

 <b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b> <b>ENGINEERING &amp; COMPLIANCE DIVISION</b> APPLICATION PROCESSING AND CALCULATIONS	APPL. NO. <b>458382 458383 458384</b> <b>467377 467378/472815</b>	DATE 3/26/10	PAGE 1 of 36
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**PERMIT TO OPERATE**

The objective of this permit action is to issue permits to operate for the PCs that were issued for the new construction of a Flare Gas Recovery System (P14S3 A/N 458384) and associated changes to the East and West Flares (P14S1 A/N 458382 and P14S2 A/N 458383) as well as the Vacuum Flash Unit (P1S4 A/N 467377) and FCC Feed (Gas Oil) Hydrodesulfurization Unit 120 (P3S3 A/N 467378). These modifications were made to allow compliance with Rule 1118 requirements. A/N 472815 was issued subsequent to A/N 467378 for an administrative change, so A/N 467378 will be cancelled, and the PO issued under A/N 472815. Emissions were calculated based on final fugitive component counts, and had changed from the emissions estimated with the PCs, although the project still shows an overall reduction in emissions relative to the initial estimate.

Changes being made to the permit include removing three conditions (I1.1, E193.3, E204.1) that were associated with PCs or Variances and no longer apply; and replacing Condition H23.22 with H23.36 to reflect 40CFR60 Subpart GGGa applicability (rather than Subpart GGG) for devices in the new Flare Gas Recovery System (P14S3).

**COMPANY INFORMATION**

Company Name: ConocoPhillips Company, Facility ID No. 800362  
 Mailing Address: 1520 E. Sepulveda Blvd., Carson, CA 90745  
 Equipment Location: 1520 E. Sepulveda Blvd., Carson, CA 90745  
 Contact Person: Marshall G. Waller, (310) 952-6240

**EQUIPMENT DESCRIPTION**

Table 1 shows the proposed Section D permit description. Additions to the description are noted in underlines and deletions are noted in ~~strikeouts~~.

**Table 1. Permit Equipment Description**

**SECTION D: FACILITY DESCRIPTION AND EQUIPMENT SPECIFIC CONDITIONS**

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions * And Requirements	Conditions
<b>Process 14: AIR POLLUTION CONTROL</b>					P18.1
<b>System 1: EAST FLARE SYSTEM</b>					S31.3
FLARE, ELEVATED WITH STEAM INJECTION, SA-4, WITH A JOHN ZINK FLARE TIP AND FOUR CONTINUOUS PILOT BURNERS, HEIGHT: 175 FT DIAMETER: 3 FT A/N 458382 <del>Permit to Construct Issued: 06/07/07</del>	C465	D422 D423 D424 D425 D449 D466 D753			D12.3, D323.2, E193.4, H23.29, H-1



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Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions * And Requirements	Conditions
VESSEL, WATER SEAL, V-3163, HEIGHT: 19 FT 6 IN; DIAMETER: 12 FT 6 IN A/N: 458382 Permit to Construct Issued: 06/07/07	D933				
TANK, HOLDING, V-3164, WATER SEAL OVERFLOW, LENGTH: 10 FT; DIAMETER: 4 FEET 6 IN A/N: 458382 Permit to Construct Issued: 06/07/07	D937				
KNOCK OUT POT, V-2254 A/N 458382 Permit to Construct Issued: 06/07/07	D466	C465 D938 D939			
KNOCK OUT POT, V-3052 A/N 458382 Permit to Construct Issued: 06/07/07	D467				
KNOCK OUT POT, V-3053 A/N 458382 Permit to Construct Issued: 06/07/07	D468				
KNOCK OUT POT, F-307, HEIGHT: 17 FT; DIAMETER: 6 FT 6 IN A/N 458382 Permit to Construct Issued: 06/07/07	D753	C465 D938 D939			
FUGITIVE EMISSIONS, MISCELLANEOUS A/N 458382 Permit to Construct Issued: 06/07/07	D876			<b>HAP: (10) [40CFR 63 Subpart CC, #5A, 6-23-2003]</b>	H23.1
<b>Process 14: AIR POLLUTION CONTROL</b>					P18.1
<b>System 2: WEST FLARE SYSTEM</b>					S31.3
FLARE, SA-6, WITH A JOHN ZINK FLARE TIP, THREE AUTOMATIC STEAM SUPPLY CONTROLS, A VAPOR SEAL, HEIGHT: 175 FT; DIAMETER: 2 FT 6 IN A/N 458383 Permit to Construct Issued: 06/07/07	C469	D754 D755 D756			D12.3, D323.2, E193.4, H23.29, H-1
KNOCK OUT POT, V-2540 A/N 458383 Permit to Construct Issued: 06/07/07	D470	C469			
KNOCK OUT POT, 120-V-22, HEIGHT: 20 FT; DIAMETER: 12 FT A/N 458383 Permit to Construct Issued: 06/07/07	D754	C469 D938 D939			E193.3, E204.1
VESSEL, WATER SEAL, 120-V-32, HEIGHT: 18 FT; DIAMETER: 11 FT 11 IN A/N 458383 Permit to Construct Issued: 06/07/07	D755	C469			



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Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions * And Requirements	Conditions
TANK, HOLDING, 120-V-34, WATER SEAL OVERFLOW, 4800 GALS; DIAMETER: 4 FT 6 IN; LENGTH: 10 FT A/N 458383 Permit to Construct Issued: 06/07/07	D756	C469			
FUGITIVE EMISSIONS, MISCELLANEOUS A/N 458383 Permit to Construct Issued: 06/07/07	D877			HAP: (10) [40CFR 63 Subpart CC, #5A, 6-23-2003]	H23.1
<b>Process 14: AIR POLLUTION CONTROL</b>					P18.1
<b>System 3: FLARE GAS RECOVERY SYSTEM</b>					S15.12, S15.13, S31.3
COMPRESSOR, C-3016, LIQUID RING, DUAL SEALS WITH BARRIER FLUID SYSTEM, 900 CU.FT./MIN A/N: 458384 Permit to Construct Issued: 06/07/07	D938	D422 D423 D424 D425 D449 D466 D753 D754			E73.3, H23.22 H23.36
COMPRESSOR, C-3017, LIQUID RING, DUAL SEALS WITH BARRIER FLUID SYSTEM, 900 CU.FT./MIN A/N: 458384 Permit to Construct Issued: 06/07/07	D939	D422 D423 D424 D425 D449 D466 D753 D754			E73.3, H23.22 H23.36
KNOCK OUT POT, V-3166, COMPRESSOR DISCHARGE, LENGTH: 18 FT; DIAMETER: 6 FT 6 IN A/N: 458384 Permit to Construct Issued: 06/07/07	D940				
KNOCK OUT POT, V-3168, SCRUBBER INLET, HEIGHT: 7 FT; DIAMETER: 2 FT A/N: 458384 Permit to Construct Issued: 06/07/07	D941				
FUGITIVE EMISSIONS, MISCELLANEOUS A/N: 458384 Permit to Construct Issued: 06/07/07	D942			HAP: (10) [40CFR 63 Subpart CC, #5A, 6-23-2003]	H23.22 H23.36

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions * And Requirements	Conditions
<b>Process 1: CRUDE DISTILLATION</b>					P13.2
<b>System 4: VACUUM FLASH UNIT</b>					S13.5, S15.2, S15.3, S15.4, S15.11, S31.3
TANK, SURGE, V-2250, SR RESIDUE, WITH NATURAL GAS BLANKETING, HEIGHT: 27 FT 6 IN; DIAMETER: 16	D64				



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Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions * And Requirements	Conditions
FT 3 IN A/N: 472815 Permit to Construct Issued: 12/04/07					
ACCUMULATOR, V-2251, FLASHER OVERHEAD, HEIGHT: 20 FT; DIAMETER: 9 FT A/N: 472815 Permit to Construct Issued: 12/04/07	D65				H23.10
KNOCK OUT POT, STEAM AIR DECOKING QUENCH, V-2253, HEIGHT: 7 FT 8 IN; DIAMETER: 4 FT A/N: 472815 Permit to Construct Issued: 12/04/07	D66				
COLUMN, FLASHER, FR-1, HEIGHT: 127 FT; DIAMETER: 23 FT 6 IN A/N: 472815 Permit to Construct Issued: 12/04/07	D69				
SCRUBBER, DEA, FR-2, VENT GAS A/N: 472815 Permit to Construct Issued: 12/04/07	D70				
COMPRESSOR, FR-501, VENT GAS A/N: 472815 Permit to Construct Issued: 12/04/07	D77				
FUGITIVE EMISSIONS, MISCELLANEOUS A/N: 472815 Permit to Construct Issued: 12/04/07	D835			HAP: (10) [40CFR 63 Subpart CC, #5A, 6-23-2003]	H23.22

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions * And Requirements	Conditions
<b>Process 3: HYDROTREATING</b>					P13.2
<b>System 3: FCC FEED (GAS OIL) HYDRODESULFURIZATION UNIT 120</b>					S13.5, S15.2, S15.3, S15.11 S31.1, S31.3
TANK, SURGE, 120-V-1, FEED, HEIGHT: 20 FT; DIAMETER: 10 FT 6 IN A/N: 467377 Permit to Construct Issued: 06/07/07	D721				
REACTOR, UNIONFINER A, 120-V-2A, HEIGHT: 55 FT 6 IN; DIAMETER: 8 FT A/N: 467377 Permit to Construct Issued: 06/07/07	D722				
REACTOR, UNIONFINER B, 120-V-2B, HEIGHT: 49 FT 3 IN; DIAMETER: 8 FT A/N: 467377 Permit to Construct Issued: 06/07/07	D723				



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Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions * And Requirements	Conditions
REACTOR, UNIONFINER GUARD C, 120-V-11, HEIGHT: 65 FT; DIAMETER: 8 FT A/N: 467377 <del>Permit to Construct Issued: 06/07/07</del>	D724				
VESSEL, SEPARATOR, HOT HIGH PRESSURE, 120-V-3, HEIGHT: 13 FT; DIAMETER: 5 FT A/N: 467377 <del>Permit to Construct Issued: 06/07/07</del>	D725				
TANK, SURGE, 120-V-30, WASH WATER, HEIGHT: 12 FT; DIAMETER: 8 FT A/N: 467377 <del>Permit to Construct Issued: 06/07/07</del>	D726				
TANK, HOLDING, 120-V-12, WASH WATER, HEIGHT: 9 FT; DIAMETER: 4 FT 6 IN A/N: 467377 <del>Permit to Construct Issued: 06/07/07</del>	D727				
CARBON ADSORBER, 120-ME-3A/B, ACTIVATED CARBON, TWO IN PARALLEL (ONE SPARE), 55-GALLON CANISTER EACH A/N: 467377 <del>Permit to Construct Issued: 06/07/07</del>	C728	D816			D90.2, E128.1, E153.2, H23.11
FILTER, 120-ME-4, FEED A/N: 467377 <del>Permit to Construct Issued: 06/07/07</del>	D814				
VESSEL, SEPARATOR, COLD HIGH PRESSURE, 120-V-5, HEIGHT: 27 FT; DIAMETER: 3 FT 6 IN A/N: 467377 <del>Permit to Construct Issued: 06/07/07</del>	D730				
TANK, DEGASSING, 120-V-17, SOUR WATER, HEIGHT: 19 FT; DIAMETER: 5 FT 6 IN A/N: 467377 <del>Permit to Construct Issued: 06/07/07</del>	D731				
EJECTOR, UNIONFINER EVACUATION, 120-EJ-1 A/N: 467377 <del>Permit to Construct Issued: 06/07/07</del>	D732				
TANK, SURGE, 120-V-13, LOW PRESSURE FEED, HEIGHT: 14 FT 6 IN; DIAMETER: 6 FT 6 IN A/N: 467377 <del>Permit to Construct Issued: 06/07/07</del>	D733				
VESSEL, SEPARATOR, 120-V-4, HEIGHT: 12 FT; DIAMETER: 5 FT A/N: 467377 <del>Permit to Construct Issued: 06/07/07</del>	D734				
COLUMN, STABILIZER, 120-V-8, HEIGHT: 54 FT; DIAMETER: 5 FT	D735				



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A/N: 467377 Permit to Construct Issued: 06/07/07					
VESSEL, SEPARATOR, COLD LOW PRESSURE, 120-V-6, HEIGHT: 12 FT; DIAMETER: 5 FT A/N: 467377 Permit to Construct Issued: 06/07/07	D736				
COMPRESSOR, HYDROGEN RECYCLE, 120-C-1A A/N: 467377 Permit to Construct Issued: 06/07/07	D738				H23.22
COMPRESSOR, HYDROGEN RECYCLE, 120-C-1B A/N: 467377 Permit to Construct Issued: 06/07/07	D740				H23.22
KNOCK OUT POT, 120-V-14, DEA CONTACTOR FEED, HEIGHT: 8 FT 6 IN; DIAMETER: 2 FT A/N: 467377 Permit to Construct Issued: 06/07/07	D741				
VESSEL, CONTACTOR, DEA, 120-V-15, HEIGHT: 54 FT 6 IN; DIAMETER: 4 FT A/N: 467377 Permit to Construct Issued: 06/07/07	D742				
COMPRESSOR, 120-C-2A, MAKEUP HYDROGEN/OFFGAS A/N: 467377 Permit to Construct Issued: 06/07/07	D748				H23.22
COMPRESSOR, 120-C-2B, MAKEUP HYDROGEN/OFFGAS A/N: 467377 Permit to Construct Issued: 06/07/07	D749				H23.22
TANK, HOLDING, (SUMP), 120-V-23, GRAVITY DRAIN, HEIGHT: 10 FT; DIAMETER: 5 FT A/N: 467377 Permit to Construct Issued: 06/07/07	D816	C728		VOC: 500 PPMV (5) [RULE 1176, 9-13-1996]	H23.11
FUGITIVE EMISSIONS, MISCELLANEOUS A/N: 467377 Permit to Construct Issued: 06/07/07	D844			HAP: (10) [40CFR 63 Subpart CC, #5A, 6-23-2003]	H23.22

**COMPLIANCE RECORD REVIEW**

A query of the AQMD Compliance Database for the past two years (3/1/08 to 3/1/10) identified 11 NOV's that were issued to the ConocoPhillips Carson Refinery (Facility ID 800362). Two of these NOV's were for the permit units that are the subject of this permit action. NOV #P48125 was issued for a 3/18/08 violation of the opacity limits at one of the flares. NOV #P26971 was issued for a 3/16/09 incident when the East Flare monitoring system was down for more than 76 hours. The compliance database indicates that the equipment in the Flare Gas Recovery System; the East and West Flares; the

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FCC Feed Hydrodesulfurization Unit 120 (Unit 120 HDS); and the Vacuum Flash Unit are currently in compliance with applicable rules and regulations.

### **FEE EVALUATION**

The fees for all of these applications were paid when the applications were submitted, and before the PCs were issued. No additional fees are required for converting these applications from PCs to POs.

A/N 458382 (CCAT 92; Flare system, refinery; Schedule F)

A/N 458383 (CCAT 92; Flare system, refinery; Schedule F)

A/N 458384 (CCAT 59; Vapor recovery serving refinery unit; Schedule E)

A/N 467377 (BCAT 000503; Hydrotreating unit; Schedule E)

A/Ns 467378 and 472815 (BCAT 000507; Vacuum distillation unit, Schedule E)

### **PROJECT BACKGROUND**

The 11/4/05 Amendments to Rule 1118 included new limits and requirements for flare venting. Among the requirements was to “operate all flares in such a manner that minimizes all flaring and that no vent gas is combusted except during emergencies, shutdowns, startups, turnarounds, or essential operational needs [1118(c)(4)]. This project was to install a flare gas recovery and treatment system in order to meet this requirement. The effective date of this requirement was delayed until 1/1/09 because the facility submitted this application by 7/1/06 per 1118(c)(4) (*the application was submitted 6/29/06*). In addition to the application for new construction of the vapor recovery system, the facility submitted related modification applications for the two flares, and also for two systems with scrubbers that are used to remove sulfur from the recovered gases.

### **PERMIT UNIT HISTORY**

The East Flare was originally built in 1969 and modified with a new flare assembly design in 1986. The West Flare was originally built in 1982 and modified with a John Zink molecular seal in 1994. Additional permit units were routed to the East and West Flares in 1995 and 1996. The permit history for these two flares is provided in Tables 2 and 3.

Duplicate applications were submitted and processed for each of the East and West Flare systems during the change of ownership of the Carson Refinery from Unocal to Tosco/ConocoPhillips. A/Ns 325717 and 325722 were processed as PC change of ownerships, while 325738 and 325740 were later processed as PO change of ownerships. Subsequent applications have been submitted that are linked to the POs. The open PCs for the flares (A/Ns 325717 and 325722) will be cancelled as part of this permit action.

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**Table 2. Permitting History of East Flare (P14S1)**

A/N	Permit #	Facility ID	Description	A/N Type	A/N Status	Permit Date
458382		800362	Connect East/Coker Flare to FGRS and connect two flares to common header	50	26	6/7/07
325738	F6571	800362	<i>Change of ownership from Unocal to Tosco (PO)</i>	40	31	6/10/97
325717		800362	<i>Change of ownership from Unocal to Tosco (PC)</i>	40	26	6/10/97
318330		88892	Remove sealless pumps from permit	20	51	8/21/96
311333		89814	Vent crude oil tank car unloading system to flares	10	51	2/14/96
295586		89813	Add connection to blowdown system from HDS Unit 120 (KO pot, pumps, water seal, water seal overflow tank) and disconnect tanks 1148, 1149, 1170, 1375 and 1376	50	50	12/14/94
257984	D45683	89813 88892	Change of ownership from Shell to Unocal Followed by change of ownership applications 325738 (PO) and 325717 (PC) (after PC's 295586, 311333, and 318330)	40	31	12/9/91
143054	D04738	41955	Replace flare tip and add vessels V3052 & V3053	50	31	1/9/89
118258	M45530	41955	Add vents from H2 plant, fuel oil hydrotreater, and SRUs	31	50	8/30/85
136444		41955	Add vent from Tk 2502	50	52	12/18/85
C08387	P69539	14627	Add spare pump for KO drum	0	31	11/10/76
A80164	P60329		Add vents from sour water oxidizer, debutanizer, crude unit no. 5 and various pump discharge lines			
A56199	P47044		New construction of flare for delayed coking complex			11/1/71

In the West Flare permit unit, Device D470 (V-2540) was inadvertently removed from Section H (but not Section D) of the permit, and was replaced 2/6/08 (pending further review during this PC/PO conversion). A detailed review found that D470 was prominently featured in the as-built P&IDs for the West Flare. It was not removed from the facility, and correctly belongs in the permit with the West Flare permit unit.

**Table 3. Permitting History of West Flare (P14S2)**

A/N	Permit #	Facility ID	Description	A/N Type	A/N Status	Permit Date
458383		800362	Connect West Flare to FGRS and connect two flares to common header	50	26	6/7/07
325740	F6572	800362	<i>Change of ownership from Unocal to Tosco (PO)</i>	40	31	6/10/97
325722		800362	<i>Change of ownership from Unocal to Tosco (PC)</i>	40	26	6/10/97

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A/N	Permit #	Facility ID	Description	A/N Type	A/N Status	Permit Date
338499		800362	TV permit shield for West Flare from 40CFR60 Subpart GGG for D754 knockout pot(Cancelled)	60	53	
311334		89814	Vent crude oil tank car unloading system to flares	20	51	2/14/96
295585		89813	Add molecular vapor seal and connection to blowdown system from HDS Unit 120 (KO pot, pumps, water seal, water seal overflow tank)	50	50	12/14/94
258007	D45647	89813	Change of ownership from Shell to Unocal Followed by A/N 325740 (PO) and 325722 (PC) (after PC's 295585, 311334, and 338499)	40	31	12/9/91
136445	M57701	41955	Add vent from Tk 2502	50	31	7/6/87
C42271	M45529	14627	New construction of backup flare (Variance 1018-87 - Rule 431.1)	20	31	8/30/85

The permitting history of the Vacuum Flash Unit is provided in Table 4. Note that A/N 467378 is part of the FGRS project, while A/N 472815 was an administrative change. The emission change due to A/N 467378 will be associated with the most recent PC, A/N 472815.

**Table 4. Permitting History of Vacuum Flash Unit (P1S4)**

A/N	Permit #	Facility ID	Description	A/N Type	A/N Status	Permit Date
472815		800362	Inactivate D68 (V-2256, skim oil pot)	63	26	12/5/07
467378		800362	Use water from Vacuum Flasher overhead drum to supply new liquid ring FGRS compressors, and use existing scrubber (D70, FR-2) to treat FGRS gases	50	26	6/7/07
348538	F19940	800362	Remove vent gas connection to heaters	50	31	3/16/99
325619	F6859	800362	Change of ownership from Unocal to Tosco	40	31	6/10/97
257947	D45725	89796	Change of ownership from Shell to Unocal, also corrected typographical error	40	31	12/9/91
138227	M57786	6754	Operate at higher temp for greater efficiency; add 1 vessel, 2 pumps and 8 exchangers	50	31	7/21/87
128357	M46019	6754	Route vent gases from flasher overhead accumulator V-2251 to blowdown facility rather than to flare for Rule 431.1 compliance	50	31	9/20/85
C21492		6754	Modify heat exchangers; integrate heat requirements of crude unit and vacuum flasher	50	52	5/27/80
A56194	P46171	6754	New construction of vacuum flash unit	0	31	9/29/71

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The Unit 120 HDS was initially constructed as part of the Reformulated Fuels Project. This unit was connected to the flares at that time. The permit history is provided in Table 5. As part of this permit action, A/N 325725 will be cancelled, since it is superseded by A/N 467377.

**Table 5. Permitting History of FCC Feed (Gas Oil) Hydrodesulfurization Unit 120 (Unit 120 HDS), P3S3**

A/N	Permit #	Facility ID	Description	A/N Type	A/N Status	Permit Date
467377		800362	Use existing scrubber (D742, 120-V-15) as backup for FGRS gas treatment	50	26	6/7/07
325725		800362	Change of ownership from Unocal to Tosco	40	26	6/10/97
281358		88892	New construction of Unit 120 HDS	10	51	11/3/93

## **PROCESS DESCRIPTION**

ConocoPhillip's Carson Refinery has two elevated flares; the East Flare and the West Flare. Previously, the two flares operated independently; the East Flare served the Coker; Vacuum Flasher; Quench Unit (Coker Blowdown); Crude Unit; C3/C4 Unit; and Utilities Areas, while the West Flare served the Hydrogen Plant; two Hydrotreaters; and the Sulfur Plant. However, as part of this permit action, the valve connecting the headers for the two flares is now operated in 'normally-open' mode.

A field evaluation was conducted on 1/15/10 to verify the installation of equipment and the operation of the system. The installation of new equipment in the Flare Gas Recovery System verified, and the equipment was inspected and observed in operation. The equipment in the other related permit units was also inspected and their operation verified as described below.

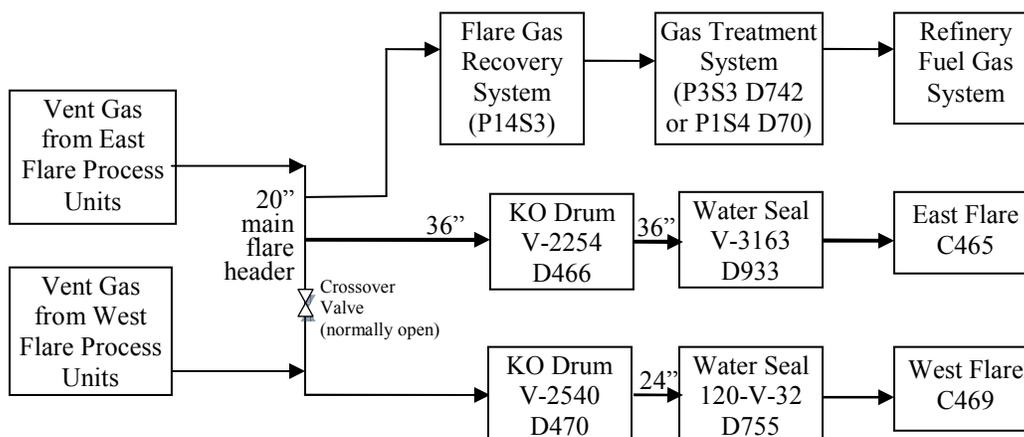
The vent gases for the East Flare are collected into a 20 inch main header and routed to the flare via a new 36" header through Knockout Drum V-2254 (D466) and new Water Seal Drum V-3163 (D933). Entrained liquids are separated in the Knockout Drum for recovery and gases are routed to the flare stack. The Water Seal prevents gas flow to the flare and allows recovery of flare gases, until the pressure in the flare header exceeds the water seal pressure. The flare stack is 30 inches in diameter and has steam injection and air induction tubes to promote combustion. Maximum flare tip capacity with a stable flame is estimated at approximately 500,000 lb/hr. Maximum smokeless capacity is 100,000 lb/hr.

The vent gases for the West Flare are collected into a 20 inch main header and routed to the flare through Knockout Drum V-2540 (D470), where entrained liquids are removed for recovery. From V-2540 (D470), gases flow through a 24 inch header to Water Seal Drum 120-V-32 (D755), then to the flare stack. The flare stack is 24 inches in diameter and has steam injection around the outer rim and in the center. The design capacity with a stable flame is 132,000 lb/hr, and the maximum smokeless capacity is 45,000 lb/hr. The maximum flow rate to the West Flare is calculated at 105,600 lb/hr for the relief scenario in a HDT emergency depressuring case.

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Figure 1 is a simplified Flow Diagram for the FGRS. During normal operation, the water seals in the flare seal drums are intact, preventing flaring and allowing recovery of vent gases. But during emergencies, shutdowns, start-ups, turnarounds, or essential operating needs, venting may exceed the recovery capacity of the new Flare Gas Recovery System (FGRS). When the capacity of the FGRS is exceeded, the header line pressure increases. The vent gas breaches the water seal once the line pressure exceeds the pressure afforded by the height of the liquid in the seals. Breaching the water seal results in the vent gas bubbling past the seal and being combusted at the flare tip.

**Figure 1. Block Flow Diagram for the Flare Gas Recovery System**



The Flare Gas Recovery System (FGRS) is designed to function automatically. During normal operation, the vent gases recovered by the FGR compressor are routed to a DEA scrubber for H<sub>2</sub>S removal, prior to being routed to the refinery's fuel gas system. Normally, one compressor is in service. Spillback gas flow routed from the discharge of the compressor to the inlet of the compressor is used to keep the compressor operating at a constant flow rate. The second compressor starts and stops automatically as the amount of flare gas vented varies. Control logic uses the compressor inlet pressure to determine the appropriate control action.

As gas released to the flare increases above normal, the header line pressure increases. As the line pressure increases, the pressure controller proportionally closes off the control valve in the spillback line. This results in a net increase in forward flow for the compressor. Once the spillback control valve is completely closed, the second compressor is brought online. The second compressor also utilizes a spillback line to maintain a constant volume flow through the compressor. The reverse logic is used to shut the second compressor down.

*Compressors* The new FGR system consists of two flare gas compressor trains. Each train is rated at 900 scfm for a total rated capacity of 1800 scfm. Each compressor train is composed of a liquid ring type compressor with liquid/gas separation and cooling. Piping connections and valves were configured to allow each compressor train to be isolated and maintained independently. The compressors (D938 & D939) have dual seals with a barrier fluid in a degassing reservoir that vents to the vapor recovery system.

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The seal water for the liquid ring compressors comes from a slip stream of existing sour water in the Vacuum Flasher Overhead Drum. Each compressor discharges a gas-water mixture to a common horizontal separator vessel. This vessel separates the compressed flare gas from the liquid seal water and any condensed hydrocarbons. The liquids drop to the bottom of the vessel while the compressed gases flow into the air cooler. An internal overflow weir is used to separate the condensed hydrocarbons from the liquid seal water. The seal liquid is recirculated back to the compressors through the liquid side of the air coolers.

A small amount of water also overflows the weir as blowdown. The blowdown water is used to control the buildup of undesirable contaminants in the recirculating water seal system. The blowdown water is transferred from the overflow side of the separator to sour water storage.

*Amine Scrubber* The compressed gas is treated for sulfur removal by one of two existing scrubbers connected to the new FGRS. The Unit 120 HDS scrubber (P3S3, D742) serves as the primary device, with a scrubber in the Vacuum Flash Unit (P1S4, D70) serving as back-up. The original PC identified the Vacuum Flash Unit scrubber as the primary scrubber, with the Unit 120 HDS scrubber as backup. However, during the 1/15/10 site visit, it was noted that the Unit 120 HDS scrubber has been acting as the primary scrubber, with the Vacuum Flash Unit acting as backup. This operational change was made primarily because the FGRS operator also is responsible for the Unit 120 HDS, while the Vacuum Flash Unit is overseen by a different operator.

The HDS scrubber (120-V-15, D742) is an existing piece of equipment with excess scrubbing capacity used to treat the FGRS recovered gas. The HDS scrubber has sufficient capacity to handle the additional loading that it receives from the FGRS. HDS scrubber 120-V-15 (D742) has a design flow rate of 905 acfm @ 80 psig (4925 scfm), and a maximum expected flow rate of 810 acfm @ 80 psig. The expected flow rate includes its existing load as well as the maximum potential load from the FGRS.

Since start-up of the FGRS in September 2008, the average gas flow rate through 120-V-15 (D742) has been ~3400 scfm, and the average DEA circulation has been about 135 gpm. The lean DEA fed to 120-V-15 (D742) is supplied by the plant-wide DEA system, which also supplies other scrubbers that remove H<sub>2</sub>S from various gas streams and transports the H<sub>2</sub>S to the sulfur plant for conversion into molten sulfur. Fresh DEA is occasionally added to maintain proper strength.

Fuel gas sulfur (H<sub>2</sub>S) concentration is continuously monitored, and is an indication of the performance of the scrubber. Based on data provided by the facility, the H<sub>2</sub>S levels in the fuel gas have not increased since the FGRS began operating, and are consistently below 20 ppm H<sub>2</sub>S. Thus, the existing scrubber D742 is able to accommodate the increased loading from the FGRS.

An underutilized scrubber in the Vacuum Flash Unit, FR-2 (D70), is available for use when the Unit 120 HDS scrubber is out of service. This absorber was installed by Shell when it was part of the DEA system that also supplied the treating and cracking units at the now-demolished Dominguez portion of the original Shell refinery. The design rate for DEA circulation is 82 gpm, although it typically operates at 42 gpm. Changes made to operating pressure have increased the capacity of this scrubber by reducing the gas velocity through the tower to accommodate the additional loading from the FGRS.

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## **EMISSIONS**

PC emissions were estimated for all of the permit units when the PCs were issued. The emission estimates were calculated based on the number of components. Final fugitive counts for all permit units were submitted by the facility on 6/8/09, and a revision was submitted on 8/4/09. Note that components were added, but no components were removed in any of the permit units. Final fugitive counts and emissions calculations for each permit unit are provided in Table 6 through Table 10 below.

**Table 6. Final fugitive component count and VOC emissions calculation for P14S1 East Flare A/N 458382**

Source Unit		Service	Emission Factor** (lb/yr / # of components)	Previous #	Previous Total Emissions (lb/yr)	# Added	Final Total #	Final Emissions (lb/yr)
Valves	Sealed bellows	All	0	33	0	7	40	0
	SCAQMD approved I&M Program	Gas/Vapor	4.55	344	1564	16	360	1636
		Light Liquid	4.55	21	95.5	0	21	95.5
		Heavy Liquid	4.55		0		0	0
		> 8 inches	4.55		0		0	0
Pumps	Sealless type	Light Liquid	0		0		0	0
	Double mech. seals or equivalent	Heavy Liquid	46.83	4	187		4	187
	Single mech.seals	Heavy Liquid	17.21		0		0	0
Flanges (ANSI 16.5-1988)		All	6.99	184	1286	29	213	1489
Compressors		Gas/Vapor	9.09		0		0	0
Pressure Relief Valves		All		1	9.1		1	9.1
Process Drains with P-trap or seal pot		All			0		0	0
Other*		All		635	5772	8	643	5845
*Other includes instruments, loading arms, pressure relief valves, vents, compressors, dump lever arms, diaphragms, drains, hatches, meters, and polished rods stuffing boxes.					Previous Total Emissions (lb/yr)	8914	<b>Final Emissions (lb/yr)</b>	<b>9262</b>
					Previous Total Emissions (lb/day)	24.4	<b>Final Emissions (lb/day)</b>	<b>25.4</b>
					Previous Total Emissions (lb/hr)	1.02	<b>Final Emissions (lb/hr)</b>	<b>1.06</b>

\*\* Emission Factors from "CAPCOA-Revised 1995 EPA Correlation Equations and Factors for Refineries and Marketing Terminals" California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities, CAPCOA/ARB, February 1999. (Table IV-3a from AQMD Guidelines for Fugitive Emissions Calculations, June 2003)

Difference in emissions (lb/day)	1.0
Emissions estimated for PC	4.0
Change in emissions	-3.0

The modifications to the East Flare include two new vessels; the water seal drum and the water seal overflow drum. The final emission increase of 1 lb/day VOC is less than the initial emissions estimate provided with the Permit to Construct (4 lb/day) (Table 6).

The Permit to Construct for the West Flare assumed no change in emissions. However, the final emissions calculation shows an increase of 0.7 lb/day VOC (Table 7). The Flare Gas Recovery System emissions (new construction) were initially estimated at 15 lb/day VOC. However, emissions estimated using the final fugitive component counts were calculated as 7.1 lb/day VOC; a reduction of nearly 8 lb/day (Table 8).

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**Table 7. Final fugitive component count and VOC emissions calculation for P14S2 West Flare A/N 458383**

Source Unit		Service	Emission Factor** (lb/yr / # of components)	Previous #	Previous Total Emissions (lb/yr)	# Added	Final Total #	Final Emissions (lb/yr)
Valves	Sealed bellows	All	0	9	0	7	16	0
	SCAQMD approved I&M Program	Gas/Vapor	4.55	168	764	15	183	832
		Light Liquid	4.55	8	36.4	0	8	36.4
		Heavy Liquid	4.55		0	0	0	0
	> 8 inches	4.55		0	0	0	0	
Pumps	Sealless type	Light Liquid	0		0		0	0
	Double mech. seals or equivalent	Heavy Liquid	46.83	2	93.7		2	93.7
	Single mech.seals	Heavy Liquid	17.21		0		0	0
Flanges (ANSI 16.5-1988)		All	6.99	67	468	20	87	608
Compressors		Gas/Vapor	9.09		0		0	0
Pressure Relief Valves		All			0.0		0	0.0
Process Drains with P-trap or seal pot		All			0		0	0
Other*		All		527	4790	7	534	4854
					Previous Total Emissions (lb/yr)	6152	Final Emissions (lb/yr)	6424
					Previous Total Emissions (lb/day)	16.9	Final Emissions (lb/day)	17.6
					Previous Total Emissions (lb/hr)	0.70	Final Emissions (lb/hr)	0.73

\*Other includes instruments, loading arms, pressure relief valves, vents, compressors, dump lever arms, diaphragms, drains, hatches, meters, and polished rods stuffing boxes.

\*\* Emission Factors from "CAPCOA-Revised 1995 EPA Correlation Equations and Factors for Refineries and Marketing Terminals" California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities, CAPCOA/ARB, February 1999. (Table IV-3a from AQMD Guidelines for Fugitive Emissions Calculations, June 2003)

Difference in emissions (lb/day)	0.7
Emissions estimated for PC	0.0
Change in emissions	0.7

**Table 8. Final fugitive component count and VOC emissions calculation for P14S3 FGRS A/N 458384**

Source Unit		Service	Emission Factor** (lb/yr / # of components)	Previous #	Previous Total Emissions (lb/yr)	# Added	Final Total #	Final Emissions (lb/yr)
Valves	Sealed bellows	All	0	0	0	44	44	0
	SCAQMD approved I&M Program	Gas/Vapor	4.55	0	0	100	100	455
		Light Liquid	4.55	0	0	0	0	0
		Heavy Liquid	4.55	0	0	0	0	0
	> 8 inches	4.55	0	0	0	0	0	
Pumps	Sealless type	Light Liquid	0	0	0		0	0
	Double mech. seals or equivalent	Heavy Liquid	46.83	0	0		0	0
	Single mech.seals	Heavy Liquid	17.21	0	0		0	0



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Source Unit	Service	Emission Factor** (lb/yr / # of components)	Previous #	Previous Total Emissions (lb/yr)	# Added	Final Total #	Final Emissions (lb/yr)
Flanges (ANSI 16.5-1988)	All	6.99	0	0	183	<b>183</b>	<b>1279</b>
Compressors	Gas/Vapor	9.09	0	0	2	<b>2</b>	<b>18.2</b>
Pressure Relief Valves	All		0	0	2	<b>2</b>	<b>18.2</b>
Process Drains with P-trap or seal pot	All		0	0	2	<b>2</b>	<b>18.2</b>
Other *	All		0	0	90	<b>90</b>	<b>818</b>
Previous Total Emissions (lb/yr)				0	<b>Final Emissions (lb/yr)</b>		<b>2606</b>
Previous Total Emissions (lb/day)				0	<b>Final Emissions (lb/day)</b>		<b>7.1</b>
Previous Total Emissions (lb/hr)				0	<b>Final Emissions (lb/hr)</b>		<b>0.30</b>

\*Other includes instruments, loading arms, pressure relief valves, vents, compressors, dump lever arms, diaphragms, drains, hatches, meters, and polished rods stuffing boxes.

\*\* Emission Factors from "CAPCOA-Revised 1995 EPA Correlation Equations and Factors for Refineries and Marketing Terminals" California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities, CAPCOA/ARB, February 1999. (Table IV-3a from AQMD Guidelines for Fugitive Emissions Calculations, June 2003)

Difference in emissions (lb/day)	7.1
Emissions estimated for PC	15
Change in emissions	-7.9

**Table 9. Final fugitive component count and VOC emissions calculation for P3S3 Unit 120 HDS (A/N 467377)**

Source Unit	Service	Emission Factor** (lb/yr / # of components)	Previous #	Previous Total Emissions (lb/yr)	# Added	Final Total #	Final Emissions (lb/yr)	
Valves	Sealed bellows	All	0	217	13	<b>230</b>	<b>0</b>	
	SCAQMD approved I&M Program	Gas/Vapor	4.55	1044	4746	5	<b>1049</b>	<b>4768</b>
		Light Liquid	4.55	421	1914		<b>421</b>	<b>1914</b>
		Heavy Liquid	4.55		0			<b>0</b>
		> 8 inches	4.55		0			<b>0</b>
Pumps	Sealless type	Light Liquid	0		0		<b>0</b>	
	Double mech. seals or equivalent	Heavy Liquid	46.83	10	468	<b>10</b>	<b>468</b>	
	Single mech. seals	Heavy Liquid	17.21	7	121	<b>7</b>	<b>121</b>	
Flanges (ANSI 16.5-1988)	All	6.99	1515	10590	16	<b>1531</b>	<b>10702</b>	
Compressors	Gas/Vapor	9.09	6	54.5		<b>6</b>	<b>54.5</b>	
Pressure Relief Valves	All		39	355		<b>39</b>	<b>355</b>	
Process Drains with P-trap or seal pot	All			0			<b>0.0</b>	
Other*	All		2499	22715	10	<b>2509</b>	<b>22806</b>	
Previous Total Emissions (lb/yr)				40962	<b>Final Emissions (lb/yr)</b>		<b>41188</b>	
Previous Total Emissions (lb/day)				112.2	<b>Final Emissions (lb/day)</b>		<b>112.8</b>	
Previous Total Emissions (lb/hr)				4.68	<b>Final Emissions (lb/hr)</b>		<b>4.70</b>	

\*Other includes instruments, loading arms, pressure relief valves, vents, compressors, dump lever arms, diaphragms, drains, hatches, meters, and polished rods stuffing boxes.

\*\* Emission Factors from "CAPCOA-Revised 1995 EPA Correlation Equations and Factors for Refineries and Marketing Terminals" California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities, CAPCOA/ARB, February 1999. (Table IV-3a from AQMD Guidelines for Fugitive Emissions Calculations, June 2003)

Difference in emissions (lb/day)	0.6
Emissions estimated for PC	0.0
Change in emissions	0.6

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The Permit to Construct for the Unit 120 HDS assumed no change in emissions. However, the final emissions calculation shows an increase of 0.6 lb/day VOC (Table 9). The Permit to Construct for the Vacuum Flash Unit also assumed no change in emissions. However, the final emissions calculation shows an increase of 1.0 lb/day VOC (Table 10).

**Table 10. Final fugitive component count and VOC emissions calculation for P1S4 Vacuum Flash Unit A/N 467378/472815**

Source Unit		Service	Emission Factor** (lb/yr / # of components)	Previous #	Previous Total Emissions (lb/yr)	# Added	Final Total #	Final Emissions (lb/yr)
<b>Valves</b>	Sealed bellows	All	0	9	0	23	32	0
	SCAQMD approved I&M Program	Gas/Vapor	4.55	1031	4687	8	1039	4723
		Light Liquid	4.55	162	736		162	736
		Heavy Liquid	4.55		0			0
		> 8 inches	4.55		0			0
<b>Pumps</b>	Sealless type	Light Liquid	0		0			0
	Double mech. seals or equivalent	Heavy Liquid	46.83	6	281		6	281
		Single mech.seals	Heavy Liquid	17.21	13	224		13
Flanges (ANSI 16.5-1988)		All	6.99	612	4278	30	642	4488
Compressors		Gas/Vapor	9.09	1	9.1		1	9.1
Pressure Relief Valves		All		8	72.7		8	72.7
Process Drains P-trap or seal pot		All			0			0
Other *		All		5710	51902	12	5722	52011
<i>*Other includes instruments, loading arms, pressure relief valves, vents, compressors, dump lever arms, diaphragms, drains, hatches, meters, and polished rods stuffing boxes.</i>		Previous Total Emissions (lb/yr)			62189		<b>Final Emissions (lb/yr)</b>	<b>62544</b>
		Previous Total Emissions (lb/day)			170.4		<b>Final Emissions (lb/day)</b>	<b>171.4</b>
		Previous Total Emissions (lb/hr)			7.10		<b>Final Emissions (lb/hr)</b>	<b>7.14</b>
		Difference in emissions (lb/day)						1.0
		Emissions estimated for PC						0.0
		Change in emissions						1.0

As indicated by the final component counts submitted by the facility and Tables 6 through 10, each permit unit had final emissions that differed from its original PC application estimate. Emissions decreased for some permit units and increased for others, as listed in Table 11. Total project emissions were estimated at 19 lb/day for the Permits to Construct, but final emissions were calculated at only 10.4 lb/day. The overall change in emissions showed a decrease of more than 8 lb/day relative to the estimate provided with the PC. Note that the emission increases are exempt from offsets because this project is part of an emission control strategy required for compliance with Rule 1118.

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**Table 11. Summary of Emissions Increases from Each Permit Unit (Estimate Provided with Permit to Construct as well as Final Emissions Increase Calculation for Permit to Operate)**

Permit Unit	Emissions increase estimated with PC (lb/day)	Final emissions increase (lb/day)
P14S1, East Flare (A/N 458382)	4	1.0
P14S2, West Flare (A/N 458383)	0	0.7
S14S3, FGRS (A/N 458384)	15	7.1
P3S3, Unit 120 HDS (A/N 467377)	0	0.6
P1S4, Vacuum Flash Unit (A/N 467378/ 472815)	0	1.0
<b>Project Emissions</b>	<b>19 lb/day (PC estimate)</b>	<b>10.4 lb/day (Final PO calc)</b>

## **RULES EVALUATION**

### **PART 1: SCAQMD REGULATIONS**

#### **Rule 212 Standards for Approving Permits And Issuing Public Notice (Amended 11/14/97)**

Public notice was required for this project prior to construction. No further public notice is needed now that the project is complete. The facility is currently in compliance with this rule and is expected to continue to operate in compliance with this rule.

#### **Rule 401 Visible Emissions (Amended 11/09/01)**

Operation of the East and West Flares (C465, C469) has the potential to cause visible emissions. However, Condition D323.2 requires regular and complaint-driven monitoring for visible emissions, as well as corrective actions when visible emissions are present. The facility is currently in compliance with this rule and is expected to continue to operate in compliance with this rule.

#### **Rule 402 Nuisance (Adopted 05/07/76)**

Operation of the East and West Flares (C465, C469) has the potential to result in a public nuisance. However, safeguards are in place, such as Condition D323.2, to investigate public complaints in a timely manner and ensure that equipment is operated properly. The facility is currently in compliance with this rule and is expected to continue to operate in compliance with this rule.

#### **Rule 404 Particulate Matter – Concentration (Amended 02/07/86)**

This rule sets forth particulate matter emission standards based on the gas discharge rate. Normally, equipment which fires on gaseous fuel, such as the East and West Flares (C465, C469), can typically meet these standards. The facility is currently in compliance with this rule and is expected to continue to operate in compliance with this rule.

#### **Rule 407 Liquid and Gaseous Air Contaminants (Amended 04/02/82)**

Rule 407 includes emission limits for CO (2000 ppm) and sulfur compounds (500 ppmv SO<sub>2</sub>) from any equipment. However, Rule 407(b)(3) states that Rule 407 requirements do not apply to emergency venting due to equipment failure or process upsets. Since this project is primarily concerned with the handling of emergency vent gases resulting from equipment failures or process

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upsets, the facility is currently in compliance with this rule and is expected to continue to operate in compliance with this rule.

**Rule 409 Combustion Contaminants (Amended 08/07/81)**

Rule 409 limits atmospheric discharge of combustion contaminants, which are defined as particulate matter discharged into the atmosphere from the burning of any kind of material containing carbon in a free or combined state. The limit is 0.1 grain per cu ft of gas calculated to 12 percent of carbon dioxide at standard conditions averaged over a minimum of 15 consecutive minutes. Equipment fired on gaseous fuel, such as the East and West Flares (C465, C469), can typically meet these limits. The facility is currently in compliance with this rule and is expected to continue to operate in compliance with this rule.

**Rule 465 Refinery Vacuum-Producing Devices or Systems (Amended 08/13/99)**

Flasher Overhead Accumulator (D65, V-2251) is subject to the requirements of Rule 465 for VOC and sulfur compounds, per Condition H23.10. These requirements include the use of a cover and continuously collecting and routing exhaust gases to a permitted fuel gas system or combustion device. The facility is currently in compliance with this rule and is expected to continue to operate in compliance with this rule.

**Rule 474 Fuel Burning Equipment – Oxides of Nitrogen (Amended 12/04/81)**

Rule 474 limits NOx emissions from fuel-burning equipment. However, since the facility is a NOx and SOx RECLAIM facility, Rule 474 is not applicable per Rule 2001, Table 1.

**Rule 1118 Control of Emissions from Refinery Flares (Amended 11/04/05)**

This objective of this project was to achieve compliance with new Rule 1118 requirements. Specifically, Rule 1118(c)(4) requires that all flares be operated in such a manner that minimizes all flaring and that no vent gas is combusted except during emergencies, shutdowns, startups, turnarounds or essential operational needs. Since the facility was required to install a flare gas recovery system to comply with 1118(c)(4), and because an application was submitted by July 1, 2006, this requirement was effective January 1, 2009.

Condition H23.29 reiterates the applicability of the Rule 1118 SOx emissions limits for the East and West Flares (C465, C469).

Condition II.1 required compliance with the variance conditions and compliance schedule associated with Case No. 4900-80. This variance required installation of the total sulfur and HHV analyzers required in Rule 1118(g)(3)Table 1 by 11/30/09 for the East Flare and by 12/29/09 for the West Flare. Written notification of final compliance was submitted on 11/25/09 and 12/18/09 for the East and West Flares, respectively. Thus, this condition is being removed from the permit.

The facility is currently in compliance with Rule 1118 and is expected to continue to operate in compliance with this rule.

**Rule 1123 Refinery Process Turnarounds (Amended 12/07/90)**

Per Condition S13.5, the equipment in the Vacuum Flash Unit (P1S4) and the Unit 120 HDS (P3S3) are subject to the requirements of Rule 1123. This rule requires that during refinery process turnarounds, the vapors released from process vessels are collected and contained for disposal until the vessel pressure is below 5 psig (or within 10% above the minimum gauge

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pressure of vapor collection, whichever is lower).

If inert gas displacement or vacuum eduction is used for the process turnaround, a plan is required to be submitted to the Executive Officer describing the procedure, disposition of displaced or educed gases, and the identifiable criteria for the stage of the procedure where the disposition is changed from a control facility to atmospheric venting. The facility is currently in compliance with this rule and is expected to continue to operate in compliance with this rule.

**Rule 1173 Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants (Amended 02/06/09)**

The project modifications added valves, flanges, compressors, pressure relief devices and drains that are subject to control of fugitive emissions. Fugitive component counts for each permit unit were listed previously. The facility has an approved Inspection and Maintenance (I&M) Program, and will include each new fugitive component in this I&M program.

Miscellaneous fugitives in the East and West Flare are subject to Rule 1173 per Condition H23.1. Compressors and miscellaneous fugitives in the FGRS (P14S3), Vacuum Flash Unit (P1S4) and Unit 120 HDS (P3S3) are subject to Rule 1173 requirements per Conditions H23.22 and H23.36. The facility is currently in compliance with this rule and is expected to continue to operate in compliance with this rule.

**Rule 1176 Sumps and Wastewater Separators (Amended 09/13/96)**

Sumps are required to have either a) a floating cover equipped with seals, b) a fixed cover with a closed vent system vented to an air pollution control device (APCD), or c) an alternate control measure approved in writing by the Executive Officer. The APCDs are required to achieve  $\geq 95\%$  VOC control efficiency by weight, and are not allowed to emit VOC emissions  $> 500$  ppm above background [1176(e)(6)].

Carbon canister C728 is used as a control device on sump D816 to comply with Rule 1176 requirements (see Condition H23.11). The sump (D816) is tagged with the Rule 1176 emission limit of 500 ppm VOC. Condition D90.2 requires daily monitoring of the VOC at the outlet of the carbon canister and Condition E153.2 requires changeout of the carbon canister when the exit VOC concentration exceeds 500 ppm VOC. The facility is currently in compliance with this rule and is expected to continue to operate in compliance with this rule.

**Reg XIII New Source Review**

**Rule 1303 Requirements (Amended 12/6/02)** New Source Review requirements apply to new, modified or relocated sources. The requirements of this regulation were imposed when the permit to construct was issued, but additional increases in emissions have since been documented. BACT is required for new or modified permit units with  $\geq 1.0$  lb/day emission increase. Based on the final fugitive component counts, all of the permit units require BACT. For these permit units, fugitive components are the main source of emissions, and BACT requirements for fugitives are outlined in Condition S31.3

Condition S31.3 requires the use of BACT for all new fugitive components in A/N's 458382, 458383, 458384, 467377 and 467378/472815. Note that A/N 472815 is replacing A/N 467378 in Condition S31.3 since it is the PO that includes the A/N 467378 modifications. The facility has documented their compliance with Condition S31.3 by submitting lists of fugitives and P&IDs

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showing the number of fugitive components, the locations of bellows-seal valves, and providing justification for any new valves used that are not leakless valves.

Each application included in this project is exempt from offsets because it is part of an air pollution control strategy. Modeling is not required for VOC emissions. No additional requirements apply. The facility is currently in compliance with this rule and is expected to continue to operate in compliance with this rule.

**Reg XIV Toxics and Other Non-Criteria Pollutants**

**Rule 1401: New Source Review of Toxic Air Contaminants (Amended 06/05/09)** Rule 1401 applies to new, modified or relocated permit units that emit Toxic Air Contaminants (TAC). The requirements of this rule were imposed when the permit to construct was issued. At that time, only the Flare Gas Recovery System, East Flare, and West Flare were estimated to have emission increases. Rule 1401 analyses were completed that showed that the PC-estimated emission increases were less than the limits for maximum individual cancer risk (MICR), cancer burden, and noncancer acute and chronic hazard index (HI).

When the final fugitive component counts were submitted, the emissions calculated differed from the initial estimates. The emissions associated with the Flare Gas Recovery System and East Flare were less than originally estimated; thus, their Rule 1401 analyses are still valid. However, the West Flare, Unit 120 HDS, and vacuum flash units were each calculated to have final emissions of approximately 1 lb/day of VOC. The PC calculations did not estimate any emissions increase from these units (except the West Flare, which was estimated to have an increase of less than 0.5 lb/day VOC). Thus, a new Rule 1401 screening analysis was conducted for these permit units to confirm that each permit unit's emissions increase did not exceed the risk thresholds. Since each permit unit had VOC increase of approximately 1 lb/day, the analysis was conducted once, and applies to each of the referenced permit unit. Table 12 shows the increase in mass emissions of each toxic air pollutant, using the speciation provided by the facility.

**Table 12. Concentrations of Hazardous Air Pollutants Present in VOCs from the FGRS project: West Flare, Unit 120 HDS, and Vacuum Flash Units.**

Code	Toxic Emissions	Weight % Provided by applicant
B9	1,3 Butadiene	4.07E-02
B1	Benzene	1.35E-02
E4	Ethylbenzene	5.00E-03
H12	Hydrogen Sulfide	3.00E-02
H8	n-Hexane	2.00E-05
P78	Propylene	9.12E+00
S6	Styrene	9.00E-03
T3	Toluene	3.42E-02
X1	Xylenes (Mixed Isomers)	1.50E-02

For these permit units, a Tier 1 analysis was conducted. Tier 1 involves a comparison of calculated emissions with screening levels for each hazardous air pollutant. The Screening Levels

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are pollutant emission thresholds which are not expected to produce a MICR greater than one in a million nor a hazard index greater than one.

The emissions used to calculate MICR, cancer burden and chronic HI for a modified permit unit are the difference between the post-modification emissions and the pre-modification emissions, per Rule 1401(f)(3). Since the net emission increase due to this project is a 1 lb/day VOC increase for the West Flare, Unit 120 HDS, and Vacuum Flash Units, Table 13 is a summary of the screening assessment that applies to each of these units. The results of the Tier 1 screening assessment are provided in Table 13, which shows that the 1 lb/day VOC increase passes the Tier 1 screening, and no additional risk analysis is required for MICR, cancer burden, and chronic HI.

**Table 13. Tier 1 Screening Risk Assessment Report: Cancer/Chronic Risk Screening for 1 lb/day VOC increase (applies to West Flare, Unit 120 HDS, and Vacuum Flash Units)**

<b>Tier 1 Results (see details below)</b>
<b>Cancer/Chronic ASI</b>
1.05E-01
<b>PASSED</b>

**APPLICATION SCREENING INDEX CALCULATION DETAILS**

Code	Compound	Average Annual Emission Rate (lbs/yr)	Max Hourly Emission Rate (lbs/hr)	Cancer / Chronic Pollutant Screening Level (lbs/yr)	Cancer / Chronic Pollutant Screening Index (PSI)
B9	Butadiene, 1,3-	1.48E-01	1.70E-05	1.49E+00	9.96E-02
B1	Benzene (including benzene from gasoline)	4.91E-02	5.63E-06	8.92E+00	5.51E-03
E4	Ethyl benzene	1.82E-02	2.08E-06	1.02E+02	1.78E-04
H12	Hydrogen sulfide	1.09E-01	1.25E-05	2.58E+03	4.23E-05
H8	Hexane (n-)	7.28E-05	8.33E-09	1.81E+06	4.02E-11
P78	Propylene	3.32E+01	3.80E-03	7.75E+05	4.28E-05
S6	Styrene (vinyl benzene)	3.28E-02	3.75E-06	2.33E+05	1.41E-07
T3	Toluene (methyl benzene)	1.24E-01	1.43E-05	7.75E+04	1.61E-06
X1	Xylenes (isomers and mixtures)	5.46E-02	6.25E-06	1.81E+05	3.02E-07
<b>TOTAL (Application Screening Index)</b>					<b>1.05E-01</b>

The emissions used to calculate acute HI for a modified permit unit are the total emissions from the permit unit, per Rule 1401(f)(4). The results of the Tier 1 screening for Acute Risk are provided in Table 14 for the West Flare, Unit 120 HDS, and Vacuum Flash Units, based on the total emissions from each unit. Table 14 shows that each of the units passes the Tier 1 screening, which means that no further risk analysis is needed for Acute Risk.

The facility is currently in compliance with this rule and is expected to continue to operate in compliance with this rule.

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**Table 14. Tier 1 Screening Risk Assessment Report: Acute Risk Screening for Total VOC Emissions from West Flare, Unit 120 HDS, and Vacuum Flash Units**

West Flare	Unit 120 HDS	Vac Flash Unit
Acute ASI	Acute ASI	Acute ASI
<b>1.99E-03</b>	<b>1.27E-02</b>	<b>1.94E-02</b>
<b>PASSED</b>	<b>PASSED</b>	<b>PASSED</b>

APPLICATION SCREENING INDEX CALCULATION DETAILS

Compound	Avg Annual Emission Rate (lbs/yr)	Max Hourly Emission Rate (lbs/hr)	Acute Pollutant Screening Level (lbs/hr)	Acute Pollutant Screening Index (PSI)
<b>West Flare A/N 458383 (Total VOC emissions = 6424 lb/yr)</b>				
Butadiene, 1,3-	2.61E+00	2.98E-04		
Benzene (including benzene from gasoline)	8.65E-01	9.90E-05	3.96E+00	2.50E-05
Ethyl benzene	3.20E-01	3.67E-05		
Hydrogen sulfide	1.92E+00	2.20E-04	1.12E-01	1.96E-03
Hexane (n-)	1.28E-03	1.47E-07		
Propylene	5.84E+02	6.69E-02		
Styrene (vinyl benzene)	5.77E-01	6.60E-05	5.62E+01	1.17E-06
Toluene (methyl benzene)	2.19E+00	2.51E-04	9.91E+01	2.53E-06
Xylenes (isomers and mixtures)	9.61E-01	1.10E-04	5.89E+01	1.87E-06
<b>TOTAL (Application Screening Index)</b>				<b>1.99E-03</b>

<b>Unit 120 HDS A/N 467377 (Total VOC emissions = 41172 lb/yr)</b>				
Butadiene, 1,3-	1.67E+01	1.91E-03		
Benzene (including benzene from gasoline)	5.54E+00	6.35E-04	3.96E+00	1.60E-04
Ethyl benzene	2.05E+00	2.35E-04		
Hydrogen sulfide	1.23E+01	1.41E-03	1.12E-01	1.25E-02
Hexane (n-)	8.21E-03	9.40E-07		
Propylene	3.74E+03	4.29E-01		
Styrene (vinyl benzene)	3.70E+00	4.23E-04	5.62E+01	7.52E-06
Toluene (methyl benzene)	1.40E+01	1.61E-03	9.91E+01	1.62E-05
Xylenes (isomers and mixtures)	6.16E+00	7.05E-04	5.89E+01	1.20E-05
<b>TOTAL (Application Screening Index)</b>				<b>1.27E-02</b>

<b>Vacuum Flash Unit A/N 467378/472815 (Total VOC emissions = 62561 lb/yr)</b>				
Butadiene, 1,3-	2.54E+01	2.91E-03		
Benzene (including benzene from gasoline)	8.42E+00	9.64E-04	3.96E+00	2.44E-04
Ethyl benzene	3.12E+00	3.57E-04		
Hydrogen sulfide	1.87E+01	2.14E-03	1.12E-01	1.91E-02
Hexane (n-)	1.25E-02	1.43E-06		
Propylene	5.69E+03	6.51E-01		
Styrene (vinyl benzene)	5.62E+00	6.43E-04	5.62E+01	1.14E-05
Toluene (methyl benzene)	2.13E+01	2.44E-03	9.91E+01	2.47E-05
Xylenes (isomers and mixtures)	9.36E+00	1.07E-03	5.89E+01	1.82E-05
<b>TOTAL (Application Screening Index)</b>				<b>1.94E-02</b>

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**Reg XXX Title V Permits**

**Rule 3002 Requirements (Amended 11/14/97)** ConocoPhillips was issued a final Title V operating permit on 11/07/08. These applications constitute a minor permit revision as defined in 3000(b)(12)(A). Table 12 lists the applications included in this Title V permit revision (A/N 508193)

**Table 12. Summary of Applications Included in this Title V Minor Permit Revision**

A/N	Pro/Sys	Emissions increase estimated with PC (lb/day)	Final emissions increase (lb/day)	Change in emissions estimate (lb/day)
458382	P14S1 (East Flare System)	4.0	1.0	- 3.0
458383	P14S2 (West Flare System)	0	0.7	+ 0.7
458384	S14S3 (Flare Gas Recovery System)	15	7.1	- 7.9
467377	P3S3 (FCC Feed (Gas Oil) Hydrodesulfurization Unit 120)	0	.6	+ 0.6
467378/472815	P1S4 (Vacuum Flash Unit)	0	1.0	+ 1.0
<b>Net change in emissions relative to PC estimate:</b>				<b>- 8.6 lb/day</b>

The net change in emissions is a reduction of more than 8 lb/day. Thus, this permit revision has no net increase in emissions, and is classified as a minor permit revision. Minor permit revisions must meet all of the criteria in Rule 3000(b)(12)(A)(i) - (ix). As shown in Table 11, the Title V permit revision that includes these applications has no net increase in emissions and meets each of the specific 3000(b)(12)(A)(vi) requirements. This revision also meets each of the other minor revision criteria.

Rule 3000(b)(12): MINOR PERMIT REVISION means any Title V permit revision that:

- (A) (i) does not require or change a case-by-case evaluation of: reasonably available control technology (RACT) pursuant to Title I of the federal Clean Air Act; or maximum achievable control technology (MACT) pursuant to 40 CFR Part 63, Subpart B;
- (ii) does not violate a regulatory requirement;
- (iii) does not require any significant change in monitoring terms or conditions in the permit;
- (iv) does not require relaxation of any recordkeeping, or reporting requirement, or term, or condition in the permit;
- (v) does not result in an emission increase of RECLAIM pollutants over the facility starting Allocation plus nontradeable Allocations, or higher Allocation amount which has previously undergone a significant permit revision process;
- (vi) does not result in an increase in emissions of a pollutant subject to Regulation XIII - New Source Review or a hazardous air pollutant;
- (vii) does not establish or change a permit condition that the facility has assumed to avoid an applicable requirement;
- (viii) is not an installation of a new permit unit subject to a New Source Performance Standard (NSPS) pursuant to 40 CFR Part 60, or a National Emission Standard for Hazardous Air Pollutants (NESHAP) pursuant to 40 CFR Part 61 or 40 CFR Part 63; and,
- (ix) is not a modification or reconstruction of an existing permit unit, resulting in new or additional NSPS requirements pursuant to 40 CFR Part 60, or new or additional NESHAP requirements pursuant to 40 CFR Part 61 or 40 CFR Part 63

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Minor permit revisions are exempt from public participation per 3006(b) but are required to be submitted to the EPA per 3003(j)(1)(A).

## PART II: STATE REGULATIONS

### CEQA California Environmental Quality Act (Amended 01/01/05)

The requirements of CEQA were imposed when the permit to construct was issued. No additional requirements apply.

## PART III: FEDERAL REGULATIONS

### 40 CFR 60 Standards of Performance for New Stationary Sources

#### **40 CFR 60 Subpart A: General Provisions**

Subpart A includes general provisions for all of the NSPS regulations with regard to notification, monitoring, recordkeeping, reporting and testing requirements; definitions; and control device requirements for flares. Condition E193.4 requires that the flares comply with applicable requirements in Section §60.18 of 40CFR60 Subpart A, which include visible emission limits, a requirement to maintain a flame at all times, design requirements for tip velocity and exit velocity, and a heating value threshold for flared gases. Condition D12.3 requires that the flares (C465, C469) install and maintain a thermocouple to indicate the continuous presence of a pilot light. The facility is currently in compliance with this regulation and is expected to continue to operate in compliance with this regulation.

#### **40 CFR 60 Subpart J: Standards of Performance for Petroleum Refineries**

Subpart J includes requirements for fuel gas combustion devices such as process heaters, boilers, and flares. The primary requirement for fuel gas combustion devices is to limit the H<sub>2</sub>S content in fuel gases. However, the combustion in a flare of process upset gases or gases released to the flare as a result of emergency malfunctions is exempt from this requirement.[§60.104(a)(1)]. The pilot gas for flares is also exempt from the continuous monitoring requirements per §60.105(a)(4)(iv)(A). The facility is currently in compliance with this regulation and is expected to continue to operate in compliance with this regulation.

#### **40 CFR 60 Subpart Ja: Standards of Performance for Petroleum Refineries for which Construction, Reconstruction or Modification Commenced After May 14, 2007**

Subpart Ja applies to affected facilities modified after May 14, 2007. However, §60.100a(b) states that for flares, Subpart Ja only applies to flares that were modified after 6/24/08. Since the permits to construct for this project were issued 6/7/07, the flares are not subject to Subpart Ja; thus, none of these requirements apply.

§60.100a (b): Except for flares, the provisions of this subpart apply only to affected facilities under paragraph (a) of this section which commence construction, modification, or reconstruction after May 14, 2007. For flares, the provisions of this subpart apply only to flares which commence construction, modification, or reconstruction, after June 24, 2008.

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**40 CFR 60 Subpart GGG Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for which Construction, Reconstruction, or Modification Commenced after January 4, 1983, and on or before November 7, 2006 (Amended 06/02/08)**

The miscellaneous fugitive components and four compressors in Unit 120 HDS [P3S3] (D844, D738, D740, D748 and D749) and the miscellaneous fugitive components in the Vacuum Flash System [P1S4] (D835) are subject to 40CFR60 Subpart GGG requirements, as stated in Condition H23.22. Fugitive component and compressor devices D942, D938 and D939 in P14S3 are also currently tagged with Subpart GGG, but they are actually subject to Subpart GGGa, as explained below.

40CFR60 Subpart GGG primarily refers to Subpart VV for specific requirements. These permit units contain valves, pumps, compressors, flanges, pressure relief valves, process drains, and other fugitive components. Rule requirements apply to each of these categories, and vary from requirements on the specifications of the equipment to monthly monitoring for leaks and timely leak repair. The facility has implemented an LDAR program to monitor and repair leaks in fugitive components. The facility is currently in compliance with this regulation and is expected to continue to operate in compliance with this regulation.

**40 CFR 60 Subpart GGGa Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for which Construction, Reconstruction, or Modification Commenced after November 7, 2006 (Amended 06/02/08)**

FGRS (P14S3) devices D942, D938 and D939 are subject to Subpart GGGa. They were modified or installed after the Permit to Construct was issued on 6/7/07. As part of this permit action, for these devices, Condition H23.22 is being replaced with Condition H23.36, which specifies compliance with 40CFR60 GGGa rather than 40CFR60 GGG. The permit to construct for the FGRS was issued on 6/7/07, but 40CFR60 Subpart GGGa was not finalized until 11/16/07. The final version of Subpart GGGa specified applicability for projects started after 11/7/06. Thus, the FGRS equipment identified above are subject to Subpart GGGa requirements, although at the time the Permit to Construct was issued, they were subject to Subpart GGG.

40CFR60 Subpart GGGa primarily refers to Subpart VVa for specific requirements. The FGRS contains valves, pumps, compressors, flanges, pressure relief valves, and other fugitive components. Rule requirements apply to each of these categories, and vary from requirements on the specifications of the equipment to monthly monitoring for leaks and timely leak repair. The facility has implemented an LDAR program to monitor and repair leaks in fugitive components. The facility is currently in compliance with this regulation and is expected to continue to operate in compliance with this regulation.

**40 CFR Part 61 National Emission Standards for Hazardous Air Pollutants**

**40 CFR 61 Subpart FF National Emission Standard for Benzene Waste Operations (Amended 12/4/03)**

The facility is required to identify benzene-containing streams and limit the amount of uncontrolled benzene emitted. The Consent Decree (Section H, Paragraph 212) requires that the facility sample End-of-Line streams and other streams with significant contributions to total annual benzene (TAB) in accordance with the "Benzene Waste Operations Revised Sampling Plan (6BQ Compliance Option)" dated 5/19/09. Sampling results were provided in the Consent Decree Semiannual Progress Report (January 2010). The quarterly BWON report dated 1/18/10 indicates

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that the facility is projected to emit less than the 6 Mg/yr limit of uncontrolled benzene. The facility is currently in compliance with this regulation and is expected to continue to operate in compliance with this regulation.

**40 CFR Part 63 National Emission Standards for Hazardous Air Pollutants for Source Categories**

**40 CFR 63 Subpart CC National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries (Amended 10/28/09)**

The miscellaneous fugitive emissions (equipment leaks) of the East Flare, West Flare, FGRS, Vacuum Flash Unit, and Unit 120 HDS (D876, D877, D942, D835, and D844, respectively) are subject to the requirements of 40CFR63 Subpart CC. Specific requirements are referenced in Section J of the permit.

§63.641 *Equipment leak* means emissions of organic hazardous air pollutants from a pump, compressor, pressure relief device, sampling connection system, open-ended valve or line, valve, or instrumentation system “in organic hazardous air pollutant service” as defined in this section. Vents from wastewater collection and conveyance systems (including, but not limited to wastewater drains, sewer vents, and sump drains), tank mixers, and sample valves on storage tanks are not equipment leaks.

Petroleum refining process units with equipment leaks containing HAPs are subject to Subpart CC requirements per §63.640(c)(4). Equipment leak standards are included in §63.648, which refers to the requirements of 40CFR60 Subpart VV. The facility is currently in compliance with Subpart CC and is expected to continue to operate in compliance with this regulation.

**RECOMMENDATIONS**

Based on the above evaluation it is recommended that a Permit to Construct be issued with the following conditions.

**CONDITIONS**

**PROCESS CONDITIONS**

P13.2 All devices under this process are subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
Benzene	40CFR61, SUBPART	FF

**[40CFR 61 Subpart FF, 12-4-2003]**

[Processes subject to this condition : 1,2,3,4,5,6,7,8,9,10]

P18.1 All affected devices listed under this process/system shall be used only to receive, recover and/or dispose of vent gases routed from the system(s) or process(es) listed below, in addition to specific

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devices identified in the “connected to” column:

- Crude Distillation Unit (Process: 1, System: 1)
- Vacuum Flash Unit (Process: 1, System: 4)
- Delayed Coking Unit (Process: 2, System: 1)
- Coker Blowdown (Process: 2, System: 3)
- FCC Feed (Gas Oil) Hydrodesulfurization Unit DHT-3 (Process: 3, System: 1)
- FCC Feed (Gas Oil) Hydrodesulfurization Unit 120 (Process: 3, System: 3)
- Hydrogen Plant (Process: 4, System: 1)
- Gas Production (Process: 5, System: 1, 2, 3, and 4)
- Gas and Water Treatment (Process: 6, System: 1, 2, 3, 4, and 5)
- Sulfur Recovery Unit No. 1 (Process: 7, System: 1)
- Sulfur Recovery Unit No. 2 (Process: 7, System: 2)
- Tail Gas (SCOT) Unit 2 (Process: 7, System: 4)
- Tail Gas (SCOT) Unit No. 1 (Process: 7, System: 5)
- Crude Oil Tank Car Unloading System (Process: 8, System: 1)
- LPG Tank Car Loading and Unloading System (Process: 8, System: 3)
- Sour Water Oxidizer (Process: 1, System: 3)

**[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002]**

[Processes subject to this condition : 14]

## SYSTEM CONDITIONS

S13.5 All devices under this system are subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
VOC	District Rule	1123

**[RULE 1123, 12-7-1990]**

[Systems subject to this condition : Process 1, System 1, 4, 8; Process 2, System 1, 3; Process 3, System 1, 3; Process 4, System 1; Process 5, System 1, 2, 3, 4; Process 6, System 1, 2, 3; Process

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7, System 4, 5]

S15.2 The vent gases from all affected devices of this process/system shall be vented as follows:

All sour gases under normal operating conditions shall be directed to the sour gas treating unit located in this system.

This process/system shall not be operated unless the sour gas treating unit is in full use and has a valid permit to receive vent gases from this system.

**[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002]**

[Systems subject to this condition : Process 1, System 4; Process 3, System 1, 3; Process 4, System 1]

S15.3 The vent gases from all affected devices of this process/system shall be vented as follows:

All emergency vent gases shall be directed to a blowdown flare system or flare gas recovery system except Devices IDs D2, D4, **D58**, D65, **D60**, D69, D95-D97, D816, D175, D188, D202, D803, D479, D896 that vent to the atmosphere.

This process/system shall not be operated unless the above air pollution control equipment is in full use and has a valid permit to receive vent gases from this system.

**[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002]**

[Systems subject to this condition : Process 1, System 1, 4, 7, 8; Process 2, System 3; Process 3, System 1, 3; Process 4, System 1; Process 5, System 2, 3, 4; Process 6, System 1, 2, 3, 4, 5; Process 7, System 1, 2, 4, 5; Process 8, System 1, 3]

*D58 and D60 are being removed from this condition because they are no longer present in the permit.*

S15.4 The vent gases from all affected devices of this process/system shall be vented as follows:

All sour gases under normal operating conditions shall be directed to the sour gas treating unit(s).

This process/system shall not be operated unless the above air pollution control equipment is in full use and has a valid permit to receive vent gases from this system.

**[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002]**

[Systems subject to this condition : Process 1, System 1, 4, 8; Process 2, System 1, 3; Process 3, System 1]

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S15.11 The vent gases from all affected devices of this process/system shall be vented as follows:

All vent gases under normal operating conditions shall be directed to a flare gas recovery system except device ID's D175, D188, D202, and D896 that vent to atmosphere.

This process/system shall not be operated unless the above air pollution control equipment (consisting of two compressors operating independently or concurrently at any given time) is in full use and has a valid permit to receive vent gases from this system.

**[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 1303(b)(2)-Offset, 5-10-1996; RULE 1303(b)(2)-Offset, 12-6-2002]**

[Systems subject to this condition : Process 1, System 1, 4, 7, 8; Process 2, System 3; Process 3, System 1, 3; Process 4, System 1; Process 5, System 2, 3, 4; Process 6, System 1, 2, 3, 4, 5; Process 7, System 1, 2, 4, 5; Process 8, System 1, 3]

S15.12 The vent gases from all affected devices of this process/system shall be vented as follows:

All sour gases during normal operation shall be directed to the sour gas treating unit located in either the Vacuum Flasher Unit (Process 1, System 4), or the Hydrodesulfurization Unit (Process 3, System 3).

**[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]**

[Systems subject to this condition : Process 14, System 3]

S15.13 The vent gases from all affected devices of this process/system shall be vented as follows:

All emergency vent gases shall be directed to a flare system.

This process/system shall not be operated unless the above air pollution control equipment is in full use and has a valid permit to receive vent gases from this system.

**[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]**

[Systems subject to this condition : Process 14, System 3]

S31.1 The following BACT requirements shall apply to VOC service fugitive components associated with the devices that are covered by application number(s) 325725:

If 98.0 percent or greater of the new valve and the new flange population inspected is found to leak gaseous or liquid volatile organic compounds at a rate less than 500 ppm for two consecutive months, then the operator shall revert to a quarterly inspection program with the approval of the executive officer. This condition shall not apply to bellow-sealed valves.

All new valves in VOC service except those specifically exempted by Rule 1173, shall be bellow-sealed valves for 2-inch and smaller sizes, except in the following applications: heavy liquid service, control valve, instrument piping/tubing, applications requiring torsional valve stem motion, applications where valve failure could pose safety hazard (e.g. drain valves with valve

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stems in horizontal position), and retrofits with space limitations.

All new components in VOC service, a leak greater than 500 ppm but less than 1, 000 ppm measured as methane background as measured using EPA Method 21, shall be repaired within 14 days of detection. Components shall be defined as any valve, fitting, pump, compressor, pressure relief device, diaphragm, hatch, sight-glass, and meter, which are not exempted by Rule 1173.

The operator shall keep records of the monthly inspection (and quarterly where applicable), subsequent repair, and reinspection, in a manner approved by the district.

All components are subject to District Rule 1173 and 40CFR60, Subpart GGG.

All new components in VOC service as defined in Rule 1173, except valves and flanges shall be inspected quarterly using EPA reference Method 21. All new valves and flanges in VOC service except those specifically exempted by Rule 1173 shall be inspected monthly using EPA Method 21.

All new valves greater than 2-inch size and major components in VOC service as defined by Rule 1173, except those specifically exempted by Rule 1173 shall be identified from other components through their tag numbers (e.g. numbers ending in the letter "N"), and shall be noted in the records.

The operator shall provide to the District, no later than 60 days after initial startup, a plot plan or process instrumentation of each new valve in VOC service.

[**RULE 1173, 5-13-1994**; RULE 1173, ~~6-1-2007~~ **2-6-2009**; **RULE 1303(a)(1)-BACT, 5-10-1996**; **RULE 1303(a)(1)-BACT, 12-6-2002**; **RULE 1303(b)(2)-Offset, 5-10-1996**; **RULE 1303(b)(2)-Offset, 12-6-2002**; **40CFR60 Subpart GGG, 6-2-2008**]

[Systems subject to this condition : Process 3, System 3]

S31.3 The following BACT requirements shall apply to VOC service fugitive components associated with the devices that are covered by application number(s) 458382, 458383, 458384, **467378, 472815**, 467377 and 464152:

The operator shall provide to the District, no later than 90 days after initial startup, a recalculation of the fugitive emissions based on actual components installed and removed from service. The valves and flanges shall be categorized by size and service. The operator shall submit a listing of all new non-bellows seal valves which shall be categorized by tag no., size, type, application, and reasons why bellows seal valves were not used.

The operator shall provide to the District, no later than 90 days after initial startup, a complete, as built, piping and instrumentation diagram(s) and copies of requisition data sheets for all non-leakless type valves with a listing of tag numbers.

All new valves in VOC service, except those specifically exempted by Rule 1173 and those in heavy liquid service as defined in Rule 1173, shall be bellows seal valves, except as approved by the District, in the following applications: heavy liquid service, control valve, instrument piping/tubing, applications requiring torsional valve stem motion, applications where valve failure could pose safety hazard, and retrofits/special applications with space limitations, and valves not commercially available.

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All new valves and major components in VOC service as defined by Rule 1173, except those specifically exempted by Rule 1173 and those in heavy liquid service as defined in Rule 1173, shall be distinctly identified from other components through their tag numbers (e.g. numbers ending in the letter “N”), and shall be noted in the records.

All new components in VOC service as defined in Rule 1173, except valves and flanges, shall be inspected quarterly using EPA reference Method 21. All new valves and flanges in VOC service except those specifically exempted by Rule 1173 shall be inspected monthly using EPA Method 21.

If 98.0 percent or greater of the new (non-bellows seal) valves and the new flange population inspected is found to leak gaseous or liquid volatile organic compounds at a rate less than 500 ppmv for two consecutive months, then the operator may change to a quarterly inspection program with the approval of the District.

The operator shall revert from quarterly to monthly inspection program if less than 98.0 percent of the new (non-bellows seal) valves and the new flange population inspected is found to leak gaseous or liquid volatile organic compounds at a rate less than 500 ppmv.

All new components in VOC service, a leak greater than 500 ppmv but less than 1, 000 ppmv, as methane, measured above background using EPA Method 21, shall be repaired within 14 days of detection. Components shall be defined as any valve, fitting, pump, compressor, pressure relief valve, diaphragm, hatch, sight-glass, and meter, which are not exempted by Rule 1173.

The operator shall keep records of the monthly inspection (quarterly where applicable), subsequent repair, and reinspection, in a manner approved by the District. Records shall be kept and maintained for at least two years, and shall be made available to the Executive Officer or his authorized representative upon request.

All open-ended valves shall be equipped with cap, blind flange, plug, or a second valve.

All pressure relief valves shall be connected to a closed vent system.

All new light liquid pumps shall utilize double seals and be connected to a closed vent system.

All compressors shall be equipped with a seal system with a higher pressure barrier fluid.

**[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]**

[Systems subject to this condition : Process 1, System 4; Process 2, System 1; Process 3, System 3; Process 14, System 1, 2,3]

*Note that A/N 472815 has replaced A/N 467378 in this condition because the Permit to Operate for the Vacuum Flash Unit (PIS4) is being issued under A/N 472815 and not A/N 467378. A/N 467378 is being cancelled and amended to A/N 472815.*

## DEVICE CONDITIONS

D12.3 The operator shall install and maintain a(n) thermocouple to accurately indicate the presence of a flame at the pilot light:

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**[RULE 3004(a)(4)-Periodic Monitoring, 12-12-1997; 40CFR60 Subpart A, 5-16-2007]**

[Devices subject to this condition : C465, C469]

D90.2 The operator shall periodically monitor the hydrocarbon concentration at the outlet of the carbon canister according to the following specifications:

The operator shall use a diffusion sensor, or flame-ionization system, or an infra-red ionization ultra-violet ionization system, or a District approved OVA to monitor the parameter.

The operator shall calibrate the instrument used to monitor the parameter in ppmv methane.

The operator shall monitor once every day.

**[RULE 1176, 9-13-1996; RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 3004(a)(4)-Periodic Monitoring, 12-12-1997]**

[Devices subject to this condition : C728]

D323.2 The operator shall conduct an inspection for visible emissions from all stacks and other emission points of this equipment whenever there is a public complaint of visible emissions, whenever visible emissions are observed, and on a semiannual basis, at least, unless the equipment did not operate during the entire semiannual period. The routine annual inspection shall be conducted while the equipment is in operation and during daylight hours.

If any visible emissions (not including condensed water vapor) are detected that last more than three minutes in any one hour, the operator shall verify and certify within 24 hours that the equipment causing the emission and any associated air pollution control equipment are operating normally according to their design and standard procedures and under the same conditions under which compliance was achieved in the past, and either:

- 1). Take corrective action(s) that eliminates the visible emissions within 24 hours and report the visible emissions as a potential deviation in accordance with the reporting requirements in Section K of this permit; or
- 2). Have a CARB-certified smoke reader determine compliance with the opacity standard, using EPA Method 9 or the procedures in the CARB manual "Visible Emission Evaluation", within three business days and report any deviations to AQMD.

The operator shall keep the records in accordance with the recordkeeping requirements in Section K of this permit and the following records:

- 1). Stack or emission point identification;
- 2). Description of any corrective actions taken to abate visible emissions;
- 3). Date and time visible emission was abated; and

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4). All visible emission observation records by operator or a certified smoke reader.

**[RULE 3004(a)(4)-Periodic Monitoring, 12-12-1997; RULE 401, 3-2-1984]**

[Devices subject to this condition : C465, C469, D796, D798, D799]

E73.3 Notwithstanding the requirements of Section E conditions, the operator is not required to use both of the flare gas recovery compressors concurrently if:

The load on the flare gas recovery system is not sufficient to require both compressors to be online.

**[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]**

[Devices subject to this condition : D938, D939]

*The rule tagging for this condition is being updated for consistency.*

E128.1 The operator shall keep all spent carbon in a tightly covered container which shall remain closed except when it is being transferred into or out of the container.

**[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002]**

[Devices subject to this condition : C517, C519, C520, C521, C728, C830]

E153.2 The operator shall change over the spent carbon with fresh activated carbon in the adsorber whenever breakthrough occurs.

For the purpose of this condition, breakthrough occurs when the hydrocarbon monitor reading indicates a concentration of 500 ppmv at the outlet of the carbon canister. (The 500 ppmv refers to VOCs).

**[RULE 1176, 9-13-1996; RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 3004(a)(4)-Periodic Monitoring, 12-12-1997]**

[Devices subject to this condition : C517, C519, C520, C521, C728, C830]

**E193.3 The operator shall construct this equipment according to the following specifications:**

~~During the construction of equipment listed under Process 14, System 2 in Section H of this facility permit, the operator shall comply with all mitigation measures contained in the November 1994 "Statement of Findings, Statement of Overriding Considerations, and Mitigation Monitoring Plan" which is part of the AQMD Final Environmental Impact Report and Addendum that were prepared for this project and certified on November 18, 1994.~~

**[CA PRC CEQA, 11-23-1970]**

**[Devices subject to this condition : D754]**

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*This condition is being removed because it is no longer needed . The 11/18/94 EIR and Addendum for the Reformulated Fuels project required only mitigation measures related to construction. Construction of D754 has been complete for many years. This device is being moved from Section H to Section D. No further action is necessary.*

E193.4 The operator shall operate and maintain this equipment according to the following specifications:

The operator shall comply with all applicable requirements specified in Section 60.18 of the 40CFR60 Subpart A.

**[40CFR60 Subpart A, 5-16-2007]**

[Devices subject to this condition : C465, C469]

**E204.1 The operator shall tag the valves according to the following specifications:**

**All new valves greater than 2-inch size and major components in VOC service as defined by Rule 1173, except those specifically exempted by Rule 1173, shall be distinctly identified from other components through their tag numbers (e.g. numbers ending in the letter "N"), and shall be noted in the records.**

**[RULE 1303(a)(1) BACT, 5-10-1996; RULE 1303(a)(1) BACT, 12-6-2002]**

**[Devices subject to this condition : D754]**

*This condition is being removed because it was part of command and control permit A/N 295585, issued 12/14/94. Construction has been complete for many years, the 'new' valves properly identified at that time, and no further action is necessary.*

H23.1 This equipment is subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
VOC	District Rule	1173

**[RULE 1173, 5-13-1994; RULE 1173, 6-1-2007 2-6-2009]**

[Devices subject to this condition : D876, D877, D945]

H23.10 This equipment is subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
VOC	District Rule	465
Sulfur compounds	District Rule	465

**[RULE 465, 8-13-1999]**

[Devices subject to this condition : D65]

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H23.11 This equipment is subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
VOC	District Rule	1176

**[RULE 1176, 9-13-1996]**

[Devices subject to this condition : C728, D816]

H23.22 This equipment is subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
VOC	District Rule	1173
VOC	40CFR60, SUBPART	GGG

**[RULE 1173, 5-13-1994; RULE 1173, 6-1-2007 2-6-2009; 40CFR60 Subpart GGG, 6-2-2008]**

[Devices subject to this condition : D738, D740, D748, D749, D832, D834, D835, D838, D842, D844, **D938, D939, D942**, D957]

*D938, D939, and D942 are being removed from Condition H23.22 and added to new Condition H23.36 as part of this permit action.*

H23.29 This equipment is subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
SOX	District Rule	1118

**[RULE 1118, 11-4-2005]**

[Devices subject to this condition : C465, C469]

**H23.36 This equipment is subject to the applicable requirements of the following rules or regulations:**

Contaminant	Rule	Rule/Subpart
VOC	District Rule	1173
VOC	40CFR60, SUBPART	GGGa

**[RULE 1173, 5-13-1994; RULE 1173, 2-6-2009; 40CFR 60 Subpart GGGa, 6-2-2008]**

**[Devices subject to this condition : D938, D939, D942]**

*Note: Condition H23.22 is being replaced by new Condition H23.36 to reference Subpart GGGa rather than Subpart GGG. Subpart GGGa was finalized after the Permit to Construct was issued, which referenced Subpart GGG. Thus, this condition is being updated as part of the Permit to Operate.*

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~~H.1 The operator shall comply with all requirements of the conditions and compliance schedule as specified in the variance dated May 8, 2007, Case No. 4900-80 in accordance with the Findings and Decisions of the Hearing Board or as subsequently modified by the Hearing Board. The operator shall submit progress reports at least semi-annually, or more frequently if specified in the Findings and Decisions. The progress reports shall contain dates for achieving activities, milestones or compliance required in the schedule of compliance and dates when such activities, milestones or compliance were achieved; and an explanation of why any dates in the schedule of compliance were not, or will not be met, and any preventative or corrective measures adopted.~~

~~The variance (or Order for Abatement) referenced in this condition does not affect federal or citizen enforceability of the underlying SIP approved rules for which the applicant is receiving the variance (or Order for Abatement).~~

~~**RULE 1118, 11-4-2005; RULE 3004(a)(10)(C), 12-12-1997**~~

~~**[Devices subject to this condition : C465, C469]**~~

*This condition is being removed because the facility has complied with the Variance 4900-80 conditions and compliance schedule, has installed the required total sulfur and HHV analyzers on both the East and West Flares, and is now in compliance with Rule 1118. The facility sent written notification of final compliance to the Hearing Board on 11/25/09 for the East Flare and on 12/18/09 for the West Flare.*