	SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT *ENGINEERING & COMPLIANCE* APPLICATION PROCESSING AND CALCULATIONS	**PAGES:** 21	**PAGE:** 1
		A/N: 521770	**DATE:** 5/5/2011
		PROCESSED BY: Meredith Hankins	**CHECKED BY:** TV

PERMIT TO CONSTRUCT

GROUND FLARE

ALTERNATION/MODIFICATION

COMPANY NAME: Chevron Products Co.

COMPANY ID: 800030

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

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

CONTACT INFORMATION:

Pat Kittikul
PKCC@chevron.com
(310) 615-5267

Rafi Ahmed
SRAH@chevron.com
(310) 615-3440

PROPOSED CHANGES TO PERMITS:

Proposed deletions are show in ~~strikeouts~~. Proposed additions are in **bold and underlined**.

SECTION H: PERMIT TO CONSTRUCT AND TEMPORARY PERMIT TO OPERATE

Equipment	ID No.	Connected To	Source Type/ Monitoring Unit	Emissions And Requirements	Conditions
Process 20 : AIR POLLUTION CONTROL					
System 36 : SNR HYDROGEN PLANT CO CONTROL FLARE					S1.2, S1.3, S18.19
KNOCK OUT POT, V-2150, HYDROGEN VENT GAS; DIAMETER (ID): 3 FT 6 IN; HEIGHT: 12 FT 3 IN T-T A/N: ~~457255~~ **521770** Permit to Construct Issued: ~~08/17/07~~ **XX/XX/11**	D4115	D4114 C4116			
FLARE, GROUND FLARE, F-2510, ENCLOSED, SINGLE STAGE, 9 BURNERS, NON-ASSISTED, 4 NAT.	C4116	D4115		**CO:** 2000 PPMV (5) [**RULE 407, 4-2-1982**] ; **PM:** 0.1 GRAINS/SCF	B61.11, D12.29, D12.35, ~~D28.32~~, D381.4, H23.2,

Equipment	ID No.	Connected To	Source Type/ Monitoring Unit	Emissions And Requirements	Conditions
Process 20 : AIR POLLUTION CONTROL					
GAS FIRED PILOTS, N2 PURGE OF FLARE GAS HEADER, CALLIDUS MODEL BTZ-TEGF, HEIGHT: 60 FT; DIAMETER: 21 FT A/N: ~~457255~~ **521770** Permit to Construct Issued: ~~08/17/07~~ **XX/XX/11**				(5) [**RULE 409, 8-7-1981**] ; **PM:** (9) [**RULE 404, 2-7-1986**]	H23.46, ~~K171.15~~

CONDITIONS:

System Conditions

S1.2 The operator shall limit the number of flaring events due to startups to no more than ~~2~~ **4** event(s) in any one calendar year **and no more than 2 event(s) in any 30 day period**.

[RULE 1703 – PSD Analysis, 10-7-1988; CA PRC CEQA, 11-23-1970; **RULE 1303(b)(2)-Offsets, 5-10-1996**; **RULE 1303(b)(2)-Offsets, 12-6-2002**]

[Systems subject to this condition: Process 20, System 36]

S1.3 The operator shall limit the number of flaring events due to planned shutdowns to no more than ~~2~~ **4** event(s) in any one calendar year **and no more than 2 event(s) in any 30 day period**.

[RULE 1703 – PSD Analysis, 10-7-1988; CA PRC CEQA, 11-23-1970; **RULE 1303(b)(2)-Offsets, 5-10-1996**; **RULE 1303(b)(2)-Offsets, 12-6-2002**]

[Systems subject to this condition: Process 20, System 36]

S18.19 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:

Steam Naptha Reformer (SNR) (Process: 6, System: 4)

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(a)(1)-BACT, 12-6-2002; RULE 407, 4-2-1982]

[Systems subject to this condition: Process 20, System 36]

Device Conditions:

B. Material/Fuel Type Limits

B61.11 The operator shall not use / combust vent gas containing the following specified compounds:

Compound	ppm by volume
H2S greater than	160

The H2S concentration limit shall be based on a rolling 3-hour averaging period.

The H2S concentration limit shall not apply to vent gas resulting from an emergency, shutdown, startup, process upset, or relief valve leakage.

[RULE 1118, 11-4-2005]

[Devices subject to this condition: C1746, C1749, C1757, C1785, C3012, C4116]

D. Monitoring/Testing Requirements

D12.29 The operator shall install and maintain a(n) thermocouple to accurately indicate the presence of a flame at the pilot light.

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

This requirement only applies when the flare is put into active service.

[RULE 1303(a)(1)-BACT, 5-10-1996; <u>RULE 1303(a)(1)-BACT, 12-6-2002</u>; RULE 3004(a)(4)-Periodic Monitoring, 12-12-1997]

[Devices subject to this condition: C4116]

D12.35 The operator shall install and maintain a(n) thermocouple to accurately indicate the temperature at the flare stack.

The thermocouple shall extend into the flare cross-section a minimum of 8 inches beyond the flare wall insulation.

The thermocouple shall be located at a height of 8 to 12 feet below the top of the flare stack.

The operator shall also install and maintain a device to continuously record the temperature during any time that there is flow of SNR vent gas to the flare. For the purpose of this condition, continuous recording is defined as once every 60 seconds.

[RULE 1303(a)(1)-BACT, 5-10-1996; <u>RULE 1303(a)(1)-BACT, 12-6-2002</u>]

[Devices subject to this condition: C4116]

~~D28.32 The operator shall conduct source test(s) in accordance with the following specifications:~~

~~The test shall be conducted at the startup following the first planned shutdown of the SNR Hydrogen Plant following the issuance of a permit to construct under application number 457257.~~

~~The test shall be conducted during a time that SNR vent gas is being directed to the flare.~~

~~The test shall be conducted to determine the CO and NOx emissions (ppmv) at the outlet of the flare.~~

~~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 condition with the exception that the test protocol shall be submitted to the District no later than 30 days before the proposed test date.~~

~~The test shall be conducted and test report submitted to the District in accordance with Section E- Administrative Conditions.~~

~~**[RULE 1303(b)(2)-Offset, 5-10-1996; RULE 407, 4-2-1982]**~~

~~[Devices subject to this condition: C4116]~~

**Note: This condition is being removed as it is no longer applicable. Chevron has already completed the required initial source test and submitted a source test report. This report was recently submitted to the District and will now be evaluated by the District's STE department.*

D381.4 The operator shall conduct an inspection for visible emissions from all stacks and other emission points of this equipment whenever there is a public compliant of visible emissions, whenever visible emissions are observed, and on an annual basis, at least, unless the equipment did no operate during the entire annual period. The routine annual inspection shall be conducted while the equipment is in operation and during daylight hours. If any visible emissions (not including condensed water vapor) are detected, the operator shall take corrective action(s) that eliminates the visible emissions within23 hours and report the visible emissions as a potential deviation accordance with the reporting requirements in Section K of this permit.

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

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

[RULE 1303(a)(1)-BACT, 5-10-1996; <u>RULE 1303(a)(1)-BACT, 12-6-2002;</u> RULE 3004(a)(4)-Periodic Monitoring, 12-12-1997; RULE 401, 3-2-1984]

[Devices subject to this condition: C4116]

H. Applicable Rules

H23.2 This equipment is subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
H2S	40CFR60, SUBPART	J

[40CFR 60 Subpart J, 6-24-2008]

[Devices subject to this condition: D471, D472, D473, D641, D643, D3031, D3778, D3973, C4116]

H23.46 This equipment is subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
SOX	District Rule	1118

[RULE 1118, 11-4-2005]

[Devices subject to this condition: C1746, C1749, C1757, C1785, C3012, C4116]

K. Recordkeeping/Reporting

K171.15 The operator shall provide to the District the following items:

Final drawings and/or specifications of the equipment installed/constructed shall be submitted to the SCAQMD within 60 days after its completion.

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

[Devices subject to this condition: D4106, ~~C4116~~, D4354, D4355, D4356, D4357, D4358, D4359, C4360, C4361, D4362]

**Note: This condition is being untagged from the subject equipment as it is no longer applicable. Chevron submitted final drawings to the District on 6/29/07 following construction.*

Note: See Reg XIII evaluation below for explanation of Rule 1303 tagging. The addition of the 12/6/02 amendment is not an update to the rule tagging but a correction to an error in the original tagging.

BACKGROUND:

Chevron submitted the subject application (A/N 521770) to increase the permitted number of planned startups and shutdowns for the ground flare at the Steam Naptha Reforming hydrogen plant (SNR). A Title V revision application was also submitted. This flare was originally constructed to control CO emissions generated during startup and shutdowns to comply with District Rule 407.

A summary of the subject application is shown below in Table 1.

Table 1 – AQMD Applications Submitted

A/N	Equipment	Device ID	Type	Status	Date Submitted	Requested Action
521770	Ground flare, knock-out pot	C4116, D4115	50	20	4/21/11	• Alteration/Modification

The fees submitted for these applications are shown below in Table 2. Note that A/N 521770 was submitted as an XPP application with an additional 50% fee.

Table 2 – Fee Summary

A/N	Equipment	Type	Fee Sched.	Fee Paid	Balance Due
521770	Ground flare, knock-out pot	50	F	$15,709.55 ($10,473.03 + 50%)	$0.00

Relevant permitting history for the subject equipment is shown below in Table 3.

Table 3 – Relevant Permitting History

A/N	Date Received	Application		Permit		Description
		Status	Type	Status	Number	
457255	5/23/06	26	10	--	--	Application submitted for initial construction of ground flare in order to ensure compliance with District Rule 407 during startup/shutdowns at SNR H2 plant.
521770	4/21/11	20	50	--	--	Subject application submitted to increase number of planned startups and shutdowns permitted per year

PROCESS DESCRIPTION:

In brief, the SNR hydrogen plant produces up to 72 MMSCFD of hydrogen from a feed of steam and refinery fuel/natural gas. The hydrogen production process comprises mainly of the following steps: feed desulfurization, hydrogen production, and purification. See A/N 457257 for more detailed information on the hydrogen production process.

Desulfurization
Before reaching the SNR plant, the SNR feed is treated for sulfur in the #4, #5, and #6 H_2S plants at the Refinery.

Hydrogen Production
Superheated steam is mixed with the SNR feed in the pre-reforming section to initiate the reforming reaction and produce a stream consisting of methane and lighter hydrocarbons. This stream is then directed to the reformer furnace, where the lighter hydrocarbons and steam are converted to H_2, CO, and CO_2 inside catalyst filled tubes. The stream exiting the reformer furnace is then reacted with more steam to produce CO_2 and additional hydrogen from the CO in the shift conversion reactors.

Purification
CO_2 is removed from the stream exiting the shift reactors by the Catacarb process, where CO_2 is adsorbed into a circulating solution of hot potassium carbonate and later stripped back out of solution with stripping steam. The remaining CO and CO_2 are hydrogenated to methane in the methanation section. The product hydrogen is then cooled and compressed to the operating pressure of other units at the Refinery for use in the hydrotreating process (including Naptha Hydrotreating No. 2 & 3, Vacuum Gas Oil, and the VRDS).

Startup/Shutdown
The product hydrogen stream was originally designed to vent to atmosphere during startups and shutdowns. However, following Chevron's experience with the Air Liquide hydrogen plant (ID 148236, see A/N 440494), it was discovered that the CO concentration in this stream could exceed the Rule 407 limit of 2,000 ppm CO (see Table 4 below for design basis vent gas compositions). Therefore, the subject ground flare was constructed to control emissions from the product hydrogen vent during planned startups and shutdowns. The subject flare is a ground flare with 9 unstaged, simultaneous, natural draft burners located inside an octagonal refractory-lined chamber 21 feet in diameter and 60 feet high.

Table 4 –Vent Gas Composition (Dry Basis)

Component	Composition (mole %)	
	Low BTU Case	High BTU Case
Methane	11.81	17.21
CO	3.13	1.86
CO_2	16.9	0.00
H_2	67.25	80.93
N_2	0.93	0.00

Note that the ground flare is only in operation during planned startups and shutdowns. During normal operation, the pilots are not lit and the flare header is blocked and purged with nitrogen. During emergencies, the vent gas is directed to the atmosphere. The ground flare cannot handle emergency shutdowns due to the high steam content in the H2 vent gas stream. During a planned shutdown, Chevron is able to control the steam content down to a level at which it may be

combusted (unlike during an emergency). Note that Rule 407 exempts emissions generated as a result of emergencies and malfunctions (though not startups and shutdowns).

Simplified startup and shutdown sequences (as provided by Chevron) are shown below.

Startup (up to 48 hours flaring per event)

- Pre-safety start-up review
- Purge unit (all piping and equipment) with nitrogen (to eliminate O2)
- Warm up and dry out all steam headers
- Pressurize unit with nitrogen and prepare compressor for nitrogen circulation
- Prepare short loop (Catacarb) circulation for nitrogen circulation of unit
- Circulate nitrogen with compressor, fire off F-1330 and heat up to ~1000F
- Prepare and light off ground flare on natural gas
- Switch to steam and hydrogen, with the once through hydrogen routed to the ground flare
- Heat process to ~1250F on steam and hydrogen
- Start up long loop circulations on Catacarb
- Prepare and start feed (natural gas) and minimum rate and vent to ground flare
- Line out unit and sample
- Place the LTS online
- Place the Methanator online
- Slowly shift hydrogen routing to compressors, pull from ground flare
- Shutdown the ground flare and secure all piping

Shutdown (up to 24 hours flaring per event)

- Reduce H2 demand to zero by lowering feed rates into the Hydrotreaters
- Put ground flare pilots into service
- Put ground flare main burners in service on natural gas
- Slowly route the H2 vent to the ground flare. The Methanator is being bypassed. Now the H2 may contain 3000 ppm CO
- Establish C-1380 short loop circulation
- Shutdown semi-lean circulation and secure C-1370 bottoms level
- Bypass the Catacarb preservation system
- Test the furnace safety shutdown device to allow a full trip of the SNR Furnace F-1330. This verifies safety system actions.
- Purge the SNR for 15 minutes (un-methanated). Since the Catacarb preservation system is bypassed, the atmospheric vent would not open and venting would continue at the ground flare, thus burning the CO.
- Follow up the H2/steam purge with nitrogen for about 1 hour
- Test for H2 and determine if more purging of nitrogen is necessary. All the nitrogen, CO, and H2 would burn in the ground flare.
- Once complete, shutdown and secure piping and ground flare.
- Pressurize the piping to the ground flare with N2 and leave it in N2 pressurized atmosphere.

<u>Proposed Modification</u>

The subject application was submitted to increase the permitted number of startups and shutdowns from 2 per year to 4 per year with a maximum of 2 per month. No other modification to the flare's current operation will occur as a result of this proposed modification.

COMPLIANCE HISTORY

NOV #P48124 was issued 3/6/08 for failing to vent gases to the ground flare during a startup on 2/21/08. This violation occurred because a high temperature alarm in the flare triggered an automatic isolation of the flare and the hydrogen vent gas from the SNR plant was automatically directed to atmosphere. This violation is now closed. There is no record of any other compliance issues relating to the subject ground flare in the past 5 years.

See Attachment A for facility Compliance History.

PERMIT CONDITION COMPLIANCE CHECK:

S1.2,3 These conditions specify a max of 2 startups and shutdowns are permitted per year. Chevron has operated this equipment in compliance with this condition, per records submitted with a 5/2/11 email from Rafi Ahmed of Chevron. The subject application was submitted to increase the permitted number of startups and shutdowns to 4 times per year (max 2 times per month).

S18.19 This condition specifies that the subject flare may only receive vent gases from P6/S4 (the SNR plant). As verified by drawings submitted during the P/C process under A/N 457255, the subject flare only receives vent gases from the hydrogen vent at the SNR Hydrogen Plant. Continued compliance is expected.

B61.11 This condition limits flares to receiving vent gases with less than 160 ppm H_2S. The subject flare is only permitted to receive vent gases generated during planned startups and shutdowns at the SNR hydrogen plant. Emissions from startups and shutdowns are specifically exempted from the 160 ppm H2S limit in Rule 1118, as specified in this condition.

D12.29 This condition requires installation and continuous monitoring of thermocouples at the pilots. As verified by continuous monitoring records submitted with 5/2/11 email from Rafi Ahmed of Chevron, Chevron is currently compliance with this condition.

D12.35 This condition requires installation and continuous monitoring of thermocouples in the flare stack. As verified by continuous monitoring records submitted with 5/2/11 email from Rafi Ahmed of Chevron, Chevron is currently compliance with this condition.

D28.32 Chevron completed the initial source test required by this condition on 7/25/07. CO concentration and visible emissions were reported to be below permitted limits. A copy of the source test report submitted to the District on 4/6/11 has been submitted to the STE department for evaluation. This condition will be removed as it is no longer applicable.

D381.4 This condition limits visible emissions and requires monitoring. By design, this enclosed ground flare operates with minimal visible emissions. Visible emissions were reported to be 0.4% opacity in the source test report submitted 4/6/11.

H23.2 This condition specifies that the flare is subject to Subpart J. See Rule Evaluation below for more details. Continued compliance with Subpart J is expected.

H23.46 This condition specifies that the flare is subject to District Rule 1118. See Rule Evaluation below for more details. Continued compliance with Rule 1118 is expected.

K171.15 This condition required submittal of final drawings following construction of the ground flare. Chevron submitted final drawings for the flare on 6/29/07. The subject device will be untagged from this condition as it is no longer applicable.

EMISSIONS CALCULATIONS:

Emissions from the subject flare are generated by combustion of the product hydrogen vent gases, as well as by the combustion of natural gas in the pilots and as supplemental fuel to maintain the heating value above 200 BTU/scf (as necessary). The basic design basis used to calculate emissions for this modification is the same as for calculating the emissions pre-modification. The only difference is the increase in the number of flaring events due to startup and shutdown per year.

The pre-modification emissions for the subject equipment were calculated based on 2 startups and 2 shutdowns per year, with all 2 startups and 2 shutdowns occurring in one month as a worst case scenario. The post-modification emissions will be calculated based on 4 startups and 4 shutdowns per year, with 2 startups and 2 shutdowns occurring in one month as a worst case scenario. Note that the subject equipment will be limited to no more than 2 startups and 2 shutdowns in any 30 day period. Detailed calculations may be found in Attachment B.

In summary, emissions from the subject equipment only increase on an annual basis for the post-modification case. The maximum daily and monthly emissions (and the NSR 30 day average) remain the same, as shown below in Table 5.

Table 5 – Emissions Increase Pre- and Post- Modification

Pollutant	lb/day (MAX)			lb/hr (MAX)			lb/yr (TOTAL)			lb/mo (MAX)			lb/day (30 DA)			ton/yr (TOTAL)		
	PRE	POST	Δ	PRE	POST	Δ	PRE	POST	Δ	PRE	POST	Δ	PRE	POST	Δ	PRE	POST	Δ
CO	1196.9	1196.9	0	49.9	49.9	0	5034.7	10069.5	5034.7	5034.7	5034.7	0	167.8	167.8	0	2.5	5.0	2.5
NOx	1569.8	1569.8	0	65.4	65.4	0	6614.1	13228.2	6614.1	6614.1	6614.1	0	220.5	220.5	0	3.3	6.6	3.3
PM10	15.0	15.0	0	0.6	0.6	0	64.0	128.1	64.0	64.0	64.0	0	2.1	2.1	0	0.03	0.06	0.03
ROG	14.0	14.0	0	0.6	0.6	0	59.8	119.5	59.8	59.8	59.8	0	2.0	2.0	0	0.03	0.06	0.03
SOx	1.7	1.7	0	0.1	0.1	0	7.1	14.2	7.1	7.1	7.1	0	0.2	0.2	0	0.00	0.01	0.00

The pre- and post- modification NSR emissions are shown below in Table 6. Note that the change in R1 and R2 values is not an actual increase between pre- and post- modification. It is unclear how the R1 and R2 values entered into NSR for previous A/N 457255 were derived. Because the yearly emissions are calculated based on the R1 and R2 values, the pre-modification yearly emissions are also incorrect. Because the R1 and R2 values are not used to calculate emission increases or offsets, no NSR Update is necessary; but it is important to note that the actual maximum hourly and daily emissions will **NOT** increase as a result of the proposed modification as demonstrated in Attachment B and in Table 5 above, only the annual emissions.

Table 6 – NSR Emissions ("PRE" = A/N 457255, "POST" = A/N 521770)

Pollutant	R1 (lb/hr)			R2 (lb/hr)			30DA (lb/day)			Yearly (lb/yr)		
	PRE	POST	Δ	PRE	POST	Δ	PRE	POST	Δ	PRE	POST	Δ
CO	22.67	49.87	+27.20	22.67	49.87	+27.20	167	168	+1 *	2,312.34	10,069.49	+7,757.15
NOx	29.54	65.41	+34.87	29.54	65.41	+34.87	218	220	+2 *	3,013.08	13,228.17	+10,215.10
PM10	0.32	0.63	+0.31	.032	0.63	+0.31	2	2	0	32.64	128.06	+95.42
ROG	0.32	0.58	+0.31	0.32	0.58	+0.31	2	2	0	32.64	119.52	+86.88
SOx	0	0	0	0	0	0	0	0	0	0	0	0

Note: P/C calculations mistakenly used 8.037 MMscf/yr annual fuel usage, but correct value is 8.5**37 MMscf/yr (as explained in Attachment B). Although the NSR database will show a small increase for CO and NOx emissions (CO: 167→168 and NO_x: 218→220), this is not reflective of an actual emission increase due to this modification, only a correction to the database.*

RULE EVALUATION:

PART 1: SCAQMD REGULATIONS

REG II: PERMITS

Rule 212: Standards for Approving Permits

11/14/97 Rule 212 requires public notice if any of the following subparts are applicable

(c)(1): The source is located within 1000 feet of a school

(c)(2): The source has emission increases exceeding the following thresholds from 212(g), all in lbs/day:

CO:	220	ROG:	30	PM10:	60
NOx:	40	Pb:	3		

(c)(3): The source generates emissions of toxic air contaminants for which the MICR is above one in a million for the subject equipment or for which MICR is above ten in a million for the facility.

During the original construction of this ground flare under A/N 457255, public notice was distributed on 2/21/07 because the emission increase for NOx exceeded the threshold in 212(c)(2).

The proposed modification does not result in an increase in emissions on a maximum hourly or daily basis, nor does it result in an increase on a 30 day average basis. The increase in calculated health risk due to the increase in emission of toxic air contaminants is not greater than one in a million. Therefore, no further public notice is required.

REG IV: PROHIBITIONS

Rule 401: Visible Emissions

11/9/01 This rule prohibits the discharge of emissions with greater opacity than Ringelmann No. 1, with some exemptions. By design, this totally enclosed ground flare operates with minimal visible emissions. No increase in visible emission is expected due to the proposed modification. Continued compliance is expected.

Rule 402: Nuisance

5/7/76 This rule prohibits the discharge of air contaminants that cause injury, detriment, nuisance, or annoyance to a considerable number of persons; endanger the comfort, health, or safety of any person; or cause injury to property. The subject flare burns easily combustible materials such as hydrogen, methane, and CO with minimal nuisance potential. Continued compliance is expected.

Rule 404: Particulate Matter - Concentration

2/7/86 This rule prohibits the discharge of particulate matter in excess of concentration limits listed in Table 504(a), which vary based on the volume of flue gas discharged by the source.

The maximum PM concentration emitted from combustion of natural gas (pilots + supplemental) is calculated below, based on Rule 1118 emission factor and the established EPA Method 19 F-factor for natural gas, where the F-factor relates the

ratio of the gas volume of the products of combustion to the heat content of the fuel:

$$\frac{7.5\ lb}{MMscf}\ x\ \frac{MM}{10^6}\ x\frac{MMBTU}{8{,}710\ scf\ flue\ gas}\ \frac{7{,}000\ gr}{lb} = \boxed{0.006\ {}^{gr}/_{scf}}$$

Flue gas flow (based on max daily fuel usage, see Attachment B):

$$\frac{2.006\ MMscf\ NG}{day}\ x\ \frac{1{,}050\ BTU}{scf\ NG}\ x\ \frac{8{,}710\ scf\ flue\ gas}{MMBTU}\ x\frac{day}{24\ hr}\ x\ \frac{hr}{60\ min}$$
$$= \boxed{12{,}740\ scfm\ flue\ gas}$$

At a flue gas flow of 12,740 scfm, the relevant concentration limit from Table 504(a) is 0.0722 gr/scf. Compliance with the emission limit of this rule during normal operation is demonstrated, as 0.006 < 0.0722.

Emissions of PM from the subject flare due to combustion of hydrogen vent gas are expected to be minimal. The proposed modification would not increase the maximum daily emission of PM. Continued compliance is expected.

Rule 407: **Liquid and Gaseous Air Contaminants**
4/2/82 This rule limits atmospheric emissions of equipment.

(a)(1): CO Emissions
This subpart prohibits the discharge of CO emissions into the atmosphere greater than 2,000 ppmv averaged over 15 minutes. Note that Rule 407 exempts emissions resulting from emergencies, but not startup/shutdowns.

Proper operation of flares results in combustion efficiencies of at least 98% (according to AP-42, Chapter 13.5). Efficient combustion in the subject flare should ensure that emission of CO at a concentration greater than 2,000 ppmv does not occur.

Chevron was required to perform a source test on the subject flare during the first startup following installation of the flare in order to demonstrate CO emissions were in compliance with this rule. Reported CO emissions from this 7/25/07 source test during a start up were 2.65 ppmv, well below the 2,000 ppmv limit of this rule. This source test report has been submitted to the District's STE department (pending evaluation). See Attachment G for copy of source test results. Because the reported emissions are orders of magnitude lower than the rule limit, evaluation of this source test report is not required prior to issuance of this P/C.

The proposed modification would not increase the maximum daily emissions of CO. Continued compliance with the CO emission limit of this subpart is expected, as demonstrated by source test.

(a)(2)(A): Sulfur Emissions
This subpart limits the sulfur emissions, measured as SO_2, to less than 500 ppmv in the South Coast Air Basin.

As a SO_x RECLAIM source, Chevron is not subject to the requirements of Rule 407 per District Rule 2001(j) – Rule Applicability. This subpart exempts SO_x RECLAIM sources from the SO_x emissions provisions of the existing District Rules listed in Table 2 of Rule 2001. Rule 407 is listed in Table 2, thus, the refinery is not subject to the sulfur emissions requirements of this rule.

Chevron is in compliance with this rule and continued compliance is expected.

Rule 409: Combustion Contaminants

8/7/81

This rule prohibits the discharge of combustion contaminants in excess of 0.23 grams per cubic meter (0.1 grains per cubic foot) of gas calculated to 12% CO_2 at standard conditions and 15 minute average.

PM emissions were calculated in the Rule 404 evaluation above. As the emissions calculated (0.006 gr/scf) are orders of magnitude lower than the Rule 409 limit (0.1 gr/scf), correcting to 12% CO_2 would not alter this determination.

The proposed modification would not increase the maximum daily emission of PM. This equipment is tagged with Rule 409 in the Requirements and Emission Limits column of the FP. Continued compliance is expected.

REG XI: SOURCE SPECIFIC STANDARDS

Rule 1118 Control of Emissions from Refinery Flares

11/04/05

This rule applies to all gas flares used at petroleum refineries, sulfur recovery plants, and hydrogen production plants. It requires monitoring and recording of flare data as required by a Flare Monitoring & Recording Plan (FMRP). Flare minimization targets (based on annually decreasing facility-wide SOx emission caps) are also included.

(c)(1) Requirements

This paragraph specifies the operational requirements for all facilities subject to this rule:

(A) This subpart requires a pilot flame be present at all times a flare is operational. Chevron monitors the presence of a pilot flame through the use of thermocouples.

(B) This subpart requires that flares be operated in a smokeless manner except for periods not to exceed 5 minutes during 2 consecutive hours. The subject flare operates with minimal visible emissions by design, as an enclosed ground flare.

(C) This subpart requires annual acoustical or temperature leak surveys of all PRVs connected to the flare. Chevron is required to conduct this annual test and submit copies to the District's Compliance staff.

(D) This subpart requires the submittal of a Specific Cause Analysis (SCA) for flare events (excluding planned startup, shutdown, and turnaround) exceeding certain criteria specified in 1118(c)(1)(D)(i-iii). The subject flare only receives vent gases generated during planned startups and shutdowns. This requirement does not apply.

(E) This subpart requires the submittal of relative cause analyses for any other flare events where more than 5,000 scf vent gas are combusted. The subject flare only receives vent gases generated during planned startups and shutdowns. This requirement does not apply.

The subject flare is classified as a "clean service flare" under Rule 1118, as it is designed to combust natural gas and other gases with a fixed composition.

Chevron has submitted a Revised FMRP to the District for approval, as required by 1118(f)(1)(A). This plan was received on 6/30/06 and is currently under evaluation by District staff under A/N 458606.

Chevron stated in their application that their Rule 1118 FMRP currently under evaluation would be revised to include the proposed modification. The District engineer currently assigned to evaluate Chevron's Rule 1118 FMRP was advised to expect this revision.

The proposed modification does not affect Rule 1118 applicability or compliance. Continued compliance with the requirements of this rule is expected.

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

2/6/09

The purpose of this rule is to control VOC leaks from components and releases from atmospheric process pressure relief devices. It applies to components at refineries, chemical plants, lubricating oil and grease re-finers, marine terminals, oil and gas production fields, natural gas processing plants, and pipeline transfer stations.

The flare pilot system is fueled exclusively on pipeline quality natural gas, which is exempt from the requirements of this rule per 1173(l)(1)(C). The hydrogen vent gas contains minimal VOC content and thus qualifies for the exemption in 1173(l)(1)(D), which excludes components that handle fluids with a VOC content less than 10% by weight. Therefore, the subject ground flare does not have any fugitive components subject to Rule 1173.

No new components subject to Rule 1173 would be installed as a result of the proposed modification.

REG XIII: NEW SOURCE REVIEW (NSR)

This regulation applies to new, modified, or relocated sources that increase emissions of any nonattainment air contaminants, ammonia, or ozone-depleting compounds. The South Coast Air Basin is currently in attainment for NO_2, SO_2, CO, and lead and nonattainment for VOC and PM10. VOC and NO_x are precursors for ozone, while VOC, NO_x, and SO_x are precursors for PM10. Therefore, emissions of NO_x, SO_x, PM10 and VOC are evaluated for compliance with NSR.

Note that at the time of the P/C evaluation, the SCAB was not yet in attainment for CO, thus CO emissions were evaluated under NSR. Also note that although Chevron is under RECLAIM for NO_x and SO_x emissions, gas flares are specifically exempted

from RECLAIM and therefore NO_x and SO_x emissions from the subject flare were evaluated under NSR.

Rule 1303: **Requirements**
12/6/02
This flare is subject to the Rule 1303 amendment dated 12/6/02, which was the current version at the time the original application for construction of this equipment was deemed complete on 6/1/06 (under A/N 457255). Note that this equipment is currently tagged with the 5/10/96 version of Rule 1303. The equipment will remain tagged with 5/10/96 as this is the federally enforceable SIP-approved amendment, but should also be tagged with 12/6/02 as shown in the proposed permit changes above.

(a)(1): Best Available Control Technology
BACT was triggered for the initial construction of this flare under A/N 457255. BACT was determined to be proper flare design and good combustion practice. The proposed modification does not result in an increase in emissions on a maximum daily or hourly basis, nor on a 30 day average basis. Therefore, BACT is not triggered for the proposed modification.

(b)(1): Modeling
Modeling was completed for the construction of this ground flare. See Reg. 13 evaluation for the P/C A/N 457255 in Attachment C. The modeling performed for the P/C resulted in concentrations below all relevant air quality standards. The proposed modification does not result in an increase in emissions on a maximum daily or hourly basis, nor on a 30 day average basis. Therefore, no further modeling is required.

(b)(2): Offsets
Chevron was exempted from providing offsets for the emissions from this equipment for initial construction under the Regulatory Compliance exemption in 1304(c)(4), as the subject ground flare was constructed solely to comply with Rule 407.

The proposed modification does not result in an actual increase in emissions on a maximum daily or hourly basis, nor on a 30 day average basis. Therefore, no new NSR requirements are triggered. Continued compliance is expected.

REG XIV: TOXIC AIR CONTAMINANTS

Rule 1401: **New Source Review of Toxic Air Contaminants**
9/10/10
This rule specifies limits for MICR, cancer burden, and noncancer acute/chronic hazard index for new permit units, relocations, or modifications to existing permit units which emit toxic air contaminants listed in Table I of this rule. This application is subject to the Rule 1401 version dated 9/10/10 (the current version when the subject application was deemed complete). Note that because toxic emissions are expected to increase on an annual basis as a result of the proposed modification, the current version of the Rule 1401 applies (rather than the version current at the time the application for construction of this equipment was deemed complete).

The subject ground flare passed a Tier 1 screening for acute risk and a Tier 2

assessment for cancer/chronic risk during the P/C process.

(d)(1) This subpart specifies that the cumulative increase in MICR due to a new, relocated, or modified permit unit may not be more than 1 in a million for equipment without T-BACT. The increase in emissions due to the proposed modification results in an increase in MICR of 0.13 in a million for residential receptors and 0.03 in a million for commercial receptors. Therefore, compliance with this subpart is demonstrated. Per the calculation requirements for modifications in 1401(f)(3), the increase in MICR was calculated using the cumulative increase in annual emissions between pre- and post- modification (averaged over 1 year to most accurately model the cancer risk). See Attachment D for calculations.

(d)(2) This subpart specifies that the cumulative increase in chronic hazard index (HIC) due to a new, relocated, or modified permit unit may not exceed 1.0 for any target organ. Table 7 below demonstrates that the proposed modification is in compliance with this requirement. Per the calculation requirements for modifications in 1401(f)(3), the increase in HIC was calculated using the cumulative increase in annual emissions between pre- and post- modification (averaged over 1 year to most accurately model the cancer risk). See Attachment D for calculations.

(d)(3) This subpart specifies that the cumulative increase in acute hazard index (HIA) due to a new, relocated, or modified permit unit may not exceed 1.0 for any target organ. Table 7 below demonstrates that the proposed modification is in compliance with this requirement. Per the calculation requirements for modifications in 1401(f)(4), the HIC was calculated using the maximum hourly emissions post-modification. See Attachment D for calculations.

Table 7 – Calculated Health Risk

Target Organs	Acute	Chronic	Acute Pass/Fail	Chronic Pass/Fail
Alimentary system (liver) - AL		4.44E-07	Pass	Pass
Bones and teeth - BN			Pass	Pass
Cardiovascular system - CV			Pass	Pass
Developmental - DEV	1.79E-04	2.19E-06	Pass	Pass
Endocrine system - END		4.44E-07	Pass	Pass
Eye	3.66E-02		Pass	Pass
Hematopoietic system - HEM	1.76E-04	1.63E-06	Pass	Pass
Immune system - IMM	1.76E-04		Pass	Pass
Kidney - KID		4.44E-07	Pass	Pass
Nervous system - NS	2.26E-06	1.78E-06	Pass	Pass
Reproductive system - REP	1.79E-04		Pass	Pass
Respiratory system - RES	5.90E-03	9.90E-05	Pass	Pass
Skin			Pass	Pass

As demonstrated by the calculations in Attachment D, the proposed modification would be in compliance with all requirements of Rule 1401 (note that the spreadsheets shown in Attachment D reflect two different risk assessments—one utilizing the increase in total annual emissions to determine the increase in cancer and chronic risk, and one utilizing the maximum hourly emissions to determine the acute risk).

Any increased health risk as a result of the modification would remain within compliance with District limits. Continued compliance is expected.

REG XVII: PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

The goal of PSD is to ensure that air quality in clean areas does not significantly deteriorate while maintaining a margin for future industrial growth. It applies to net emission increases of criteria air pollutants that are currently in attainment. The District recently signed a new Limited PSD Delegation agreement with EPA (effective July 26, 2007) that gives the District limited responsibility for PSD. The South Coast Air Basin is currently in attainment for NO_2, SO_2, CO, and lead.

A recent EPA Endangerment Finding for greenhouse gases (GHG) means that emissions of GHG need to be evaluated under PSD. Note that ambient air quality standards have not yet been released for GHG. Therefore, as the South Coast Air Basin is *not* in *non*attainment, GHG emissions are also subject to PSD in South Coast.

The newly-promulgated Tailoring Rule specifies that GHG emissions must be evaluated under PSD for permits issued after January 2nd, 2011 for projects at existing PSD or Title V sources in South Coast according to a phased-in applicability time frame. The subject equipment is located at a Title V facility (Chevron was issued an initial Title V permit effective 9/1/09). Note that because this modification is expected to take place after July 1, 2011, the Tailoring Rule Step 2 would apply. This means that a significant emission increase of GHGs can itself trigger PSD for modifications (rather than only being evaluated as a part of "anyway" modifications that trigger PSD due to increases in other regulated pollutants).

The increase in annual emissions on a ton per year basis is shown below in Table 8, along with the PSD modification significance thresholds. See Attachments B and E, as well as the Calculations section above for more details.

Table 8 – PSD Applicability Determination

Pollutant	Pre-Modification Emissions (tpy)	Post-Modification Emissions (tpy)	Emissions Increase (tpy)	PSD Significance Threshold (tpy)	Exceed Threshold?
CO	2.52	5.03	+2.52	100	No
NOx	3.31	6.61	+3.31	40	No
PM10	0.03	0.06	+0.03	15	No
ROG	0.03	0.06	+0.03	N/A	No
SOx	0.00	0.01	0.00	40	No
GHG	1,908	3,817	+1,908	75,000	No

Because all emission increases for attainment pollutants are below the significance thresholds, PSD is not triggered for the proposed modification. Further analysis under Reg. 17 is not required.

Note that the original construction of this equipment also did not trigger PSD (see PSD determination from EPA in Attachment E).

REG XX: REGIONAL CLEAN AIR INCENTIVE MARKET (RECLAIM)

RECLAIM is a market incentive program designed to allow facilities flexibility in achieving emission reduction requirements for NO_x and SO_x. Chevron is currently subject to RECLAIM requirements for both NO_x and SO_x emissions. However, NO_x and SO_x emissions from gas flares are specifically exempted from the MRR requirements of RECLAIM under Rule 2001(i) and 2012(k). Therefore, the subject ground flare is not subject to any RECLAIM requirements.

REG XXX: TITLE V PERMITS

The Title V Permit system is the air pollution control permit system required to implement the federal Operating Permit Program as required by Title V of the federal Clean Air Act as amended in 1990. This regulation defines permit application and issuance procedures as well as compliance requirements associated with the program. Chevron was issued an initial Title V permit effective 9/1/09.

Because the proposed modification does not result in an increase in daily maximum emissions, but also does not meet any of the criteria for an Administrative Revision in District Rule 3000(b)(1), this application qualifies as a Title V Minor Revision per Rule 3000(b)(15). This means that EPA review of the draft permit is required, per Rule 3003(j)(1)(A). Public review is not required, per 3006(b). A copy of the final permit will also be submitted to the EPA within 5 working days of its issuance, per Rule 3003(j)(1)(E).

PART II: STATE REGULATIONS

CEQA: CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA requires that the environmental impacts of proposed projects be evaluated and that feasible methods to reduce, avoid, or eliminate identified significant adverse impacts of these projects be considered. CEQA defines "significant" by the following net emission increase thresholds (all in lbs/day):

ROG: 55 PM_{10}: 150 CO: 274

An Initial Study/Environmental Checklist was completed for the initial construction of the subject flare in 2006 and the project was determined to be exempt from further CEQA analysis.

Because the proposed modification does not increase the daily maximum emissions, no further CEQA review is required.

PART III: FEDERAL REGULATIONS

40CFR: PROTECTION OF ENVIRONMENT

Part 60: Standards of Performance for New Stationary Sources (NSPS)

Subpart A: General Provisions

This subpart lays out general requirements for affected sources under 40 CFR Parts 60 and 61 (NSPS). Note that the ground flare is not subject to the control device requirements listed in §60.18 of Subpart A, because it is not used to comply with any applicable subparts in 40 CFR Parts 60 and 61. See rule evaluations below for applicability discussion for individual subparts.

Subpart J: Standards of Performance for Petroleum Refineries

The ground flare is subject to the requirements of this subpart as a "fuel gas combustion device." §60.104 prohibits the combustion of fuel gas with H_2S in excess of 160 ppm in a fuel gas combustion device. However, §60.104(a)(1) specifically states that:

> *"The combustion in a flare of process upset gases or fuel gas that is released to the flare as a result of relief valve leakage or other emergency malfunctions is exempt from this paragraph."*

§60.101(a) defines process upset gas as:

> *"any gas generated by a petroleum refinery process unit as a result of start-up, shut-down, upset or malfunction."*

As the subject flare does not receive any gases other than "process upset gas" (startups and shutdowns), the 160 ppm H_2S limit in §60.104(a) does not apply. Note that the flare is subject to a similar 160 ppm H_2S limit under Rule 1118 and condition B61.11 (but also similarly exempted for startups and shutdowns).

The flare is therefore also exempt from the continuous monitoring requirements of Subpart J. The proposed modification does not affect this applicability determination.

The subject flare is not used as a control device to comply with this subpart so it does not trigger Subpart A applicability.

Subpart GGG: Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for which Construction, Reconstruction, or Modification Commenced After January 4, 1983, and on or Before November 7, 2006

Subpart GGG only applies to components in "VOC Service," which is defined as components which come into contact with streams containing greater than 10% VOC. None of the components associated with the hydrogen vent gas or natural gas streams combusted in the flare are in VOC service as defined above, and the ground flare is therefore not subject to any requirements in Subpart GGG, similarly to its exemption from Rule 1173. The proposed modification does not affect this applicability determination.

The subject flare is not used as a control device to comply with this subpart so it does not trigger Subpart A applicability.

Part 63: National Emissions Standards for Hazardous Air Pollutants (NESHAPS)

Subpart A: General Provisions

Similarly to Subpart A in Part 60, this subpart lays out general requirements for affected sources under 40 CFR Parts 63 (NESHAPS). Note that the ground flare is again not subject to the control device requirements listed in §63.11 of Subpart A, because it is not used to comply with any applicable subparts in 40 CFR Part 63. See rule evaluations below for applicability discussion for individual subparts.

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

This subpart applies to petroleum refining sources and related emission sources that are specified in §§63.640(c)(1)-(c)(8) 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. The vent gas streams directed to the subject ground flare are potentially defined as "miscellaneous process vents," which is a source listed in §63.640(c)(1). However the following exemption is included in the definition of miscellaneous process vents in §63.641:

Miscellaneous process vent means a gas stream containing greater than 20 parts per million by volume organic HAP… Miscellaneous process vents do not include:

> *(4) Episodic or nonroutine releases such as those associated with startup, shutdown, malfunction, maintenance, depressuring, and catalyst transfer operations;*

This means that the streams directed to the subject flare do not qualify as miscellaneous process vent gas streams since the flare only receives episodic and nonroutine streams generated during startups and shutdowns. The streams directed to the ground flare do not qualify as any of the other emissions sources listed in §§63.640(c)(1)-(c)(8) and are therefore not subject to the requirements of this subpart. The proposed modification does not affect this applicability determination.

Because the subject flare does not receive miscellaneous process vent streams, it cannot be considered a control device used to comply with this subpart under §63.643(a) so it does not trigger Subpart A applicability.

RECOMMENDATIONS:

The subject flare is currently in compliance with and the proposed modification is expected with all applicable District, State, and Federal rules and regulations. Permit to Construct is recommended with the conditions listed in the Conditions section above.