AB2588 Air Toxics Emission Inventory Plan
Exxon – SYU Stationary Source

Los Flores Canyon Oil & Gas Plant
And
POPCO Gas Plant

Emissions Reporting Year: 2013

Submitted to:

Santa Barbara County Air Pollution Control District
260 North San Antonio Road, Suite A
Santa Barbara, CA 93110

Submitted by:

ExxonMobil Production
P.O. Box 4358
Houston, TX 77210-4358

December 2013

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1 Industry Contact Information

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Santa Barbara County Air Pollution Control District
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Santa Barbara, CA 93110
Attn: Robin Cobbs

Submitted by:

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Signed: ______________________________

Date: ______________________________

2 Introduction

The Las Flores Canyon and POPCO facilities are part of the *Exxon – SYU Project* stationary source. The *Exxon - SYU Project* stationary source consists of five facilities, three of which are platforms located in the outer continental shelf, not subject to review under AB2588. ExxonMobil Production Company ("ExxonMobil"), an unincorporated division of Exxon Mobil Corporation, owns and operates the Las Flores Canyon facility. Pacific Offshore Pipeline Company ("POPCO"), a subsidiary of Exxon Mobil Corporation, owns the POPCO facility, while ExxonMobil operates the facility.

The onshore facilities are located in Las Flores Canyon ("LFC") approximately 20 miles west of Santa Barbara, California in the southwestern part of Santa Barbara County. The ExxonMobil property consists of a pie-shaped piece of property, approximately 1500 acres, starting on the north side of Highway 101 and continuing to the north. Of this area, approximately 110 acres have been cleared with 34 acres containing facilities and the remainder left as open space. A paved road about 1.5 miles long from Calle Real, the frontage road off Highway 101, provides access to the facility. Within the ExxonMobil property, approximately 17 acres is leased to Pacific Offshore Pipeline Company ("POPCO") to operate a natural gas treating facility. In addition, small areas are provided for installation of utility connections by Southern California Gas Company ("SCG") and Southern California Edison Company ("SCE") as well as a pump station by the All American Pipeline Company for crude transportation.

The Santa Ynez Unit ("SYU") Project develops production from three platforms (Platforms Hondo, Harmony and Heritage) located offshore California in the Santa Barbara Channel. The production is transported to shore through a subsea pipeline and treated in the production facilities located in Las Flores Canyon. The LFC facility treats the oil, gas, and other by-products to acceptable product quality specifications prior to shipment by pipeline or truck to their destinations. The onshore LFC facility is subdivided into the following plants:

- Oil Treating Plant ("OTP")
- Stripping Gas Treating Plant ("SGTP")
- Transportation Terminal ("TT")
- Cogeneration Power Plant ("CPP")

The POPCO Gas Plant processes the majority of the natural gas produced by the SYU Project. The POPCO Gas Plant receives the raw natural gas from the offshore platforms via the 12-inch produced gas pipeline. The Gas Plant produces PUC quality natural gas, propane, butane and sulfur products for sale. The recovered produced water is treated to acceptable standards and returned to Platform Harmony for release to the ocean in accordance with NPDES permit No. CA0110842.

Please see Part 70/APCD PTO 5651 and Part 70/APCD PTO 8092 for additional details pertaining to the operation of these facilities.

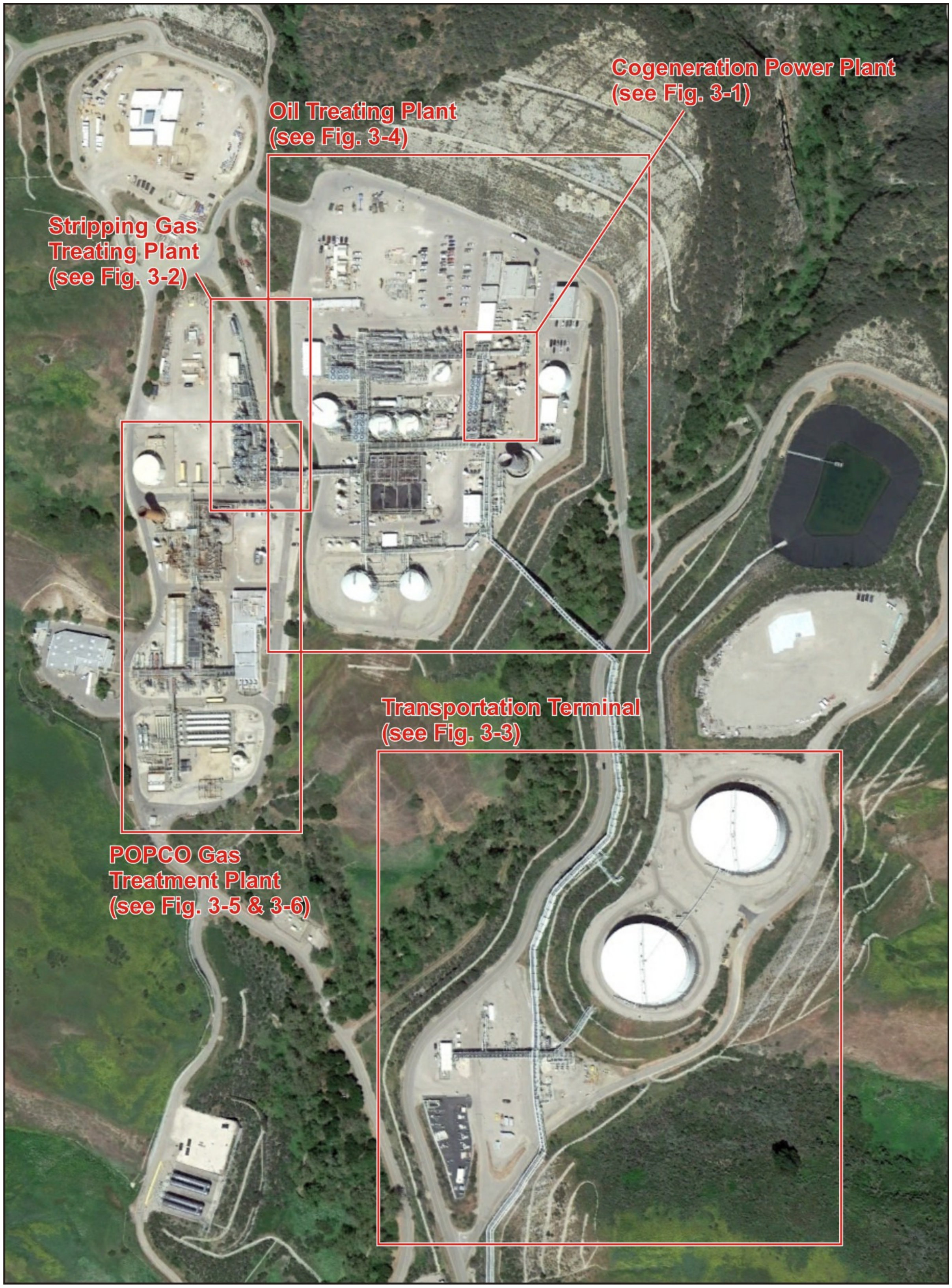

Figure 2-1 Aerial View of Las Flores Canyon and POPCO Facilities

3 Detailed Facility Information

3.1 Las Flores Canyon Facility

Tables 3-1, 3-2, 3-3, and 3-4 provide a list of the emitting equipment at Las Flores Canyon, organized into four groups based on the plant within the facility that the equipment is located at. The table identifies the device, APCD Device No, the new Device No. assigned by ExxonMobil to be used in the ATEIR, along with the AB2588 substances that may be quantified for each device. The emission points in these tables are taken from the past ATEIR, and Table 5.1 and section 10.5 of Part 70/PTO 5651.

As noted in Tables 3-1 through 3-4, some of the substances which CARB has identified for emission quantification under the AB2588 program have not been assigned risk assessment health values by OEHHA and CARB (OEHHA/CARB, 2013). ExxonMobil has included these substances in Tables 3-1 through 3-4 should OEHHA and CARB define risk assessment values in the future; however they will not be included in the emission estimates or modeling associated with the 2013/2014 ATEIR.

The AB2588 program includes equipment that is already under permit by the Santa Barbara APCD, as well as equipment that is exempt from APCD permitting. Permitted equipment has an APCD Device No. associated with it, whereas exempt equipment may not. A new numbering system has been defined for this ATEIP such that all equipment are identified using a common numbering system. The basic structure for the new system is as follows:

- <u>Device Identification Numbers:</u>
  - 6-digit unique device identification number for each piece of equipment and operating mode;
  - Incorporates ExxonMobil's existing Equipment Operator ID
  - Point Sources: 1XXXXX
  - Area Sources: 2XXXXX
  - Volume Sources: 3XXXXX
- <u>Stack Identification Numbers:</u>
  - 5-digit unique stack identification number. This number is shared for devices with multiple operating modes or which vent through a common stack

Figures 3-1 through 3-4 include diagrams of each of the four plant areas within the Las Flores Canyon facilities. Each diagram identifies the associated point, volume, and area sources of emissions.

Table 3-1 AB2588 Substances to be Quantified for Year 2013 Toxics Emission Inventory – LFC Cogeneration Power Plant

Device Name	APCD ID	Device ID	Acetaldehyde	Acrolein	Ammonia	1,3-butadiene	Benzene	Carbonyl Sulfide	Chlorine	Chlorobenzene	Cyclohexane	Diesel Particulate	Ethylene Glycols (DEG, EG, TEG)	Diethylene Glycol Monobutyl Ether	Ethylbenzene	Formaldehyde	Hexane	Hyrdrazine	Hydrochloric Acid	Hydrogen Sulfide	Naphthalene	PAHs	Phosphoric Acid	Propylene	Propylene Oxide	Sodium Hydroxide	Trimethylbenzene (1,2,4)	Toluene	Xylenes	Metals
OEHHA RA Health Value?			✓	✓	✓	✓	✓	No	✓	✓	No	✓	No	No	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	No	✓	✓	✓
Acid Skid		125060																	x											
Ammonia Storage Vessel and Injection System		221050			x																									
Caustic Skid		225050																								x				
Cooling Water System		224060																								x				
CPP -- HRSG Only	7865	126022	x	x		x	x								x	x	x				x	x		x	x			x	x	
CPP -- Normal Ops. Modes (GTG and GTG/HRSG Ops.)	6585	126021	x	x		x	x								x	x	x				x	x		x	x			x	x	
CPP - SU/SD Combined CPP & Bypass Stacks	7866	125010	x	x		x	x								x	x	x				x	x		x	x			x	x	
CPP Compressor Seals - Plant Wide		380222	x	x			x									x	x			x	x	x		x				x	x	
CPP Fugitive Components (Gas) - Plant Wide		360211	x	x			x						x			x	x			x	x	x		x				x	x	
CPP Fugitive Components (Oil) - Plant Wide		360212	x	x			x						x			x	x			x	x	x		x				x	x	
CPP Maint. Abrasive Blasting - Plant Wide		370211																												x
CPP Maint. Painting & Coating - Plant Wide		370212									x				x													x	x	
CPP Process Solvent Loss - Plant Wide		390220																										x	x	
CPP Pump Seals - Plant Wide		380221	x	x			x									x	x			x	x	x		x				x	x	
Deaerator		121110																X												
Steam Condensate System		221090																X												
Steam Drum		221120																X												
Steam System Chemical Injection System		225020																X												

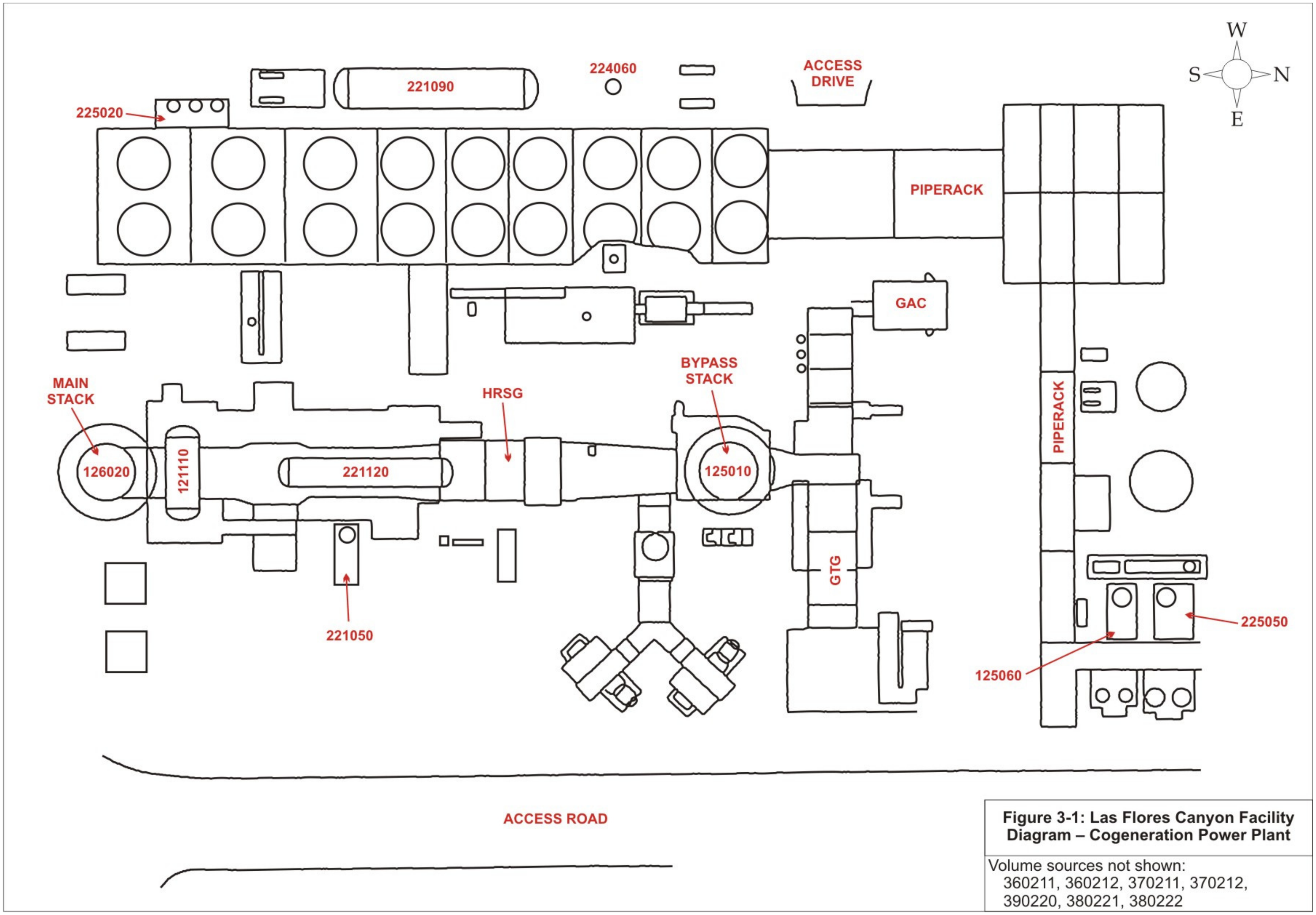

Figure 3-1: Las Flores Canyon Facility Diagram – Cogeneration Power Plant

Volume sources not shown:
360211, 360212, 370211, 370212,
390220, 380221, 380222

Table 3-2 AB2588 Substances to be Quantified for Year 2013 Toxics Emission Inventory – LFC Stripping Gas Treating Plant

Device Name	APCD ID	Device ID	Acetaldehyde	Acrolein	Ammonia	1,3-butadiene	Benzene	Carbonyl Sulfide	Chlorine	Chlorobenzene	Cyclohexane	Diesel Particulate	Ethylene Glycols (DEG, EG, TEG)	Diethylene Glycol Monobutyl Ether	Ethylbenzene	Formaldehyde	Hexane	Hyrdrazine	Hydrochloric Acid	Hydrogen Sulfide	Naphthalene	PAHs	Phosphoric Acid	Propylene	Propylene Oxide	Sodium Hydroxide	Trimethylbenzene (1,2,4)	Toluene	Xylenes	Metals
OEHHA RA Health Value?			✓	✓	✓	✓	✓	No	✓	✓	No	✓	No	No	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	No	✓	✓	✓
Area Drain Oil/Water Separator - SGTP	6578	144060					x													x								x	x	
Area Drain Sump - SGTP	6582	244050					x													x								x	x	
Fresh Caustic Day Tank		244120																								x				
Open Drain Sump - SGTP	6579	144070					x													x								x	x	
SGTP Compressor Seals - Plant Wide		380422	x	x			x									x	x			x	x	x		x				x	x	
SGTP Fugitive Components (Gas) - Plant Wide		360411	x	x			x						x			x	x			x	x	x		x				x	x	
SGTP Fugitive Components (Oil) - Plant Wide		360412	x	x			x						x			x	x			x	x	x		x				x	x	
SGTP Maint. Abrasive Blasting - Plant Wide		370411																												x
SGTP Maint. Painting & Coating - Plant Wide		370412									x				x													x	x	
SGTP Process Solvent Loss - Plant Wide		390420																										x	x	
SGTP Pump Seals - Plant Wide		380421	x	x			x									x	x			x	x	x		x				x	x	
Waste Gas Incinerator -- Planned SU/SD/Maintenance	7869	146032					x									x	x				x	x						x		
Waste Gas Incinerator (w/out Merox)	7868	146031					x									x	x				x	x						x		

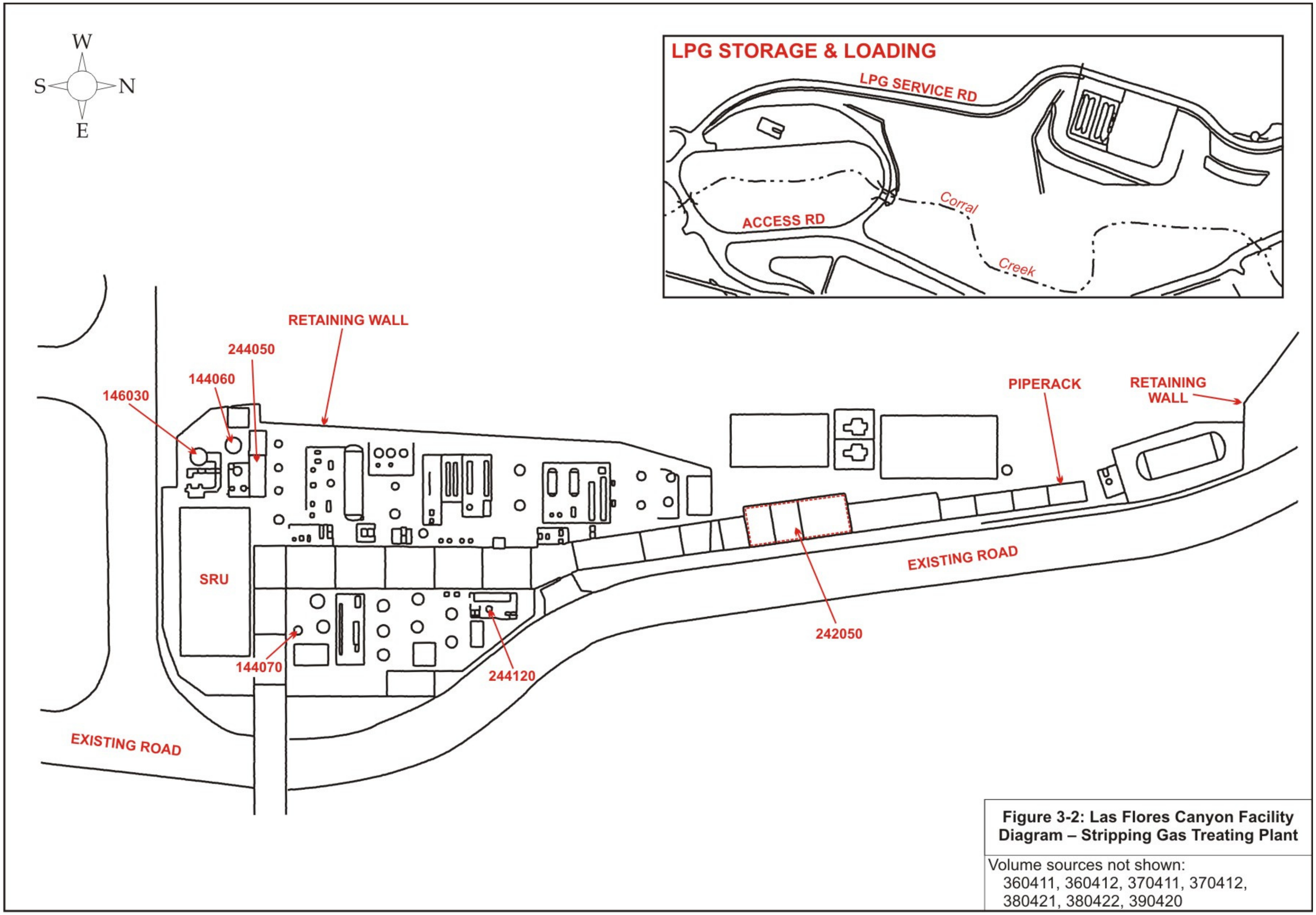

Figure 3-2: Las Flores Canyon Facility Diagram – Stripping Gas Treating Plant

Volume sources not shown:
360411, 360412, 370411, 370412, 380421, 380422, 390420

Table 3-3 AB2588 Substances to be Quantified for Year 2013 Toxics Emission Inventory – LFC Transportation Terminal

Device Name	APCD ID	Device ID	Acetaldehyde	Acrolein	Ammonia	1,3-butadiene	Benzene	Carbonyl Sulfide	Chlorine	Chlorobenzene	Cyclohexane	Diesel Particulate	Ethylene Glycols (DEG, EG, TEG)	Diethylene Glycol Monobutyl Ether	Ethylbenzene	Formaldehyde	Hexane	Hyrdrazine	Hydrochloric Acid	Hydrogen Sulfide	Naphthalene	PAHs	Phosphoric Acid	Propylene	Propylene Oxide	Sodium Hydroxide	Trimethylbenzene (1,2,4)	Toluene	Xylenes	Metals
OEHHA RA Health Value?			✓	✓	✓	✓	✓	No	✓	✓	No	✓	No	No	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	No	✓	✓	✓
Area Drain Oil/Water Separator - TT	6572	134020					x	x			x				x						x						x	x	x	
Area Drain Sump - TT	6580	234030					x	x			x				x						x						x	x	x	
Foam Tank		114410											x																	
Oil Emulsion Pig Receiver	6565	137100					x										x													
Oil Storage Tank A	6566	234011					x	x			x				x						x						x	x	x	
Oil Storage Tank B	6567	234012					x	x			x				x						x						x	x	x	
TT Compressor Seals - Plant Wide		380322	x	x			x									x	x			x	x	x		x				x	x	
TT Fugitive Components (Gas) - Plant Wide		360311	x	x			x						x			x	x			x	x	x		x				x	x	
TT Fugitive Components (Oil) - Plant Wide		360312	x	x			x						x			x	x			x	x	x		x				x	x	
TT Maint. Abrasive Blasting - Plant Wide		370311																												x
TT Maint. Painting & Coating - Plant Wide		370312									x				x													x	x	
TT Process Solvent Loss - Plant Wide		390320																										x	x	
TT Pump Seals - Plant Wide		380321	x	x			x									x	x			x	x	x		x				x	x	

Table 3-4 AB2588 Substances to be Quantified for Year 2013 Toxics Emission Inventory – LFC Oil Treating Plant

Device Name	APCD ID	Device ID	Acetaldehyde	Acrolein	Ammonia	1,3-butadiene	Benzene	Carbonyl Sulfide	Chlorine	Chlorobenzene	Cyclohexane	Diesel Particulate	Ethylene Glycols (DEG, EG, TEG)	Diethylene Glycol Monobutyl Ether	Ethylbenzene	Formaldehyde	Hexane	Hyrdrazine	Hydrochloric Acid	Hydrogen Sulfide	Naphthalene	PAHs	Phosphoric Acid	Propylene	Propylene Oxide	Sodium Hydroxide	Trimethylbenzene (1,2,4)	Toluene	Xylenes	Metals
OEHHA RA Health Value?			✓	✓	✓	✓	✓	No	✓	✓	No	✓	No	No	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	No	✓	✓	✓
Aeration Tank A		214250						x																						
Aeration Tank B		214260						x																						
Anaerobic Filter A		211090					x	x							x					x	x		x				x	x	x	
Anaerobic Filter B		211190					x	x							x					x	x		x				x	x	x	
Area Drain Oil/Water Separator - OTP	6577	114150					x	x			x				x						x						x	x	x	
Area Drain Sump - OTP	6581	214140					x	x			x				x						x						x	x	x	
Backwash Collection Tank	7885	214210					x																							
Backwash Sump	6575	114420					x	x			x										x						x	x	x	
Caustic Tank		114380																								x				
Centrate Sump		114430						x																						
Clarifier A		214280						x																						
Clarifier B		214290						x																						
Demineralizer Caustic Tank		114100																								x				
Demulsifier Tote Tank 1	6583	114021					x										x											x		
Demulsifier Tote Tank 2	6583	114022					x										x											x		
Demulsifier Tote Tank 3	6583	114023					x										x											x		
Demulsifier Tote Tank 4	6583	114024					x										x											x		
Diesel Storage Tank		114160																			x								x	
Equalization Tank	6573	114240					x	x							x					x	x						x	x	x	
Firewater Pump A	1085	113961	x	x		x	x		x	x		x			x	x	x		x		x	x		x	x			x	x	x
Firewater Pump B	1086	113962	x	x		x	x		x	x		x			x	x	x		x		x	x		x	x			x	x	x
Foam Tank		114410												x																
Fw Pump Diesel Fuel Tanks		113963																												
HCL Tank A		114361																	x											
HCL Tank B		114362																	x											
Maintenance Shop - Parts Cleaning		318023																										x	x	
Maintenance Shop - Welding - GMAW		318022																												x
Maintenance Shop - Welding -		318021																												x

Device Name	APCD ID	Device ID	Acetaldehyde	Acrolein	Ammonia	1,3-butadiene	Benzene	Carbonyl Sulfide	Chlorine	Chlorobenzene	Cyclohexane	Diesel Particulate	Ethylene Glycols (DEG, EG, TEG)	Diethylene Glycol Monobutyl Ether	Ethylbenzene	Formaldehyde	Hexane	Hyrdrazine	Hydrochloric Acid	Hydrogen Sulfide	Naphthalene	PAHs	Phosphoric Acid	Propylene	Propylene Oxide	Sodium Hydroxide	Trimethylbenzene (1,2,4)	Toluene	Xylenes	Metals
OEHHA RA Health Value?			✔	✔	✔	✔	✔	No	✔	✔	No	✔	No	No	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	No	✔	✔	✔
SMAW																														
Oily Sludge Thickener	6574	114230					x										x											x		
Open Drain Sump - OTP	6576	114130					x	x			x				x						x						x	x	x	
OTP Compressor Seals - Plant Wide		380122	x	x			x									x	x			x	x	x		x				x	x	
OTP Fugitive Components (Gas) - Plant Wide		360111	x	x			x						x			x	x			x	x	x		x				x	x	
OTP Fugitive Components (Oil) - Plant Wide		360112	x	x			x						x			x	x			x	x	x		x				x	x	
OTP Maint. Abrasive Blasting - Plant Wide		370111																												x
OTP Maint. Painting & Coating - Plant Wide		370112									x				x													x	x	
OTP Process Solvent Loss - Plant Wide		390120																										x	x	
OTP Pump Seals - Plant Wide		380121	x	x			x									x	x			x	x	x		x				x	x	
Outfall Batch Tank		214310						x																						
Phosphoric Acid Tank		114370																					x							
Quality Control Lab		111990													x												x	x	x	
Rerun Tank A	6570	214011					x	x			x				x						x						x	x	x	
Rerun Tank B	6571	214012					x	x			x				x						x						x	x	x	
Skim Tank		214500						x																						
SOV Distance Piece Vent - Compressor A	7881	113011					x										x													
SOV Distance Piece Vent - Compressor B	7881	113012					x										x													
SOV Distance Piece Vent - Compressor C	7881	113013					x										x													
Stang Pump	8122	119990	x	x		x	x		x	x		x			x	x	x		x		x	x		x	x			x	x	x
Thermal Oxidizer -- Planned – Other	1088	116013	x	x			x								x	x	x				x	x		x	x			x	x	
Thermal Oxidizer -- Planned Continuous (Acid Gas, Low Pressure)	1088	116012	x	x			x								x	x	x				x	x		x	x			x	x	

Device Name	APCD ID	Device ID	Acetaldehyde	Acrolein	Ammonia	1,3-butadiene	Benzene	Carbonyl Sulfide	Chlorine	Chlorobenzene	Cyclohexane	Diesel Particulate	Ethylene Glycols (DEG, EG, TEG)	Diethylene Glycol Monobutyl Ether	Ethylbenzene	Formaldehyde	Hexane	Hyrdrazine	Hydrochloric Acid	Hydrogen Sulfide	Naphthalene	PAHs	Phosphoric Acid	Propylene	Propylene Oxide	Sodium Hydroxide	Trimethylbenzene (1,2,4)	Toluene	Xylenes	Metals
OEHHA RA Health Value?			✓	✓	✓	✓	✓	No	✓	✓	No	✓	No	No	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	No	✓	✓	✓
Thermal Oxidizer -- Purge and Pilot	1088	116011	x	x			x								x	x	x				x	x		x	x			x	x	
Thermal Oxidizer -- Unplanned – Other	1088	116014	x	x			x								x	x	x				x	x		x	x			x	x	
Vacuum Flash Tower Feed Drum		211380					x	x			x										x						x	x	x	
VRU Distance Piece Vent - Compressor A	7882	113020					x										x													
VRU Distance Piece Vent - Compressor B	7882	113030					x										x													
Waste Sludge Cake Transfer - Pump A		113601						x																						
Waste Sludge Cake Transfer - Pump B		113602						x																						
Waste Sludge Cake Transfer - Pump C		113603						x																						

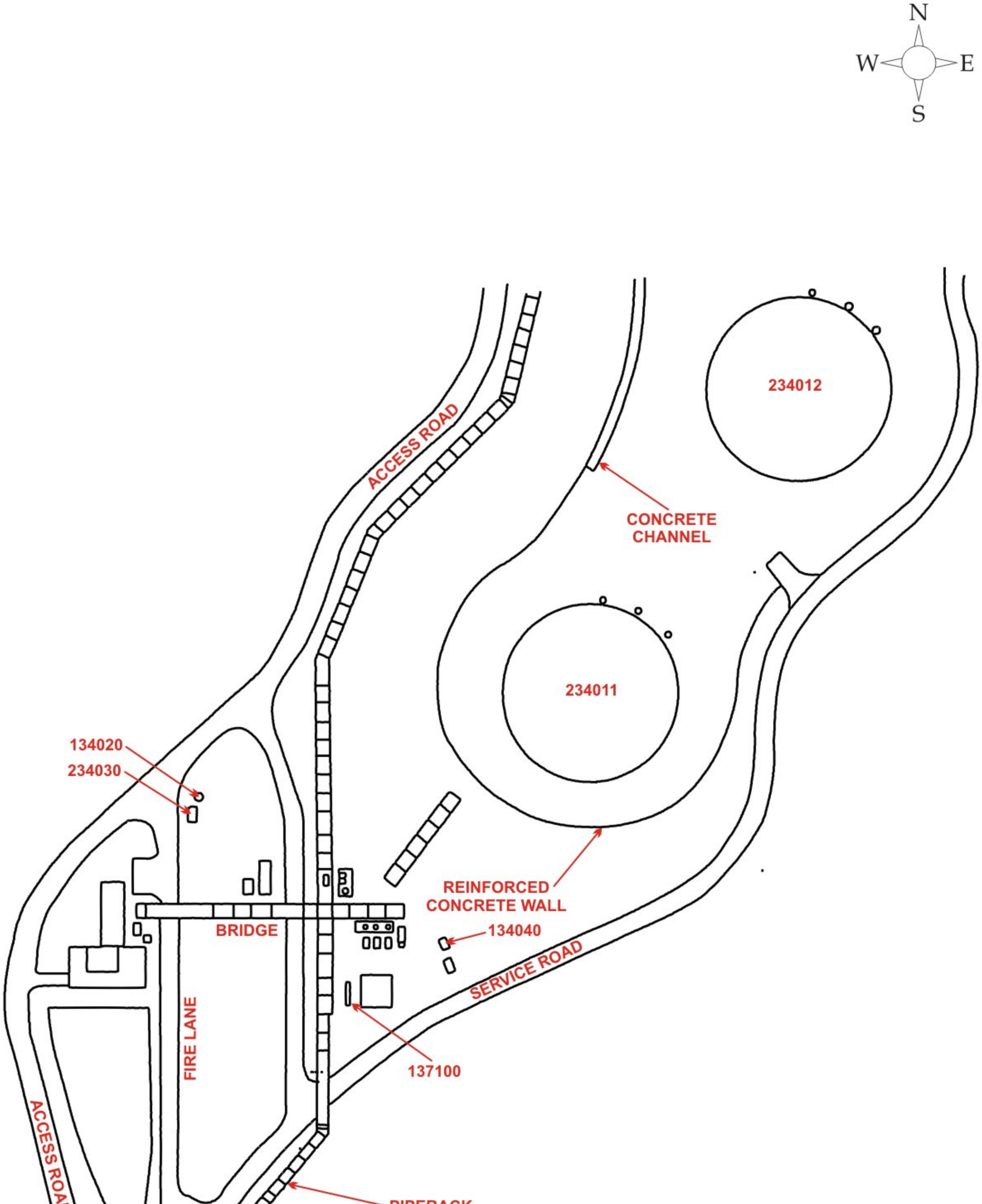

Figure 3-3: Las Flores Canyon Facility Diagram – Transportation Terminal

Volume sources not shown:
360311, 360312, 370311, 370312, 380321, 380322, 390320

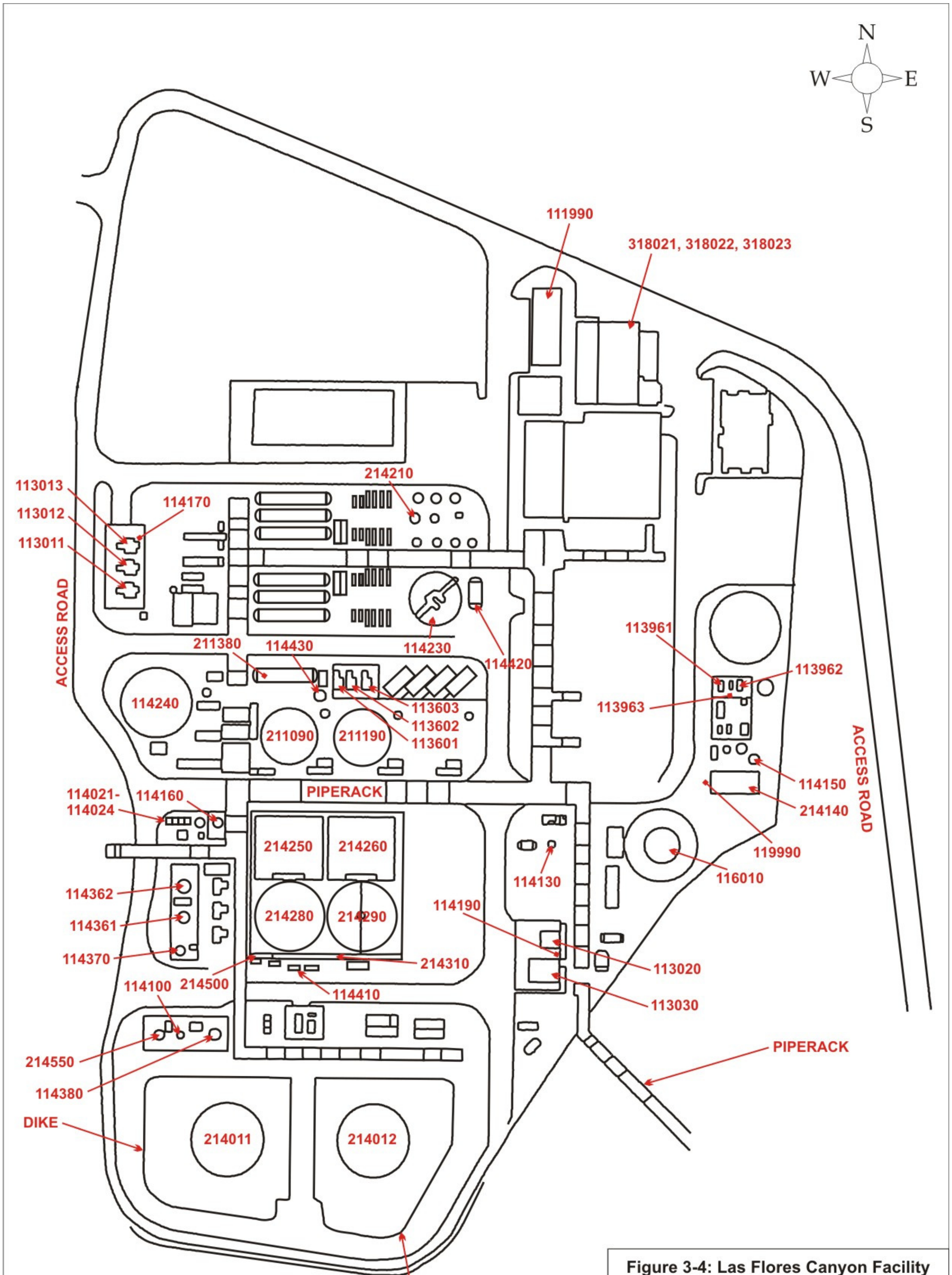

Figure 3-4: Las Flores Canyon Facility Diagram – Oil Treating Plant

Volume sources not shown:
360111, 360112, 370111, 370112, 380121, 380122, 390120, 390220

3.2 POPCO Facility

Table 3-5 provides a list of the emitting equipment at POPCO. The table identifies the device, APCD Device No, the new Device No. assigned by POPCO to be used in the ATEIR, along with the AB2588 substances that may be emitted from each device. The emission points in these tables are taken from the past ATEIR, and Table 5.1 and section 10.5 of Part 70/PTO 8092.

As noted in Table 3-5, some of the substances which CARB has identified for emission quantification under the AB2588 program have not been assigned risk assessment health values by OEHHA and CARB (OEHHA/CARB, 2013). POPCO has included these substances in Table 3-5 should OEHHA and CARB define risk assessment values in the future; however they will not be included in the emission estimates or modeling associated with the 2013/2014 ATEIR.

As with LFC, APCD Device No.'s have not been assigned to all devices included in the previous ATEIR, the ID number used is the "Device ID". In addition, there are devices currently permitted, which were not previously identified in the ATEIR. As described in Section 3.1, the emission sources at POPCO have been assigned new device and stack identification numbers. The same structure applied to the equipment at LFC has been used for POPCO.

Figures 3-5 and 3-6 identify the point, area, and volume emission sources associated with the POPCO facility. The emission sources have been identified by the new device numbering sequence previously discussed in Section 3.1.

Table 3-5 AB2588 Substances to by Quantified for Year 2013 Toxics Emission Inventory - POPCO

Device Name	APCD ID	Device ID	Acetaldehyde	Acrolein	Ammonia	1,3-butadiene	Benzene	Carbonyl Sulfide	Chlorine	Chlorobenzene	Cyclohexane	Diesel Particulate	Diethylene Glycol Monobutyl Ether	Ethylbenzene	Ethylene Glycols (DEG, EG, TEG)	Formaldehyde	Hexane	Hyrdrazine	Hydrochloric Acid	Hydrogen Sulfide	Methanol	Naphthalene	PAHs	Phosphoric Acid	Propylene	Propylene Oxide	Sodium Hydroxide	Trimethylbenzene (1,2,4)	Toluene	Xylenes	Metals
OEHHA RA Health Value?			✓	✓	✓	✓	✓	No	✓	✓	No	✓	No	✓	No	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	No	✓	✓	✓
Aerator A (Oxidizer Tank No. 1)	105191	250120					x										x												x	x	
Aerator B (Oxidizer Tank No. 2)	105192	250130					x										x												x	x	
Boiler A - Natural Gas	2350	150021	x	x			x									x	x					x	x		x				x	x	
Boiler A - Stretford Tailgas	105204	150022	x	x			x									x	x					x	x		x				x	x	
Boiler B - Natural Gas	2351	150031	x	x			x									x	x					x	x		x				x	x	
Boiler B - Stretford Tailgas	105204	150032	x	x			x									x	x					x	x		x				x	x	
Diesel Tanks		250200																				x								x	
Emergency Air Generator	2357	150090	x	x		x	x		x	x		x		x		x	x		x			x	x		x	x			x	x	x
Emergency Generator (G-800)	2358	150060	x	x		x	x		x	x		x		x		x	x		x			x	x		x	x			x	x	x
Evaporative Cooler	105199	150100																		x							x				
Firewater Pump (805)	2359	150070	x	x		x	x		x	x		x		x		x	x		x			x	x		x	x			x	x	x
Firewater Pump (806)	2356	150080	x	x		x	x		x	x		x		x		x	x		x			x	x		x	x			x	x	x
GPU TEG Glycol Reboiler	2353	150050	x	x			x									x	x			x		x	x		x	x			x	x	
Methanol Tank	102620	150210																			x										
POPCO Compressor Seals - Plant Wide	7079	380522	x	x			x									x	x			x		x	x		x				x	x	
POPCO Fugitive Components (Gas) - Plant Wide	113979	360511	x	x			x								x	x	x			x		x	x		x				x	x	
POPCO Fugitive Components (Oil) - Plant	7068	360512	x	x			x								x	x	x			x		x	x		x				x	x	

Device Name	APCD ID	Device ID	Acetaldehyde	Acrolein	Ammonia	1,3-butadiene	Benzene	Carbonyl Sulfide	Chlorine	Chlorobenzene	Cyclohexane	Diesel Particulate	Diethylene Glycol Monobutyl Ether	Ethylbenzene	Ethylene Glycols (DEG, EG, TEG)	Formaldehyde	Hexane	Hyrdrazine	Hydrochloric Acid	Hydrogen Sulfide	Methanol	Naphthalene	PAHs	Phosphoric Acid	Propylene	Propylene Oxide	Sodium Hydroxide	Trimethylbenzene (1,2,4)	Toluene	Xylenes	Metals
OEHHA RA Health Value?			✓	✓	✓	✓	✓	No	✓	✓	No	✓	No	✓	No	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	No	✓	✓	✓
Wide																															
POPCO Maint. Abrasive Blasting - Plant Wide	8796	370511																													x
POPCO Maint. Painting & Coating - Plant Wide		370512																													x
POPCO Process Solvent Loss - Plant Wide	105156	390520																											x	x	
POPCO Pump Seals - Plant Wide	7080/7081	380521	x	x			x									x	x			x		x	x		x				x	x	
Sulfinol TEG Reboiler	2352	150040	x	x			x									x	x			x		x	x		x	x			x	x	
Sulfur Loading	105182	150160																		x											
Thermal Oxidizer -- Planned Continuous Flaring	107202, 102615	150012	x	x			x									x	x					x	x		x	x			x	x	
Thermal Oxidizer -- Planned Other (SU, Maintenance, Tailgas Incineration)	102616	150013	x	x			x									x	x					x	x		x	x			x	x	
Thermal Oxidizer -- Purge & Pilot	102614	150011	x	x			x									x	x					x	x		x	x			x	x	
Thermal Oxidizer -- Unplanned Other (Miscellaneous, SRU Failure)	108095	150014	x	x			x									x	x					x	x		x	x			x	x	
Waste Liquid Storage Tank (601)	103103	150270				x											x														
Water Treating Regulator		350140							x																						

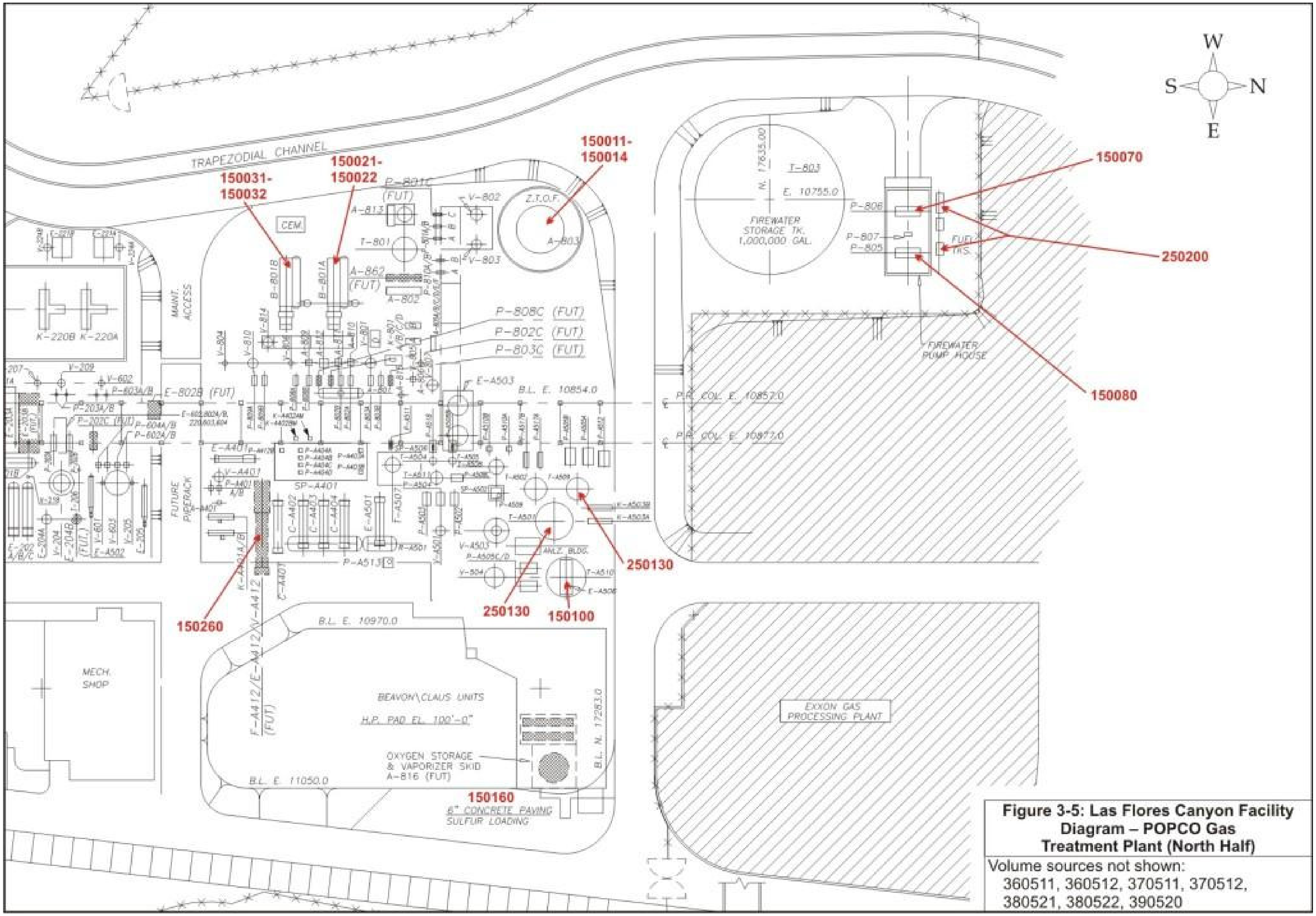

Figure 3-5: Las Flores Canyon Facility Diagram – POPCO Gas Treatment Plant (North Half)

Volume sources not shown:
360511, 360512, 370511, 370512,
380521, 380522, 390520

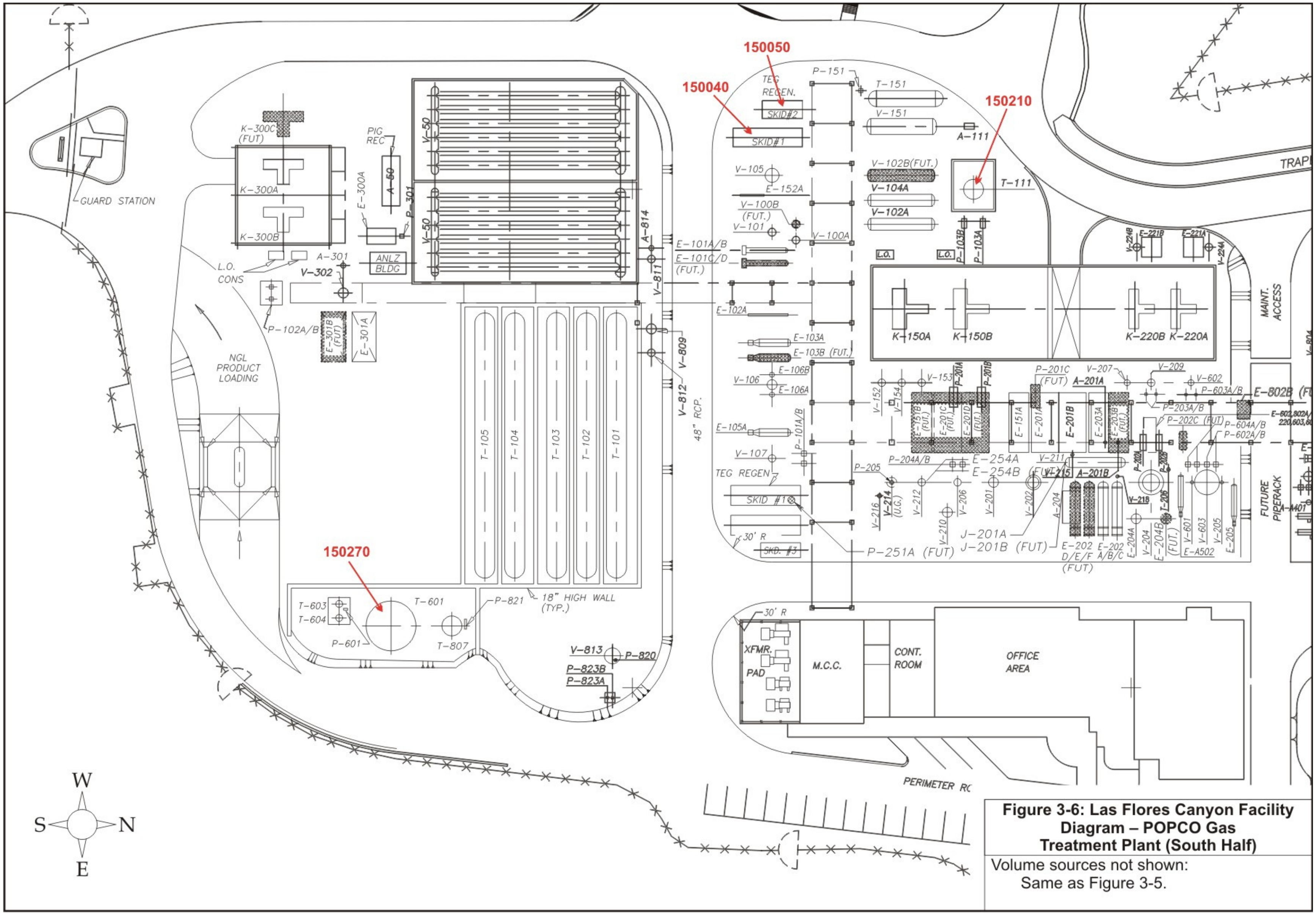

Figure 3-6: Las Flores Canyon Facility Diagram – POPCO Gas Treatment Plant (South Half)

Volume sources not shown:
Same as Figure 3-5.

4 Emission Estimation Techniques and Proposals

This section provides information on how emission rates will be estimated in the ATEIR for both Las Flores Canyon and POPCO. Emission Estimation Techniques (EETs) are presented in the following sections on a device category basis. Emissions are determined through one of three basic means: permitted emission limits calculations, mass balance, or source test data.

4.1 Las Flores Canyon Facility

4.1.1 Gas Turbine

Emissions from the Cogeneration Power Plant (CPP) come from the gas turbine generator and the low-NO_x duct burner associated with the Heat Recovery Steam Generator (HRSG). NO_x emissions from the gas turbine and duct burner are controlled by an ammonia injection selective catalytic reduction (SCR) unit. Emissions are determined for the CPP under three operating modes, as permitted in Part 70/APCD PTO 5651. The CPP is periodically required to be shutdown/started up during unplanned events. These unplanned startup/shutdown events are infrequent and unpredictable, so have not been included in this plan.

Table 4-1 CPP Operating Modes

Mode	Equipment	Load	Heat Input (MMBtu/hr)	APCD Device No.	Device ID	Stack ID
Normal Operations	Gas Turbine	99%	460	6585	126021	26020
	HRSG	41%	141	7865	126021	26020
	Turbine Bypass	1% Gas Turbine	4.60	7864	125010	25010
HRSG Only	HRSG	100%	345	7865	126022	26020
Planned SU/SD	Gas Turbine/HRSG		308.821	7866	125010	25010

Air toxic emissions are estimated from the gas turbine, turbine bypass and HRSG using emission factors from Table 3.1-3 of US EPA AP-42, as recommended by Ventura County APCD (VC APCD, 2001) for natural gas fired turbines. Hexane and propylene emissions for the gas turbine are calculated using the emission factors defined by the California Air Toxic Emission Factor (CATEF) website as identified in Table E-1. Emissions from the turbine bypass stack during Normal Operations are based on a leakage rate of one percent of the gas turbine exhaust. Emissions from the HRSG/SCR unit associated with the injection of ammonia (Device ID 2105) are estimated by multiplying the outlet concentration of ammonia (slip) times the stack flowrate, as monitored by the continuous emission monitoring system (CEM) as described further below. Hourly air toxic emissions are estimated using the rated heat input for each equipment item as found in Part 70/APCD PTO 5651.

Equation 4-1 Annual Average Emissions of NH_3

$$E_{yr}NH_3 = \frac{\left(C_{avg} * Q * 10^{-6} * M_{NH3} * C_2 * C_3\right)}{\left(C_1\right)}$$

Where:
$E_{yr,}NH_3$ = Average emission rate of ammonia, [lb/year]
C_{avg} = Average stack ammonia concentration, [ppm]
Q = Stack flowrate, [dscfm]
M_{NH3} = Molecular weight of ammonia, [17 lb/lb-mole]
C_1 = Standard molar volume at 68 °F, [385 ft^3/lb-mole]
C_2 = 60 minute/hour
C_3 = Hours of operation per year, [8,760 hours/year]

Equation 4-2 Hourly Maximum Emissions of NH_3

$$E_{hr}NH_3 = \frac{\left(C_{max} * Q * 10^{-6} * M_{NH3} * C_2\right)}{\left(C_1\right)}$$

Where:
$E_{hr,}NH_3$ = Maximum emission rate of ammonia, [lb/hour]
C_{max} = Maximum hourly recorded stack ammonia concentration, [ppm]

4.1.2 Thermal Oxidizer and Waste Gas Incinerator

This category includes the thermal oxidizer in the Oil Treating Plant (OTP) as well as the waste gas incinerator in the Stripping Gas Treating Plant (SGTP). The waste gas incinerator has not operated with the Merox vent in recent years so this mode of operation will not be included in the model. Emissions associated with unplanned startup/shutdown activities of the waste gas incinerator will also be omitted due to the infrequent and unpredictable nature of these events. Air toxic emission factors were developed by applying the CARB speciation profile number 719 (ICE – Reciprocating – Natural Gas) to the total organic carbon (TOC) emission factor for flares from Chapter 13 of US EPA AP-42; as provided by Ventura County APCD in their AB 2588 Combustion Emission Factors (VC APCD, 2001).

Table 4-2 Thermal Oxidizer and Waste Gas Incinerator Devices

Plant Area	Device Name	APCD Device No.	Device ID	Stack ID
SGTP	Waste Gas Incinerator (w/out Merox)	7868	146031	46030
SGTP	WGI - Planned Startup/Shutdown/Maintenance	7869	146032	46030
OTP	Thermal Oxidizer - Purge and Pilot	1088	116011	16010
OTP	Thermal Oxidizer - Planned Continuous (AG, LP)	1088	116012	16010
OTP	Thermal Oxidizer - Planned Other	1088	116013	16010
OTP	Thermal Oxidizer - Unplanned Other	1088	116014	16010

Emissions from the thermal oxidizer are calculated based on the following operating scenarios: Planned Continuous – Acid Gas, Planned Continuous – Low Pressure, Purge & Pilot, Planned – Other, and Unplanned – Other. Annual emissions of each toxic compound will be calculated using the actual annual fuel use data and waste gas reported for 2013 for these operating scenarios. Hourly air toxic emissions are estimated using the rated heat input for the waste gas incinerator and maximum hourly gas flow rate for the thermal oxidizer as found in Part 70/APCD PTO 5651.

Equation 4-3 Hourly Maximum Emissions for Thermal Oxidizer

$$E_{i,max} = V_{max,TO} \times EF_i$$

Equation 4-4 Hourly Maximum Emissions for Waste Gas Incinerator

$$E_{i,max} = V_{max,WGI} \div HHV \times EF_i$$

Equation 4-5 Average Annual Emissions for Thermal Oxidizer and WGI

$$E_{i,avg} = V \times EF_i$$

Where:
$E_{i,max,}$ = Max emission rate of substance *i*, [lb/hour]
$E_{i,avg}$ = Average emission rate of substance *i,* [lb/year]
V = Total annual Volume of gas combusted [MMscf/year]
$V_{max,TO}$ = Max hourly gas flow rate [MMscf/hour]
$V_{max,WGI}$ = Max hourly heat input rate [MMBtu/hr]
HHV –Higher Heating Value of fuel combusted in WGI [Btu/scf]
EFi = Emission factor of toxic pollutant, [lb/MMscf]

4.1.3 Internal Combustion Engines

There are three permitted diesel-fired internal combustion engine, two of which are permitted to power firewater pumps, and one stang pump. Hourly air toxic emission factors were based on source testing conducted by several different organizations, as reported by Ventura County APCD (VC APCD, 2001). Annual air toxic emission factors are based on Table 3.3-1 of AP-42 as permitted in Part 70/APCD PTO 5651.

Table 4-3 Internal Combustion Engines

Plant Area	Device Name	APCD Device No.	Device ID	Stack ID
OTP	Firewater Pump A	1085	113961	13961
OTP	Firewater Pump B	1086	113962	13962
OTP	Stang Pump	8122	119990	19990

Hourly and annual emissions of each toxic compound will be calculated using the rated heat input of each engine and the actual annual fuel use data reported for 2013 respectively.

Equation 4-6 Hourly Maximum Emissions for ICE

$$E_{i,max} = (bhp) \times (BSFC) \times EF_i \div HHV \times CF$$

Equation 4-7 Average Annual Emissions for ICE

$$\boldsymbol{E_{i,avg} = (bhp) \times (BSFC) \times OH \times EF_i \div HHV \times CF}$$

Where:
$E_{i,max,}$ = Max emission rate of substance *i*, [lb/hour]
$E_{i,avg}$ = Average emission rate of substance *i,* [lb/year]
Bhp = Maximum rated brake horsepower
BSFC = Brake Specific Fuel Consumption, [BTU/bhp-hr]
OH = Operating Hours, [Hours/year]
EF_i = Emission factor of toxic pollutant, [lb/kgal]
HHV = Higher Heating Value of fuel, [BTU/gal]
CF = Conversion Factor, [kgal/1000 gal]

4.1.4 Fixed Roof Storage Tanks

LFC has several fixed roof storage tanks operating at the facility: (2) two oil storage tanks, (2) two rerun tanks, (3) three diesel tanks, and (2) two demulsifier tote tanks. Breathing and working losses from the rerun, and diesel tanks are estimated using the equations defined for fixed roof tanks in chapter 7 of US EPA AP-42. Emissions from the oil storage tanks are based on PSV events reported in the semi-annual compliance verification report (CVR).

Table 4-4 Fixed Roof Storage Tanks

Profile	Process Stream	Plant Location	Service	Device Name	APCD ID	Device ID	Stack ID
LFC-7	**Crude**	OTP	Liq	Rerun Tank A	6570	214011	14011
				Rerun Tank B	6571	214012	14012
		TT	Liq	Oil Storage Tank A	6566	234011	34011
				Oil Storage Tank B	6567	234012	34012
CARB	**Diesel**	OTP	Liq	Diesel Fuel Tanks		113963	13963
		OTP	Liq	Diesel Storage Tank		114160	14160
CARB	**Demulsifier**	OTP	Liq	Demulsifier Tote Tanks 1 - 4	6583	114021	14021
						114022	14022
						114023	14023
						114024	14024

Emissions from the rerun and oil storage tanks are controlled through connections to the vapor recovery system. The demulsifier tote tanks are connected to carbon canisters. The diesel tanks vent to atmosphere.

Air toxic emission factors for the rerun tanks and the oil storage tanks were based on samples collected from several streams throughout the process to more accurately describe the emission from various locations. Sampling was conducted in 2013 as part of the ATEIP/R for LFC and POPCO. The stream profile for the crude process stream (LFC-7) was sampled from LFC's treated crude. Air toxic emission factors for the diesel and demulsifier tote tanks are based on the CARB speciation manual, profile number 297 (Crude Oil Evaporation) as currently identified in Part 70/APCD 5651 for tanks.

Hourly and annual emissions of each toxic compound will be calculated using the permitted maximum daily throughput and the actual annual throughput to these tanks as reported for 2013. The Rerun tanks and Oil Storage tanks are connected to vapor recovery. Emissions are assumed to be reduced by 95% on an hourly and daily basis, and up to 99.8% on an annual average. Emissions are estimated based on USEPA AP-42, Chapter 7 equations consistent with the Part 70/APCD PTO 5651.

4.1.5 Wastewater Storage Devices

The produced water treatment system is located in the OTP; and treats the produced water removed from the oil/water emulsion as well as the miscellaneous process waste water streams. The produced water treatment system include both closed (vented to VR or SRU) and open (fugitive) process devices. The closed portions of the system include an equalization tank, two anaerobic filters, and the vacuum flash tower feed drum. The open portions of the system are in the OTP and include aeration tanks, clarifiers, a skim tank, the outfall batch tank, the waste sludge cake transfer unit, and the centrate sump.

Table 4-5 Produced Water Device Stream Grouping

Profile	Process Stream	Plant Location	Service	Device Name	APCD ID	Device ID	Stack ID
LFC-5	**Anaerobic**	OTP	Liq	Anaerobic Filter A Anaerobic Filter B Equalization Tank	6573	211090 211190 114240	11090 11190 14240
LFC-6	**Aeration**	OTP	Liq	Aeration Tank A Aeration Tank B Clarifier A Clarifier B Skim Tank Outfall Batch Tank Centrate Sump Waste Sludge Cake Transfer – A Waste Sludge Cake Transfer – B Waste Sludge Cake Transfer - C		214250 214260 214280 214290 214500 214310 114430 113601 113602 113603	14250 14260 14280 14290 14500 14310 14430 13601 13602 13603
LFC-1	**Emulsion**	OTP	Liq	Vacuum Flash Tower Feed Drum		211380	11380

Air toxic emission factors for these devices are determined using Henry's Law and Raoult's Law. These emission factors are derived from assumed partial pressures associated with the known constituents in the wastewater and Henry's Law constants defined for the individual air toxic pollutants. The air toxics in the produced water were determined through process stream sample data collected in 2013 specified in Table 4-5 and provided in Appendix A. The stream profiles used for the anaerobic, aeration, and emulsion process streams were sampled at LFC.

Equation 4-8 Henry's Law for Produced Water Treatment System

$$p_{i,t} = H_i \times x_i$$

$$M_{i,w} = \frac{p_{i,t}}{p_{w,i}}$$

Where:
X_i = Mole fraction of substance *i* in water, [lb-mole/lb-mole]
H_i = Henry's Law constant at temperature t, [atm/lb-mole/lb-mole]
$M_{i,w}$ = Mass ratio for evaporation [lb substance i/lb water]
$p_{i,t}$ = Partial pressure of substance *i* at temperature t, [mm Hg]
$p_{w,t}$ = Partial pressure of water at temperature t, [mm Hg]

Equation 4-9 Raoult's Law for Produced Water Treatment System

$$M_{i,w} = C_1 \times \frac{p_{i,t}}{p_{w,i}}$$

Where:
$M_{i,w}$ = Mass ratio for evaporation [lb substance i/lb water]
C_1 = Concentration of substance in water, [fraction]
$p_{i,t}$ = Vapor pressure of substance *i* at temperature t, [mm Hg]
$p_{w,t}$ = Vapor pressure of water at temperature t, [mm Hg]

Hourly and annual emissions of each toxic compound will be calculated using the permitted surface area of each device, the amount of water processed in a given hour, and the stream speciation data consistent with the CARB/KVB Report (*Emissions Characteristics of Crude Oil Production in California,* January 1983) used in Part 70/APCD PTO 5651.

Equation 4-10 Hourly Maximum Emissions from Produced Water Treatment System

$$E_{i,max} = N_a \times M \times A \times M_{i,w} \times \left(\frac{1 - CE}{100}\right)$$

Equation 4-11 Annual Average Emissions from Produced Water Treatment System

$$E_{i,avg} = N_a \times M \times A \times M_{i,w} \times OH \times \left(\frac{1 - CE}{100}\right)$$

Where:
$E_{i,max}$ = Max emission rate of substance *i*, [lb/hour]
$E_{i,avg}$ = Average emission rate of substance *i,* [lb/year]
N_a = Molar flux of water to air, [lb-mole/hr-ft^2]

M = Molecular weight of water, 18 lb/lb-mole
A = Emitting surface area, [ft^2]
$M_{i,w}$ = Mass ratio for evaporation of Raoult's Law, [lb substance i/lb water]
OH = Annual operating hours, [hours/year]
CE = Efficiency of emission control device connected to equipment

Equation 4-12 Diffusivity of Water to Air

$$D_{AB,t} = 3.875 \times D_{AB} \times \left({}^{T}/_{273}\right)^{1.75} \times \left({}^{1}/_{P}\right)$$

Where:
$D_{AB,t}$ = Diffusivity of water to air at temperature t, ft^2/hr
D_{AB} = Diffusivity of water to air at 0°C, 0.220 cm^2/sec
T = Temperature, °K
P = Barometric pressure, atm

Equation 4-13 Molar Flux of Water to Air

$$N_A = \frac{\left[D_{AB,t} \times P \times (p_{a1} - p_{a2})\right]}{[R \times t \times z \times p_{bm}]}$$

Where:
N_a = Molar flux of water to air, [lb-mole/hr-ft^2]
P_{a1} = vapor pressure of water at temperature t, atm
P_{a2} = 0
R = Gas Constant, 0.730 atm-ft^3/lb mole-°R
z = Gas film thickness, ft
t = Temperature, °R
p_{bm} =[(P – p_{a2}) – (P – p_{a1})]/ ln [(P – p_{a2})/ (P – p_{a1})]

4.1.6 Acids and Caustics Storage Devices

The devices at LFC containing various acids and caustics include the following:

Table 4-6 Acids and Caustics Storage Device Process Streams

Plant Area	MSDS	Device Name	APCD Device No.	Device ID	Stack ID
Various	NA	Chemical Storage Tote Tanks	7886	OOS	OOS
SGTP	Sodium Hydroxide, Various Dilutions (20%)	Fresh Caustic Day Tank		244120	44120
OTP	Sodium Hydroxide, Various Dilutions (20%)	Caustic Tank		114380	14380
OTP	Sodium Hydroxide, Various Dilutions (20%)	Waste Caustic Tank		OOS	OOS
OTP	Sodium Hydroxide, Various Dilutions (20%)	Demineralizer Caustic Tank		114100	14100
OTP	Ansulite 3% (DGME 10%)	Foam Tank		134040	34040
OTP	Hydrochloric Acid, 33-38%	HCL Tanks		114360	14360

Plant Area	MSDS	Device Name	APCD Device No.	Device ID	Stack ID
OTP	Phosphoric Acid, 70-85%	Phosphoric Acid Tank		114370	14370
TT	Ansulite 3% (DGME 10%)	Foam Tank		134040	34040
CPP	Hydrochloric Acid, 33-38%	Acid Skid		125060	25060
CPP	Sodium Hydroxide, 4% (1N)	Cooling Water System		224060	24060
CPP	Sodium Hydroxide, Various Dilutions (20%)	Caustic Skid		225050	25050

The Raoult's Law and vapor diffusion method of estimating emissions of dilute acids and caustics in water solution from liquid surfaces to air provides a conservative emission estimate technique for these substances. See Appendix C for the table of default values used to calculate emissions came from the CRC Handbook of Chemistry and Physics.

Equation 4-14 Raoult's Law for Dilute Acids and Caustics

$$M_{i,w} = C_1 \times C_2 \times \frac{p_{i,t}}{p_{w,i}}$$

Where:
$M_{i,w}$ = Mass ratio for evaporation [lb substance i/lb water]
C_1 = Concentration of stock in water, [fraction]
C_2 = Concentration of substance in stock (per MSDS), [fraction]
$p_{i,t}$ = Vapor pressure of substance *i* at temperature t, [mm Hg]
$p_{w,t}$ = Vapor pressure of water at temperature t, [mm Hg]

Air toxic emissions are calculated in a similar manner as the wastewater storage devices described in the previous section) using the concentration of the caustic or acid, along with the vapor pressure of water and the caustic/acid at the given temperature for the device. Speciation data is based on the MSDS sheets for the solutions maintained in each of these tanks.

Hourly and annual emissions of each toxic compound will be calculated using the permitted surface area of each device and the amount of caustic in water solution processed in a given hour (See Equation 4-10, Equation 4-11, Equation 4-12, and Equation 4-13). Emissions from the Chemical Storage Tote Tanks or the Caustic Tank will not be included because the tanks did not operate during the reporting period.

4.1.7 Steam System

All steam condensate used throughout the plant is returned to the CPP condensate handling system. This system condenses steam to assist in power generation. The system also heats the condensate and make-up water, and reduces the oxygen content of the stream to the requirements of the HRSG. Hydrazine is a reducing agent used in the boiler feedwater to scavenge oxygen. Since its boiling point is only slightly higher than water, it is assumed to be present in the process stream, and all but the blow down fraction is emitted fugitively.

Table 4-7 Steam System Equipment

Plant Area	MSDS	Device Name	APCD Device No.	Device ID	Stack ID
CPP	TRASAR (Hydrazine 0.01%)	Steam Condensate System		221090	21090
CPP	TRASAR (Hydrazine 0.01%)	Steam Drum		221120	21120
CPP	TRASAR (Hydrazine 0.01%)	Deaerator		121110	21110
CPP	TRASAR (Hydrazine 0.01%)	Steam System Chemical Injection System		225020	25020

The hydrazine emission rate for the Steam Condensate System (2109) and the Steam Drum (2112) is calculated using the following material balance equation:

Equation 4-15 Hourly Maximum Emissions from Steam System

$$E_{hdz,hr} = \frac{E_{hdz,yr}}{8760}$$

Equation 4-16 Annual Average Emissions from Steam System

$$E_{hdz,yr} = Q_{hdz} \times D_{hdz} \times C_{hdz} \times \left(\frac{1 - {}^{B}/_{F}}{100}\right)$$

Where:
$E_{hdz,yr}$ = Average emission rate of hydrazine, lb/yr
Q_{hdz} = Quantity of hydrazine dispensed, gal/yr (0.01% of Trasar dispensed)
D_{hdz} = Density of hydrazine solution, 8.7 lb/gal
C_{hdz} = Concentration of hydrazine solution, weight percent
B/F = Ratio of blowdown to total feedwater makeup

The deaerator (121110) is used to remove dissolved oxygen, carbon dioxide and other gases present in the demineralized makeup water and hot steam condensate through mechanical separation. Oxygen removal is enhanced through the use of the oxygen scavenger (hydrazine) added to chemically reduce the dissolved oxygen concentration. Hydrazine is stored in the steam chemical injection system (225020). Emissions for these two devices are estimated using the methods for acids and caustics, discussed in the previous section.

4.1.8 Sumps and Separators

The sumps and separators operating at LFC include the following:

Table 4-8 Sumps and Separators Process Stream Grouping

Profile	Process Stream	Plant Location	Service	Device Name	APCD ID	Device ID	Stack ID
POP-8	**Sump**	SGTP	Liq	Area Drain Oil/Water Separator	6578	144060	44060
				Area Drain Sump	6582	244050	44050
				Open Drain Sump	6579	144070	44070
LFC-1	**Emulsion**	OTP	Liq	Backwash Collection Tank	7885	214210	14210
MSDS	**NaOH (20%)**	OTP	Liq	Backwash Sump	6575	114420	14420
LFC-7	**Crude**	OTP	Liq	Area Drain Sump	6581	214140	14140
				Open Drain Sump	6576	114130	14130
				Area Drain Oil/Water Separator	6577	114150	14150
		TT	Liq	Area Drain Oil/Water Separator	6572	134020	34020
				Area Drain Sump	6580	234030	34030
NA	**NA**	CPP		Chemical Sump		NA	NA
CARB 297	**Crude Oil Evaporation**	OTP		Oily Sludge Thickener	6574	114230	14230

Emissions from these devices are estimated using CARB/KVB method which is dependent upon the surface area of the sump or separator, the type of material being processed through the device (heavy crude), as well as the service (1°, 2°, or 3°). Note that all sumps and separators identified in Table 4-7 are assumed to be in tertiary, heavy oil service (3°). Air toxic emission factors for these devices were based on samples collected from several streams throughout the process to more accurately describe the emission from various locations as identified in Table 4-7. Sampling was conducted in 2013 as part of the 2014 ATEIR for LFC and POPCO. The profile used for the sump process stream was sampled at POPCO. The profiles for the emulsion, and crude process streams were specifically sampled at LFC. The results of this sampling are found in Appendix A.

The chemical sump is a part of the Demineralized Water System and was identified in the previous ATEIP/ATEIR, as being a non-emitting piece of equipment. The activities associated with this device and system remains unchanged; therefore this device will not be included in this emissions evaluation. The oily sludge thickener was not previously modeled, so emissions have been calculated using the CARB speciation manual, profile number 297 (Crude Oil Evaporation), as defined in Part 70/APCD PTO 5651. The backwash sump now receives the waste caustic material which was previously diverted to the waste caustic tank (1455[1]). As a result, the emissions associated with the backwash sump will include a 20% sodium hydroxide solution.

Hourly and annual emissions of each toxic compound will be calculated using the permitted surface area of each device.

Equation 4-17 CARB/KVB Equation for Sumps and Separators

$$E_{i.avg} = \left(\frac{EF \times SA}{24}\right) \times (1 - CE) \times OH \times Wt_i$$

$$E_{i,max} = \left(\frac{EF \times SA}{24}\right) \times (1 - CE) \times Wt_i$$

Where:
$E_{i,avg}$ = Average emission rate of substance *i,* [lb/year]
$E_{i,max}$ = Max emission rate of substance *i,* [lb/hour]
EF = ROC emission factor, [lb/ft^2-day]
SA = Unit surface area, [ft^2]
CE = Control Efficiency
OH = Annual operating hours, [hours/year]
Wt_i = Weight fraction of toxic species i, [fraction]

4.1.9 Compressor Vent

LFC operates three SOV compressors and two vapor recovery (VR) compressors in the OTP, each equipped with dual sealing systems which are connected to vapor recovery via the distance piece of each compressor. The emissions from the back end of each distance piece are routed through a common vent system, and directed to a carbon canister system. TOC emissions will be calculated using the ROC emission factor defined in Part 70/APCD PTO 5651 which was established based on past source test data collected at the outlet of the vents and applying the ROC/TOC factor from the CARB Speciation Manual, #757, to convert to TOC.

Table 4-9 Compressor Vents

Profile	Plant Area	Device Name	APCD Device No.	Device ID	Stack ID
CARB 757	OTP	SOV Distance Piece Vent – Compressor A	7881	113011	13010
CARB 757	OTP	SOV Distance Piece Vent – Compressor B	7881	113012	13010
CARB 757	OTP	SOV Distance Piece Vent – Compressor C	7881	113013	13010
CARB 757	OTP	VRU Distance Piece Vent – Compressor A	7882	113020	13020
CARB 757	OTP	VRU Distance Piece Vent – Compressor B	7882	113030	13020

Profile Number 757 from the CARB Speciation Manual was used to determine air toxic emissions from each compressor vent as specified in the current Part 70/APCD PTO 5651.

[1] The Waste Caustic Tank has been out of service for several years, and currently remains out of service. As such, it will not be included in the model.

Equation 4-18 Max Hourly and Annual Average Emissions from Compressor Vents

$$E_{i.avg} = (EF) \times \left(\frac{TOC}{ROC}\right) \times OH \times Wt_i$$

$$E_{i,max} = (EF) \times \left(\frac{TOC}{ROC}\right) \times Wt_i$$

Where:
$E_{i,avg}$ = Average emission rate of substance *i,* [lb/year]
$E_{i,max}$ = Max emission rate of substance *i,* [lb/hour]
EF = ROC emission factor, [lb/hr]
TOC/ROC = CARB Speciation Profile #757 conversion to TOC
OH = Annual operating hours, [hours/year]
Wt_i = Weight fraction of toxic species i, [fraction]

4.1.10 Pigging Equipment

LFC operates one oil emulsion pig receiver at the Transportation Terminal. TOC emissions will be calculated using the ROC emission factor and applying the ROC/TOC fraction defined in Part 70/APCD PTO 5651, and 2013 pigging event data.

Table 4-10 Pigging Equipment

Profile	Plant Area	Device Name	APCD Device No.	Device ID	Stack ID
CARB 757	TT	Oil Emulsion Pig Receiver	6565	137100	37100

Equation 4-19 Density of Vapor at Actual Conditions

$$\rho = \frac{P \times MW}{R \times T} = \frac{(14.7 + 1) \times 19.3}{10.73 \times 560} = 0.0504 \left[\frac{lb}{ft^3}\right]$$

Where:
ρ = Density of vapor remaining in vessel, lb ROC/ft^3
P = Remaining vessel pressure, psig
MW = 19.3 lb/lb-mol
T = Temperature in Rankine, 100°F
R = 10.73 ft^3/psi*R*lb-mol

Equation 4-20 TOC Emission Factor

$$EF = V * \rho$$

$$EF = 78.5\left[ft^3\right] * 0.0504\left[\frac{lb}{ft^3}\right]$$

$$EF = 3.956\left[lb - TOC / event\right]$$

Where:

EF = lb TOC/pigging event
V = Volume of vessel, ft^3
ρ = Density of vapor remaining in vessel, lb ROC/ft^3

Air toxic emissions were determined using the TOC emission factor calculated from equations
Equation 4-19and

Equation 4-20 above.
Equation 4-19 is described in section 4 of Part 70/APCD PTO 5651 for pigging events. The pig receiver is purged with sweet fuel gas prior to opening, as such the emitting stream consists primarily of gas vapors. CARB speciation profile #757 – Oil & Gas Production Fugitives – Gas Service, is used to calculate the air toxic emissions as described in the current permit.

4.1.11 Fugitive Components

LFC maintains fugitive components consisting of valves, connections, compressor seals, and pump seals in both gas and oil service. These components have been grouped according to the location of the facility they are found (Stripping Gas Treating Plant, Oil Treating Plant, Cogeneration Power Plant, and Transportation Terminal), the service code identified for the components, and whether they are in gas or oil service. Each P&ID was reviewed to identify an appropriate stream profile for each gas and liquid service components prior to grouping the components by plant area. The stream profiles were chosen based on the type of equipment and the processes occurring (service code) within the P&ID.

There are no "Device ID's" to reference, as the previous ATEIP/ATEIR relied on "systems" created for the purpose of modeling. The past plan summed the fugitive emissions for all components in each plant area and assigned that total to each of several systems defined within the plant area. By assigning the total plant area fugitive emissions to each system, instead of determining the number of components actually associated with each system, the air toxic emissions were greatly over estimated. If data were available on fugitive components by device, it is still not clear from the past plan what devices were actually associated with the systems, therefore determining the number of components that should be assigned to these systems is not possible.

Data is available, as required in the Part 70 Compliance Verification Reports (CVRs), on the number and type of components in each plant area. The inventory also maintains a record of the “service code” and P&ID for each component, which further describes a more specific process associated with the component. This plan focuses on the effect of the various component types and numbers by service code and P&ID in each plant area of the facility.

TOC emissions have been calculated using the component leakpath (clp) emission factors defined in Part 70/APCD PTO 5651. Air toxic emissions are calculated using the stream data collected in 2013. The most appropriate gas and liquid stream for each P&ID and service code were chosen based on the type of equipment and processes occurring in the P&ID.

The tables which group the fugitive components by P&ID are fairly extensive, and have been included in Appendix H. Note that the total component count reported for the facility under AB2588 differs from the count identified by the APCD as subject to permitting and control under district Rule 331. AB2588 includes process streams that would be considered exempt under district Rule 331. Data for each stream profile identified in these tables is provided in Appendix A.

4.1.12 Maintenance - Welding

LFC and POPCO conduct welding operations on an as needed basis to insure equipment is maintained in good working order without cracks or stress points that might cause the equipment to fail. As part of this plan update ExxonMobil has identified the specific type of welding operations that occur, noted in the table below.

Table 4-11 Welding Operations

Profile	Plant Area	Device Name	APCD Device No.	Device ID	Stack ID
EPA	OTP - Shop	Shielded Metal Arc (SMAW)	NA	318021	18020
EPA	OTP - Shop	Gas Metal Arc (GMAW)	NA	318022	18020

The equations for estimating emissions from Shielded Metal Arc Welding (SMAW) and Gas Metal Arc Welding (GMAW) come from San Diego County APCD and EPA. For trace metals without an AP-42 listed emissions factor (AP-42 Section 12.19), the factors identified by San Diego APCD were used.

Equation 4-21 Max Hourly and Annual Average Emissions from Welding – with AP-42 Factor

$$E_a = (EF) \times U_a \times (1 - e)$$

$$E_h = (EF) \times U_h \times (1 - e)$$

Equation 4-22 Max Hourly and Annual Average Emissions from Welding – without AP-42 Factor

$$E_a = (EF) \times U_a \times \left(\frac{Fume\ generate\ rate\ lbs\ fume}{lb\ rod}\right) \times (NASSCO\ Fume\ Correction\ Factor) \times C_i$$

$$E_h = (EF) \times U_h \times \left(\frac{Fume\ generate\ rate\ lbs\ fume}{lb\ rod}\right) \times (NASSCO\ Fume\ Correction\ Factor) \times C_i$$

Where:
Ea = Annual emissions of each listed toxic air contaminant per device, (lbs/year)
Eh = Maximum hourly emissions of each listed toxic air contaminant per device, (lbs/hour)
Ua = Annual usage of each welding rod, (lbs/year)
Uh = Maximum hourly usage of each welding rod, (lbs/hour)
EF = Listed substance emission factor from AP-42, (lbs listed substance/lb rod consumed)
e = Control equipment PM10 collection and removal efficiency

4.1.13 Maintenance – Abrasive Blasting

LFC and POPCO conduct abrasive blasting using CARB-certified sands in preparation for surface coating the equipment. This process emit particulates coming from the base material to be blasted, from the prior surface coating being removed, as well as from the abrasive blasting material. Actual air contaminants released depend on the specific abrasive blasting activity, but will include metals and silica.

Table 4-12 Abrasive Blasting

Plant Area	Device Name	APCD Device No.	Device ID	Stack ID
CPP	Abrasive Blasting	NA	370211	60211-3
OTP	Abrasive Blasting	NA	370111	60111-8
SGTP	Abrasive Blasting	NA	370411	60411-3
TT	Abrasive Blasting	NA	370311	60311-4

The equations for estimating emissions from abrasive blasting come from Bay Area AQMD Permit Handbook and EPA AP-42 Ch. 13.2.6. The California Air Toxics Emission Factors (CATEF) database was queried to identify emission factors for common particulate metals emitted during abrasive blasting operations.

Equation 4-23 Max Hourly and Annual Average Emissions from Abrasive Blasting

$$E_a = (EF) \times U_a \times \left(1 - {}^{A}\!/_{100}\right)$$

$$E_h = (EF) \times U_h \times \left(1 - {}^{A}\!/_{100}\right)$$

Where:
Ea = Annual emissions of particulate metal, (lbs/year)

Eh = Maximum hourly emissions of particulate metal, (lbs/hour)
Ua = Annual usage of blasting material (lbs/year)
Uh = Maximum hourly usage of blasting material, (lbs/hour)
EF = Listed substance emission factor, (lb listed substance/1000 lb Abrasive)
A = Abatement Efficiency (%)

4.1.14 Solvent Use

LFC and POPCO use solvents for a variety of purposes throughout each facility. Solvents are used for parts cleaning/degreasing, surface wiping cleaning, lab analysis, and paint thinning. Solvent use is conducted in the maintenance shop, the QC lab, and at the actual location of the equipment being maintained.

Table 4-13 Solvent Use Sources

Plant Area	Device Name	APCD Device No.	Device ID	Stack ID
Maintenance Shop	Parts Cleaning		318023	18020
CPP	Painting & Coating		370212	60211-3
OTP	Painting & Coating		370112	60111-8
SGTP	Painting & Coating		370412	60411-3
TT	Painting & Coating		370312	60311-4
QC Lab	Lab Analysis		111990	11990

Emissions are estimated based on the type of solvent used, the VOC content and density of the solvent, solvent recovery method, and amount used each year, consistent with existing reporting requirements under Part 70/APCD PTO 5651. The following emission calculation methods are used depending type of solvent use as approved under LFC's Solvent Reclamation Plan:

Type of Solvent Use	Recovery Method	Control Efficiency	Calculation Method
Parts Cleaning w/Exempt Cleaners and Equipment	Open Drain	75%	A
	Closed Container	90%	A
Parts Cleaners/Degreasers w/Remote Solvent Reservoir	Open Drain	75%	A
	Closed Container	90%	A
Wipe Cleaning	Open Drain or Closed Container	0%	B
Lab Analysis	Open Drain	75%	C
	Closed Container	90%	C
Spray Painting	Closed Container	90%	D
Brush Painting	Closed Container	90%	D

Equation 4-24 Emission Calculation Method for Parts Cleaning – Method A

$$E_A = \left[[\{V_d - (V_r \times 0.97)\} + \{V_r \times 0.97 \times (1 - RE)\}] \times VOC\ Content \right]$$

Equation 4-25 Emission Calculation Method for Wipe Cleaning – Method B

$$E_B = V_d \times VOC\ Content$$

Equation 4-26 Emission Calculation Method for Lab Analysis – Method C

$$E_C = [\{V_d \times (1 - 0.95)\} + \{(V_d \times 0.95) \times (1 - RE)\}] \times VOC\ Content$$

Equation 4-27 Emission Calculation Method for Painting – Method D

$$E_D = [\{V_d - V_r\} + \{V_r \times (1 - RE)\}] \times VOC\ Content$$

Where:
V_d = Volume of solvent dispensed
V_r = Volume of solvent recovered
RE = Recovery Efficiency

4.2 POPCO Gas Plant

4.2.1 External Combustion Equipment

The external combustion equipment at POPCO includes two utility boilers (B-801 A and B-801 B), the sulfinol TEG reboiler, the GPU TEG glycol reboiler, and the forced air furnace. Air toxic emissions for these units are estimated using emission factors developed by source tests completed by the California Air Resources Board (CARB), as reported by the Ventura County APCD (VC APCD, 2001).

The utility boilers combust plant fuel gas as well as Stretford tailgas resulting from the three stage sulfur recovery unit. The VC APCD natural gas based emission factors have been modified from natural gas factors assuming the tailgas has an average higher heating value of 25 Btu/scf as specified in the current Part 70/APCD PTO 8092.

The forced air furnace is currently out of service, as such it will not be included in the model.

Table 4-14 External Combustion Equipment

Device Name	APCD Device No.	Device ID	Stack ID
Boiler A – Plant Fuel Gas	2350	150021	50020
Boiler A – Tailgas Incineration		150022	50020
Boiler B – Plant Fuel Gas	2351	150031	50030
Boiler B – Tailgas Incineration		150032	50030
Forced Air Furnace	8792	OOS	OOS
GPU TEG Glycol Reboiler	2353	150050	50050
Sulfinol TEG Reboiler	2352	150040	50040

Hourly and annual emissions of each toxic compound will be calculated using the rated heat input of each device and the actual annual fuel use data reported for 2013, respectively.

Hourly air toxic emissions associated with the Sulfur Recovery Unit Stretford tailgas incineration in the boilers are calculated assuming there is approximately 5.62 MMBtu/hr additional heat released to the boilers from the Stretford tailgas. Annual air toxic emissions associated with the SRU are calculated using the actual annual tailgas fuel use data reported for 2013.

Equation 4-28 Maximum Hourly Emissions from External Combustion Equipment

$$E_{i,max} = MFR \div HHV \times CF_1 \div CF_2 \times EF_i$$

Equation 4-29 Average Annual Emissions from External Combustion Equipment

$$E_{i,avg} = AF \times EF_i$$

Where:
$E_{i,avg}$ = Average emission rate of substance *i,* [lb/year]
$E_{i,max}$ = Max emission rate of substance *i,* [lb/hour]
MFR = Maximum firing rate, [MMBtu/hr]
AF = Annual Fuel Use, [MMscf/year]
HHV = Higher Heating Value, [Btu/scf]
CF_1 = Conversion Factor, 10^6 Btu/MMBtu
CF_2 = Conversion Factor, 10^6 scf/MMscf
EF_i = Toxic emission factor, [lb/MMscf]

4.2.2 Sulfur Loading

Device Name	APCD Device No.	Operator ID	Device ID	Stack ID
Sulfur Loading	105182	P-A403 A/B	150160	50160
Sulfur Pit	105178	SP-A401	NA	NA

Acid gas from the amine unit is processed in three stages in the SRU. The third stage of the unit takes the H_2S enriched tailgas through a Stretford process where the H_2S is absorbed in a two-stage contactor system. Once the H_2S has been absorbed, it is converted to elemental sulfur, which is then skimmed from the Stretford solution and sent to a filter press to remove residual Stretford solution prior to being shipped offsite via trucks.

The sulfur shipped offsite is maintained in the sulfur pit (SP-A401) prior to shipment. Emissions from the pit are routed through a vent to the Evaporative Cooler where the H_2S is scrubbed with Stretford solution prior to release to the atmosphere (See Appendix B). Emissions associated with the sulfur pit are accounted for at the Evaporative Cooler.

The air toxic emission factor for hydrogen sulfide during loading operations is based on source testing completed in September 1990 during actual sulfur loading at the POPCO truck loading station. The results of the source test estimated hydrogen sulfide emissions at 0.0015 lb/minute based on the following assumptions:

- Sulfur loading rate of ~1670 lb S/minute
- Air flow rate = 245 scfm
- Hydrogen Sulfide concentration = 69 ppmv

Annual emissions assume one truck is loaded per week, with each loading event taking ½ hour to complete; consistent with the assumptions made in the previous ATEIP.

4.2.3 Internal Combustion Engines

There are four permitted diesel-fired internal combustion engine, two of which are permitted to power firewater pumps, one for emergency power, and one to generate power for an emergency air compressor. The hourly air toxic emission factors were based on source testing conducted by several different organizations, as reported by Ventura County APCD (VC APCD, 2001). Annual air toxic emission factors are based on Table 3.3-1 of AP-42 as permitted in Part 70/APCD PTO 8092.

Table 4-15 Internal Combustion Engines

Device Name	APCD Device No.	Device ID	Stack ID
Emergency Air Generator	2357	150090	50090
Emergency Generator (G-800)	2358	150060	50060
Firewater Pump (805)	2359	150070	50070
Firewater Pump (806)	2356	150080	50080

Hourly and annual emissions of each toxic compound will be calculated using the rated heat input and actual annual fuel use data reported for 2013, respectively.

Equation 4-30 Hourly Maximum Emissions for ICE

$$\boldsymbol{E_{i,max} = (bhp) \times (BSFC) \times EF_i \div HHV \times CF}$$

Equation 4-31 Average Annual Emissions for ICE

$$\boldsymbol{E_{i,avg} = (bhp) \times (BSFC) \times OH \times EF_i \div HHV \times CF}$$

Where:
$E_{i,max,}$ = Max emission rate of substance *i*, [lb/hour]
$E_{i,avg}$ = Average emission rate of substance *i,* [lb/year]
Bhp = Maximum rated brake horsepower
BSFC = Brake Specific Fuel Consumption, [BTU/bhp-hr]
OH = Operating Hours, [Hours/year]
EF_i = Emission factor of toxic pollutant, [lb/kgal]
HHV = Higher Heating Value of fuel, [BTU/gal]
CF = Conversion Factor, [kgal/1000 gal]

4.2.4 Thermal Oxidizer

This category includes the John Zink thermal oxidizer operated at the POPCO Gas Plant. Table 4-17 lists all flaring categories permitted under Part 70/APCD PTO 8092 as well as ATC/PTO 12020. The Unplanned Other – SRU Failure and Unplanned Other – Worst Case Emergency categories have not been included in the air toxic emission calculations or modeling since no actual emissions have occurred for the reporting year. Air toxic emission factors were developed by applying the CARB speciation profiles to the total organic carbon (TOC) emission factor for flares from US EPA AP-42; as provided by Ventura County APCD in their AB 2588 Combustion Emission Factors (VC APCD, 2001).

Table 4-16 Thermal Oxidizer Equipment

Device Name	APCD Device No.	Device ID	Stack ID
Purge and Pilot	102614	150011	50010
Planned Continuous Flaring	107202	150012	50010
Planned Other (SU, Maintenance, TG Incin)	102616	150013	50010
Unplanned Other (Miscellaneous, SRU Failure)	108095	150014	50010
Unplanned Other – Worst Case Emergency	102617	NA	NA

Hourly and annual emissions of each toxic compound will be calculated using the rated heat input for each flaring category and actual annual fuel use data reported for 2013, respectively.

Equation 4-32 Maximum Hourly Emissions from Flaring

$$E_{i,max} = MFR \div HHV \times CF_1 \div CF_2 \times EF_i$$

Equation 4-33 Average Annual Emissions from Flaring

$$E_{i,avg} = AF \times EF_i$$

Where:
$E_{i,avg}$ = Average emission rate of substance *i,* [lb/year]
$E_{i,max}$ = Max emission rate of substance *i,* [lb/hour]
MFR = Maximum firing rate, per flare category, [MMBtu/hr]
AF = Annual Fuel Use, [MMscf/year]
HHV = Higher Heating Value, [Btu/scf]
CF_1 = Conversion Factor, 10^6 Btu/MMBtu
CF_2 = Conversion Factor, 10^6 scf/MMscf
EF_i = Toxic emission factor, [lb/MMscf]

4.2.5 Aerators and Evaporative Cooler

The aerators (referred to as the Stretford Oxidizer Tanks in Part 70/APCD PTO 8092) and evaporative cooler are a part of the Sulfur Recovery Unit (SRU), and have the potential to release emissions of sodium hydroxide, hydrogen sulfide, and dissolved metals as they aerate and recirculate Stretford solution. Two aerators bubble air through the process solution. The process solution is then pumped to the evaporative cooler where air flows countercurrent to the solution, resulting in some fluid entrainment as drift droplets. The majority of the emissions from the aeration and evaporative cooling processes occur from the evaporative cooler.

Table 4-17 Aerators and Evaporative Cooler

Profile	Process Stream	Device Name	APCD Device No.	Device ID	Stack ID
POP-9	Stretford Absorber Outlet	Aerator A (Oxidizer Tank No. 1)	105191	250120	50120
POP-9	Stretford Absorber Outlet	Aerator B (Oxidizer Tank No. 2)	105192	250130	50130
POP-9	Stretford Absorber Outlet	Evaporative Cooler	105199	150100	50100

Emissions of ROC from the aerators come from the results of the APCD approved source test completed in June 2013 (See Appendix D) corrected for TOC using CARB Speciation Profile #532 - Oil & Gas Extraction – Well heads, cellars, and oil & water separators. Air toxic emissions for all three devices were determined using the CARB-sponsored cooling tower emission estimation technique (ARB, 1988). This method uses the speciation data obtained at POPCO from the outlet of the Stretford Absorber Columns (POP-9) collected as part of the 2013 sampling series (Appendix A). This sample point represents the location in which the Stretford solution is expected to be the most concentrated as it moves through the aerators and evaporative cooler.

Equation 4-34 Maximum Hourly Emissions from Aerators and Evaporative Cooler

$$E_{i,max} = DF \times WR \times WF_i \times \rho \times CF_1$$

Equation 4-35 Average Annual Emissions from Aerators and Evaporative Cooler

$$E_{i,avg} = DF \times WR \times WF_i \times OF \times \rho \times CF_1$$

Where:
Ei,avg = Average emission rate of substance *i,* [lb/year]
Ei,max = Max emission rate of substance *i,* [lb/hour]
DF = Drift Fraction, [0.0002 gpm/gpm]
WR = Water Circulation Rate, [330 gpm]
WF_i = Weight Fraction of substance *I* in Stretford Solution, [ppmv *i*/10^6 H_2O]
OF = Operation Fraction [Hours/yr/8760 hours/yr]
ρ = Density, [8.33 lb/gal]
CF1 = Conversion Factor, [60 min/hour]

4.2.6 Storage Tanks

POPCO has a few miscellaneous storage tanks permitted to operate at the facility: the methanol tank and the two diesel tanks. Breathing and working losses from the diesel tanks are estimated using the equations defined for fixed roof tanks in chapter 7 of US EPA AP-42.

Emissions from the methanol tank are based on the ideal gas law and vapor displacement during tank fillings.

Air toxic emission factors for the diesel tanks are based on the CARB speciation manual, profile number 297 (Crude Oil Evaporation) as currently permitted.

Table 4-18 Storage Tanks

Profile	Process Stream	Service	Device Name	APCD ID	Device ID	Stack ID
CARB 297	**Diesel**	Liquid	Diesel Tanks	NA	250200	50200
MSDS	**Methanol**	Liquid	Methanol Tank	102620	150210	50210

Hourly and annual emissions of each toxic compound will be calculated using the actual annual throughput to these tanks as reported for 2013.

4.2.7 Wastewater Storage Tanks

POPCO operates two wastewater tanks. Emissions from these tanks are controlled by carbon canisters. Tank T-807 is currently not in service, so emissions from this unit will not be characterized in this ATEIP/ATEIR. The wastewater tanks at POPCO have not been characterized in previous ATEIP/ATEIRs.

Table 4-19 Wastewater Storage Tanks

Profile	Process Stream	Service	Device Name	APCD Device No.	Device ID	Stack ID
POP-8	**Sour Water Stripper**	Liquid	Waste Liquid Storage Tank (601)	103103	150270	50270
NA	**NA**	Liquid	Waste Liquid Storage Tank (807)	103104	OOS	OOS

ROC emissions from the wastewater tank T-601 are based on the APCD approved source test completed in January 2012 assuming 75% control for the carbon canisters (see Appendix D). The ROC emissions were converted to TOC using the CARB Speciation Profile #532 – Oil & Gas Extraction – Well heads, cellars, and oil & water separators. The air toxics in the wastewater were determined from the sour water process stream (POP-8) collected at the inlet to the sour water stripper at POPCO which receives water prior to being sent to the wastewater tanks. This stream data was collected in 2013 as provided in Appendix A.

Air toxic emission factors for the operating wastewater tank are determined using Henry's Law and Raoult's Law as described in Section 4.1.5 for the Wastewater storage tanks used at LFC. These emission factors are derived from assumed partial pressures associated with the known constituents in the wastewater and Henry's Law constants defined for the individual air toxic pollutants as described in Appendix C.

4.2.8 Maintenance - Welding

POPCO conducts welding operations on an as needed basis to insure equipment is maintained in good working order without cracks or stress points that might cause the equipment to fail. ExxonMobil uses the Shielded Metal Arc Welding (SMAW) process and the Gas Metal Arc Welding (GMAW) processes. Note, welding operations for LFC and POPCO are conducted at the maintenance shop at LFC, as such there is not a separate emissions point for POPCO. See Section 4.1.11 for additional details

4.2.9 Fugitive Components

POPCO maintains fugitive components consisting of valves, connections, compressor seals, and pump seals in gas and light liquid service. Each P&ID was reviewed to identify an appropriate stream profile for the processes shown in the P&ID. Due to the smaller size of POPCO relative to LFC the applicable streams for each P&ID are summarized plant-wide as one volume source for the facility. See Appendix B for the location of the stream samples used, and Appendix I for the component summary by stream profile.

TOC emissions have been calculated using the emission factors defined by component leak path (clp) in Part 70/APCD PTO 8092. Air toxic emissions are calculated using the stream data collected in 2013. The most appropriate gas and liquid stream for each P&ID and service code were chosen based on the type of equipment and processes occurring in the P&ID.

5 Source Modeling Parameters

The source release parameters for modeling are presented separately below for the traditional LFC sources and the POPCO sources. The identification numbering scheme has been modified from the past to avoid potential conflicts between sources for the two facilities. The source IDs are still five digits, the maximum allowed within the HARP risk assessment software. Except for plant-wide fugitive sources, the LFC source IDs are based the ExxonMobil 4-digit equipment number. Therefore, the LFC IDs begin with "1", "2", "3", or "4" for OTP, CPP, TT or SGTP, respectively. The fifth digit is a "0" unless the same equipment number applies to more than one piece of equipment. For POPCO, source IDs are a 5-digit number beginning with "5" followed by the past 3-digit source number, and ending in "0".

There are two OTP stacks that do not have 4-digit equipment numbers. Because of this, and to be consistent with the other LFC ID numbers, new stack ID numbers needed to be assigned. Previously, the firewater pump fuel tanks had used the stack ID of 80000; this ID has been changed to 13963 because of the fuel tanks' association with the OTP firewater pumps (13961 and 13962). Also, the Stang pump had previously used the stack ID of 20000; this has been changed to 19990.

The assignment of 5-digit ID numbers for plant-wide fugitive volume sources are discussed within Sections 5.3 and 5.6 below.

5.1 Las Flores Canyon

Source modeling parameters for LFC are presented in Table 5-1 for point sources, Table 5-2 for area sources, and Table 5-3 for volume sources.

Source locations are UTM coordinates in the NAD27, Zone 10 reference and were determined primarily from geo-coded aerial imagery. For area sources, the coordinates represent the southwest corner of the area consistent with the requirements of the ISCST3 model embedded in the HARP risk assessment modeling system. Except for plant-wide volume sources, the locations of the devices associated with these sources are shown in Figures 3-1 through 3-4. Notably, for cases where the device is connected to a carbon canister, the actual emission release point may be located a few meters from the device.

5.1.1 Point Sources

The release parameters (height, stack diameter, exit temperature, and exit velocity) for the point sources were largely carried over from the previous AB 2588 analyses. Notable exceptions to this are as follows. The exit temperature and exit velocity for the thermal oxidizer were adjusted to be consistent with discussions with John Zink during the ExxonMobil/POPCO Synergy Project; specifically, the temperature and velocity for the LFC thermal oxidizer were increased slightly over values used in the past AB 2588 analyses. John Zink was consulted relative to anticipated flow and temperature measurements. Flow measurement data were based on anticipated air to fuel ratios for this natural draft device. John Zink indicated that a reasonable air to fuel ratio would be between 20 and 40 to 1 on a volumetric basis. ExxonMobil's calculations used a 20 to 1 ratio average. Temperature data were based on technical data provided by John Zink. For the AB-2588 ATEIP stack parameter data, no actual temperature or flow measurements have been taken. The temperature and exit velocities shown for the thermal oxidizer reflect continuous operations. The short-term release parameters associated with the maximum hourly flaring emissions will be determined based on the actual worst-case flaring event for 2013 operations. For non-buoyant point source releases (for example, tank vents), nominal stack diameter and exit velocity values have been assigned, and they will be modeled using ambient temperature to ensure that there is no appreciable plume rise from these sources. Sumps listed in Table 5-1 are controlled with carbon canisters and are therefore treated as non-buoyant point sources.

5.1.2 Area Sources

Area sources will be used to represent emissions from two dimensional sources for which it is appropriate to assume a negligible vertical distribution. Many of the area sources are tanks not connected to vapor recovery or carbon canisters, though this source type also includes filters, aerators, and clarifiers.

5.1.3 Volume Sources

Volume sources include various plant-wide fugitive emissions categories grouped by plant location (CPP, OTP, SGTP, and TT). These categories include:

- piping components (gas and oil),
- pump seals,
- compressor seals,
- process solvent losses,
- maintenance abrasive blasting, and
- maintenance painting & coating.

The "Fugitive Components" volume sources (i.e., piping components and equipment seals) for each LFC plant and service code grouping will include emissions from devices not otherwise represented in the inventory. The coverage for each service code grouping specified in Section 4 is based on the plant location (CPP, SGTP, OTP, or TT) as it is not feasible to define smaller geographic areas within each plant.

Previous AB2588 modeling for LFC associated fugitive component emissions with various devices or "systems" within each plant. Generic ROC emission values were previously assumed for each plant, and applied to multiple devices or systems within each plant. This prior approach is inconsistent with the APCD’s preferred method of defining areas in which the exact component count and associated emissions could be quantified. Therefore, the device and stack identification numbers for “fugitive devices” as defined in the prior ATEIP/ATEIR could not be used.

For the 2013 inventory, all volume sources representing plant-wide emissions have a 5-digit Stack ID that begins with "60". This is followed by a single digit identifying the LFC plant as follows:

1. OTP
2. CPP
3. TT
4. SGTP

There are potentially two sets of fugitive volume sources for each plant, as indicated by the fourth digit:

1. Fugitive emissions that can occur throughout a relatively deep surface layer in each plant. These emissions result from:
    a. piping components
    b. maintenance abrasive blasting
    c. maintenance painting & coating
2. Fugitive emissions that occur in a relatively shallow surface layer. These emissions result from:
    a. pumps seals
    b. compressor seals
    c. process solvent losses (includes wipe cleaning activities)

The fifth (rightmost) digit identifies the three to eight volume sources used to approximate the footprint of each plant. Using multiple volume sources for each plant allows a better spatial distribution than is possible with a single, larger volume source. The fugitive volume sources are depicted in Figure 5-1. For plotting purposes, the volume sources are depicted as circles; the diameter of each circle within a group is equal to the center to center distance between adjacent "in-line" volume sources. However, the value of the Sigma-y(init) parameter input to the HARP model is this distance divided by 2.15, consistent with Table 2.2.4 of the District's Modeling Guidelines for Health Risk Assessments.

As an example of this numbering system, a volume source for modeling fugitive emissions from SGTP piping components, maintenance abrasive blasting, and/or maintenance painting & coating would be in the range of 60411 through 60413 because SGTP is represented by three volume sources.

The vertical extent of the fugitive volume sources for which the fourth digit is a "1" is different for each plant; the specific values were determined based on visual inspection of each plant. For volume sources with a "2" as the fourth digit, the vertical extent is set to a fixed vertical dimension based on the values assigned to the volume source representing pump seals in the past analyses for POPCO. Note that in past analyses for LFC, fugitive emissions were represented by surface-based square area sources – one for each plant.

There is also a single volume source representing emissions from welding and parts cleaning activities inside Building 1802 of OTP. These emissions exit the building through natural building ventilation processes, so the volume source dimensions are based on the building dimensions.

Table 5-1 Las Flores Canyon Point Sources

Plant Area	Device Name	New Stack ID	UTM Coordinates		Release Height	Stack Diameter	Exit Temperature	Exit Velocity
			UTME	UTMN	(ft)	(ft)	(°F)	(fpm)
OTP	Quality Control Lab Vent	11990	771811.7	3819699.0	17.0	0.10	ambient	0.1
OTP	SOV Distance Piece Vent[2]	13010	771687.9	3819635.4	4.0	0.10	ambient	0.1
OTP	VRU Distance Piece Vent [2]	13020	771823.9	3819499.8	4.0	0.10	ambient	0.1
OTP	Sludge Hdlg Vent Exhaust [2]	13050	771763.5	3819588.4	4.0	0.10	ambient	0.1
OTP	Firewater Pump A	13961	771859.9	3819586.8	15.3	0.66	700.1	3562.0
OTP	Firewater Pump B	13962	771865.9	3819586.8	15.3	0.66	700.1	3562.0
OTP	Firewater Pump Diesel Fuel Tanks	13963	771862.9	3819584.4	16.3	0.10	ambient	0.1
OTP	Demulsifier Tote Tank 1	14021	771700.6	3819545.4	12.5	0.10	ambient	0.1
OTP	Demulsifier Tote Tank 2	14022	771702.3	3819545.4	12.5	0.10	ambient	0.1
OTP	Demulsifier Tote Tank 3	14023	771704.0	3819545.4	12.5	0.10	ambient	0.1
OTP	Demulsifier Tote Tank 4	14024	771705.7	3819545.4	12.5	0.10	ambient	0.1
OTP	Demineralizer Caustic Tank	14100	771702.9	3819477.8	14.0	0.10	ambient	0.1
OTP	Open Drain Sump[2]	14130	771810.5	3819542.0	4.0	0.10	ambient	0.1
OTP	Area Drain Oil/Water Separator [2]	14150	771865.4	3819566.6	4.5	0.10	ambient	0.1
OTP	Diesel Storage Tank	14160	771713.2	3819541.4	16.0	0.10	ambient	0.1
OTP	SOV Lube Oil Tank	14170	771672.3	3819617.3	15.0	0.10	ambient	0.1
OTP	VR Lube Oil Tank	14190	771802.2	3819518.4	15.0	0.10	ambient	0.1
OTP	Oily Sludge Thickener	14230	771775.9	3819610.2	32.0	0.10	ambient	0.1
OTP	Equalization Tank [2]	14240	771678.6	3819587.3	16.0	0.10	ambient	0.1
OTP	HCL Tank A	14361	771701.5	3819513.6	34.0	0.10	ambient	0.1
OTP	HCL Tank B	14362	771701.3	3819522.0	34.0	0.10	ambient	0.1
OTP	Phosphoric Acid Tank	14370	771702.2	3819503.5	19.0	0.10	ambient	0.1
OTP	Caustic Tank	14380	771713.3	3819477.8	24.0	0.10	ambient	0.1
OTP	Foam Tank	14410	771735.6	3819499.4	12.0	0.10	ambient	0.1

[2] Connected to carbon canister

Plant Area	Device Name	New Stack ID	UTM Coordinates		Release Height	Stack Diameter	Exit Temperature	Exit Velocity
			UTME	UTMN	(ft)	(ft)	(°F)	(fpm)
OTP	Backwash Sump	14420	771787.2	3819614.7	4.0	0.10	ambient	0.1
OTP	Centrate tank	14430	771741.2	3819580.4	12.0	0.10	ambient	0.1
OTP	Thermal Oxidizer	16010	771840.4	3819540.8	115.1	35.42	98.3	1.4
OTP	Stang Pump - Horiz Stack	19990	771855.1	3819558.6	14.1	0.10	ambient	0.1
CPP	Deaerator	21110	771824.1	3819570.8	81.0	0.10	ambient	0.1
CPP	CPP - Bypass Stack	25010	771824.1	3819605.2	65.0	12.14	528.0	2814.9
CPP	Acid Skid	25060	771836.5	3819630.7	10.0	0.10	ambient	0.1
CPP	CPP - Main Stack	26020	771824.1	3819565.8	98.1	12.14	326.0	3208.6
TT	Area Drain Oil/Water Separator [2]	34020	771818.5	3819124.3	4.0	0.10	ambient	0.1
TT	Foam Tank	34040	771901.6	3819075.3	12.0	0.10	ambient	0.1
TT	Oil Emulsion Pig Receiver	37100	771868.6	3819056.7	5.0	0.10	ambient	0.1
SGTP	Area Drain Oil/Water Separator [2]	44060	771623.7	3819533.6	20.0	0.10	ambient	0.1
SGTP	Open Drain Sump [2]	44070	771641.8	3819536.8	4.0	0.10	ambient	0.1
SGTP	Waste Gas Incinerator	46030	771622.8	3819523.0	100.0	2.62	1800.0	273.5

Table 5-2 Las Flores Canyon Area Sources

Plant Area	Device Name	New Stack ID	UTM Coordinates[3]		Release Height	X-Width	Y-Width	Angle
			UTME	UTMN	(ft)	(ft)	(ft)	(deg)
OTP	Anaerobic Filter A	11090	771727.5	3819562.1	48.0	46.5	46.5	
OTP	Anaerobic Filter B	11190	771747.9	3819562.1	48.0	46.5	46.5	
OTP	VF Tower Feed Drum	11380	771729.8	3819584.2	10.0	8.8	8.8	
OTP	Rerun Tank A	14011	771707.1	3819435.9	48.0	65.3	65.3	

[3] UTM Coordinates for Area Sources represent the southwest corner of the device.

Plant Area	Device Name	New Stack ID	UTM Coordinates[3]		Release Height	X-Width	Y-Width	Angle
			UTME	UTMN	(ft)	(ft)	(ft)	(deg)
OTP	Rerun Tank B	14012	771749.3	3819435.9	48.0	65.3	65.3	
OTP	Area Drain Sump	14140	771856.8	3819555.5	0.0	50.0	21.0	
OTP	Backwash Collection Tank	14210	771769.9	3819633.0	20.0	8.8	8.8	
OTP	Aerator A	14250	771724.2	3819526.4	35.0	67.3	62.3	
OTP	Aerator B	14260	771744.7	3819526.4	35.0	67.3	62.3	
OTP	Clarifier A	14280	771724.2	3819504.9	19.0	67.3	62.3	
OTP	Clarifier B	14290	771744.7	3819504.9	19.0	67.3	62.3	
OTP	Outfall Batch Tank	14310	771730.9	3819502.9	19.0	112.0	5.0	
OTP	Skim Tank	14500	771724.5	3819502.9	19.0	20.0	5.0	
OTP	Waste Caustic Tank	14550	771694.4	3819476.5	15.0	8.8	8.8	
CPP	Ammonia Storage Vessel and Injection System	21050	771826.2	3819581.5	20.0	13.4	4.9	
CPP	Steam Condensate System	21090	771797.8	3819578.8	28.0	9.9	39.0	
CPP	Steam System	21120	771823.4	3819576.9	95.0	5.8	34.9	
CPP	Cooling Water System	24060	771798.5	3819595.4	1.0	4.0	4.0	
CPP	Steam System Chemical Injection System	25020	771797.7	3819567.7	7.0	6.3	15.2	
CPP	Caustic Skid	25050	771834.2	3819632.6	0.5	13.0	9.0	
TT	Oil Storage Tank A	34011	771917.5	3819134.0	56.0	177.4	177.4	
TT	Oil Storage Tank B	34012	771984.9	3819235.7	56.0	177.4	177.4	
TT	Area Drain Sump	34030	771817.7	3819111.0	0.0	9.0	18.0	
SGTP	Refrigeration System	42050	771627.0	3819591.1	12.0	15.0	26.0	-7
SGTP	Area Drain Sump	44050	771620.5	3819530.3	0.0	17.0	6.0	
SGTP	Fresh Caustic Day Tank	44120	771641.2	3819559.8	1.0	2.0	2.0	

Table 5-3 Las Flores Canyon Volume Sources

Plant	Device Name[4,5]	New Stack ID	UTM Coordinates (meters)		Release Height	Sigma-y	Sigma-z
			UTME	UTMN	(ft)	(ft)	(ft)
OTP	Maintenance Shop	18020	771828.9	3819681.3	15.2	13.5	14.14
OTP	OTP PC volume source #1	60111	771709.4	3819459.3	15.0	80.2	13.95
OTP	OTP PC volume source #2	60112	771709.4	3819511.9	15.0	80.2	13.95
OTP	OTP PC volume source #3	60113	771709.4	3819564.4	15.0	80.2	13.95
OTP	OTP PC volume source #4	60114	771709.4	3819617.0	15.0	80.2	13.95
OTP	OTP PC volume source #5	60115	771762.0	3819459.3	15.0	80.2	13.95
OTP	OTP PC volume source #6	60116	771762.0	3819511.9	15.0	80.2	13.95
OTP	OTP PC volume source #7	60117	771762.0	3819564.4	15.0	80.2	13.95
OTP	OTP PC volume source #8	60118	771762.0	3819617.0	15.0	80.2	13.95
CPP	CPP PC volume source #1	60211	771812.9	3819565.0	7.5	44.9	6.97
CPP	CPP PC volume source #2	60212	771812.9	3819594.4	7.5	44.9	6.97
CPP	CPP PC volume source #3	60213	771812.9	3819623.8	7.5	44.9	6.97
TT	TT PC volume source #1	60311	771812.4	3819042.0	3.0	70.9	2.79
TT	TT PC volume source #2	60312	771785.8	3819080.1	3.0	70.9	2.79
TT	TT PC volume source #3	60313	771850.5	3819068.7	3.0	70.9	2.79
TT	TT PC volume source #4	60314	771823.9	3819106.7	3.0	70.9	2.79
SGTP	SGTP PC volume source #1	60411	771630.0	3819533.7	22.5	44.9	20.92
SGTP	SGTP PC volume source #2	60412	771630.0	3819563.1	22.5	44.9	20.92
SGTP	SGTP PC volume source #3	60413	771630.0	3819592.5	22.5	44.9	20.92
OTP	OTP PS volume source #1	60121	771709.4	3819459.3	4.9	80.2	4.58
OTP	OTP PS volume source #2	60122	771709.4	3819511.9	4.9	80.2	4.58
OTP	OTP PS volume source #3	60123	771709.4	3819564.4	4.9	80.2	4.58
OTP	OTP PS volume source #4	60124	771709.4	3819617.0	4.9	80.2	4.58
OTP	OTP PS volume source #5	60125	771762.0	3819459.3	4.9	80.2	4.58

[4] "PC" refers to piping components, but also applies to maintenance abrasive blasting, and maintenance painting & coating.
[5] "PS" refers to pumps seals, but also applies to compressor seals and process solvent losses.

Plant	Device Name[4,5]	New Stack ID	UTM Coordinates (meters)		Release Height	Sigma-y	Sigma-z
			UTME	UTMN	(ft)	(ft)	(ft)
OTP	OTP PS volume source #6	60126	771762.0	3819511.9	4.9	80.2	4.58
OTP	OTP PS volume source #7	60127	771762.0	3819564.4	4.9	80.2	4.58
OTP	OTP PS volume source #8	60128	771762.0	3819617.0	4.9	80.2	4.58
CPP	CPP PS volume source #1	60221	771812.9	3819565.0	4.9	44.9	4.58
CPP	CPP PS volume source #2	60222	771812.9	3819594.4	4.9	44.9	4.58
CPP	CPP PS volume source #3	60223	771812.9	3819623.8	4.9	44.9	4.58
TT	TT PS volume source #1	60321	771812.4	3819042.0	4.9	70.9	4.58
TT	TT PS volume source #2	60322	771785.8	3819080.1	4.9	70.9	4.58
TT	TT PS volume source #3	60323	771850.5	3819068.7	4.9	70.9	4.58
TT	TT PS volume source #4	60324	771823.9	3819106.7	4.9	70.9	4.58
SGTP	SGTP PS volume source #1	60421	771630.0	3819533.7	4.9	44.9	4.58
SGTP	SGTP PS volume source #2	60422	771630.0	3819563.1	4.9	44.9	4.58
SGTP	SGTP PS volume source #3	60423	771630.0	3819592.5	4.9	44.9	4.58

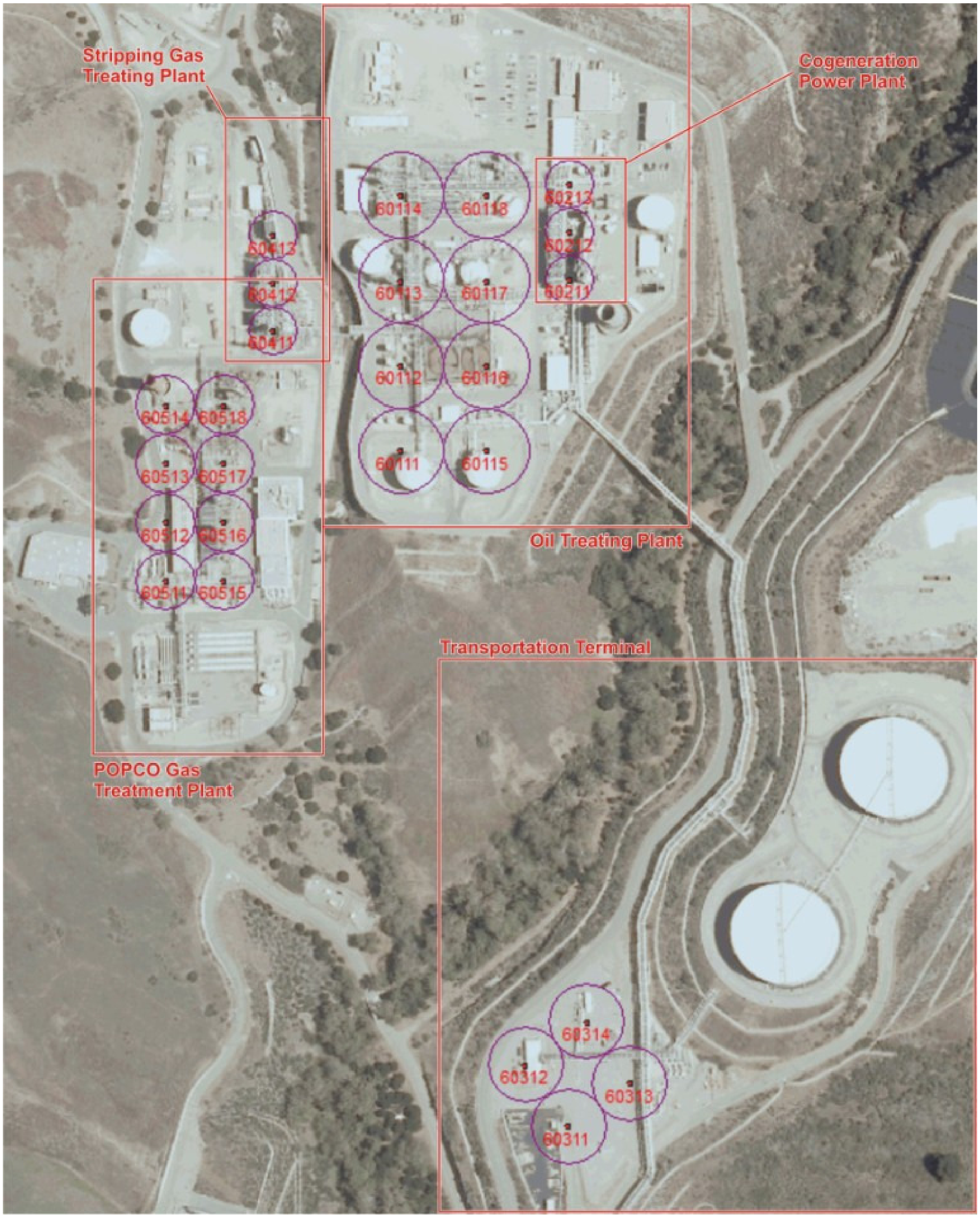

Figure 5-1 Volume Sources (as circles) Used to Model Plant-Wide Fugitive Emissions

5.2 POPCO Gas Plant

Source modeling parameters for POPCO are presented in Table 5-4 for point sources, Table 5-5 for area sources, and Table 5-6 for volume sources.

In the prior ATEIP/ATEIR, the Stack IDs were not associated with any identification numbers used by POPCO on facility P&ID diagrams, as was done with Las Flores Canyon. Rather, the Stack ID's began with "9", "8", or a "5" followed by a 4-digit number within the range of "0001" through "0022". Releases associated with point sources were preceded with a "9" or an "8". Volume and area source releases began with a "5". For the present analyses, all POPCO source IDs except those used to model plant-wide fugitive emissions begin with a 4-digit number in the range of "5001" through "5028" and end with a "0". In this case the "5" at the beginning indicates that it is a POPCO source, in the same sense that "1" through "4" as the first digit of the Stack ID denotes an LFC source.

Source locations are UTM coordinates in the NAD27 reference and were determined from geo-coded aerial imagery of the facility. For area sources, the coordinates represent the southwest corner of the area, consistent with the requirements of the ISCST3 model embedded in the HARP risk assessment modeling system. Except for plant-wide volume sources, the locations of the devices associated with these sources are shown in Figure 3-5. For cases where the device is connected to a carbon canister, the actual emission release point may be located a few meters from the device.

5.2.1 Point Sources

The release parameters (height, stack diameter, exit temperature, and exit velocity) for the point sources were largely carried over from the previous AB 2588 analyses. Notable exceptions to this are as follows. The exit temperature and exit velocity for the thermal oxidizer were adjusted to be consistent with discussions with John Zink during the ExxonMobil/POPCO Synergy Project; specifically, the temperature and velocity for the POPCO thermal oxidizer were reduced slightly over values used in past AB 2588 analyses. Flow measurement data were based on anticipated air to fuel ratios for this natural draft device. John Zink indicated that a reasonable air to fuel ratio would be between 20 and 40 to 1 on a volumetric basis. ExxonMobil's calculations used a 20 to 1 ratio average. Temperature data were based on technical data provided by John Zink.

No actual temperature or flow measurements have been taken specifically for determining the AB 2588 ATEIP stack parameters. However, the exit temperatures and exit velocities for Boilers A and B are based on recent (2013) source tests. The temperature and exit velocities shown for the thermal oxidizer reflect continuous operations. The short-term release parameters associated with the maximum hourly flaring emissions will be determined based on the actual worst-case flaring event from 2013 operations.

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5.2.2 Area Sources

In POPCO, area sources are limited to a small number of tanks. Lateral dimensions of the area sources were measured from available plot plans, and tank heights were measured.

5.2.3 Volume Sources

The source IDs for volume sources representing plant-wide fugitive emissions are as explained in Section 5.1.3 except that all POPCO sources begin with "605". The vertical extent of these volume sources were also carried over from the previous AB 2588 analysis. However, to achieve a better fit with the area within POPCO where the fugitive emissions are most likely to occur than can b achieved by a single volume source, two sets of 8 volume sources were created for the current analysis. Each set comprises two north-south columns of four sources each. Within each set – one for piping components ("PC") and one for pump seals ("PS") – the eight sources share the same horizontal dimensions, which are consistent with the spacing between adjacent sources. The vertical dimension is different for "PC" sources than for "PS" sources, however.

There is one emission device that will be modeled as a single volume source in POPCO, namely, the Water Treating Regulator (ID# 50140). The volume source release parameters (height, sigma-y, and sigma-z) for this device were carried over from the previous AB 2588 analyses.

Table 5-4 POPCO Point Sources

Device Name	New Stack ID	UTM Coordinates		Release Height	Stack Diameter	Exit Temperature	Exit Velocity
		UTME	UTMN	(ft)	(ft)	(°F)	(fpm)
Thermal Oxidizer	50010	771560.8	3819499.0	125.0	24.00	98.3	2.4
Boiler A	50020	771572.2	3819472.3	75.0	3.46	338.4	951.6
Boiler B	50030	771572.2	3819465.4	75.0	3.46	311.1	706.1
Sulfinol TEG Reboiler	50040	771603.2	3819365.4	36.0	1.25	486.0	253.0
GPU TEG Glycol Reboiler	50050	771550.8	3819368.9	29.0	1.00	525.0	357.0
Emergency Generator (G-800)	50060	771640.1	3819659.1	9.0	0.25	500.0	3669.0
Firewater Pump (805)	50070	771560.8	3819555.7	28.0	0.50	500.0	3618.0
Firewater Pump (806)	50080	771556.5	3819555.7	28.0	0.50	500.0	3618.0
Emergency Air Generator	50090	771577.2	3819476.7	9.0	0.25	500.0	3669.0
Evaporative Cooler	50100	771610.0	3819501.9	25.0	7.00	110.0	1705.0
Sulfur Loading	50160	771650.8	3819498.4	11.8	0.33	65.9	2899.0
Methanol Tank	50210	771557.1	3819397.7	24.0	0.10	ambient	0.1
Wastewater Tank[6]	50270	771628.1	3819315.4	4.0	0.10	ambient	0.1

Table 5-5 POPCO Area Sources

Device Name	New Stack ID	UTM Coordinates		Release Height	X-Width	Y-Width	Angle
		UTME	UTMN	(ft)	(ft)	(ft)	(deg)
Aerator A (Oxidizer Tank No. 1)	50120	771597.0	3819502.4	23.0	9.4	9.4	
Aerator B (Oxidizer Tank No. 2)	50130	771599.9	3819496.9	23.0	16.0	16.0	

[6] Connected to carbon canister.

Device Name	New Stack ID	UTM Coordinates		Release Height	X-Width	Y-Width	Angle
		UTME	UTMN	(ft)	(ft)	(ft)	(deg)
Diesel Tanks	50200	771559.2	3819559.6	10.0	4.0	2.0	

Table 5-6 POPCO Volume Sources

Device Name	New Stack ID	UTM Coordinates		Release Height	Sigma-y	Sigma-z
		UTME	UTMN	(ft)	(ft)	(ft)
Water Treating Regulator	50140	771636.8	3819586.4	4.1	3.81	3.81
POPCO PC volume source #1	60511	771563.8	3819379.0	16.4	55.2	15.26
POPCO PC volume source #2	60512	771563.8	3819415.2	16.4	55.2	15.26
POPCO PC volume source #3	60513	771563.8	3819451.4	16.4	55.2	15.26
POPCO PC volume source #4	60514	771563.8	3819487.6	16.4	55.2	15.26
POPCO PC volume source #5	60515	771600.0	3819379.0	16.4	55.2	15.26
POPCO PC volume source #6	60516	771600.0	3819415.2	16.4	55.2	15.26
POPCO PC volume source #7	60517	771600.0	3819451.4	16.4	55.2	15.26
POPCO PC volume source #8	60518	771600.0	3819487.6	16.4	55.2	15.26
POPCO PS volume source #1	60521	771563.8	3819379.0	4.92	55.2	4.58
POPCO PS volume source #2	60522	771563.8	3819415.2	4.92	55.2	4.58
POPCO PS volume source #3	60523	771563.8	3819451.4	4.92	55.2	4.58
POPCO PS volume source #4	60524	771563.8	3819487.6	4.92	55.2	4.58
POPCO PS volume source #5	60525	771600.0	3819379.0	4.92	55.2	4.58
POPCO PS volume source #6	60526	771600.0	3819415.2	4.92	55.2	4.58
POPCO PS volume source #7	60527	771600.0	3819451.4	4.92	55.2	4.58
POPCO PS volume source #8	60528	771600.0	3819487.6	4.92	55.2	4.58

5.3 Las Flores Canyon/POPCO Facility Location

Table 5-7 includes the property boundary coordinates combined for LFC and POPCO. Figure 5-2 shows the location of the SGTP, OTP, TT, CPP, and POPCO within the property boundary.

Table 5-7 Boundary Coordinates

UTM Coordinates (NAD27)	
Easting (m)	**Northing (m)**
771183.5	3821382.3
773926.3	3821210.9
773328.7	3820136.9
773023.9	3820160.7
772885.7	3819902.1
772897.6	3819225.8
772540.5	3819111.5
772385.7	3818628.2
772304.7	3818392.4
772225.3	3818385.3
772160.5	3818333.7
772152.6	3818243.7
771780.3	3817804.5
771700.1	3817623.0
771673.7	3817497.3
771686.9	3817445.7
771402.5	3817416.6
771423.7	3817693.1
771324.4	3817760.6
771250.3	3818116.7
771107.7	3818931.4
771161.7	3819181.4
770966.4	3819479.7
771092.0	3819708.3
771280.8	3820234.5
771349.8	3820789.4
771202.2	3821044.2
771209.3	3821306.1

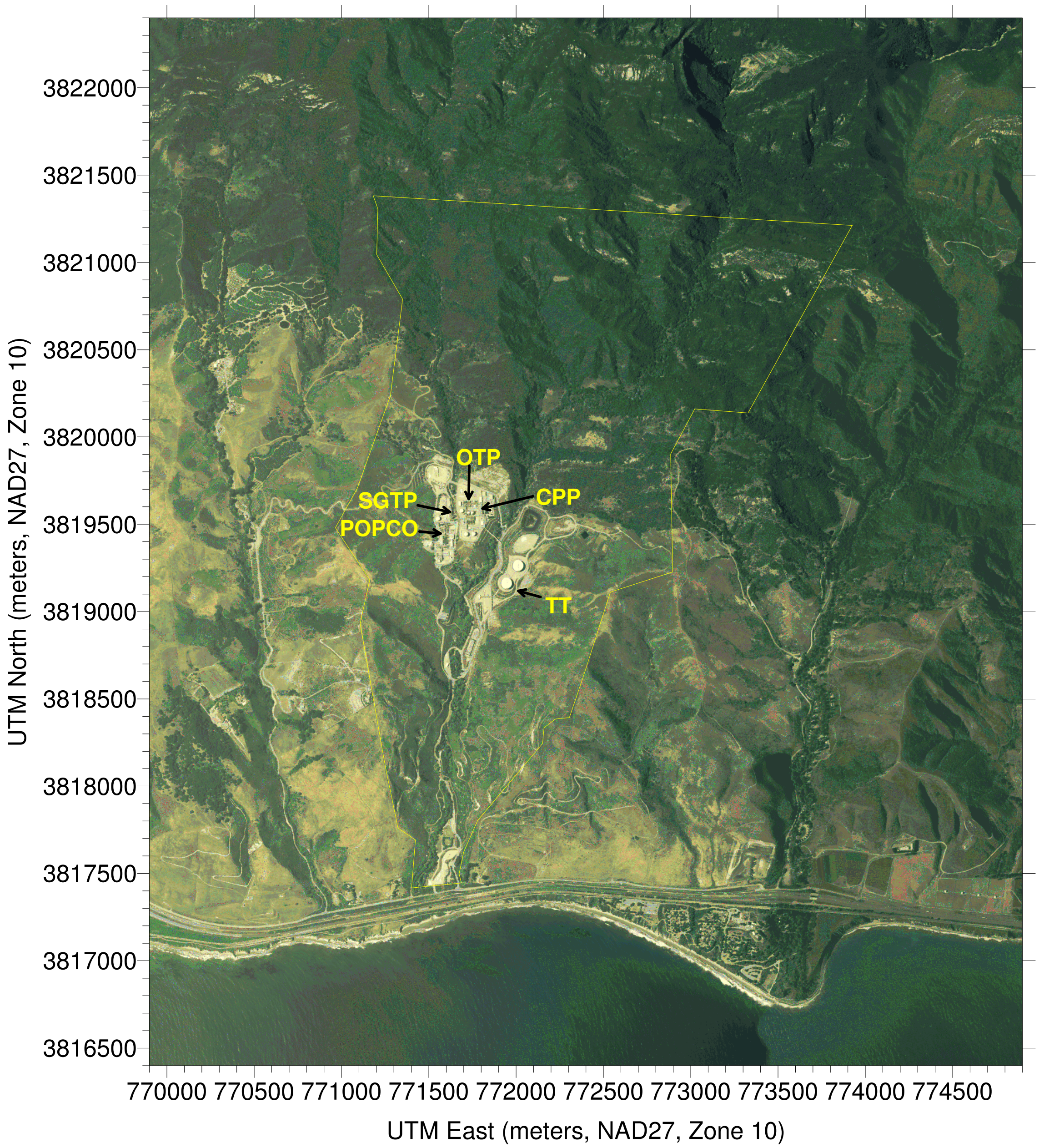

Figure 5-2 Facility Boundary and Area Sources for Each Plant

5.4 *Las Flores Canyon/POPCO Building Tier Heights and UTM Coordinates*

The 69 structures included in the analysis of building downwash effects in the air dispersion modeling are identified in Table 5-8. For conventional structures, such as rectangular buildings, the corner points were determined from UTM-coded aerial imagery – specifically, NAIP 1-meter resolution imagery –and structure heights were determined from plans or by measurement.

Of the 69 structures, 46 are cylindrical tanks with circular cross-sections. Each of these tanks is represented by 32 points around the perimeter as calculated by a pre-processor that is given the center point coordinates and diameter of each tank. This representation provides much better directional treatment of the tanks with respect to downwash than if they were represented as a structure with a square cross-section. The tank dimensions are based on specifications or measurements.

Table 5-8 Structures included in the Downwash Analysis

Structure Number	Description	Tier No.	Tier Height (m)	Number of Points
1	Control Bldg	1	4.3	4
2	Warehouse	1	9.3	4
3	Switchgear Bldg	1	6.7	4
4	OTP Rerun Pump Bldg	1	4.1	4
5	OTP SOV Compressor Bldg	1	7.8	4
6	OTP VR Compressor Bldg	1	8.1	4
7	Admin Bldg	1	9.1	4
8	OTP Firewater Pump Cover	1	0.[7]	4
9	Lab Bldg	1	5.1	4
10	SGTP Bldg	1	7.6	4
11	POPCO Admin/Electrical/Control Bldg	1	5.0	12
11	POPCO Admin/Electrical/Control Bldg	2	6.3	4
11	POPCO Admin/Electrical/Control Bldg	3	8.7	4
12	POPCO Warehouse	1	6.1	7
13	POPCO Firewater Pump Bldg	1	5.6	4
14	POPCO Main Compressor Bldg	1	10.9	4
15	POPCO Sales Bldg	1	8.9	4
16	OTP Aerators	1	10.7	4
17	OTP Clarifiers	1	5.8	4
18	POPCO Boiler 801A	1	4.9	4
19	POPCO Boiler 801B	1	4.9	4
20	Cogen Train	1	6.7	4
20	Cogen Train	2	7.6	4

[7] This structure (#8) has been included as a building with downwash potential in previous draft versions of the ATEIP. However, it is now being excluded from the downwash analysis because it is a cover only and does not have walls to obstruct air flow. A zero height has been assigned so that it will not have downwash potential.

Structure Number	Description	Tier No.	Tier Height (m)	Number of Points
20	Cogen Train	3	9.5	4
20	Cogen Train	4	11.6	4
20	Cogen Train	5	13.4	4
20	Cogen Train	6	14.8	4
20	Cogen Train	7	15.5	4
21	TT Rectangular Tank	1	3.4	4
22	TT Foam Tank	1	3.4	4
23	OTP Sludge Cake Transfer Bldg	1	3.5	4
24	Tank 1401A	1	14.6	32
25	Tank 1401B	1	14.6	32
26	Tank 1424	1	14.6	32
27	Tank 1440	1	14.6	32
28	POPCO Tank 803	1	14.6	32
29	Tank 1109	1	14.6	32
30	Tank 1119	1	14.6	32
31	Tank 3401A	1	17.1	32
32	Tank 3401B	1	17.1	32
33	POPCO Tank A510	1	7.6	32
34	Tank 1410	1	4.6	32
35	Tank 1438	1	7.3	32
36	Tank 1455	1	4.3	32
37	Tank 1437	1	5.8	32
38	Tank 1436B	1	10.4	32
39	Tank 1436A	1	10.4	32
40	Tank 1402	1	5.8	32
41	Tank 1416	1	3.0	32
42	Tank 1421	1	9.1	32
43	Tank 1443	1	3.7	32
44	Tank 1423	1	6.1	32
45	POPCO Tank A501	1	7.0	32
46	POPCO Tank A509	1	7.0	32
47	POPCO Tank 111	1	7.3	32
48	POPCO Tank V105	1	11.9	32
49	POPCO Tank 801	1	6.4	32
50	POPCO Tank A813	1	10.7	32
51	Tank 2401	1	7.3	32
52	Tank 2404	1	8.5	32
53	Tank 1135A	1	9.1	32
54	Tank 1135B	1	9.1	32
55	Tank 1135C	1	9.1	32
56	Tank 4179	1	5.5	32
57	Tank 4121A	1	14.0	32
58	Tank 4121B	1	14.0	32
59	Tank 4121C	1	14.0	32

Structure Number	Description	Tier No.	Tier Height (m)	Number of Points
60	POPCO Tank A816	1	9.1	32
61	POPCO Tank 601	1	8.8	32
62	POPCO Rental Tank 1	1	3.7	32
63	POPCO Rental Tank 2	1	3.7	32
64	POPCO Rental Tank 3	1	3.7	32
65	POPCO Rental Tank 4	1	3.7	32
66	POPCO Rental Tank 5	1	3.7	32
67	POPCO Rental Tank 6	1	3.7	32
68	POPCO Rental Tank 7	1	3.7	32
69	POPCO Tank A502	1	5.5	32

A plot of the structures listed in Table 5-8 is shown in Figure 5-3. Also shown are the locations of point sources that will be included in the downwash analysis. Because of the large number of structures and point sources, only the larger structures are labeled – using the structure numbers given in Table 5-8. Complete data on the structures, including the coordinates of each corner point, are listed in Appendix G. Moreover, an input file to the Building Profile Input Program (BPIP) is provided electronically. This provides all data needed to determine the direction-specific projected widths and heights of structures with the potential to create building downwash effects on emissions from each source. The BPIP output files are also included in electronic format.

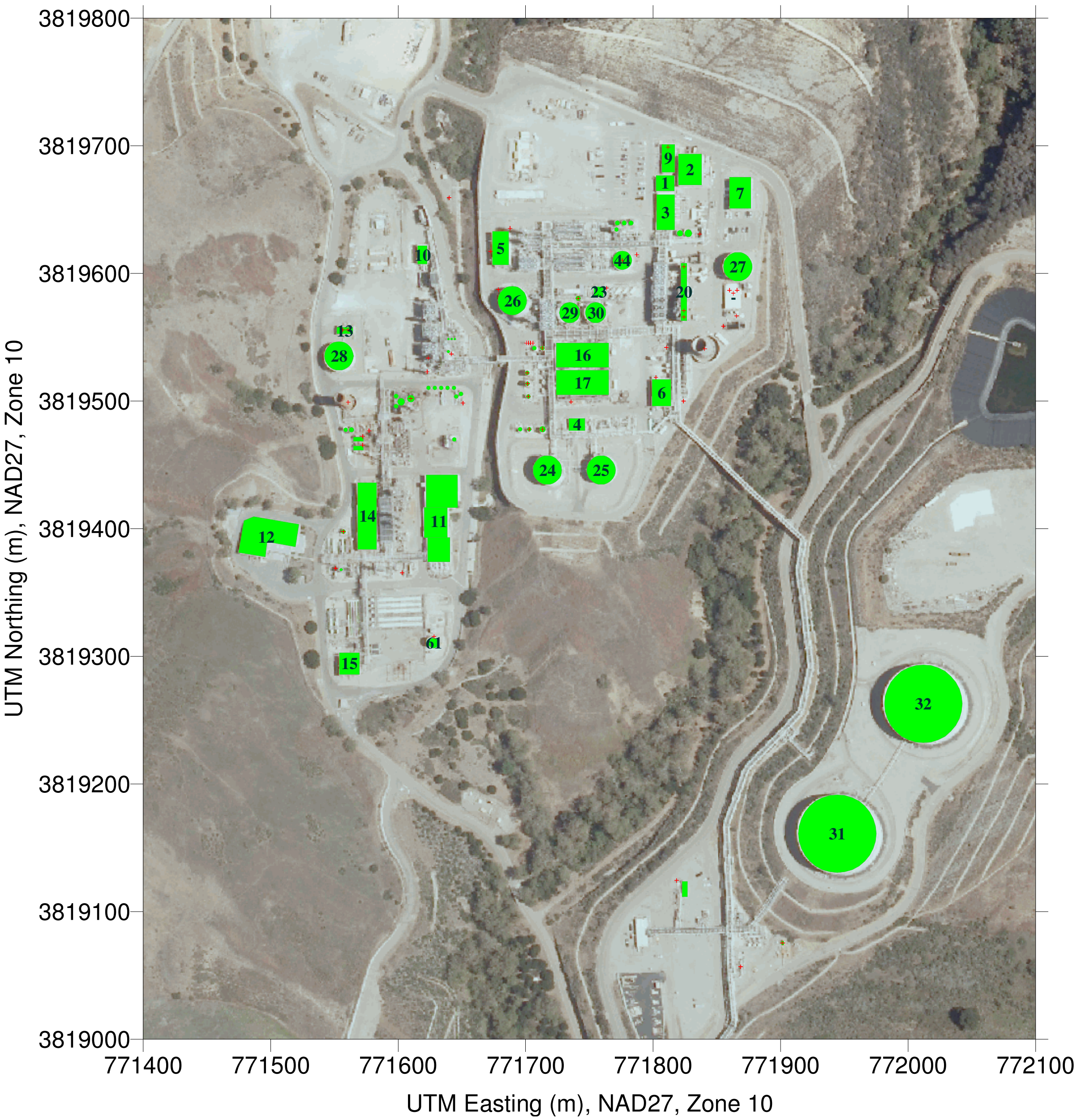

Figure 5-3 Structures (green) and Point Sources (red)

Note: See Table 5-8 for the key to structure numbers

6 Schedule for ATEIR

ExxonMobil will coordinate with the APCD to develop a mutually agreeable schedule for completing the ATEIR.

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