SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT	PAGES 50	PAGE 1
OFFICE OF ENGINEERING AND COMPLIANCE	APPL. NO. 388733 & 465533	DATE 8/8/12
APPLICATION PROCESSING AND CALCULATIONS	PROCESSED BY: Bob Sanford	CHECKED BY:

PERMIT TO OPERATE

COMPANY NAME: Chevron Products Company

MAILING ADDRESS: 324 W. El Segundo Blvd.
El Segundo, CA 90245

EQUIPMENT LOCATION: 324 W. El Segundo Blvd.
El Segundo, CA 90245

PROJECT OVERVIEW:

This evaluation is for conversion of the permits to construct/temporary permits to operate for the Delayed Coking Unit (P2S1) and Coker Blowdown System (P2S5) to regular permits to operate. Each permit unit has been issued multiple permits to construct (PCs) since issuance of the last permit to operate (PO). These PCs are summarized below.

Delayed Coking Unit (DCU)

Application No. (A/N) 448244 – Under Chevron's Heavy Crude Project, the front end of the refinery including the No. 4 Crude Distillation Unit (P1S5), Delayed Coking Unit (P2S1), Coker Blowdown System (P2S5) and Raw Coke Handling System (P2S3) were modified to enable refining of additional heavy crude oil. The capacity of the DCU was increased from 60 Mbbl/day up to 75 Mbbl/day to handle the additional heavy (vacuum) residuum from the No. 4 Crude Unit. Primary modifications included replacement of the Main Fractionator column (C-501A; D134) and Wet Gas Compressor (K-501; D3261); installation of a new refrigeration unit and cooling water supply line, installation and replacement of various heat exchangers and pumps; and connection of new emergency pressure relief valves (PRVs) to the Coker Flare.

The modifications of the DCU allowed a reduction in the total coking/decoking cycle from 30 hours down to 24 hours.

A/N 464819 – This PC was part of a project to improve the vapor recovery capacity for the LSFO Plant and DCU to reduce flaring at the plants. In the remainder of this engineering evacuation, the project will be referred to as the Flaring Reduction Project. Under this project, the outlet of existing PRVs in the DCU and the front end of the Coker Blowdown System were connected to the Refinery Blowdown Gas Recovery System (also referred to as LSFO Vapor Recovery System (VRS)). Previously, the PRVs were connected directly to the Coker Flare and the coke drum blowdown flowed through the front end of the Coker Blowdown System to the K-2005 compressor, which now operates in standby mode to the K-2006, K-2007 and K-2008 Compressors in the LSFO VRS.

Other modifications under this project included replacement of three existing 2 MMSCD compressors in the LSFO VRS with three 4 MMSCFD compressors and addition of a water seal drum to the Coker Flare. Note that this Flaring Reduction Project was undertaken prior to completion of the Heavy Crude Project. Construction of the two projects was completed simultaneously.

Two existing fuel gas filters (K-506/A; D4209/D4210) were also added to the DCU permit.

A/N 388733 – An existing knockout pot (V-521; D4372) was administratively added to the DCU permit.

Coker Blowdown System

A/N 458897 – This PC was issued as part of Chevron's Heavy Crude Project. The Coker System was modified to accept higher coke drum blowdown load and provide the capability to blowdown the coke drums to 2 psig, which was BACT for the coke drums. Major modifications included installation of a new finfan cooler parallel to an existing cooler to increase the capacity of the system and installation of two steam ejectors to overcome pressure drop in the system to facilitate blowdown of the coke drums to 2 psig.

A/N 465533 – As part of the Flaring Reduction Project, this change of condition application converted compressor K-2005 (D196) in the Coker Blowdown System into standby backup service for the new larger compressors (K-2006, K-2007 and K-2009) in the LSFO VRS. The system was not physically modified.

EQUIPMENT DESCRIPTION:

The proposed permits to operate will be issued in Section D of Chevron's RECLAIM/Title V Facility Permit. Proposed additions and deletions to equipment descriptions and conditions are noted by underline and strikeout text, respectively. Conditions with modified text are indicated by parenthesis.

Chevron has confirmed that the DCU and Coker Blowdown System were modified as proposed in the subject PCs and that the current equipment descriptions are accurate with the exception of the Chevron equipment number for two ejectors (now K-511 & K-511A) in the Coker Blowdown System.

Section D: Facility Description and Equipment Specific Conditions

Description	ID No.	Connected To	RECLAIM Source Type	Emissions and Requirements	Conditions
Process 2: Coking and Residual Conditioning					P13.1
System 1: Delayed Coking Unit					~~S7.3~~, S13.2, S15.7, S15.9, S15.10, S31.19
FRACTIONATOR, C-501A, T/T HEIGHT: 139 FT 6 IN; DIAMETER: 27 FT **A/N: 388733**	D134		Note: Equipment was replaced.		

Description	ID No.	Connected To	RECLAIM Source Type	Emissions and Requirements	Conditions
COLUMN, FRACTIONATOR SIDECUT STRIPPER, C-502A/B, STACKED, HEIGHT: 56 FT; DIAMETER: 6 FT 6 IN **A/N: 388733**	D135		Note: Added Nozzles. No changes to vessel.		
COLUMN, ABSORBER-STRIPPER, C-503, STACKED, HEIGHT: 168 FT 5 IN; DIAMETER: 11 FT 7 IN **A/N: 388733**	D137		Note: No modification		
ABSORBER, C-504, SPONGE OIL, HEIGHT: 60 FT 6 IN; DIAMETER: 5 FT 6 IN **A/N: 388733**	D138		Note: No modification		
VESSEL, LEAN OIL STILL, C-505, HEIGHT: 89 FT; DIAMETER: 11 FT 7 IN **A/N: 388733**	D139		Note: No modification		
COLUMN, JET SIDECUT STRIPPER, C-510, HEIGHT: 66 FT; DIAMETER: 5 FT **A/N: 388733**	D140		Note: No modification		
COKE DRUM, V-501A, T/T HEIGHT: 68 FT; DIAMETER: 26 FT **A/N: 388733**	D141		Note: Bottom section repaired.	PM: (9) RULE 405, 2-7-1986]	(D12.33), D12.34, (D28.31), (E336.14)
COKE DRUM, V-501B, T/T HEIGHT: 68 FT; DIAMETER: 26 FT **A/N: 388733**	D142		Note: Bottom section repaired.	PM: (9) RULE 405, 2-7-1986]	(D12.33), D12.34, (D28.31), (E336.14)
COKE DRUM, V-501C, T/T HEIGHT: 68 FT; DIAMETER: 26 FT **A/N: 388733**	D143		Note: Bottom section repaired.	PM: (9) RULE 405, 2-7-1986]	(D12.33), D12.34, (D28.31), (E336.14)
COKE DRUM, V-501D, T/T HEIGHT: 68 FT; DIAMETER: 26 FT **A/N: 388733**	D144		Note: Bottom section repaired.	PM: (9) RULE 405, 2-7-1986]	(D12.33), D12.34, (D28.31), (E336.14)
COKE DRUM, V-501E, T/T HEIGHT: 68 FT; DIAMETER: 26 FT **A/N: 388733**	D145		Note: Bottom section repaired.	PM: (9) RULE 405, 2-7-1986]	(D12.33), D12.34, (D28.31), (E336.14)
COKE DRUM, V-501F, T/T HEIGHT: 68 FT; DIAMETER: 26 FT **A/N: 388733**	D146		Note: Bottom section repaired.	PM: (9) RULE 405, 2-7-1986]	(D12.33), D12.34, (D28.31), (E336.14)
ACCUMULATOR, V-503, FRACTIONATOR OVERHEAD, WITH WATER LEG, LENGTH: 30 FT; DIAMETER: 11 FT **A/N: 388733**	D148		Note: Replaced water boot with larger diameter boot.		
ACCUMULATOR, V-504A, COMPRESSOR INTERSTAGE, WITH WATER LEG, BOTTOM SECTION; T/T HEIGHT: 10 FT; DIAMETER: 9 FT 6 IN; TOP SECTION; T/T HEIGHT: 5 FT., DIAMETER 4 FT 6 IN **A/N: 388733**	D149		Note: Equipment was replaced.		
DRUM, V-505, ABSORBER-STRIPPER FEED, WITH WATER LEG, LENGTH: 27 FT; DIAMETER: 10 FT **A/N: 388733**	D150		Note: No modification		

Description	ID No.	Connected To	RECLAIM Source Type	Emissions and Requirements	Conditions
ACCUMULATOR, V-507, LEAN OIL STILL OVERHEAD, LENGTH: 12 FT; DIAMETER: 5 FT **A/N: 388733**	D151		Note: No modification		
VESSEL, V-508, COKE CONDENSATE, LENGTH: 10 FT; DIAMETER: 5 FT **A/N: 388733**	D152		Note: No modification		
VESSEL, TAIL GAS SEPARATOR, V-518, HEIGHT: 8 FT; DIAMETER: 4 FT 6 IN **A/N: 388733**	D153		Note: No modification		
TANK, T-205, FEED, CHEMICAL ADDITIVE, 5700 GALS; DIAMETER: 10 FT; HEIGHT: 10 FT 2 IN **A/N: 388733**	D156		Note: No modification		
PIT, COKE, 3 SECTIONS, INCLUDING 2 CLEAR WATER SUMPS, WIDTH: 49 FT; DEPTH: 35 FT; LENGTH: 287 FT **A/N: 388733**	D158		Note: No modification		H23. 6
COMPRESSOR, K-501A, FRACTIONATOR OVERHEAD ACCUMULATOR OFF-GAS, TWO-STAGE, CENTRIFUGAL WITH DRY GAS SEAL VENTED TO A FUEL GAS SYSTEM; 13,000 BHP, **A/N: 388733**	D3261		Note: Compressor was replaced..		H23.47
FILTER, K-505 **A/N: 388733**	D3262		Note: No modification		
FILTER, FRACTIONATOR PUMP AROUND STRAINERS, K-535A **A/N: 388733**	D3263		Note: No modification		
FILTER, FRACTIONATOR PUMP AROUND STRAINERS, K-535B **A/N: 388733**	D3264		Note: No modification		
FILTER, K-505A **A/N: 388733**	D3828		Note: No modification		
POT, CONDENSATE, V-523, T/T DIAMETER: 3 FT; HEIGHT: 7 FT 6 IN **A/N: 388733**	D4092		Note: New equipment		
FLASH DRUM, V-524, 15 PSI STEAM, DIAMETER: 4 FT; LENGTH: 12 FT **A/N: 388733**	D4093		Note: New equipment		
FILTER, FUEL GAS, K-506, HEIGHT: 9 FT 1 IN; DIAMETER: 1 FT 10 IN **A/N: 388733**	D4209				
FILTER, FUEL GAS, K-506a, HEIGHT: 9 FT 1 IN; DIAMETER: 1 FT 10 IN **A/N: 388733**	D4210				

Description	ID No.	Connected To	RECLAIM Source Type	Emissions and Requirements	Conditions
KNOCK OUT POT, V-521, T/T. HEIGHT: 3 FT 6 IN; DIAMETER: 1 FT 4 IN **A/N: 388733**	D4372				
FUGITIVE EMISSIONS, MISCELLANEOUS **A/N: 388733**	D3580			HAP: (10) [40CFR 63 Subpart CC, #5A, 6-23-2003]	H23. 19

Description	ID No.	Connected To	RECLAIM Source Type	Emissions and Requirements	Conditions
Process 2: Coking and Residual Conditioning					P13.1 (existing)
System 5: Coker Blowdown System					~~S7.3~~; S13.2, S15.5, S18.12, S31.19
KNOCK OUT POT, V-509, BLOWDOWN K. O. , HEIGHT: 42 FT 6 IN; DIAMETER: 12 FT **A/N: 465533**	D193		Note: No modification.		
VESSEL, BLOWDOWN SETTLING, V-510, OILY WATER SEPARATION, T/T LENGTH: 40 FT; DIAMETER: 10 FT **A/N: 465533**	D194		Note: No physical mod. Added new instrumentation.		
VESSEL, SOUR WATER DEGASSER, V-511, HEIGHT: 18 FT; DIAMETER: 5 FT **A/N: 465533**	D195		Note: No modification.		
COMPRESSOR, K-2005, COKER BLOWDOWN GAS RECOVERY, BACK UP UNIT FOR K-2006, K-2007 K-2008, TWO-STAGE, RECIPROCATING, ~~WITH PACKED SEAL~~, DUAL PACKING RINGS WITH NITROGEN PURGE GAS VENTED TO A FUEL GAS SYSTEM, 700-H. P. (LOCATED IN LSFO) **A/N: 465533**	D196		Note: No modification.		E71.59 H23.19
POT, EJECTOR SUCTION KNOCKOUT, V-514A, HEIGHT: 12 FT; DIAMETER: 3 FT **A/N: 465533**	D197		Note: Replaced.		
EJECTOR, KG ~~G~~-511, GRAHAM, (STANDBY), UTILIZES 150 LB. STEAM, BLOWDOWN GAS CAPACITY: 700 ACFM, LENGTH: 6 FT. **A/N: 465533**	D4099		Note: New Equipment.		
EJECTOR, KG ~~G~~-511A, (STANDBY), GRAHAM, UTILIZES 150 LB. STEAM, BLOWDOWN GAS CAPACITY: 700 ACFM, LENGTH: 6 FT. **A/N: 465533**	D4100		Note: New Equipment.		

Description	ID No.	Connected To	RECLAIM Source Type	Emissions and Requirements	Conditions
TANK, EMULSION BREAKER, T-208, HEIGHT: 8 FT; DIAMETER: 3 FT **A/N: 465533**	D201		Note: No modification.		
FUGITIVE EMISSIONS, MISCELLANEOUS **A/N: 465533**	D3581			HAP: (10) [40CFR 63 Subpart CC, #5A, 6-23-2003]	H23.19

PROCESS CONDITIONS

P13.1 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, 11, 12, 13, 14, 16]

SYSTEM CONDITIONS

S7.3 The following conditions shall apply to all refinery operation and related devices from this system:

The operator shall comply with all applicable mitigation measures stipulated in the "Statement of Findings, Statement of Overriding Considerations, and Mitigation Monitoring Plan" document which is part of the AQMD Certified Final Environmental Impact Report dated 09-August-2006 for this facility.

The operator shall maintain records in a manner approved by the District , to demonstrate compliance with the applicable measures stipulated in the "Statement of Findings, Statement of Overriding Considerations, and Mitigation Monitoring Plan" document.

[CA PRC CEQA, 11-23-1970]

[Systems subject to this condition: Process 1, System 5; ~~**Process 2, System 1**~~, 3, ~~**5**~~, 7; Process 10, System 1; Process 12, System 26, 27; Process 13, System 1, 2, 4; Process 20, System 12]

Note: This condition will be removed from the permit for the DCU and Coker Blowdown System since there are no on-going requirements.

S13.2 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 3, 5, 13, 17; **Process 2, System 1, 5**, 6; Process 3, System 1, 5; Process 4, System 1, 3, 5, 7, 9, 11, 13; Process 5, System 1; Process 6, System 4; Process 7, System 2, 4, 7; Process 8, System 1, 2, 5, 7, 8, 10; Process 9, System 1, 2; Process 10, System 1, 4; Process 12, System 2, 4, 7, 9, 10, 11, 12, 13, 16, 17, 18, 22, 26, 27, 28; Process 20, System 3, 7, 10, 11, 12, 14, 18, 19, 23; Process 21, System 13, 14, 16, 18]

S15.5 The vent gases from all affected devices of this process/system shall be vented as follows:

All emergency vent gases from the vapor recovery system shall be directed to the flare system.

This process/system shall not be operated unless the flare(s) 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(b)(2)-Offset, 5-10-1996**]

[Systems subject to this condition: **Process 2, System 5**; Process 8, System 9; Process 20, System 10, 37]

S15.7 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 vapor recovery system and/or flare system except Devices IDs D15, D3195, D3199, D3200 (Process 1, System 3), D106 (Process 1, System 13), D3574, D3371, D3373, D591, D595, D597, D3372, D592, D598 & D602 (Process 6, System 4) that vent to the atmosphere.

This process/system shall not be operated unless the vapor recovery system and/or flare system 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(b)(2)-Offset, 5-10-1996**]

[Systems subject to this condition : Process 1, System 3, 5, 13, 17; **Process 2, System 1**; Process 3, System 1 , 5; Process 4, System 1, 3, 5, 7, 9, 11, 13; Process 5, System 1; Process 6, System 4; Process 7, System 4 , 7; Process 8, System 1, 2, 5, 7, 8, 10; Process 9, System 1, 2; Process 10, System 1; Process 12, System 2, 7, 9, 11, 13, 17, 22, 23, 25, 26, 27; Process 20, System 18, 19; Process 21, System 18]

S15.9 The vent gases from all affected devices of this process/system shall be vented as follows:

All sour gases shall be directed to the sour gas treating unit(s).

This process/system shall not be operated unless the sour gas treating unit(s) 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(b)(2)-Offset, 5-10-1996**]

[Systems subject to this condition: Process 1, System 3, 5, 13; **Process 2, System 1**; Process 3, System 1; Process 4, System 1, 3, 7, 9, 11, 13; Process 7, System 4; Process 8, System 1, 5; Process 10, System 1; Process 12, System 7; Process 20, System 4, 10, 28, 29, 30, 37]

S15.10 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 the vapor recovery system.

This process/system shall not be operated unless the vapor recovery system(s) 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(b)(2)-Offset, 5-10-1996**]

[Systems subject to this condition : Process 1, System 3, 5, 13, 17; **Process 2, System 1**; Process 3, System 1 , 5; Process 4, System 1, 3, 5, 7, 9, 11, 13; Process 5, System 1; Process 6, System 4; Process 7, System 4 , 7; Process 8, System 1, 2, 5, 7, 8, 10; Process 9, System 1, 2; Process 10, System 1; Process 12, System 2, 7, 9, 11, 13, 17, 22, 23, 25, 26, 27; Process 20, System 18]

S18.12 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 devices identified in the "connected to" column:

Crude Distillation (Process: 1, System: 3, 5 & 13)

Coking & Residual Conditioning (Process: 2, System: 1)

Hydrotreating (Process: 4, System: 1, 9, 11 & 13)

Hydrogen Generation (Process: 6, System: 4)

Alkylation (Process: 8, System: 2 & 5)

Coker Depropanizer (Process: 10, System: 1)

Treating and Stripping (Process: 12, System: 26, 27 & 28)

Sulfur Production (Process: 13, System: 10 & 11)

Air Pollution Control (Process: 20, System: 18 & 19)

Miscellaneous (Process: 21, System: 14)

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

[Systems subject to this condition: **Process 2, System 5**; Process 20, System 10]

S31.19 The following BACT requirements shall apply to VOC service fugitive components associated with the devices that are covered by application number(s) 448244 and 458897:

All sampling connections shall be closed-purge, closed loop, or closed-vent systems.

All new valves in VOC service shall be leakless type, except those specifically exempted by Rule 1173 or approved by the District in the following applications: heavy liquid service, control valves, instrument piping/tubing, applications requiring torsional valve stem motion, applications where valve failure could pose safety hazard (e.g., drain valves with valve stems in horizontal position), retrofits/special applications with space limitations, and valves not commercially available.

For the purpose of this condition, leakless valve shall be defined as any valve equipped with sealed bellows or equivalent approved in writing by the District prior to installation.

All new components in VOC service as defined by 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. Components shall be defined as any valve, flange, fitting, pump, compressor, pressure relief device, diaphragm, hatch, sight-glass, and meter, which are not exempted by Rule 1173.

The following leaks shall be repaired within 7 calendar days -- all light liquid/gas/vapor components leaking at a rate of 500 to 10,000 ppm, heavy liquid components leaking at a rate of 100 to 500 ppm and greater than 3 drops/minute, unless otherwise extended as allowed under Rule 1173.

The following leaks shall be repaired within 2 calendar days -- any leak between 10,000 to 25,000 ppm, any atmospheric PRD leaking at a rate of 200 to 25,000 ppm, unless otherwise extended as allowed under Rule 1173.

The following leaks shall be repaired within 1 calendar day -- any leak greater than 25,000 ppm, heavy liquid leak greater than 500 ppm, or light liquid leak greater than 3 drops per minute.

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 ppmv for two consecutive months, then the operator may revert to a quarterly inspection program with the approval of the Executive Officer. This condition shall not apply to leakless valves.

The operator shall revert from quarterly to monthly inspection program if less than 98.0 percent of the new valves and the new flange population inspected are found to leak gaseous or liquid volatile organic compounds at a rate less than 500 ppmv. This condition shall not apply to leakless valves.

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

The operator shall provide to the District, prior to initial startup, a list of all non-leakless type valves that were installed. The list shall include the tag numbers for the valves and reasons why leakless valves were not used. The operator shall not startup the equipment prior to the Districts approval for the use of all non-leakless valves.

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 operator shall also submit a complete, as built, piping and instrumentation diagram(s) and copies of requisition data sheets or field inspection surveys for all non-leakless type valves with a listing of tag numbers and reasons why leakless valves were not used.

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

[Systems subject to this condition: **Process 2, System 1, 5**]

DEVICE CONDITIONS

D12.33 The operator shall install and maintain a(n) pressure sensing device to accurately indicate the pressure in the coke drum.

The operator shall also install and maintain a device to continuously record the parameter being measured. The pressure shall be recorded to a sensitivity level of 0.1 psig.

The range of the measuring device or gauge shall not be greater than zero (0) to fifty (50) psig.

The measuring device or gauge shall be accurate to within plus or minus 5 percent for the sub-range of zero (0) to five (5) psig. It shall be calibrated once every year. When a calibration produces a percentage accuracy of greater than plus or minus 5%, the measuring device shall be calibrated every operating calendar quarter until a subsequent calibration which shows a percentage accuracy of less than plus or minus 5% is achieved.

For the purpose of this condition, continuously record shall be defined as recording the two-minute average pressure at least once every minute during each time period when gas is being released from the coke drum to the Coker Blowdown System (Process 2, System 5) or to the atmosphere, prior to removal of coke from the coke drum.

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

[Devices subject to this condition: **D141, D142, D143, D144, D145, D146**]

D12.34 The operator shall install and maintain a(n) sensor to accurately indicate the open or closed position of the valve.

For the purpose of this condition, the "valve" shall be defined as the valve on the atmospheric vent stack for the coke drum.

For the purpose of this condition, the "sensor" shall be defined as a position indicator that sends a signal to the data acquisition system when the valve is in the closed position.

The operator shall also install and maintain a device to continuously record the parameter being measured.

For the purpose of this condition, continuously record shall be defined as recording at least once every minute during each time period when gas is being released from the coke drum to the Coker Blowdown System (Process 2, System 5) or to the atmosphere, prior to removal of coke from the coke drum.

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

[Devices subject to this condition: **D141, D142, D143, D144, D145, D146**]

D28.31 The operator shall conduct source test(s) in accordance with the following specifications:

~~The test shall be conducted within 90 days after achieving maximum daily coke production rate, but no later than 180 days after initial startup~~.

The test shall be conducted every three years. ~~following the initial source test.~~

The test shall be conducted when the coke level in the drum is between 25 and 34 feet of outage (empty space above the coke).

The test shall be conducted to determine the concentration and mass emission of CO, VOC, Solid PM, Total PM, total PM10 and TRS during the venting of the coke drum to the atmosphere during the drum depressurization step of the decoking process, prior to removal of coke from the drum.

The District shall be notified of the date and time of the test at least 10 days prior to the test.

The test shall be conducted after District approval of a source test protocol submitted in accordance with Section E - Administrative Conditions.

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

[Devices subject to this condition: **D141, D142, D143, D144, D145, D146**]

E71.59 The operator shall only use this equipment for backup to any of the Compressors in Process 20, System 10 (D4211, D4212 & D4213) to ensure recovery of all vent gases that may go to the LSFO Flare Header under normal operating conditions. Under this condition, unless allowed under Rule 1118, no venting to a flare shall be allowed.

[**RULE 1118, 11-4-2005; RULE 1303(a)(1)-BACT, 5-10-1996**]

[Devices subject to this condition: **D196**]

E336.14 The operator shall vent the vent gases from this equipment as follows:

All blowdown gases from this coke drum shall be directed to the Coker Blowdown System (Process 2, System 5) if the pressure inside the coke drum is greater than or equal to 2 psig.

The operator shall utilize the two-minute average coke drum pressure data recorded according to condition D12.33 to demonstrate compliance with this condition.

This equipment shall not be operated unless the Coker Blowdown System (Process 2, System 5) is in full use and has a valid permit to receive vent gases from this equipment.

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

[Devices subject to this condition: **D141, D142, D143, D144, D145, D146**]

H23.6 This equipment is subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
PM	District Rule	1158

[RULE 1158, 7-11-2008]

[Devices subject to this condition: **D158**]

H23.19 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, 2-6-2009; **40CFR 60 Subpart GGG, 6-2-2008**]

[Devices subject to this condition: **D196**, D237, D633, D1047, D1048, D1049, D1054, D1929, D1930, D3522, D3527, **D3580, D3581**, D3583, D3585, D3587, D3589, D3613, D3622, D3636, D3638, D3652, D3653, D3675, D3803, D4303, D4353]

H23.47 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: **D3261**]

PERMIT HISTORY

Permit History for the Delayed Coking Unit (P2S1)

Permit to Construct		Permit to Operate		Description of Modification
No.	Issue Date	No.	Issue Date	
A49877	1969			Original construction.
A71315	3/23/72	P54378	10/23/73	Installation of a tank for storage of polysulfide solution, which is a corrosion inhibitor.
A75697		P54378	10/23/73	Permit covers the installation of the rest of the polysulfide injection system, which was installed without a permit.
C06859		na.	na.	Records not clear.
C14273		na.	na.	Records not clear.
C20072	11/16/78	na.	na.	Installed a tank and associated pumps for the injection of AFTOL 37 into the coke drums to minimize coke deposits
C25570	3/25/80	na.	na.	Installed a new HX on the fractionator sidecut gasoil stripper (C-502A & B).
103023	~Jan. 1993	na.	na.	Installed a new finfan section to the Fractionartor overhead condenser and new pumps and HXs. Allowed increase in Residuum Feed Rate of 6000 bbl/day. ROG = +2 lb/day
114211		M46264	10/08/85	
132346		M49898	6/01/86	Added the Jet Side Stripper (C-510) and associated equipment. ROG = +4.3 lb/day
157030	1987	na.	na.	Added sponge oil coolers, gas oil product filters, a pump, and a strainer. ROG = +7.3 lb/day
171622	09/06/88	na.	na.	Added a fuel gas filter and two sludge injection pumps. ROG = +5.4 lb/day
180493	4/11/89	D38519	5/21/91	Added an oil/water separation vessel (V572) to remove water from the coker feed. Also added recovered oil and sour water pumps. ROG = +6.3 lb/day
257502		R-D62082	1/4/93	Install larger motors on two pumps. No change in emissions
337210	6/18/98	na.	na.	Replaced the existing Absorber-Stripper Column C-503 (D137) to increase propane recovery and reduce sulfur content in the refinery fuel gas. ROG = +0.48 lb/day.
393028	na.	na.	na.	Admin application submitted to make corrections to equipment descriptions for the coke drums. The application was cancelled with the understanding that the requested changes would be evaluated upon issuance of a PO under AN 337210. The drums are being modified under AN 448244.
402249	na.	F53241	6/28/02	Admin Appl: Remove Tank T-520 (D154) since the tank was removed from service. Add an existing filter to the permit.

Permit to Construct		Permit to Operate		Description of Modification
No.	Issue Date	No.	Issue Date	
448244	8/24/06	na.	na.	Heavy Crude Project. Made the following modifications to increase the capacity of the DCU from 60k bbl/day to 75k bbl/day: replacement of the main fractionator column (C-501), upgrade of existing and installation of additional heat exchangers and pumps, replacement of the wet gas compressor (K-501), installation of a new cooling water supply system, upgrade of the coke drilling system from pneumatic drive to hydraulic drive, and connection of new PRVs to the Coker Flare.
464819	7/06/07	na.	na.	Connected existing pressure relief valves and the blowdown line for the coke drums to the LSFO Vapor Recovery System. The three 2 MMSCFD compressors in the LSFO were replaced with 4 MMSCFD compressors.
388733	4/6/11	na.	na.	Administrative application for inclusion of an existing KO pot (V-521) in the permit.

Permit History for the Coker Blowdown System (P2S5)

Permit to Construct		Permit to Operate		Description of Modification
No.	Issue Date	No.	Issue Date	
114210		M46263	10/8/85	
241174			8/16/91	PC/PO. Chevron modified the Alkyl Units Vapor Recovery System, which received vent gases from the Coker Blowdown System. Previously, relief gases were discharged to two gas holders (T-2010 and T-20202) that were upstream of some Houdry Compressors. If the compressors were unavailable or overloaded, the tanks were vented to the atmosphere. Under this modification, the gas holders were removed and the Alkyl VRS was tied into the LSFO and FCCU VRSs.
401517	na.	F53352	7/09/02	Administrative application. Change the Chevron ID of Tank T-514 (D201) to T-208.
448245	na.	na.	na.	Heavy Crude Project. Installation of a new set of finfan condensers and other related capacity increase modifications. This application was cancelled and the proposed modifications processed under AN 458897.
458897	8/24/06	na.	na.	Heavy Crude Project. Installation of the two ejectors and associated equipment as BACT for the coke drums in the Delayed Coking Unit.
465533	7/06/07	na.	na.	Change of condition to convert compressor K-2005 into standby backup service for the new larger compressors (K-2006, K-2007 and K-2009) in the LSFO VRS.

COMPLIANCE RECORD REVIEW

There are no ongoing violations for any of the equipment covered in this evaluation.

PROCESS DESCRIPTION:

This section contains a summary description of the Delayed Coking Unit and Coker Blowdown System. A more detailed discussion is contained in the engineering evaluation for PC A/N 448244.

Delayed Coking Unit [Process 2, System 1]

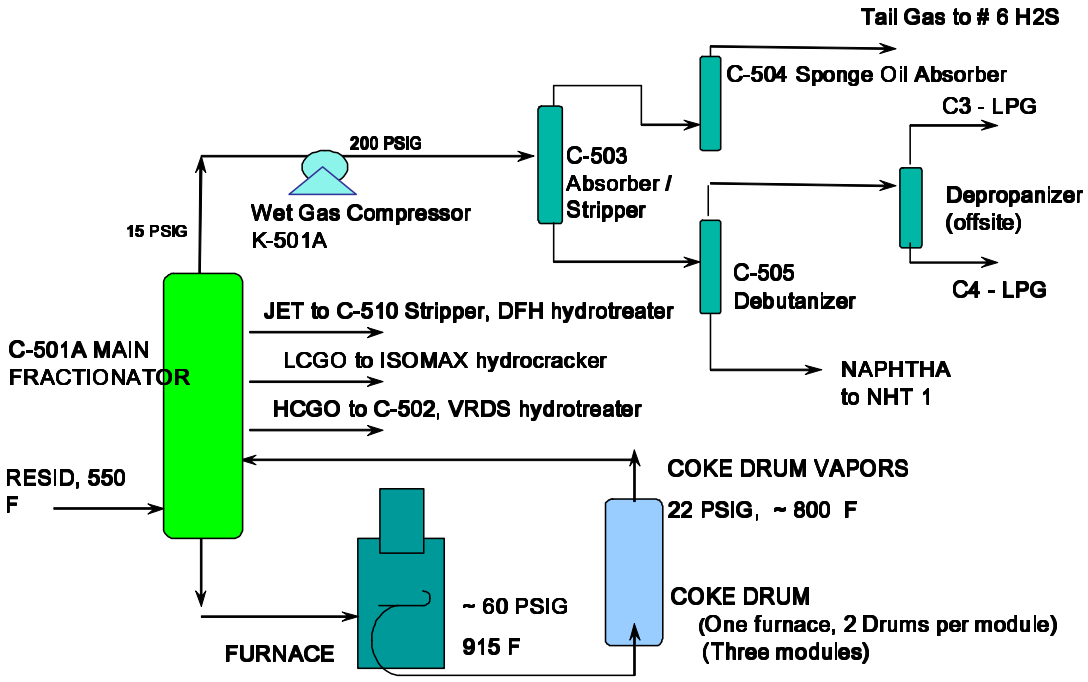
General: An overview diagram of the Delayed Coking Unit is shown below. In this unit, the vacuum resid (1050F+ boiling range) from the No.2 and No.4 crude unit vacuum towers are thermally cracked to maximize the production of lighter products. The thermal cracking occurs in a batch process in large vessels called coke drums. The batch process in the coke drums includes a coking cycle and a decoking cycle. The DCU has 6 coke drums which operate in pairs. While one of the drums is in a coking cycle, the paired drum is in a decoking cycle.

The vacuum residuum feed (~400°F) is first routed to the bottom of the main fractionator (C-501A; D134), which serves as a feed surge drum to remove fluctuations in feed rate. From the main fractionator, the feed is pumped to the one of three coker furnaces (F-501A/B/C) where it is heated to the desired temperature level (approximately 915°F) for thermal cracking and pumped into the bottom of the coke drums. Each of the coker drum pairs are fed by one of the three coker heaters.

The light cracked materials are sent from each coke drum to the main fractionator (C-501A; D134) where they are separated by molecular weight and boiling point. Jet fuel boiling range material, light coker gasoil and heavy coker gas oil are drawn from different trays of the fractionator and routed to steam strippers [(C-510; D140) and (C-502A/B; D135)] to remove excess H2S and light hydrocarbon prior to routing to subsequent refinery units to remove sulfur. Diesel boiling range material is drawn from the fractionator and routed directly to the diesel processing section of the refinery without stripping. Unconverted residuum feed and coke fines that are entrained in the coke drum vapors are condensed in the fractionator bottom section where they are co-mingled with the incoming residuum feed and are recycled to the coke drums for additional thermal coking.

Vapors from the top of the main fractionator (C-501A) are cooled and routed to the wet gas compressor where they are partially condensed and routed to the Coker gas recovery section (C-503/C-504/C-505/C-506). The gas recovery section splits this light hydrocarbon stream into fuel gas, LPG and gasoline boiling range material (Naphtha) streams that are subsequently routed to other refinery units to remove sulfur.

Coker Overview



Coking/Decoking Cycles: The heated vacuum residuum is pumped into the bottom of the coke drums during the coking cycle. Heavy unconverted hydrocarbons condense and precipitate to the bottom of the coke drum to form petroleum coke. The coke drums continually fill from the bottom for the entire coking cycle. As the coke begins to solidify, the fresh feed pumped into the drum flows through channels that form in the coke. The fresh feed continually flows to top of the formed coke. This liquid front of fresh feed moves up the drum for the entire coking cycle. The coker feed is switched to the paired coke drum at the end of the cycle. During the entire coking cycle, the cracked light product rises to the top of the vessel and flows to the main fractionator & distillation sections.

Once the coking cycle is complete, a coke drum must be decoked. The decoking process includes the following steps: Steam strip, Quenching, Depressuring, Deheading, Draining, Coke Cutting, Rehead, Steam Purging and Preheating. The length of the decoking cycle is approximately the same length as the coking cycle.

During the steam strip, a coke drum is purged with steam to remove any residual hydrocarbon liquids and vapors. The steam/hydrocarbon mixture exits the top of the coke drum. In the beginning of the steaming process, the steam/ hydrocarbon mixture is sent to the fractionator.

Later in the steaming step, the steam/hydrocarbon mixture is sent to the Coker Blowdown System. At the end of the steaming step, the steam flow into the bottom of the coke drum is slowly replaced with water. The coke drum is completely filled with water to cool down the coke. Steam that is formed during this quench step is sent to the Coker Blowdown System. The pressure of a coke drum at the end of the quench step is approximately 30 psig. This pressure must be relieved before the water can be drained from a coke drum. The steam/ residual hydrocarbon vent stream is sent to the Coker Blowdown System until the drum pressure drops below 2 psig.

Heavy Crude Project: As a result of the Crude Project, the capacity of the Delayed Coking Unit was increased from 60 Mbbl/day up to 75 Mbbl/day by increasing the total number of coking/decoking cycles from 4.8 per day to 6.0 through reduction of the coking and decoking cycle lengths from 15 hours to 12 hours each. The coking cycle was reduced by increasing the flow rate of the vacuum resid to the coke drums. The flow rate was previously limited primarily by the size of the Main Fractionator (C-501A), heat transfer capacity of portions of unit, and pumping capacity. The decoking cycle times were decreased primarily through reduction of the quench and pre-heat steps. The quench step was reduced by increasing the water flow rate to the drum. The water flow rate was previously limited by the ability of the Coker Blowdown System to cool the overhead vent stream to the required temperature to condense out the condensable portion of the vent gases. An additional fin-fan heat exchanger was installed in the Coker Blowdown System to provide the cooling capacity required to be able to increase the water flow rate to each drum.

The modifications of the DCU included:

- Replacement of the existing Main Fractionator column (C-501) with a larger diameter, higher capacity column;
- Replacement and upgrade of numerous large valves to reduce pressure drop;
- Installation of six (6) new pumps and replacement of eight (8) to increase pumping capacity;
- Installation of five (5) additional heat exchangers; modification / change of service on existing exchangers; and addition / modification of existing piping to increase heat transfer and removal;
- Installation of a new refrigeration unit to provide chilled cooling water to further improve cooling;
- Installation of a new cooling water supply and return system from Cooling Tower No. 9 to the Coker to increase cooling capacity;
- Replacement of the Wet Gas Compressor (K-501) and the interstage cooler and knockout vessel to increase gas compression capabilities;
- Installation of additional automated controls for existing equipment to improve emergency response and normal operating efficiency;
- Replacement of the lower section of each coke drum (no change in size);
- Modification of the coke drilling systems from pneumatic drive to hydraulic drive; and
- Connection of new emergency relief pressure valves to the Coker emergency relief system.

A detailed table of modifications is contained in the engineering evaluation for PC A/N 448244.

Coker Blowdown System [Process 2, System 5]

Process Description: As noted previously, the Coker Blowdown System works in conjunction with the LSFO VRS for recovery of the hydrocarbon laden stream released from the coke drums during the latter portion of the steam strip cycle, the quench cycle, and the depressurization cycle. During the coke drum depressurization step of the decoking process, a coke drum is vented to this blowdown system until the coke drum pressure drops below 2 psig. When the drum pressure drops below 2 psig, the coke drum is vented to the atmosphere until the internal pressure reaches atmospheric pressure.

The blowdown system receives the steam and trace hydrocarbons to the blowdown drum (V-509; D193) where any entrained heavy oil is separated and routed back to the fractionator for re-cycle to the coke drums with the incoming feed. Steam from the top of the blowdown drum is routed through a bank of cooling fan condensers and to the oil/water separator (V-510; D194) where condensed water and condensed hydrocarbon (oil) are separated. The separated oil is sent to a slop oil tank for storage until it is pumped back into the front end of the refinery for processing in the crude units.

The non-condensable hydrocarbons flow from the V-510 through a knockout pot (V-514A; D197) to the sour water degasser vessel (V-511;D195) and then are normally routed to the suction of the LSFO Vapor Recovery Compressors K-2006, K-2007, and K-2008 with Coker Blowdown Gas Recovery Compressor K-2005 (D196) as a backup. As discussed below, the Coker Blowdown System also contains a couple of steam driven ejectors (K-511/ & K-511A), which operate on an as needed basis. When in operation, blowdown gases from the V-14A Knockout Pot are routed through one of the ejectors before flowing through the V-511 Sour Water Degasser Vessel to the suction of the LSFO Vapor Recovery Compressors.

Heavy Crude Project: The Coker Blowdown System was modified for the following two primary reasons:

- Expand the capacity of the system.
- Improved control of PM10/VOC emissions from the coke drums.

Capacity Increase: The capacity of the blowdown system was previously limited by its cooling capacity. Chevron installed a new set of finfans (condensers) that run in parallel with an existing set of condensers, which are located downstream of the blowdown knockout drum (V-509; D193). The installation of the new finfan condensers in parallel with the existing condensers also reduced the pressure drop through the blowdown system.

Improved Control of PM10/VOC from the Coke Drums: Prior to the Heavy Crude Project, the coke drums were vented to the atmosphere when the drum pressure dropped below 5 psig. As BACT, PC A/N 448244 was conditioned with a requirement to vent the coke drums to the Coker Blowdown System until the drum pressure dropped below 2 psig. According to Chevron, the coke drums were previously vented to the atmosphere at 5 psig because the blowdown system did not provide adequate motive force to overcome the pressure drop in the system. As mentioned above, the installation of the new finfan condensers reduced pressure drop through the blowdown system.
Chevron also installed two steam ejectors downstream of the oil/water separator (V-510;

D194) to overcome some of the pressure drop in the blowdown system. The ejectors operate on a standby basis. Use of the ejectors is not always required depending on the pressure drop in the system, which varies depending on the cleaning cycles for the condensers, etc. When needed, they are utilized only when the drum pressure drops below 5 psig. At this time, the flow is switched through the ejector. The suction pressure of the ejector is controlled to some pressure below 2 psig through "spillback" of some of the flow exiting the ejector back to the suction side of the ejector. For safety reasons, the control system is designed such that a suction is never pulled on the hot coke drums.

The equipment changes to the Coker Blowdown System are summarized in the table below.

Coker Blowdown System Equipment Modifications
(Process 2, System 5)

A/N	Action	Device Tag No.	Device ID
458897	Replacement of:		
	• Oily Water Separator (vessel)	~~V-510~~ V-510A	D194
	• ~~Blowdown Separator Pot~~ • Ejector Suction KO Pot	~~V-514~~ V-514A	D197
	Addition of:		
	• Blowdown Condensers (6 or 8 fans)	E-509-9 to E-509-14	Not on permit
	• Slop Oil Pump(s)	P-515A, P-515B	Not on permit
	• Blowdown Gas Ejector	G-511/A	D4099 & D4100
	• Ejector After Condensers	E-514	Not on permit

CALCULATIONS

The criteria air pollutant (CO, NOx, PM10, SO2, and VOC) emission estimates for the Delayed Coking Unit and Coker Blowdown System are contained in this section. These estimates include emissions for non-emergency operating conditions. Emissions from emergency events are not included.

For the Heavy Crude Project, both the DCU and Coker Blowdown System had increases in estimated fugitive VOC since the project caused a net increase in the number of fugitive components (valves, pumps, connectors, etc.) in each unit. The DCU also had an increase in estimated CO, PM10 and VOC emissions due to the increase in the number of coke drum cycles. No new fugitive components were added to the DCU for the Flaring Reduction Project. However, there was a 0.1 lb/day increase in the fugitive VOC emission estimate in A/N 464819 due to the addition of two existing filters (K-506/A; D4209/D4210) and associated components to the fugitive component count. There was no change in estimated VOC emissions for the Coker Blowdown System under the Flaring Reduction Project since no new components were installed or removed.

Fugitive VOC Emissions - The DCU and Coker Blowdown System both contain fugitive components. Fugitive components that handle gases or liquids that contain VOCs may periodically leak VOC containing gas or liquid to the atmosphere. VOC emissions for these fugitive components are estimated by multiplying the total number of each fugitive component type by an appropriate emission factor. Fugitive VOC emission estimates in the subject PCs utilized emission factors that were developed and utilized for emission estimates for the CARB Reformulated Fuels Projects at the refineries. Subsequent to the issuance of the PCs, the District has switched to the use of emission factors based on correlation equations from the *California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities* (CARB/CAPCOA - 1999).

In 2009, subsequent to the completion of construction for the Heavy Crude Project and the Flaring Reduction Project, Chevron underwent a project to re-inventory fugitive components and revise their database to better track existing and new fugitive components. During the re-inventory, there were some readjustments to the boundaries for permit units. Additionally, the new inventory includes process drains, which were not routinely included in fugitive component counts at the time of the Heavy Crude Project.

To account for the refinement of the baseline fugitive component count and the change in emission factors, the original baseline fugitive VOC emission estimate for the Delayed Coking Unit and Coker Blowdown System under A/Ns 448244 and 458897 will be revised in the Districts NSR database. The table below illustrates the impact of the fugitive count refinement and the change in fugitive emission factors. Based on these calculations, the baseline emissions for A/Ns 448244 and 458897 will be updated to 305.6 lb/day and 23.6 lb/day, respectively. The detailed fugitive estimates for the DCU and Coker Blowdown System are contained in Appendices A and B, respectively.

Adjustment of Fugitive VOC Emission Baseline

Permit Unit	Original BL Fugitive VOC Estimate Using Old EFs (lb/day)(1)	Revised BL Fugitive VOC Estimate Using Old EFs (lb/day)(1)(2)_	Revised BL Fugitive VOC Estimate Using New EFs (lb/day)(1)(3)
Delayed Coking Unit	160.4	225.8	305.6
Coker Blowdown Sys.	30.1	30.2	23.6

(1) 30 day average based on maximum annual emissions divided by 360. Note that emissions estimates in the PC evaluation are erroneously based on maximum annual emissions divided by 365.
(2) Using refined fugitive count including process drains and emission factors developed for the CARB Reformulated Fuels projects.
(3) Using refined fugitive count including process drains and emission factors based on CARB/CAPCOA correlation equations.

The Flaring Reduction Project did not include the addition or removal of any new fugitive components. For the Heavy Crude Project, Chevron estimated the number of fugitive components that would be installed and removed for each permit unit under the project. Permit condition S31.19, which was imposed on the PCs, required Chevron to provide a re-

calculation of fugitive emissions based on the post-construction count of actual components installed and removed during construction.

The estimated fugitive VOC emissions based on the pre-construction estimate of fugitive components to be installed and removed during Heavy Crude Project construction and on the post-construction actual count of fugitive components installed and removed are shown in the table below. These estimates are made with both the old and new emission factors. As seen in the table, the increase in estimated fugitive VOC emissions based on the actual post-construction fugitive component counts for each permit unit is less than estimated under the PCs. The detailed fugitive VOC emission estimates for the DCU and Coker Blowdown System are shown in Appendix A and B, respectively.

Comparison of Estimated VOC Emission Increase versus Actual VOC Emission Increase

Permit Unit	VOC Emission Estimate Based on Pre-Construction Fugitive Estimate (lb/day)(1)(4)		VOC Emission Estimate Based on Post-Construction Fugitive Count (lb/day)(1)(5)		Difference In VOC Emission Estimates based on Estimated and Actual Counts (lb/day)(1)	
	Old EFs (2)	New EFs (3)	Old EFs (2)	New EFs (3)	Old EFs (2)	New EFs (3)
Delayed Coking Unit	231.7	326.6	227.5	325.4	- 4.2	- 1.2
Coker Blowdown Sys.	32.6	26.5	30.4	25.0	- 2.2	- 1.5

(1) 30 day average based on maximum annual emissions divided by 360.
(2) Using emission factors developed for the CARB Reformulated Fuels projects.
(3) Using emission factors based on CARB/CAPCOA correlation equations.
(4) Based on Heavy Crude Project pre-construction estimate of fugitive components to be installed and removed. (Mr. Neal Troung on 7-12-06)
(5) Based on the post-construction count of fugitive components installed and removed during Heavy Crude Project construction (Mr. John Fowkes on 3-20-08).

Coke Drum Depressurization Emissions **-** As discussed earlier, under the Heavy Crude Project, the size of the coke drums was not increased but the total coke drum cycles, including both coking and decoking, were reduced from 30 hours down to 24 hours so that more vacuum resid could be processed in each of the coke drums. This decrease in coke drum cycle time increased the maximum number of coke drum cycles from 4.8 per day up to 6.0 per day. The increase in CO, PM10, and VOC emissions associated with this increased number of cycles was determined by multiplying the estimated emissions for one cycle by 1.2 [6 cycles - 4.8 cycles].

CO, PM10 and VOC emission estimates in the PC were based on a source test of the atmospheric venting portion of the depressurization of Coke Drum V-501D that was performed by the District's Source Test Group on January 23, 2003. The measured emissions of CO, Solid PM, condensable organics, and gaseous VOC are summarized in the following table.

Summary of the Results of District Coke Drum Source Test
Measured Emissions for one Coke Drum Cycle

Test Date	CO (lb/day)	Solid PM (lb/day)	Condensable Organic (lb/day)	Total PM (1) (lb/day)	Gaseous VOC (lb/day)
1/23/03	0.16	1.25	12.5	13.75	11.2

(1) Total PM includes the condensable organic fraction.

In the engineering evaluation for PC A/N 448244, it was estimated that the volume of atmospheric vent gas and the emission of CO, PM10 and VOC for each drum depressurization would be reduced by 50 percent by reducing the pressure at which the drums are vented to the atmosphere by 50 percent or more. The CO, VOC and PM10 emission estimates for PC A/N 448244 are summarized in the two tables below.

Estimated Pre and Post Modification Coke Drum Emissions

Pollutant	Pre-Mod Emissions (lb)		Post-Mod Emissions (lb)			
			Uncontrolled		Controlled	
	Per Cycle	For 4.8 Cycles Per Day (2)	Per Cycle	For 6 Cycles Per Day (2)	Per Cycle	For 6 Cycles Per Day (2)
CO	0.16	0.8	0.16	1.0	0.08	0.5
PM10 (1)	13.75	68.20	13.75	85.3	6.9	42.8
VOC	11.2	55.6	11.2	69.4	5.6	33.6

(1) Assumed that all of the measured PM is PM10.
(2) Adjusted to 30-day average based on maximum monthly (31-day month) divided by 30

Coke Drums: Estimated Change in Maximum Potential Emissions

Pollutant	Change in Uncontrolled Emissions		Change in Controlled Emissions	
	(lb/day)(2)	(lb/year)	(lb/day)(2)	(lb/year)
CO	+ 0.2	69	-0.3	-110.
PM10 (1)	+ 17.3	6023	-24.6	-8979.
VOC	+ 13.4	4891	-20.2	-7373.

(1) Assumed that all of the measured PM is PM10.
(2) 30-day average based on maximum monthly (31-day month) divided by 30

Per source test condition D28.31, Chevron performed source tests of each of the six drums on April 3, 2008 and March 22, 2011. The measured emissions of CO, Solid PM, condensable organics, and gaseous VOC for each source test are summarized in the following table.

Summary of Coke Drum Source Test Results
Measured Average Emissions for one Coke Drum Cycle

Test Date	CO (lb/vent)	Solid PM (lb/vent)	Condensable (lb/vent)	Total PM (1) (lb/vent)	Gaseous VOC (lb/vent))
4/03/08 (2)	0.10	0.07	0.16	0.23	8.5
3/22/11 (2)	0.003	0.01	0.03	0.04	0.3
Average (3)	0.05	0.04	0.09	0.13	4.4

(1) Total PM includes the condensable organic fraction.
(2) Average emissions for source test of each of the six coke drums.
(3) Average of 2008 and 2011 source test results. Basis for NSR/PSD emission estimates.

As seen in the table, measured mass emissions of each of the pollutants were significantly lower for the 2011 source test than the 2008 test. The average atmospheric vent duration during the 2008 and 2011 tests was 35 minutes and 3 minutes, respectively. Atmospheric vent times during the 2008 tests varied from 5 minutes to 62 minutes. Following the 2008 source tests, Chevron evaluated drum quenching/cooling procedures to determine the reason for this variability. Standard operating procedures (SOPs) were developed based on best operating practices. A critical improvement was optimization of the quench water addition rate including slower water addition at the beginning of the cooling/quenching cycle and ramping of the water addition rate as the cooling cycle proceeds. The SOP also includes application of back pressure to a drum after the water level rises above the top of the coke. This procedure appears to force water more uniformly into the coke to provide more complete and uniform cooling.

It is believed that the 2011 source test results are more representative of current drum vent emissions. However, as a conservative estimate of maximum potential post-construction emissions, the average of the 2008 and 2011 source test results are utilized in the post-construction emission estimates. Estimated post-construction maximum potential CO, PM and VOC emissions and the estimated reduction of CO, PM and VOC emissions based on the average of the 2008 and 2011 source test data are shown in the following tables.

Estimated Maximum Potential Coke Drum Emissions

	CO (lb)	Solid PM (lb)	Condensable (lb)	Total PM (1) (lb)	Gaseous VOC (lb)
Max. Daily (2)	0.30	0.24	0.54	0.78	26.4
30-day Avg. (3)	0.30	0.24	0.45	0.79	26.8
Max. Annual (4)	110	88	197	285	9636

(1) Total PM includes the condensable organic fraction.
(2) Based on six coke drum venting episodes per day (24-hour cycles).
(3) Based on maximum annual emissions divided by 360.
(4) Based on 2190 (365 vents/drum x 6 drums) coke drum venting episodes per year

Estimated Change in Coke Drum Emissions

Pollutant	Pre-Mod Emissions (lb)(1)		Post-Mod Emissions (lb)		Change in Emissions
	Per Cycle	Daily (4.8 Cycles) (2)	Per Cycle	Daily (6 Cycles) (2)	lb/day (2)
CO	0.16	0.8	0.05	0.30	-0.5
PM10 (3)	13.75	66.0	0.13	0.79	-65.2
VOC	11.2	53.8	4.4	26.8	-27.0

(1) From engineering evaluation for PC A/N 448244.
(2) 30-day average - based on maximum annual emissions divided by 360.
(3) Assume that all of the measured PM is PM10.

Total VOC Emissions for the Delayed Coking Unit – The estimated maximum potential emissions for the DCU including both fugitive VOC emissions and coke drum vent VOC emissions are shown in the table below.

Permit Unit	Fugitive VOC Emissions (lb/day)(1)	Coke Drum Vent VOC Emissions (lb/day)(1)	Total VOC Emissions (lb/day)(1)
Delayed Coking Unit	325.4	26.8	352.2

(1) 30-day average - based on maximum annual emissions divided by 360.

The project caused a net reduction in estimated DCU maximum potential (30-day avg.) VOC emissions of 25.4 lb/day based on an increase of 1.6 lb/day in fugitive VOC emissions and a reduction of 27 lb/day in coke drum VOC emissions.

RULE COMPLIANCE REVIEW:

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., requires that the environmental impacts of proposed "projects" be evaluated and that feasible methods to reduce, avoid or eliminate significant adverse impacts of these projects be identified and implemented. According to the District's CEQA Guidelines, the net emission increase thresholds for significant effect are:

ROG (VOC): 55 lb/day
PM10: 150 lb/day
CO: 274 lb/day

The Heavy Crude Project qualified as a significant project so preparation of a CEQA document was required. The final Environmental Impact Report (EIR) was certified on

August 9, 2006. The PCs for the DCU and Coker Blowdown System was issued with condition S7.3 that specifies that Chevron shall comply with all applicable mitigation measures stipulated in the "Statement of Findings, Statement of Overriding Considerations, and Mitigation Monitoring Plan" document which is part of the AQMD Certified Final Environmental Impact Report. The PO will not include this condition since there are no on-going requirements in this document.

CEQA analysis was not required for the Flaring Reduction Project since the increase in VOC emissions was less than the significance threshold and there were no other significant environmental impacts. On the 400-CEQA form, Chevron marked "No" to all of the additional criterion that may trigger CEQA. For these reasons, CEQA did not apply.

Rule 212: Standards for Approving Permits

212(c)(1): Public notice is required for a project if any of the modified permit units are located within 1000 feet of a school. Public notice was not required under this clause for either project since neither the DCU nor Coker Blowdown System are located with 1000-foot of a school.

212(c)(2): Public notice is required for any "new or modified facility", which has on-site emission increases exceeding any of the daily maximums specified in subdivision (g) of Rule 212. The 212(g) emission thresholds are shown in the table below. Public notice was not required under this clause since the increase in VOC emissions for each project was less than the Rule 212(g) thresholds.

212(c)(3): Public notice is required for a project if any of the modified permit units have an increase in toxic air contaminants that results in an increase of maximum individual cancer risk (MICR) of more than one in a million (1×10^{-6}) during a lifetime (70 years). As discussed in additional detail in the evaluation of Rule 1401, none of the subject PCs resulted in an increase in MICR of more than 1×10^{-6} for any of the subject permit units. Public notice was not required under this clause.

212(g): 212(g) specifies that any new or modified sources subject to Regulation XIII which undergo construction or modifications resulting in an emissions increase exceeding any of the daily maximum emission thresholds (listed in the table above) will require notification. From Regulation XIII (Rule 1302), the definition of "Source" is any permitted individual unit, piece of equipment, article, machine, process, contrivance, or combination thereof, which may emit or control an air contaminant. This includes any permit unit at any non-RECLAIM facility and any device at a RECLAIM facility.

Public notice was not required under this clause since none of the PCs had increases in estimated criteria pollutant emissions that exceeded the thresholds in 212(g).

Regulation IV - PROHIBITIONS

Rule 401: Visible Emissions

This rule specifies that a person shall not discharge emissions from a source for a period or periods aggregating more than three minutes in any one hour which are as dark or darker in shade as that designated No. 1 on the Ringelmann Chart or emissions of such opacity that it obscures an observers view to an equal or greater level. This is equivalent to opacity of 20%.

Visible emissions are not expected from either the DCU or Coker Blowdown System. For the coke drums, more that 99 percent of the vapor emitted from the coke drums during the atmospheric venting portion of the depressurization cycle is steam so the plume from the vent stack contains visible condensed water vapor. In this case, visible emissions (opacity) observations must be made beyond the point in the plume at which condensed water vapor is no longer visible. The solid PM concentrations are in such low concentrations relative to the amount of steam that no significant visible emission (opacity) is observed beyond the point at which the condensed water vapor is no longer visible. The modifications under the Heavy Crude Project increased the number of the atmospheric venting events but reduced the amount of particulate matter in the vent stream through reduction of the pressure at which the drums vent to the atmosphere. Compliance with this rule is expected.

Rule 402: Nuisance

This rule requires that a person not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which cause, or have a natural tendency to cause injury or damage to business or property.

The two periods during the coke drum cycles that have emissions to the atmosphere are the atmospheric venting step during coke drum depressurization and during the hydraulic drilling of the coke. The modifications under the Heavy Crude Project increased the number of atmospheric venting events but potentially reduced nuisance potential by reducing the quantity of atmospheric vent gas during the depressurization step. Reduction of flaring potential under the Flaring Reduction Project also reduces the nuisance potential of the DCU. Compliance with this rule is expected.

Rule 404: Particulate Matter - Concentration

This rule sets concentration limits for total PM (solid and condensable) emissions. The rule limit varies based on the quantity of exhaust gas (dry basis) discharged from a source.

The Coker Blowdown System does not emit quantifiable amounts of PM. The coke drums do emit PM during the atmospheric venting portion of the depressurization cycles. However, District Counsel has determined that this rule is not applicable to coke drums.

Rule 405: Solid Particulate Matter – Weight

This rule sets solid PM mass emission limits for the processing of solid materials. The Coker Blowdown System does not emit solid PM. The only sources in the DCU that emit solid PM are the coke drums. The normal coke production for a coke drum batch is 683 tons. The total coking/decoking cycle time for a batch is about 24 hours. The process rate is conservatively determined to be 56,900 lb/hr [(683 tons)(2000 lb/ton) / 24 hours]. The solid PM emission limit, as determined through interpolation of Table 405(a) in this rule at this material processing rate, is 15.0 lb/hr. The solid PM emission rate measured during the 2008 and 2011 source tests was 0.13 lb/hr and 0.20 lb/hr, respectively, which is well below the 15.0 lb/hr limit of this rule.

The emission of solid PM is also expected to occur during the coke drilling and coke removal step of the decoking cycle. During this step, a hole is hydraulically drilled down the center of the coke. Next, lateral hydraulic nozzles on the drill head are utilized to cut the coke into concentric rings or donuts starting from the bottom of the drum. The coke falls out the bottom of the drum. Due to safety concerns and the difficulty of collecting a representative sample, measurements of the solid PM emissions from this step have not been made. Compliance with the solid PM emission limits of this rule is expected since the coke has a high moisture content due to the steaming/quenching steps of the decoking cycle and to the use of water to drill the coke.

Rule 407: Liquid and Gaseous Air Contaminants

This rule contains the following emission limits:

- Carbon monoxide (CO) - 2,000 ppmv (dry; 15 minute average) [407(a)(1)]
- Sulfur Compounds – 500 ppmv (calculated as SO2; 15 minute average [407(a)(2)(B)]

CO Limit

The only CO emission sources in the DCU and Coker Blowdown system are the coke drums. The average CO measured during the 2008 and 2011 coke drum vent source tests was 356 ppmv and 208 ppmv, respectively. Compliance with the 2000 ppmv CO limit is expected.

Sulfur Compound Limit:

Compliance with the 500 ppmv sulfur compound limit on a 15-minute average basis is more difficult to assess due to the complex sampling environment and previously discussed changes to coke drum operating procedures. The complex sampling environment includes small sample vent duct, high moisture content and rapidly changing vent flows during the test. Note that all of the sulfur is expected to be in a reduced form since the coking process does not include oxygen. A 2003 Total Reduced Sulfur (TRS) source test of one of the drums demonstrated compliance with the limit.

Chevron tested all six of the drums in 2008. These tests were not included in the approved source test protocol since they were performed due to a last minute request of the District. Samples were collected in a tedlar bag downstream of the dry gas meter during the first 5

minutes of the PM source test for each drum. The vast majority of the sulfur was in the form of H2S. Measured H2S concentrations varied from 109 ppmv to 7698 ppmv on a dry basis. H2S was measured as non-detect in the vent gas samples for drums A and E. The non-detect values may be due partially to low sample volumes due to the short atmospheric vent times (7 and 15 minutes) for these two drums. As discussed previously, vent durations for the six drums varied from 5 to 62 minutes during the 2008 tests. The average vent gas H2S concentration for the 6 drums was 3420 assuming an H2S concentration of 100 ppmv each for the non-detect values.

Current vent gas sulfur compound concentrations and mass emissions are expected to be well below the concentrations seen in the 2008 test due to the implementation of improved uniform coke cooling/procedures, which reduced vent duration and vent gas pollutant concentrations. Vent gas durations currently average 3 minutes. Measured average gaseous VOC concentrations during the 2011 source tests were more than 50% lower than the 2008 source tests and mass emissions were 96% lower. It is expected that H2S concentrations were reduced by an equal amount. Based on a 50% reduction, average vent gas H2S concentrations are estimated to be around 1700 ppmv for the 3-minute vent durations. This equates to 340 ppmv on a 15-minute average basis.

The requirement to test for TRS will be added to source test condition D28.31, which is tagged to each of the coke drums. Chevron will be required to revise the current source test protocol to include TRS.

Rule 409: Combustion Contaminants

This rule contains a limit on combustion contaminants from the combustion of fuel. This rule is not applicable to any of the equipment in the DCU and Coker Blowdown System since none of the equipment combusts fuel.

Regulation IX - NEW SOURCE PERFORMANCE STANDARDS (NSPS)

40 CFR 60 Subpart J -- Standards of Performance for Petroleum Refineries

This NSPS is applicable to the following affected facilities in petroleum refineries:

- Fluid Catalytic Cracking Unit Catalyst Regenerators
- Fuel Gas Combustion Devices
- All Claus Sulfur Recovery Plants (SRPs)(except Claus Plants of 20 long tons per day (LTD) or less

Neither the DCU nor the Coker Blowdown System is subject to any requirements under this regulation.

40 CFR 60 Subpart Ja -- Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007

This NSPS is applicable to the following affected facilities in petroleum refineries:

- Fluid Catalytic Cracking Unit Catalyst Regenerators
- Fuel Gas Combustion Devices
- All Claus Sulfur Recovery Plants (SRPs)(except Claus Plants of 20 long tons per day (LTD) or less
- Fluid Coking Units
- Delayed Coking Units

The Delayed Coking Unit has not been modified or reconstructed after May 17, 2007. Construction under the Heavy Crude Project and Flaring Reduction Project commenced prior to May 17, 2007. The DCU is not subject to any requirements under this regulation.

40 CFR 60 Subpart GGG: Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries

Applicability: This NSPS is applicable to affected facilities in refineries that begin construction after January 4, 1983. The following are affected facilities under this subpart:

- Compressors
- The group of all the equipment within a process unit.

Equipment is defined as "each valve, pump, pressure relief device, sampling connection system, open-ended valve or line, and flange or other connector in VOC service". From Subpart VV (as referenced from GGG), the definition of "*in VOC service*" is that "the piece of equipment contains or contacts a process fluid that is at least 10 percent VOC by weight".

The DCU, Coker Blowdown System and Compressor K-2005 are all subject to this regulation. In Chevron's Title V Permit, the "fugitive emission, miscellaneous" devices D3580, D3581 and D196 for the DCU, Coker Blowdown System and Compressor K-2005, respectively, are tagged with condition H23.19, which denotes that the process units and compressors are subject to the applicable requirements of District Rule 1173 and 40CFR60 Subpart GGG.

Fugitive Components - Subpart GGG refers to Subpart VV - Standards of Performance for Equipment leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry). All new component in VOC service are expected to meet the equipment standards and monitoring requirements in Sections 60.482-1 60.482-10 for pumps, valves, pressure relief devices, closed vent system, etc. In general, the equipment leak inspection and monitoring requirements of Rule 1173 are more stringent than this regulation but pertinent requirements of this regulation have been incorporated into Chevron's Inspection and Monitoring (I&M) Program for fugitive emissions. It is expected that Chevron will comply with the inspection, maintenance, and record keeping requirements of this rule.

In addition, according to 63.640(p), fugitive components that are subject to both 40CFR63, Subpart CC and an equipment leak standard in 40 CFR parts 60 (NSPS) or 63 (NESHAPS) are required only to comply with the provisions of Subpart CC. As noted later in this document, some of the fugitive components in the DCU and Coker BD System are subject to 40CFR63, Subpart CC.

Compressor K-2005 – It is specified in §60.482–3(a) that each compressor shall be equipped with a seal system that includes a barrier fluid system and that prevents leakage of VOC to the

atmosphere, except as provided in §60.482–1(c) and paragraphs (h), (i), and (j) of this section. It is specified in paragraph (h) that a compressor is exempt from the requirements of paragraphs (a) and (b) of this section, if it is equipped with a closed vent system to capture and transport leakage from the compressor drive shaft back to a process or fuel gas system or to a control device that complies with the requirements of §60.482–10. As specified in the equipment description, the subject compressor is equipped with a dual packing rings with nitrogen purge vented to a fuel gas system. Therefore, the compressor is exempt from the seal requirements specified in §60.482–3(a) and (b). Compliance with the requirements of these regulations is expected.

40CFR60 Subpart GGGa – Standards of Performance for Equipment Leaks of VOCs in Petroleum Refineries for Which Construction, Reconstruction or Modification Commenced After November 7, 2006

Applicability: This NSPS is applicable to affected facilities in refineries that begin construction after November 7, 2006. The following are affected facilities under this subpart:

- Compressors
- The group of all the equipment within a process unit.

Fugitive Components - The fugitive components in the DCU and Coker Blowdown System are not subject to this NSPS since construction of the Heavy Crude Project began in August 2006.

Compressor K-501A – Chevron has accepted applicability of this NSPS since the subject compressor was installed after November 7, 2006. The compressor is tagged with condition H23.47, which specifies that it is subject to Rule 1173 and 40CFR60 Subpart GGGa.

It is specified in §60.482–3a(a) that each compressor shall be equipped with a seal system that includes a barrier fluid system and that prevents leakage of VOC to the atmosphere, except as provided in §60.482–1a(c) and paragraphs (h), (i), and (j) of this section. It is specified in paragraph (h) that a compressor is exempt from the requirements of paragraphs (a) and (b) of this section, if it is equipped with a closed vent system to capture and transport leakage from the compressor drive shaft back to a process or fuel gas system or to a control device that complies with the requirements of §60.482–10a. As specified in the equipment description, the subject compressor is equipped with a dry gas seal vented to a fuel gas system (LSFO VRS). Therefore, the compressor is exempt from the seal requirements specified in §60.482–3a(a) and (b). Compliance with the requirements of these regulations is expected.

40CFR60: Subpart QQQ: Standards of Performance for VOC Sources from Petroleum Refinery Wastewater Systems

Applicability: This regulation is applicable to a facility located in petroleum refineries for which construction, modification, or reconstruction commenced after May 4, 1987. The following are separate affected facilities under this regulation:

- An individual drain system (all process drains connected to the first common downstream junction box, together with their associated sewer lines and junction boxes, downstream to the receiving oil-water separator)
- An oil-water separator
- An aggregate facility (individual drain system together with ancillary downstream sewer lines and oil-water separators)

Neither of the subject projects included the installation or modification of any process drains or wastewater system components. Compliance with this rule was not be impacted by the modifications undertaken in these projects.

Regulation X - NATIONAL EMISSION STANDARD FOR HAZARDOUS AIR POLLUTANTS (NESHAPS)

Subpart CC: National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries

This Subpart applies to petroleum refining sources and related emission sources that are specified in section 63.640 (c) (5) through (c) (7) (e.g. miscellaneous process vents (except for FCCU, SRU, and CRU vents), storage vessels, wastewater stream, equipment leaks, gasoline loading racks, marine vessel loading, etc.) that are located in a major source and emit or have equipment contacting one or more of the hazardous air pollutants (HAPs) listed in Table 1 of this subpart.

Applicability for Equipment Leaks: The equipment leak standards for existing sources as specified in 63.648 are applicable to fugitive components that are "in organic hazardous air pollutant service". In "organic hazardous air pollutant service" is defined as a piece of equipment that either contains or contacts a fluid (liquid or gas) that is at least 5% by weight of total organic HAPs as determined according to 63.180(d).

Some of the fugitive components in both the DCU and Coker Blowdown System are subject to the requirements of this regulation since the components are "in organic hazardous air pollutant service". The "fugitive emissions, miscellaneous" devices D3580 and D3581 for these permit units include "HAP: 40CFR 63 Subpart CC, 6-23-2003" in the "Emissions and Requirements" column to denote the applicability of this regulation.

This regulation refers to the fugitive component monitoring requirements of NSPS Subpart VV and NESHAP Subpart H with exceptions that are specifically noted in the regulation. In general, the equipment leak inspection and monitoring requirements of District Rule 1173 are more stringent than this regulation but pertinent requirements of this regulation have been incorporated into Chevron's Inspection and Monitoring (I&M) Program for fugitive emissions. It is expected that Chevron will comply with the inspection, maintenance, and record keeping requirements of this rule.

Applicability for Miscellaneous Process Vents: *Miscellaneous process vent* is defined as "a gas stream containing greater than 20 parts per million by volume organic HAP that is continuously or periodically discharged during normal operation of a petroleum refining process unit. Miscellaneous process vents include gas streams that are discharged directly to the atmosphere, gas streams that are routed to a control device prior to discharge to the

atmosphere, or gas streams that are diverted through a product recovery device prior to control or discharge to the atmosphere".

The definition of a *miscellaneous process vent* at 40CFR63.641 specifies a number of vent streams that are not considered to be *miscellaneous process vents*, which are subject to the requirements of this rule. Some of the streams that are included in this list of exempt streams are:

- Gaseous streams routed to a fuel gas system
- Relief valve discharges
- "Episodic or nonroutine releases such as those associated with startup, shutdown, malfunction, maintenance, depressuring, and catalyst transfer operations.
- Sulfur plant vents
- Coking unit vents associated with coke drum depressuring at or below a coke drum outlet pressure of 15 psig, deheading, draining, or decoking (coke cutting), or pressure testing after decoking.

The DCU and Coker Blowdown System do not contain any miscellaneous process vents as defined in this regulation.

Rule 1173: Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants

This rule is intended to control volatile organic compound (VOC) leaks from fugitive components at refineries, chemical plants, oil and gas production fields, natural gas processing plants, and pipeline transfer stations. It contains identification requirements, leak standards, inspection requirements, maintenance and repair requirements, and recordkeeping and reporting requirements for fugitive components.

Chevron has an existing fugitive emission component inspection and monitoring (I&M) program for compliance with the requirements of this rule.

Regulation XIII - NEW SOURCE REVIEW

As specified in Rule 1301, Regulation XIII, sets forth pre-construction review requirements for new, modified, or relocated facilities, to ensure that the operation of such facilities does not interfere with progress in attainment of the national ambient air quality standards (NAAQS), and that future economic growth within the South Coast Air Quality Management District (District) is not unnecessarily restricted. The specific air quality goal of this regulation is to achieve no net increases from new or modified permitted sources of nonattainment air contaminants or their precursors.

The South Coast Air Basin (SOCAB) is designated in attainment of the NAAQSs for CO, NOx and SOx. The following are currently considered nonattainment air contaminants that are subject to new source review (NSR): NOX, SOx, $PM_{2.5}$, PM_{10}, and VOC. NOx and VOC are included since they are precursors for ozone. NOx, SOx and VOC are included as $PM_{2.5}$ and PM_{10} precursors.

NSR requirements for these nonattainment pollutants are specified in the following rules:

- Rule 1303 – PM10 and VOC (all facilities); NOx and SOx (non-RECLAIM facilities)

- Rule 1325 – PM2.5
- Rule 2005 – NOx and SOx (RECLAIM facilities)

Since Chevron is a RECLAIM facility, it is subject to the NSR requirements for NOx and SOx specified in Rule 2005 of the RECLAIM regulation (Regulation XX). Sources that emit ammonia, CO, and Ozone Depleting Compounds (ODCs) are subject to only the BACT requirements of Rule 1303 for these pollutants.

Rule 1303: Requirements

This rule requires the Executive Officer to deny a Permit to Construct for any new, modified or relocated source which results in an emission increase of CO, PM10, VOC, any ozone depleting compound, or ammonia, unless BACT is used. This rule also requires modeling for a net increase in PM10 and offset (among other requirements) for a net increase in PM10 or VOC emissions for any new or modified source.

1303(a)(1): Best Available Control Technology (BACT): Any new or modified source which results in an emission increase of any nonattainment air contaminant, any ozone depleting compound, or ammonia, must employ BACT for the new or relocated source or for the actual modification to an existing source. BACT is required for any increase in emissions that exceeds 1.0 lb per day on a maximum daily basis.

BACT was not triggered for the DCU and Coker Blowdown System under the Flaring Reduction Project. For the Heavy Crude Project, BACT was triggered for the following sources:

- Delayed Coking Unit - Fugitive Components (VOC emissions)
- Delayed Coking Unit – Coke Drums (PM10 and VOC emissions)
- Coker Blowdown System – Fugitive Components (VOC emissions)

Fugitive Components: The following BACT was applied to new fugitive components installed in the DCU and Coker Blowdown System for the Heavy Crude Project:

- *Valves*: Bellow-sealed valves are required with the following exemptions.

  1. Heavy liquid service (i.e., streams with a vapor pressure <0.1 psia @ 100 ^{o}F (kerosene) based on the most volatile class present > 20% by volume)
  2. Control valve
  3. Instrument tubing application
  4. Applications requiring torsional valve stem motion
  5. Applications where valve failure could pose safety hazard (e.g., drain valves with valve stem in horizontal position)
  6. Retrofit/special applications with space limitation (special applications such as skid mounted standard packaged systems)
  7. Valves not commercially available

  For PC A/Ns 448244 and 258897, permit condition S31.19 was added to the DCU and Coker Blowdown System permit units in the RECLAIM permit. This condition S31.19 specifies the requirement to install bellow-sealed (leakless) valves except for the exempt applications listed above. This condition also specifies that Chevron must

submit a list of all non-leakless valves to the District and receive District approval for the list prior to the startup of the subject permit units following completion of construction. Chevron submitted the list of non-leakless valves on October 25, 2007. Chevron received approval for the list in a Dec. 27, 2007 email from Bob Sanford to John Fowkes.

Condition S31.19 also requires submission of "as built" piping and instrumentation drawings and a recalculation of fugitive VOC emission based on actual components installed and removed from service. Chevron submitted the required drawings and fugitive emission recalculation on March 20, 2008.

- *Relief Valves*: BACT for emergency pressure relief valves (PRVs) is connection to a closed vent system. The new emergency PRVs installed in the Delayed Coking Unit are connected to the LSFO VRS.

- *Process Drain*: BACT for new process drains is installation of p-traps or seal pots and inclusion in an approved I&M program. According to Chevron, no new process drains were installed for the Heavy Crude Project.

- *Pumps*: New pumps in light liquid service are equipped with double or tandem seals vented to a closed system and included in Chevron's approved I&M program. New pumps in heavy liquid service are equipped with single mechanical seals and included in Chevron's approved I&M program.

- *Flanges*: BACT for new flanges was compliance with ANSI/API standards and inclusion in an approved I&M program.

- *Compressors*: BACT for new compressors is an enclosed seal system connected to closed vent system or a double mechanical seal system with a higher pressure barrier fluid. For the Heavy Crude Project, Chevron replaced Compressor K-501A. The new compressor is equipped with a dry gas seal system vented to a vapor recovery system.

Coke Drums: As found in the engineering evaluation for PC A/N 448244, a complete coke drum BACT determination was performed. It was determined that BACT for coke drum PM10 and VOC emissions was venting of the drums to the Coker Blowdown System during drum depressurization until the internal drum pressure falls below 2 psig. This requirement is imposed through condition E336.14. Chevrons standard operating procedure prior to the Heavy Crude Project included venting of the drums to the Coker Blowdown System until the drum pressure fell below 5 psig.

Conditions D12.33 and D12.34 require Chevron to monitor drum pressure and the position (open or closed) of the atmospheric vent valve. Coke drum pressure and vent valve monitoring data were reviewed for the period from November 1, 2011 through January 31, 2012. A couple of compliance issues where identified from this data.

Issue No. 1 - Chevron identified that individual coke drums were vented to the atmosphere at a pressure greater than or equal to 2 psig on 28 occasions, which equates to 6.4% of the coke

drum cycles during the period. For these 28 instances, the average pressure at which the drums were vented to the atmosphere is 2.08 psig.

Chevron identified the following two reasons for the venting of these drums at a pressure of 2 psig or greater.

1. Chevron failed to assure that all of the operators understood that the drums could only be vented to the atmosphere once the drum pressure dropped below 2 psig, not dropped to 2 psig.
2. Condition D12.33 requires that drum pressure be continuously monitored and that the pressure be recorded once per minute. Operators in the field would often open the motor operator valve on the atmospheric vent when the continuous pressure reading dropped below 2 psig. However, due to some variation in drum pressure, the pressure recorded at the one-minute interval would be slightly above 2 psig.

According to Chevron, they have modified their internal operating procedures so that the coke drum pressure must be equal to or less than 1.95 psig for two minutes before venting a coke drum to the atmosphere. Chevron provided monitoring data for the period of March 8th through April 30th. For all coke drum cycles during this period, the coke drum pressure was below 2 psig when the drum was vented to the atmosphere.

To increase the margin of compliance with the subject atmospheric venting pressure limit, conditions D12.33 and E336.14 will be revised as shown below.

D12.33 The operator shall install and maintain a(n) pressure sensing device to accurately indicate the pressure in the coke drum.

The operator shall also install and maintain a device to continuously record the parameter being measured. The pressure shall be recorded to a sensitivity level of 0.1 psig.

The range of the measuring device or gauge shall not be greater than zero (0) to fifty (50) psig.

The measuring device or gauge shall be accurate to within plus or minus 5 percent for the sub-range of zero (0) to five (5) psig. It shall be calibrated once every year. When a calibration produces a percentage accuracy of greater than plus or minus 5%, the measuring device shall be calibrated every operating calendar quarter until a subsequent calibration which shows a percentage accuracy of less than plus or minus 5% is achieved.

For the purpose of this condition, continuously record shall be defined as recording the two-minute average pressure at least once every minute during each time period when gas is being released from the coke drum to the Coker Blowdown System (Process 2, System 5) or to the atmosphere, prior to removal of coke from the coke drum.

E336.14 The operator shall vent the vent gases from this equipment as follows:

All blowdown gases from this coke drum shall be directed to the Coker Blowdown System (Process 2, System 5) if the pressure inside the coke drum is greater than or equal to 2 psig.

The operator shall utilize the two-minute average coke drum pressure data recorded according to condition D12.33 to demonstrate compliance with this condition.

This equipment shall not be operated unless the Coker Blowdown System (Process 2, System 5) is in full use and has a valid permit to receive vent gases from this equipment.

Issue No. 2 - From the November through January coke drum pressure data, it was also determined that the pressure sensors/transmitters for each of the drums were measuring residual pressures of 0.8 psig to 1.4 psig when the drum pressure reached atmospheric pressure (0 psig). This is a violation of the condition D12.33 requirement that measuring device or gauge shall be accurate to within plus or minus 5 percent for the sub-range of zero (0) to five (5) psig. This equates to an accuracy of +/- 0.25 psig. According to Chevron, the residual pressure was due to the water column pressure of steam condensate that collected in a portion of the pressure leads. Chevron resolved this problem by filling this portion of the tubing with glycerine, which is a non-volatile liquid, and re-zeroing the pressure transmitter. According to Chevron, this is a fairly common practice at the refinery. The glycerine serves to isolate the sensor/transmitter from heat, moisture, and particulate. Chevron provided coke drum data for May 20, 2012 that demonstrated the pressure sensors were measuring 0 psig within the required +/- 0.25 psig accuracy.

1303(b) – The following requirements apply to any new or modified source which results in a net emission increase of any nonattainment air contaminant.

1303(b)(1): Modeling - The applicant must substantiate with modeling that the new facility or modification will not cause a violation, or make significantly worse an existing violation of any state or national ambient air quality standards at any receptor location in the District. According to 1306(b), the new total emissions for modified sources shall be calculated on a pound per day basis for determination of BACT and modeling applicability. The modeling procedures are discussed in Appendix A to the rule.

The only criteria pollutant emission increases for both the Heavy Crude Project and Flaring Reduction Project were VOC emission increases due to the installation of new fugitive components. Modeling was not required since it is specified in Appendix A that modeling is not required for VOC or SOx.

1303(b)(2): Offsets – Unless exempt from offsets requirements pursuant to Rule 1304, emission increases shall be offset by either Emission Reduction Credits approved pursuant to Rule 1309, or by allocations from the Priority Reserve.

Under PC A/N 448244 and 458897, respectively, Chevron provided ERCs of 7 lb/day to offset the DCU fugitive VOC emission increase of 5.9 lb/day and 3 lb/day to offset the Coker BD System fugitive VOC emission increase of 2.5 lb/day. An offset ratio of 1.2 to

1 was utilized in determination of ERC requirements. As discussed in the *Calculation Section*, the actual fugitive VOC emission increase for the DCU and Coker BD System based on post-construct fugitive component counts is less than estimated under the permits to construct. Therefore, no additional ERCs are required.

1303(b)(3) - Sensitive Zone Requirements: This section pertains to Emission Reduction Credits (ERCs) for facilities in the South Coast Air Basin (SOCAB). Except for credits that are obtained from the Priority Reserve, facilities are subject to the Sensitive Zone requirements (H&SC Section 40410.5) for ERCs. A facility in zone 1 may obtain ERCs originated in zone 1 only, and a facility in zone 2A may obtain ERCs from either zone 1 or zone 2A.

The El Segundo Refinery is located in Zone 1. For PC A/Ns 448244 and 458897, Chevron provided ERCs generated in Zone 1.

1303(b)(4) - Facility Compliance: The facility must be in compliance with all applicable rules and regulations of the District. Chevron complied with this requirement for both the Heavy Crude Project and the Flaring Reduction Project.

***1303 (b)(5) - Major Polluting Facilities*:** Any new major polluting facility or major modification at an existing major polluting facility must comply with the requirements summarized below. A major modification is defined in 1302(r) as any modification at an existing major source that will cause

- an increase of one pound per day or more, of the facility's potential to emit (PTE) for NOx or VOC if the facility is located in the SOCAB , or
- an increase of 40 tons per year or more, of the facility's PTE for SOx, or
- an increase of 15 tons per year or more, of the facility's PTE for PM_{10}; or,
- an increase of 50 tons per year or more, of the facility's PTE for CO.

The Flaring reduction project was not a major modification. The heavy Crude Project was a major modification since the increase in VOC emissions was greater than 1 lb/day. As discussed below, Chevron complied with all requirements of this section.

(A) Alternative Analysis – Applicant must conduct an analysis of alternative sites, sizes, production processes, and environmental control techniques for such proposed source and demonstrate that the benefits of the proposed project outweigh the environmental and social costs associated with that project.

In lieu of conducting an alternative analysis, Chevron met the requirements of this subparagraph through compliance with the California Environmental Quality Act (CEQA) in accordance with Rule 1303(b)(5)(D).

(B) Statewide Compliance: The applicant must demonstrate that all major stationary sources, as defined in the jurisdiction where the facilities are located, that are owned or operated by the applicant in the State of California are subject to emission limitations and are in compliance or on a schedule for compliance with all applicable emission limitations and standards under the Clean Air Act.

Chevron submitted a letter by Ms. Lani Marshall, the Health, Environmental, and Safety Manager at the El Segundo Refinery, indicating that all major sources owned or operated

by Chevron U.S.A. Inc. in California were in compliance or on a schedule for compliance with all applicable standards emission limitations and standards under the Clean Air Act.

(C) Protection of Visibility - A modeling analysis for plume visibility is required if the net emission increase exceeds 15 tons/yr of PM10 or 40 tons/yr of NOx.

This requirement was not applicable since none of the PCs had PM10 emission increases that exceeded the listed threshold. The NOx requirement has been subsumed by RECLAIM.

(D) Compliance through California Environmental Quality Act- As discussed previously, CEQA requirements were fulfilled for each of the subject PCs (See CEQA Evaluation).

Rule 1325: Federal PM2.5 New Source Review Program

This NSR rule for PM2.5 was adopted by the District's Governing Board on June 3, 2011. None of the subject PCs issued for the DCU and Coker Blowdown System were subject to this regulation since all of the PCs were issued before June 3, 2011.

Regulation XIV - TOXICS AND OTHER NON-CRITERIA POLLUTANTS

Rule 1401: New Source Review of Carcinogenic Air Contaminants

Requirements – Rule 1401 contains the following requirements:

1) *(d)(1) MICR and Cancer Burden* - The cumulative increase in MICR which is the sum of the calculated MICR values for all toxic air contaminants emitted from the new, relocated or modified permit unit will not result in any of the following:
   (A) an increased MICR greater than one in one million (1.0×10^{-6}) at any receptor location, if the permit unit is constructed without T-BACT;
   (B) an increased MICR greater than ten in one million (1.0×10^{-5}) at any receptor location, if the permit unit is constructed with T-BACT;
   (C) a cancer burden greater than 0.5.

2) *(d)(2) Chronic Hazard Index* - The cumulative increase in total chronic HI for any target organ system due to total emissions from the new, relocated or modified permit unit will not exceed 1.0 at any receptor location.
3) *(d)(3) Acute Hazard Index* - The cumulative increase in total acute HI for any target organ system due to total emissions from the new, relocated or modified permit unit will not exceed 1.0 at any receptor location.

Heavy Crude Project – Under this rule, a health risk assessment (HRA) must be performed for each individual permit unit for which there is an increase in TACs. For the Heavy Crude Project, an HRA was performed for both the Delayed Coking Unit and Coker Blowdown System. The only increase in TAC emissions was from new fugitive components. The following table shows the summary results of the Rule 1401 Tier 1 screening analysis.

Summary Results of Tier I Screening Analysis (100 meters) (From A/N 448244)

Permit Unit	Application Number	Total Application Screening Index	
		Cancer/Chronic	Acute
Delayed Coking Unit	448254	0.44	.00006
Coker Blowdown System	448245	0.15	0.00002

Compliance with this rule was achieved since the Cancer/Chronic and Acute Screening Indexes were less than 1.0. The HRA performed for PC A/Ns 448244 and 458897 is ultraconservative since the actual fugitive VOC emission increase based on post-construction component counts is substantially lower than estimated under the PCs. Also, the DCU had a net reduction in VOC emissions including the reduction in VOC emissions for the coke drum vents. Therefore, it is also expected that there was a reduction in TACs.

Regulation XVII - PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

The PSD program is the federal New Source Review (NSR) program for pollutants for which an area is in attainment with or unclassified with respect to a National Ambient Air Quality Standard (NAAQS) and for Greenhouse Gases (GHGs).

Rule 1703 – PSD Analysis (& Associated Rules 1701, 1702, 1704, 1706, 1710 & 1713)
These rules contain the PSD requirements for attainment pollutants and selected unclassified pollutants. As discussed earlier, SOCAB is currently designated as attainment with NAAQSs for SO2, NO2, CO, and Lead. On March 3, 2003, AQMD's PSD delegation was rescinded by EPA. AQMD and EPA signed a "Partial PSD Delegation Agreement" effective July 11, 2007. According to a memo from Mr. Mohsen Nazemi, who is the Deputy Executive Officer of the AQMD Engineering and Compliance Division, this Partial Delegation Agreement is "intended to delegate the authority and responsibility to AQMD for issuance of initial PSD permits and for PSD permit modifications where the applicant does not seek to use the emissions calculation methodologies promulgated in 40 CFR 52.21 (NSR Reform) but not set forth in AQMD Regulation XVII."

All of the subject PCs except administrative A/N 388733 where issued prior to July 11, 2007 so they were not subject to the requirements of Rule 1703. The applicant was notified to contact EPA directly regarding PSD applicability. EPA did not issue a PSD permit for either of the projects.

Rule 1714 – Prevention of Significant Deterioration for Greenhouse Gases
This rule, which was adopted on November 5, 2010, sets preconstruction review requirements for greenhouse gases. None of the subject PCs issued for the DCU and Coker Blowdown System was subject to this regulation since all of the PCs except administrative A/N 388733 were issued before November 5, 2010.

Regulation XX - REGIONAL CLEAN AIR INCENTIVES MARKET (RECLAIM)

RECLAIM is a market incentive program designed to allow facilities flexibility in achieving emission reduction requirements for Oxides of Nitrogen (NOx), and Oxides of Sulfur (SOx). The Chevron Refinery (ID 800030) is a Cycle II RECLAIM facility.

Neither of the subject permit units is subject to this regulation since they do not emit significant amounts of NOx or SOx.

Regulation XXX – TITLE V PERMITS

These permits will be issued as a revision of Chevron's Title V permit. Permit revisions are categorized into the following four types: *administrative, minor, de minimis significant and significant*. The review and distribution requirements for each revision type are summarized in the following table.

Title V Permit Revisions: Review and Distribution Requirements

Revision Type	Permit Review and Distribution Requirements		
	EPA Review (45-day)	Public Notice (30-day)	Send Final Permit to EPA
Administrative	No	No	Yes
Minor	Yes	No	Yes
De Minimis Significant	Yes	No	Yes
Significant	Yes	Yes	Yes

As defined in Rule 3000, an administrative Title V permit revision is any revision to:

1) correct typographical errors;
2) record facility ownership and information changes which identify changes in the name, address, or phone number of any person identified in the permit, or provide a similar minor administrative change at the source; or change ownership or operational control of a source where the District determines that no other change in the permit is necessary;
3) impose requirements for more frequent monitoring, recordkeeping, or reporting by the permittee;
4) issue a final permit to operate for equipment previously issued a Title V permit to construct, with no change in permit terms and conditions except for the removal of permit to construct terms or conditions which are no longer applicable; or inclusion of changes consistent with items 1, 2, 3, 5, 6, 7.
5) annually record revised annual Allocations for each remaining year of the permit term for facilities subject to RECLAIM as a result of the trade, sale, or purchase of RECLAIM Trading Credits (RTC) in compliance with Rule 2007 - Trading Requirements, provided New Source Review is not triggered pursuant to Rule 2005 - RECLAIM New Source Review;
6) remove equipment, provided that equipment removal does not result in an increase in emissions; or,

7) move equipment within a facility provided that there is no change to permit conditions and that such a move does not require an evaluation of regulatory requirements.

Conversion of PC A/N 465533 for the Coker Blowdown System to a PO is an administrative Title V permit revision per item 4 since the only change to the permit is removal of PC condition S7.3. For an administrative revision, neither EPA review nor public notice is required. A copy of the revision will be sent to EPA.

Conversion of PC A/N 388733 for the DCU to a PO does not qualify as an administrative Title V revision under item 4 because the implied instantaneous coke drum pressure monitoring requirement and atmospheric vent pressure limit in permit conditions D12.33 and E 336.14, respectively, are each being revised to two-minute averaging period. Also, TRS is being added to source test condition D28.31. The imposition of a two-minute averaging period strengthens the atmospheric vent pressure limit and inclusion of TRS strengthens the source test condition but these revisions disqualify the DCU PC to PO conversion as an administrative Title V revision.

As defined in Rule 3000, a minor Title V permit revision is any revision that:

(1) 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;
(2) does not violate a regulatory requirement;
(3) does not require any significant change in monitoring terms or conditions in the permit;
(4) does not require relaxation of any recordkeeping, or reporting requirement, or term, or condition in the permit;
(5) 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;
(6) does not result in an increase in emissions of a pollutant subject to Regulation XIII - New Source Review or a hazardous air pollutant;
(7) does not establish or change a permit condition that the facility has assumed to avoid an applicable requirement;
(8) 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,
(9) 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; or,
(10) incorporates an existing general permit, as defined in subdivision (e) of Rule 3004, and its associated requirements, into another Title V permit.

The DCU PC to PO conversion qualifies as a minor revision since it complies with all items above including: (1) no significant change in monitoring terms or conditions (item 3); no relaxation of any term or condition (item 4); and no increase in emissions (item 6). The imposition of the two-minute averaging period in conditions D12.33 and E336.14 and inclusion of TRS in source test condition D28.31 are not believed to be significant revision of

the Title V permit. The Title V revision will be sent to EPA for a 45-day review. Public notice is not required.

CONCLUSION / RECOMMENDATION:

Based on the foregoing evaluation, it is expected that the subject applications will comply with all applicable District Rules and Regulations. It is recommended that, Permits to Operate, Section D of the facility permit, be issued for the subject permit units.

Appendix A: Delayed Coking Unit
Baseline Fugitive VOC Emission Estimates Using "Old" Emission Factors

Equipment Type	Service	Original Baseline Fugitive Count (1)	Revised Baseline Fugitive Count (2)	Emission Factor (lb/yr) (3)	Original BL Fugitive VOC Estimate	Revised BL Fugitive VOC Estimate
Valves - Sealed Bellow	All	202	690	0	0	0
Valves - SCAQMD Approved I & M Program	Gas/Vapor	550	594	23	12650	13662
	Light Liquid	927	843	19	17613	16017
	Heavy Liquid	1399	2386	3	4197	7158
Flanges	Light Liquid/Vapor	6106	9074	1.5	9159	13611
Connectors	Light Liquid/Vapor	5852	9359	1.5	8778	14039
Pumps	Light Liquid (sealless type)	0	2	0	0	0
	Light Liquid (double seal)	13	18	104	1352	1872
	Heavy Liquid (single seal)	15	22	80	1200	1760
Compressors	Gas/Vapor	1	1	514	514	514
PRV's	All (To Atmosphere)	2	2	1135	2270	2270
	All (Closed Vent)	93	128	0	0	0
Drains (with p-trap)	All	0	130	80	0	10400
		TOTAL		**lb/yr**	**57733**	**81303**
				lb/day (4)	**160.4**	**225.8**

(1) Based on pre-construction count of fugitive components. (Mr. Neal Troung on 7-12-06)

(2) Based on refined count of Delayed Coking Unit fugitive components performed in 2009.

(3) Fugitive emission factors developed and utilized for the CARB Reformulated Fuels Projects at the refineries.

(4) 30-day average emissions based on annual emissions divided by 360.

Appendix A: Delayed Coking Unit
Baseline Fugitive VOC Emission Estimates Using "New" Emission Factors

Equipment Type	Service	Original Baseline Fugitive Count (1)	Revised Baseline Fugitive Count (2)	Emission Factor (lb/yr) (3)	Original BL Fugitive VOC Estimate	Revised BL Fugitive VOC Estimate
Valves - Sealed Bellow	All	202	690	0.00	0	0
Valves - SCAQMD Approved I & M Program	Gas/Vapor	550	594	4.55	2503	2703
	Light Liquid	927	843	4.55	4218	3836
	Heavy Liquid	1399	2386	4.55	6365	10856
Flanges	Light Liquid/Vapor	6106	9074	6.99	42681	63427
Connectors	Light Liquid/Vapor	5852	9359	2.86	16737	26767
Pumps	Light Liquid (sealless type)	0	2	0	0	0
	Light Liquid (double seal)	13	18	46.83	609	843
	Heavy Liquid (single seal)	15	22	17.21	258	379
Compressors	Gas/Vapor	1	1	9.09	9	9
PRV's	All (To Atmosphere)	2	2	9.09	18	18
	All (Closed Vent)	93	128	0	0	0
Drains (with p-trap)	All	0	130	9.09	0	1182
		TOTAL		**lb/yr**	**73398**	**110019**
				lb/day (4)	**203.9**	**305.6**

(1) Based on pre-construction count of fugitive components. (Mr. Neal Troung on 7-12-06)

(2) Based on refined count of Delayed Coking Unit fugitive components performed in 2009.

(3) Fugitive emission factors emission factors based on correlation equations from the *California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities* (CARB/CAPCOA - 1999)

(4) 30-day average emissions based on annual emissions divided by 360.

Appendix A: Delayed Coking Unit
Pre- and Post-Construction Fugitive VOC Emission Estimates Using "Old" Emission Factors

Equipment Type	Service	Pre-Construction Estimate of Fugitives (1)	Post-Construction Fugitive Count (2)	Emission Factor (lb/yr) (3)	Pre-Construction Fugitive VOC Estimate	Post-Construction Fugitive VOC Estimate
Valves - Sealed Bellow	All	1160	877	0	0	0
Valves - SCAQMD Approved I & M Program	Gas/Vapor	604	603	23	13892	13869
	Light Liquid	835	760	19	15865	14440
	Heavy Liquid	2445	2418	3	7335	7254
Flanges	Light Liquid/Vapor	10107	10112	1.5	15161	15168
Connectors	Light Liquid/Vapor	9359	9359	1.5	14039	14039
Pumps	Light Liquid (sealless type)	2	2	0	0	0
	Light Liquid (double seal)	18	18	104	1872	1872
	Heavy Liquid (single seal)	26	26	80	2080	2080
Compressors	Gas/Vapor	1	1	514	514	514
PRV's	All (To Atmosphere)	2	2	1135	2270	2270
	All (Closed Vent)	153	146	0	0	0
Drains (with p-trap)	All	130	130	80	10400	10400
		Total		**lb/yr**	**83427**	**81906**
				lb/day (4)	**231.7**	**227.5**

(1) Based on pre-construction estimate of fugitive components to be installed and removed during Heavy Crude Project construction. (Mr. Neal Troung on 7-12-06)

(2) Based on the post-construction count of fugitive components installed and removed during Heavy Crude Project construction. (Mr. John Fowkes on 3-20-08)

(3) Fugitive emission factors developed and utilized for the CARB Reformulated Fuels Projects at the refineries.

(4) 30-day average emissions based on annual emissions divided by 360.

Appendix A: Delayed Coking Unit

Pre- and Post-Construction Fugitive VOC Emission Estimates Using "New" Emission Factors

Equipment Type	Service	Pre-Construction Estimate of Fugitives (1)	Post-Construction Fugitive Count (2)	Emission Factor (lb/yr) (3)	Pre-Construction Fugitive VOC Estimate	Post-Construction Fugitive VOC Estimate
Valves - Sealed Bellow	All	1160	877	0.00	0	0.0
Valves - SCAQMD Approved I & M Program	Gas/Vapor	604	603	4.55	2748	2744
	Light Liquid	835	760	4.55	3799	3458
	Heavy Liquid	2445	2418	4.55	11125	11002
Flanges	Light Liquid/Vapor	10107	10112	6.99	70648	70683
Connectors	Light Liquid/Vapor	9359	9359	2.86	26767	26767
Pumps	Light Liquid (sealless type)	2	2	0	0	0.0
	Light Liquid (double seal)	18	18	46.83	843	843
	Heavy Liquid (single seal)	26	26	17.21	447	447
Compressors	Gas/Vapor	1	1	9.09	9	9
PRV's	All (To Atmosphere)	2	2	9.09	18	18
	All (Closed Vent)	153	146	0	0	0.0
Drains (with p-trap)	All	130	130	9.09	1182	1182
		TOTAL		**lb/yr**	**117586**	**117153**
				lb/day (3)	**326.6**	**325.4**

(1) Based on pre-construction estimate of fugitive components to be installed and removed during Heavy Crude Project construction. (Mr. Neal Troung on 7-12-06)

(2) Based on the post-construction count of fugitive components installed and removed during Heavy Crude Project construction. (Mr. John Fowkes on 3-20-08)

(3) Fugitive emission factors emission factors based on correlation equations from the *California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities* (CARB/CAPCOA - 1999)

(4) 30-day average emissions based on annual emissions divided by 360.

Appendix B: Coker Blowdown System
Baseline Fugitive VOC Emission Estimates Using "Old" Emission Factors

Equipment Type	Service	Original Baseline Fugitive Count (1)	Revised Baseline Fugitive Count (2)	Emission Factor (lb/yr) (3)	Original BL Fugitive VOC Estimate	Revised BL Fugitive VOC Estimate
Valves - Sealed Bellow	All	23	23	0	0	0
Valves - SCAQMD Approved I & M Program	Gas/Vapor	257	213	23	5911	4899
	Light Liquid	107	101	19	2033	1919
	Heavy Liquid	93	93	3	279	279
Flanges	Light Liquid/Vapor	726	628	1.5	1089	942
Connectors	Light Liquid/Vapor	829	711	1.5	1244	1067
Pumps	Light Liquid (sealless type)	0	0	0	0	0
	Light Liquid (double seal)	2	2	104	208	208
	Heavy Liquid (single seal)	1	1	80	80	80
Compressors	Gas/Vapor	0	1	514	0	514
PRV's	All (To Atmosphere)	0	0	1135	0	0
	All (Closed Vent)	8	8	0	0	0
Drains (with p-trap)	All	0	12	80	0	960
		TOTAL		**lb/yr**	**10844**	**10868**
				lb/day (4)	**30.1**	**30.2**

(1) Based on pre-construction count of fugitive components. (Mr. Neal Troung on 7-12-06)

(2) Based on refined count of Coker Blowdown System fugitive components performed in 2009.

(3) Fugitive emission factors developed and utilized for the CARB Reformulated Fuels Projects at the refineries.

(4) 30-day average emissions based on annual emissions divided by 360.

Appendix B: Coker Blowdown System
Baseline Fugitive VOC Emission Estimates Using "New" Emission Factors

Equipment Type	Service	Original Baseline Fugitive Count (1)	Revised Baseline Fugitive Count (2)	Emission Factor (lb/yr) (3)	Original BL Fugitive VOC Estimate	Revised BL Fugitive VOC Estimate
Valves - Sealed Bellow	All	23	23	0.00	0	0
Valves - SCAQMD Approved I & M Program	Gas/Vapor	257	213	4.55	1169	969
	Light Liquid	107	101	4.55	487	460
	Heavy Liquid	93	93	4.55	423	423
Flanges	Light Liquid/Vapor	726	628	6.99	5075	4390
Connectors	Light Liquid/Vapor	829	711	2.86	2371	2033
Pumps	Light Liquid (sealless type)	0	0	0	0	0
	Light Liquid (double seal)	2	2	46.83	94	94
	Heavy Liquid (single seal)	1	1	17.21	17	17
Compressors	Gas/Vapor	0	1	9.09	0	9
PRV's	All (To Atmosphere)	0	0	9.09	0	0
	All (Closed Vent)	8	8	0	0	0
Drains (with p-trap)	All	0	12	9.09	0	109
			TOTAL	**lb/yr**	**9636**	**8504**
				lb/day (4)	**26.8**	**23.6**

(1) Based on pre-construction count of fugitive components. (Mr. Neal Troung on 7-12-06)

(2) Based on refined count of Coker Blowdown System fugitive components performed in 2009.

(3) Fugitive emission factors emission factors based on correlation equations from the *California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities* (CARB/CAPCOA - 1999)

(4) 30-day average emissions based on annual emissions divided by 360.

Appendix B: Coker Blowdown System
Pre- and Post-Construction Fugitive VOC Emission Estimates Using "Old" Emission Factors

Equipment Type	Service	Pre-Construction Estimate of Fugitives (1)	Post-Construction Fugitive Count (2)	Emission Factor (lb/yr) (3)	Pre-Construction Fugitive VOC Estimate	Post-Construction Fugitive VOC Estimate
Valves - Sealed Bellow	All	65	32	0	0	0
Valves - SCAQMD Approved I & M Program	Gas/Vapor	230	212	23	5290	4876
	Light Liquid	101	101	19	1919	1919
	Heavy Liquid	93	93	3	279	279
Flanges	Light Liquid/Vapor	753	698	1.5	1130	1047
Connectors	Light Liquid/Vapor	717	711	1.5	1076	1067
Pumps	Light Liquid (sealless type)	0	0	0	0	0
	Light Liquid (double seal)	3	2	104	312	208
	Heavy Liquid (single seal)	3	1	80	240	80
Compressors	Gas/Vapor	1	1	514	514	514
PRV's	All (To Atmosphere)	0	0	1135	0	0
	All (Closed Vent)	8	9	0	0	0
Drains (with p-trap)	All	12	12	80	960	960
		Total		**lb/yr**	**11719**	**10950**
				lb/day (4)	**32.6**	**30.4**

(1) Based on pre-construction estimate of fugitive components to be installed and removed during Heavy Crude Project construction. (Mr. Neal Troung on 7-12-06)

(2) Based on the post-construction count of fugitive components installed and removed during Heavy Crude Project construction. (Mr. John Fowkes on 3-20-08)

(3) Fugitive emission factors developed and utilized for the CARB Reformulated Fuels Projects at the refineries.

(4) 30-day average emissions based on annual emissions divided by 360.

Appendix B: Coker Blowdown System
Pre- and Post-Construction Fugitive VOC Emission Estimates Using "New" Emission Factors

Equipment Type	Service	Pre-Construction Estimate of Fugitives (1)	Post-Construction Fugitive Count (2)	Emission Factor (lb/yr) (3)	Pre-Construction Fugitive VOC Estimate	Post-Construction Fugitive VOC Estimate
Valves - Sealed Bellow	All	65	32	0.00	0	0.0
Valves - SCAQMD Approved I & M Program	Gas/Vapor	230	212	4.55	1047	965
	Light Liquid	101	101	4.55	460	460
	Heavy Liquid	93	93	4.55	423	423
Flanges	Light Liquid/Vapor	753	698	6.99	5263	4879
Connectors	Light Liquid/Vapor	717	711	2.86	2051	2033
Pumps	Light Liquid (sealless type)	0	0	0	0	0.0
	Light Liquid (double seal)	3	2	46.83	140	94
	Heavy Liquid (single seal)	3	1	17.21	52	17
Compressors	Gas/Vapor	1	1	9.09	9	9
PRV's	All (To Atmosphere)	0	0	9.09	0	0
	All (Closed Vent)	8	9	0	0	0.0
Drains (with p-trap)	All	12	12	9.09	109	109
		TOTAL		**lb/yr**	**9554**	**8989**
				lb/day (3)	**26.5**	**25.0**

(1) Based on pre-construction estimate of fugitive components to be installed and removed during Heavy Crude Project construction. (Mr. Neal Troung on 7-12-06)

(2) Based on the post-construction count of fugitive components installed and removed during Heavy Crude Project construction. (Mr. John Fowkes on 3-20-08)

(3) Fugitive emission factors emission factors based on correlation equations from the *California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities* (CARB/CAPCOA - 1999)

(4) 30-day average emissions based on annual emissions divided by 360.