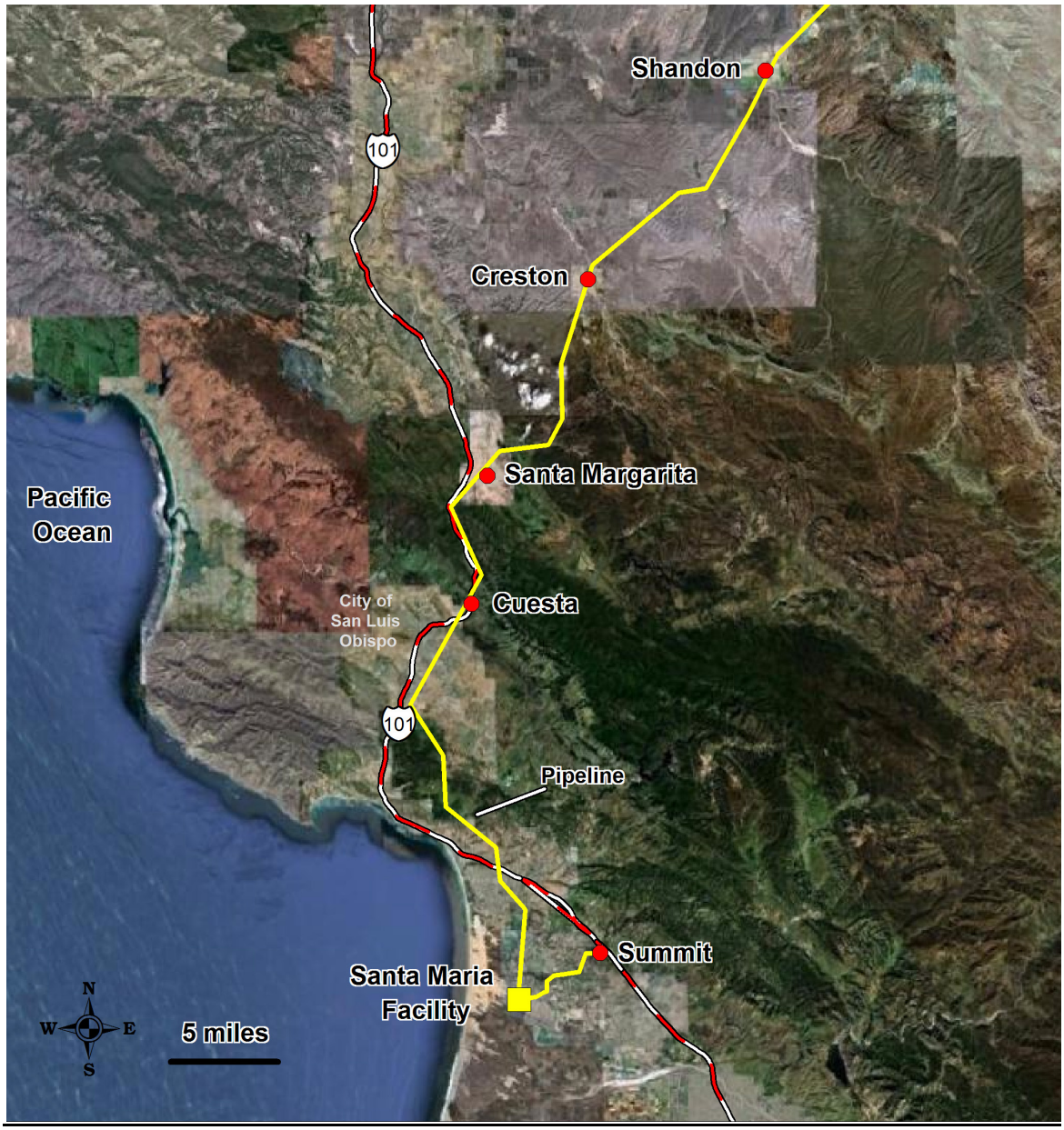
Creston Pump Station

There are no longer any pumps or active tanks at the Creston Pump Station.

Cuesta Pump Station

Two electric pumps at the Cuesta Pump Station pump semi-refined products from Cuesta County Park to the Santa Margarita Pump Station.

Figure 2-10 San Luis Obispo County Pump Stations - Pipeline from SMF to Rodeo Refinery



2.1.8 Utilities and Ancillary Systems

The onsite 5.8-megawatt electrical power generation system creates electricity from excess fuel gas. The system was installed in the mid-1990s after the Battles Gas Plant and the Guadalupe Oilfield, which historically used excess refinery fuel gas, shut down. The power generation unit is a boiler (B-505), which burns the excess fuel gas to produce high quality steam, which turns a steam turbine and a generator.

Steam generated from the B-505 boiler normally does not supply the utility plant with steam. However, during a process upset, the B-505 does have the capability to supply steam, if needed.

2.1.9 Utility and Water Usage

The SMF uses fuel gas produced from the refining operation as a fuel source, primarily to fire heaters and boilers for process heat and steam. When refinery fuel gas cannot produce the necessary levels of steam and electricity, surplus gas is purchased from the Southern California Gas Company. Electrical requirements at the SMF are similarly met by the power-generating unit and purchases from Pacific Gas and Electric Company. Table 2-7 summarizes utility usage at the SMF.

Table 2-7 Santa Maria Facility Utility Usage

		2005	2006	2007	2008	2009
Electrical	Pacific Gas and Energy (MWhr)	23,587	23,316	19,293	22,736	23,273
	Onsite Generation (MWhr)	-	-	29,333	24,041	20,732
Natural Gas	Southern California Gas (mmscf)	220	372	214	226	397
	Onsite Fuel Gas (mmscf)	-	-	2,747	2,550	2,185
	Flaring of coker and non-coker gas (mmscf)	-	-	2	0.79	4.4
Diesel Fuel	(Gallons)	-	-	8,911	5,449	4,591

Notes: MWhr = mega watt hours, mmscf = million standard cubic feet
Source: Phillips 66

The SMF obtains all of its water from onsite wells. Although the volume of water taken from the wells is not directly metered, usage is estimated by Phillips at approximately 681 gpm or 357.9 million gallons per year (1,100 acre-feet per year[AFY]). Water is primarily used for cooling, boiler feed for steam production, and process use such as coke drum cutting. The SMF currently uses less water than it has historically because of two changes:

- The SMF installation of a reverse osmosis water treatment unit, which requires less water than the water softener unit it replaced.
- The March 2007 shutdown of the Carbon Plant that used water for cooling coke from the calcine process and green coke screening.

Prior to the calciner shutdown, the facility used approximately 459 million gallons of groundwater per year. Currently, usage is estimated to be 358 million gallons of groundwater per year (ConocoPhillips 2010).

2.1.10 Employees and Scheduling

Current general facility operations involve 95 employees and 65 contractors during the week and 40 employees on weekends. Typically 10 employees work at the facility during nighttime. General facility employees include office staff, operators, supervisors, and maintenance technicians.

Current normal operations truck visits (not including green coke or sulfur truck trips) to and from the facility average 10 per day. These truck trips are associated with normal materials shipments and employee duties.

2.1.11 Chemical Usage and Waste

SMF procedures require cleaning any spilled petroleum material as soon as possible to minimize hydrocarbon emissions and odors. Cleanup materials are stored in closed containers in accordance with applicable regulations and disposed of as hazardous material in compliance with federal, state, and local regulations. The proposed change in crude throughput and semi-refined crude oil would not impact the baseline.

The SMF recovers and then processes oily waste onsite using the Mobil Oil Sludge Coking system. The Mobil Oil Company developed a process to dispose of refinery waste by injecting it into the coke bed during the quench cycle. During the delayed coking process, the solid waste and any organic liquids become dispersed throughout the coke mass. The combustible portion of the sludge becomes part of the coke. Oily wastes generated from equipment and cleaning activities are also sent off-site. These levels would not increase with the proposed throughput increase.

Figure 2-11 includes photographs of the SMF process.

Figure 2-11 SMF Operations Areas Photographs

Coke Transfer Area

Sulfur Pile

Petroleum Coke Piles and Loading Area

Santa Maria Pump Station Truck Unloading Rack

2.2 Proposed Project Description

The Proposed Project is a request to increase the volume of crude oil that the SMF is permitted to process over the existing permit level, by 10 percent.

Under the Proposed Project, the County permit would increase the daily maximum limit of crude oil throughput by 10 percent, from 44,500 bpd to 48,950 bpd. Additionally, for the SLOCAPCD permit, the 12-month rolling average of crude throughput would increase from 16,220,600 bpy to 17,866,750 bpy.

With the proposed increase in volume of crude oil, the increase in crude feed is expected to be derived from various sources depending on markets and availability.

No changes to the overall processing methods are proposed.

The Proposed Project would potentially cause changes at the SMF, including:

- an increased volume of crude oil delivered to and shipped via pipeline from the Santa Maria Pump Station to the SMF;
- an increased volume of products leaving the SMF for the Rodeo Refinery via pipeline;
- an increased volume of green coke and sulfur production; and
- an increase in shipments leaving the facility by either truck or railcar.

Green coke production is proportional to the amount of crude throughput. Green coke production is estimated at 22.85 short tons per thousand barrels of crude throughput. Typically, green coke has 10 to 12 percent moisture content with a required minimum material moisture content of eight percent under the Coke and Sulfur Storage and Handling Plan.

If crude oil volumes increase, green coke and sulfur production would correspondingly increase.

In addition, the mix of rail versus truck transport affects the number of green coke truck trips, which could impact traffic and air quality in the vicinity. Under the existing permits, the fraction of green coke transported by truck could increase while rail shipments could decrease, as there are no permit limits on the distribution of truck versus rail transportation levels. To assess potential impacts under the worst-case scenario, it is assumed that the future production of green coke and sulfur would be transported by truck and rail at the historical highest levels of truck usage. Historic levels of coke transportation by rail range from 19 percent up to 39 percent between 2002 and 2009.

Table 2-8 shows defined baseline and future production levels. In Table 2-8, the baseline and Project assume that movements of petroleum coke associated with inventory reduction would remain the same as the previous 3-year average for the next few years before decreasing to zero.

Crude oil processed in 2009 was a historically low volume because of two planned maintenance shutdowns. However, coke shipments by rail were quite low in 2009, causing a historical high number of truck trips (when combined with the coke inventory reduction program).

The current Department of Planning and Building permit limit of 44,500 bpd was evaluated in a CEQA document in a negative declaration in 1990. Therefore, all operations at the Refinery under the current Department of Planning and Building permit limit of 44,500 bpd would be covered by a CEQA analysis and the permit level of 44,500 bpd is considered the baseline for this analysis. To determine the operational parameters at these levels, historical operations related to rail/truck fraction, coke production per barrel of crude oil, and sulfur production per barrel of crude oil have been utilized to estimate the SMF operating parameters at the 44,500-bpd level. The Proposed Project would not involve any construction or additions to the plot plan. Modifications to equipment and the facility would be made to comply with best available control technologies, if warranted, as determined by SLOCAPCD. This would likely include modifications to:

- combustion control equipment for nitrogen oxide emissions; and
- other Refinery equipment for possible reductions in sulfur oxides and hydrocarbon emissions.

Table 2-8 Baseline and Proposed Project Operations

Operational Parameter	Baseline* Operations	Proposed Project Operations	Notes
Crude Processing	▪ 16,242,500 bbl/year ▪ 44,500 bpd peak	▪ 17,866,750 bbl/year ▪ 48,950 bpd peak	Baseline is 44,500 bpd throughput. Proposed Project is the proposed allowable crude oil processing.
Coke Production and Transportation	▪ 498,990 tons total ▪ 371,141 from crude production, 127,849 tons from inventory reduction ▪ 10,994 truck trips/year associated with crude production ▪ 5,110 truck trips associated with inventory reduction	▪ 536,104 tons total ▪ 408,255 from crude production, 127,849 tons from inventory reduction ▪ 12,261 truck trips/year associated with crude production ▪ 5,110 truck trips associated with inventory reduction	Baseline is 44,500 bpd estimated total coke production from crude oil processing and inventory reduction. Proposed Project is based on an increase to the 17,866,750 bbl/year with all of the increased coke production transported by truck and including 3-year average of inventory reduction.
Sulfur Production	▪ 40,612 tons ▪ 1,624 truck trips/year	▪ 44,673 tons ▪ 1,787 truck trips/year	Baseline is the 44,500-bpd levels. Proposed Project is the 2009 sulfur/crude ratio applied to the 17,866,750 bbl/year.
Total Trucks	▪ 17,732 ▪ 49 trucks/day avg	▪ 19,162 ▪ 53 trucks/day avg	All trucks including inventory reduction

Notes: bbl = barrels. *Baseline coke transportation assumes 44,500 bpd throughput with 22.85 tons coke/kbbl crude and 19% of coke transported by rail (as in 2009). Proposed operations assume no calcine coke transportation, the same fraction of produced coke transported by rail as in 2009 and all increases in materials production transported by truck. Future sulfur production is based on the historical production levels of 2.5 tons sulfur/kbbl of crude and 25 tons per truck.

Refinery fuel gas would increase by a ratio similar to the increase in crude throughput. This would decrease electricity purchased from Pacific Gas and Electric Company and would decrease natural gas demand from Southern California Gas Company. Onsite SMF fuel gas production would increase to 3,171 million standard cubic feet per year. The increase in fuel gas would be used to fire the heaters and produce electricity with the electrical power-generating unit. The use of diesel fuel is not expected to increase with the throughput increase.

The Proposed Project could also be associated with an increase in the movements of crude oil to the Refinery. The level of increase in movements associated with the transportation of crude oil would be a function of the crude oil origin and the transportation methods and might not occur at all if market conditions are not favorable to increased production. At this time, it is not known where the additional crude oil would come from that would allow the Refinery to operate at a higher throughput level. Increased throughput could be produced from onshore fields or from offshore fields. It could be transported by pipeline or it could be transported by truck to the Santa Maria Pump Station. Since the mode and source of the transportation are not known, and are

typically dictated by fluctuating market forces, a reasonable worst-case scenario is defined where the additional crude oil would come from onshore sources requiring transportation by truck to the Santa Maria Pump Station. This would increase the movements of crude oil by truck to the SMPS from a baseline level of 8,389 annual truck trips (as per the SMF operating at the 44,500 bpd permit level) to 18,293 annual truck trips under the Proposed Project, or an increase of 9,904 trucks trips per year (27 per day) as a worst case, if all of the increased production came from onshore sources requiring truck transport.

The use of water is not directly proportional to crude oil rates; Phillips estimates water use may increase by one percent under the Proposed Project.

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