



SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
ENGINEERING AND COMPLIANCE DIVISION

ENGINEERING EVALUATION REPORT

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PROCESSED BY	Yan Yang
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AN413907 PC Alternation and PC to PO
AN284288 Cancellation

COMPANY NAME: Chevron Products Company
El Segundo Refinery

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

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

CONTACT PERSON: R. Mélida Escalante-Henricks
Permitting Engineer
Health, Environmental and Safety Department

EQUIPMENT DESCRIPTION:

TAME Plant will be renamed as C₅ Selective Hydrogenation Unit. The following equipment under Process 9/System 2 will be moved from Section H to Section D in the Title V permit. Additions and deletions are noted in underlines and ~~strikeouts~~, respectively. The current equipment under Process 9/System 2 will be deleted from Section H in the Title V permit.

SECTION D: FACILITY DESCRIPTION AND EQUIPMENT SPECIFIC CONDITIONS

FACILITY PERMIT SECTION D					
Equipment	ID No.	Connected To	RECLAIM Source Type	Emission* And Requirements	Conditions
Process 9: OXYGENATES PRODUCTION-SELECTIVE HYDROGENATION					P13.1
System 2: TAME PLANT C5 SELECTIVE HYDROGENATION UNIT					S11.1, S13.2, S15.7, S15.10, S31.14
COLUMN, FCC DEPENTANIZER, C-5700, HEIGHT: 167 FT ; DIAMETER: 16 FT A/N: 284288 Permit to Construct Issued: 11/18/93	D2093 (Re-used in Gasoline Splitter Unit)				
ACCUMULATOR, V-5700, DEPENTANIZER OVERHEAD, HEIGHT: 19 FT 9 IN; DIAMETER: 8 FT 6 IN A/N: 284288 Permit to Construct Issued: 11/18/93	D2096 (Re-used in Gasoline Splitter Unit)				
VESSEL, WATER WASHER, V-5725, HEIGHT: 32 FT ; DIAMETER: 7 FT A/N: 284288 <u>413907</u> Permit to Construct Issued: 11/18/93	D2099				



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FACILITY PERMIT SECTION D					
Equipment	ID No.	Connected To	RECLAIM Source Type	Emission* And Requirements	Conditions
Process 9: OXYGENATES PRODUCTION-SELECTIVE HYDROGENATION					P13.1
System 2: TAME PLANT C5 SELECTIVE HYDROGENATION UNIT					S11.1, S13.2, S15.7, S15.10, S31.14
VESSEL, COALESCER, V-5726, HEIGHT: 4 FT 5 1/2 IN; DIAMETER: 2 FT 2 IN A/N: 284288413907 Permit to Construct Issued: 11/18/93	D2100				
TANK, SURGE, C5 SELECTIVE HYDROGENATION, V-5730, HEIGHT/LENGTH: 39 FT 8 IN; DIAMETER: 10 FT A/N: 284288413907 Permit to Construct Issued: 11/18/93	D2101				
REACTOR, C5 SELECTIVE HYDROGENATION, R-5730, HEIGHT: 66 FT ; DIAMETER: 4 FT A/N: 284288413907 Permit to Construct Issued: 11/18/93	D2107				
REACTOR, PRIMARY, R-5740, HEIGHT: 28 FT ; DIAMETER: 10 FT A/N: 284288 Permit to Construct Issued: 11/18/93	D2018 (Re-used in Gasoline Splitter Unit)				
COLUMN, CATALYTIC DISTILLATION, C-5740, HEIGHT: 166 FT ; DIAMETER: 9 FT 6 IN A/N: 284288 Permit to Construct Issued: 11/18/93	D2110 (Re-used in Gasoline Splitter Unit)				
ACCUMULATOR, V-5740, CATALYTIC DISTILLATION COLUMN OVERHEAD, HEIGHT: 19 FT 9 IN; DIAMETER: 6 FT 6 IN A/N: 284288 Permit to Construct Issued: 11/18/93	D2112 (Re-used in Alkylate Depentanizer Unit)				
VESSEL, COALESCER, V-5741, CATALYTIC DISTILLATION COLUMN OVERHEAD, HEIGHT: 4 FT 5 IN; DIAMETER: 2 FT A/N: 284288 Permit to Construct Issued: 11/18/93	D2115				
COLUMN, METHANOL EXTRACTION, C-5750, HEIGHT: 53 FT 6 IN; DIAMETER: 5 FT 6 IN A/N: 284288 Permit to Construct Issued: 11/18/93	D2116				
VESSEL, COALESCER, V-5750, METHANOL EXTRACTION COLUMN OVERHEAD, V-5750, HEIGHT: 4 FT 3 IN; DIAMETER: 1 FT A/N: 284288 Permit to Construct Issued: 11/18/93	D2117				



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FACILITY PERMIT SECTION D					
Equipment	ID No.	Connected To	RECLAIM Source Type	Emission* And Requirements	Conditions
Process 9: OXYGENATES PRODUCTION-SELECTIVE HYDROGENATION					P13.1
System 2: TAME PLANT C5 SELECTIVE HYDROGENATION UNIT					S11.1, S13.2, S15.7, S15.10, S31.14
COLUMN, METHANOL RECOVERY, C-5760, HEIGHT: 115 FT 3 IN; DIAMETER: 9 FT A/N: 284288 Permit to Construct Issued: 11/18/93	D2118 (Re-used in Alkylate Depentanizer Unit)				
COLUMN, METHANOL RECOVERY, V-5760, HEIGHT: 15 FT 9 IN; DIAMETER: 6 FT A/N: 284288 Permit to Construct Issued: 11/18/93	D2122				
KNOCK OUT POT, METHANOL FLARE, V-5790, HEIGHT: 15 FT; DIAMETER: 8 FT A/N: 284288 Permit to Construct Issued: 11/18/93	D2125 (Re-used in Gasoline Splitter Unit)				
FILTER, K-5740, METHANOL A/N: 284288 Permit to Construct Issued: 11/18/93	D3417				
POT, DEPENTANIZER WATER DRAW OFF, V-5701, HEIGHT: 3 FT; DIAMETER: 2 FT A/N: 284288 Permit to Construct Issued: 11/18/93	D3419 (Re-used in Gasoline Splitter Unit)				
POT, CATALYTIC DISTILLATION COLUMN WATER DRAW OFF, V-5748, HEIGHT: 3 FT; DIAMETER: 2 FT A/N: 284288 Permit to Construct Issued: 11/18/93	D3421 (Re-used in Alkylate Depentanizer Unit)				
FUGITIVE EMISSIONS, MISCELLANEOUS A/N: 284288 <u>413907</u> Permit to Construct Issued: 11/18/93	D3639			HAP: (10) [40CFR 63 Subpart CC, #5A, 6-23-2003]	H23.19

Note: See Appendix B for other devices that were installed/constructed in connection with the above permit units and would not be identified or described in the permit per refinery permitting guidelines.

- **CONDITIONS** -

New are noted in bold & underlines. Additions are noted in bold and deletions in strikeouts.

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



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[40CFR 61 Subpart FF, 12-4-2003]
 [Processes subject to this condition : 9]

SYSTEM CONDITIONS:

S11.1 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-may-1995 for this facility.

This condition shall only apply to equipment listed in Section H of this facility permit.

[CA PRC CEQA, 11-23-1970]
 [Systems subject to this condition : Process 4, System 3; Process 8, System 1 , 7; ~~Process 9, System 2~~; Process 14, System 17; Process 20, System 24]

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 9, System 1, 2]

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 9, System 1, 2]

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.



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[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(b)(2)-Offset, 5-10-1996]
[Systems subject to this condition : Process 9, System 1 , 2]

S31.14 The following BACT requirements shall apply to VOC service fugitive components associated with the devices that are covered by application number(s) 284288, 284290, 289724, 290190, 292674, 326619, 329314 and 403039:

The operator shall provide to the District, no later than 60 days after initial startup, a recalculation of the fugitive emissions based on actual components installed and removed from service. The valves and flanges shall be categorized by size and service. The operator shall submit a listing of all new non-bellows seal valves which shall be categorized by tag no., size, type, operating temperature, operating pressure, body material, application, and reasons why bellows seal valves were not used.

All new valves in VOC service, except those specifically exempted by Rule 1173, shall be bellows seal valves for 2-inch and smaller sizes, except as approved by the District, in the following applications: heavy liquid service, control valve, instrument piping/tubing, applications requiring torsional valve stem motion, applications where valve failure could pose safety hazard (e.g., drain valves with valve stems in horizontal position), retrofits/special applications with space limitations.

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

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

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

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

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



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

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

[Systems subject to this condition : Process 9, System 1 , 2]

DEVICE CONDITIONS:

H. Applicable Rules

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 : D3639]

Additionally, the following conditions will be administratively modified as shown below to reflect the new name for Process 9/System 2.

S18.7 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 and Resid Conditioning (Process: 2, System: 1 & 5)
- FCCU (Process: 3, System: 1 & 5)
- Hydrotreating (Process: 4, System: 1, 7, 9, 11 & 13)
- Hydrogen Generation (Process: 6, System: 4)
- Alkylation (Process: 8, System: 1, 2, 5, 7, 8, 9 & 10)
- ~~Oxygenates Production~~ **C5 Selective Hydrogenation Unit** (Process: 9, System: 2)
- LPG Production (Process: 10, System: 1 & 2)
- Treating & Stripping (Process: 12, System: 2, 7, 9, 11, 13, 17, 22, 23, 25, 26, 27 & 28)
- Sulfur Production (Process: 13, System: 10 & 11)
- Air Pollution Control (Process: 20, System: 10, 19 & 34)
- Miscellaneous (Process: 21, System: 13, 14 & 18)

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

[Systems subject to this condition : Process 20, System 3 , 7 , 23]

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S18.13 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:

FCCU (Process: 3, System: 1 & 5)
 Alkylation (Process: 8, System: 8)
~~Oxygenates Production~~ **C5 Selective Hydrogenation Unit** (Process: 9, System: 2)
 Treating and Stripping (Process: 12, System: 17)

[RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(b)(2)-Offset, 5-10-1996]
 [Systems subject to this condition : Process 20, System 34]

COMPLIANCE RECORD REVIEW:

The AQMD's compliance database shows that Chevron El Segundo Refinery has been cited with eight Notices of Violation and three Notices to Comply within the last two years. Appendix A includes a list of the citations. All of the NOV's and NC's have been resolved to the satisfaction of the Executive Officer. District records do not indicate any outstanding compliance problem with the operation of the C₅ Selective Hydrogenation Unit (SHU).

BACKGROUND:

Chevron Products Company (Chevron) constructed and operated a TAME (tertiary amyl-methyl ether) plant under permit to construct (PC) A/N 284288 issued on November 18, 1993. The construction and operation of the TAME plant was part of a program to comply with the requirements of the Federal 1990 Clean Air Act Amendments and the California Air Resources Board (CARB) Phase II Reformulated Gasoline (RFG) Regulations. The TAME plant started up on December 13, 1994. It consisted of a C₅ prefractionation section, a C₅ pretreatment section and a TAME section. A brief process description of the TAME plant can be found in the engineering evaluation for A/N 284288.

With the implementation of Chevron's CARB Phase III Clean Fuels and phase out of TAME & ether-based oxygenates, the TAME plant was modified without obtaining a permit around January, 2003. The TAME production was shut-down. All equipment in the C₅ prefractionation section and some of the equipment in the TAME section were being reused in the newly constructed Gasoline Splitter Unit (A/N 413909). Other components in the TAME section were also being reused in Alkylate Depentanizer Unit (A/N 385373). Some of the equipment was completely taken out of service. The C₅ pretreatment section is the only remaining part of the original TAME plant. It continues to operate as permitted but now feeds only the Alkylation Unit. The equipment components for the original TAME plant and their current operations are shown in Table 1. Among a total of 19 pieces of equipment described in the TAME plant's permit, only five devices remain to operate as permitted. Chevron submitted the subject AN 413907 on May 20, 2003 for modifications to convert the TAME plant to C₅ SHU, which was the same operation of the previous C₅ pretreatment section.



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Table 1 – Current Status of TAME Plant Equipment

Equipment	ID No.	Current Operation
Process 9: OXYGENATES PRODUCTION		
System 2: TAME PLANT		
C ₅ prefractionation	COLUMN, FCC DEPENTANIZER, C-5700, HEIGHT: 167 FT ; DIAMETER: 16 FT	D2093 GASOLINE SPLITTER
C ₅ prefractionation	ACCUMULATOR, V-5700, DEPENTANIZER OVERHEAD, HEIGHT: 19 FT 9 IN; DIAMETER: 8 FT 6 IN	D2096 GASOLINE SPLITTER
C ₅ prefractionation	POT, DEPENTANIZER WATER DRAW-OFF, V-5701, HEIGHT: 3 FT ; DIAMETER: 2 FT	D3419 GASOLINE SPLITTER
C ₅ pretreatment	VESSEL, WATER WASHER, V-5725, HEIGHT: 32 FT ; DIAMETER: 7 FT	D2099 C ₅ SHU
C ₅ pretreatment	VESSEL, COALESCER, V-5726, HEIGHT: 4 FT 5 IN; DIAMETER: 2 FT	D2100 C ₅ SHU
C ₅ pretreatment	TANK, SURGE, C5 SELECTIVE HYDROGENATION, V-5730, HEIGHT: 39 FT ; DIAMETER: 10 FT	D2101 C ₅ SHU
C ₅ pretreatment	REACTOR, C5 SELECTIVE HYDROGENATION, R-5730, HEIGHT: 66 FT ; DIAMETER: 4 FT	D2107 C ₅ SHU
TAME	REACTOR, PRIMARY, R-5740, HEIGHT: 28 FT ; DIAMETER: 10 FT	D2108 GASOLINE SPLITTER
TAME	COLUMN, CATALYTIC DISTILLATION, C-5740, HEIGHT: 166 FT ; DIAMETER: 9 FT 6 IN	D2110 GASOLINE SPLITTER
TAME	ACCUMULATOR, V-5740, CATALYTIC DISTILLATION COLUMN OVERHEAD, HEIGHT: 19 FT 9 IN; DIAMETER: 6 FT 6 IN	D2112 ALKYLATE DEPENTANIZER
TAME	VESSEL, COALESCER, V-5741, CATALYTIC DISTILLATION COLUMN OVERHEAD, HEIGHT: 4 FT 5 IN; DIAMETER: 2 FT	D2115 OUT OF SERVICE
TAME – Methanol Recovery	COLUMN, METHANOL EXTRACTION, C-5750, HEIGHT: 53 FT 6 IN; DIAMETER: 5 FT 6 IN	D2116 OUT OF SERVICE
TAME – Methanol Recovery	VESSEL, COALESCER, V-5750, METHANOL EXTRACTION COLUMN OVERHEAD, V-5750, HEIGHT: 4 FT 3 IN; DIAMETER: 1 FT	D2117 OUT OF SERVICE
TAME – Methanol Recovery	COLUMN, METHANOL RECOVERY, C-5760, HEIGHT: 115 FT 3 IN; DIAMETER: 9 FT	D2118 ALKYLATE DEPENTANIZER
TAME – Methanol Recovery	COLUMN, METHANOL RECOVERY, V-5760, HEIGHT: 15 FT 9 IN; DIAMETER: 6 FT	D2122 UNDETERMINED
TAME	KNOCK OUT POT, METHANOL FLARE, V-5790, HEIGHT: 15 FT ; DIAMETER: 8 FT	D2125 GASOLINE SPLITTER
TAME	FILTER, K-5740, METHANOL	D3417 OUT OF SERVICE
TAME	POT, CATALYTIC DISTILLATION COLUMN WATER DRAW-OFF, V-5748, HEIGHT: 3 FT ; DIAMETER: 2 FT	D3421 ALKYLATE DEPENTANIZER
	FUGITIVE EMISSIONS, MISCELLANEOUS	D3639 C ₅ SHU



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The purpose of the C₅ SHU is to reduce the dienes present in the overhead stream of the FCC Depentanizer Column (C-5700) in the Gasoline Splitter Unit by the selective hydrogenation. The C₅/C₆ light gasoline overhead stream from the FCC Depentanizer Column first passed to Water Washer V-5725 to extract the residual nitrile compounds, which would poison the catalysts in the downstream process, from the light gasoline stream. Free water is removed in Water Coalescer V-5726. The light gasoline stream is sent to C₅ Selective Hydrogenation Surge Drum V-5730. C₅ Selective Hydrogenation Feed Pump P-5730 or P-5730A feeds the light gasoline from V-5730 through Reactor Feed/Effluent Heat Exchangers E-5730A/B/C and E-5733A/B and then the 150 psig Steam Preheater E-5734 on the way to Selective Hydrogenation Reactor R-5730. The hydrogen is injected upstream of the heat exchanger E-5730. In the reactor, dienes in the feedstock are hydrogenated to olefins. The complete list of the equipment in the C₅ SHU and the updated set of P&IDs are included Appendix B.

Exiting the bottom of the reactor, the reactor effluent is sent to E-5733A/B and then previously to the TAME section when the TAME plant was in operation. Since the Alkylation unit was built in 1994/1995 and started up in early 1996, the effluent of the C₅ SHU's reactor has also provided the feed for the Alkylation unit. After shutdown of the TAME, C₅ SHU output continued going to the Alkylation unit through existing heat exchangers E-5733A/B, E-5730A/B/C and E-5735 for cooling purposes. With less dienes in the feed stream to the Alkylation unit, the acid consumption of the process is beneficially reduced. The reaction also transforms an unreactive isoamylene compound into a reactive one to increase yield for the alkylation process.

As specified by condition S18.13, the process vents of C₅ SHU are discharged to the refinery fuel gas system via the FCCU Vapor Recovery Unit, which utilizes four motor-driven reciprocating compressors. In emergencies, the process vents are routed to the FCCU Flare as required by condition S18.14. The locations of the process vents are shown in Table 2 below.

Table 2 – Locations of Process Vents in C₅ SHU

Location of Process Vent	Identification	Size
V-5725	PSV 5023	3" x 4"
V-5726	PSV 5024	1" x 2"
V-5730	PSV 5003	3" x 4"
V-5730	Vent	1½"
R-5730 Inlet	PSV 5002	2" x 3"
E-5730A/B/C Tubeside	PSV 5000	¾" x 1"
R-5730 Outlet	Drain	6"
E-5735 Shell	PSV 5005	2" x 3"
E-5730A/B/C Shell	PSV 5057	2½" x 4"

PERMIT CONDITION COMPLIANCE REVIEW

Non-BACT (Bellows Seal) Valves

A final list of all the new valves installed in VOC service under A/N 284288 in the TAME plant was provided by Chevron on February 9, 1995. Note that only new valves in VOC service for 2-inch and smaller sizes shall be bellows seal valves per Condition S31.14. A list of the non-bellow seal valves that are in the C₅ SHU are shown in the Table 3. The non-bellow seal valves are control valves, which are not required to be bellow-sealed valves. As shown later, BACT is not required the

modifications under A/N 413907 because the shutdown of the TAME production results in an emission decrease.

Table 3 – Non-BACT (Bellows Seal) Valves in C₅ SHU

Tag No.	Size (inch)	Type	Operating Temperature (F)	Operating Pressure (psig)	Body Material	Application	Reason Bellows Seal Not Used
00536.1	1½	Flow Control	100	300	Steel	FV020, Bypass C ₅ SHU Feed	Control Valve
03763.1	2	Flow Control	95	100	Steel	HV034, Startup Recycle to V-5730	Control Valve
00445.1	1	Pressure Control	100	24	Steel	PV022B, V-5730 Back Pressure	Control Valve

EMISSIONS:

Criteria Pollutant Emissions

The fugitive VOCs are the main air pollutants emitted from the C₅ Selective Hydrogenation Unit. Table 4 shows the number of the fugitive component by category and the calculation of the post modification fugitive emission for the entire TAME plant permitted under A/N 284288. The post modification of the fugitive emission was determined to be about 41.66 lb/day from 3550 components. These numbers were derived from the original P&ID's and in-plant inspections. The calculations use the new fugitive 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). The same information provided by Chevron is also included in Appendix C.

Table 4 – Recalculated Fugitive Emission for New TAME Plant (A/N 284288)

Source Unit		Service	Emission Factor lb/yr	TAME Plant Total Count		Reused Component Count	
				Component	Emission lb/yr	Component	Emission lb/yr
Valves	Sealed bellows	All	0	673		1	
	SCAQMD Approved I&M Program	Gas/Vapor	4.55				
		Light Liquid	4.55	379	1722.84		
		Heavy liquid	4.55				
Pumps	Double Mechanical Seals or Equivalent Seals	Light Liquid	46.83	13	608.73		
Flanges	ANSI/API standards	All	6.99	1270	8877.53	152	1062.51
Connectors		All	2.86	1133	3241.95	3	8.58
PRVs	Closed vent system	All	0	22			
Drains	P-Trap or Seal Pot	All	9.09	60	545.8		
Total counts				3550		156	
Annual Emission, lbs/yr					14996		1071
Hourly Emission = (Annual)/(52×7×24), lb/hr					1.72		0.12
Daily Maximum = (Annual)/(52×7), lbs/day					41.20		2.94
30-day Average = (Annual)/(12×30), lbs/day					41.66		2.98

The construction of the TAME Plant included the use of existing equipment and piping (mostly from the Aromatic Recovery Plant). The information on reused equipment together with its prior location and service designation was provided by Chevron and shown in Table 5. The reused equipment



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contributed 156 components and 2.98 lb/day of fugitive emissions. However, the reused 156 components included only a few valves and flanges. Many reused components in the existing piping were not counted. Therefore, the emission from the reused components was under estimated. The calculation of the emission from these reused components is also shown in Table 4 and in Appendix C. Consequently, the emission increase (30-day average) due to the installation of the TAME plant is 38.68 lb/day (41.66 – 2.98 lb/day) based on the current counts. In the Permit to Construct (PC) evaluation for the new TAME plant (AN 284288), the fugitive VOC emission increase was estimated at 28.58 lb/day using the old fugitive emission factors with BACT (1993).

Table 5 – Reused Equipment in New TAME Plant

Reused Equipment	Origin	ID No.
C-5700	ARP C-101	D2093
C-5740	ARP C-102	D2110
C-5760	ARP C-103	D2118
E-5707	POX E-221A	
E-5767	ARP E-125B	
V-5700	ARP V-101	D2096
V-5730	POX V-203	D2101
V-5740	ARP V-102	D2112
V-5760	ARP V-103	D2122
V-5790	ARP V-111	D2125

Table 6 shows the calculations for the post modification VOC fugitive emissions for the TAME Plant as it is being converted into the C₅ SHU. The calculations are based on actual inventory of the remaining section of the TAME plant after the TAME production was shutdown. A total of 826 fugitive components are counted in the C₅ SHU. The fugitive emission (30-day average) is estimated at 9.33 lb/day for the C₅ SHU. As a result, the conversion to C₅ SHU results in an emission decrease of 32.33 (41.66 – 9.33) lbs/day.

Table 6 – C₅ SHU Fugitive Emission (Post-Mod of TAME Plant A/N 413907)

Source Unit		Service	Emission Factor lb/yr	Baseline	
				Counts	Emission lb/yr
Valves	Sealed bellows	All	0	160	
	SCAQMD Approved I&M Program	Gas/Vapor	4.55		
		Light Liquid	4.55	80	363.66
		Heavy liquid	4.55		
Pumps	Double Mechanical Seals or Equivalent Seals	Light Liquid	46.83	2	93.65
Flanges	ANSI/API standards	All	6.99	291	2031.14
Connectors		All	2.86	278	795.46
PRVs	Closed vent system	All	0	7	
Drains	P-Trap or Seal Pot	All	9.09	8	72.72
Total counts				826	
Annual Emission, lbs/yr					3359.63
Hourly Emission = (Annual)/(52×7×24), lb/hr					0.38
Daily Maximum= (Annual)/(52×7), lbs/day					9.23
30-day Average = (Annual)/(12×30), lbs/day					9.33



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Toxic Air Contaminant (TAC) Emissions and Health Risk Assessment (HRA)

Benzene is the main TAC expected to be emitted from the TAME plant's operation. The fugitive benzene emission due to the installation of the TAME plant was estimated to be 38.9 lb/year. (See details in the PC evaluation of A/N 284288) The Industrial Source Complex Short Term model, version 2 (ISCST2) was used to predict ground-level concentrations of benzene due to emission from the source. The Maximum Individual Cancer Risk (MICR) was determined to be below the threshold in the Rule 1401. Since VOC emissions decrease, benzene emissions are also expected to decrease as the result of converting the old TAME Plant into the current C₅ SHU under A/N 413907.

RULE EVALUATION:

PART 1: SCAQMD REGULATIONS

Rule 212: Standards for Approving Permits and Issuing Public Notice

Amended
11/14/97
There was an emission increase of 38.68 lb/day of VOC due to the installation of the TAME plant permitted under AN 284288. However, as part of Chevron's RFG project, the requirement for public notices was determined based on the emission changes associated with the entire RFG project. No public notice was issued because there is no school within 1000 feet of the project site; there is no increase in toxic emission; and the entire RFG project didn't result in an emission increase which is higher than the daily maximum threshold.

The shutdown of TAME production permitted under AN 413907 resulted in a VOC emissions decrease of 32.33 lb/day. There is no TAC emission increase for this system due to the shutdown of the TAME production. Therefore, a public notice is not required for AN 413907.

Rule 401: Visible Emissions

Amended
11/9/01
The C₅ SHU is not expected to result in visible emissions under normal operating conditions. Compliance is expected.

Rule 402: Nuisance

Adopted
5/7/76
Nuisance complaints are not expected under normal operating conditions. Compliance is expected.

Rule 1123: Refinery Process Turnaround

Amended
12/7/90
The refinery is subject to the requirements of this rule during a process turnaround. The C₅ SHU is expected to comply with this rule in future process turnarounds.

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

Amended
2/6/09
Chevron has an on-going Leak Detection And Repair (LDAR) program to meet all applicable requirements of the rule, such as: Identification Requirements (e), Operator Inspection Requirement (f), Maintenance Requirements (g), Atmospheric Process PRD Requirements (h), Recordkeeping and Reporting Requirements (i), and Test Methods. All of the fugitive components in C₅ SHU are expected to comply with to this rule.



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REG XIII New Source Review

1301 General

Amended The modifications of TAME plant caused the issuance of VOC at the refinery.
12/7/95 Therefore, they were subject to this rule.

1303 Requirements

Amended Best Available Control Technology (BACT)

12/6/02 The addition of TAME plant (permitted under AN 284288) resulted in an increase of VOC about 38.68 lb/day. Therefore, any new or replacement fugitive components to be installed on this system were required to have BACT as indicated in S31.14. The compliance with this requirement was evaluated in the section of "PERMIT CONDITION COMPLIANCE REVIEW" above. Compliance with this rule is expected.

The shutdown of TAME production permitted under AN 413907 resulted in an emission decrease. BACT is not required.

Offset

For AN 413907, no emission offset was required. For AN 284288, see the evaluation of Rule 1304.

1304 Exemptions

Amended The emission increase due to the initial installation of the TAME plant was exempt
6/14/96 from offset per Regulatory Compliance section in Rule 1304 (c)(4).

1306 Emission Calculations

Amended The BACT adjusted fugitive emission reduction due to the shutdown of the TAME
12/6/02 production is less than the offsets obtained pursuant to the exemption provisions of Rule 1304 for the initial installation of TAME plant. No further emission reduction credit (ERC) should be given to Chevron per Rule 1306 (e)(3). It was confirmed with Chevron that no ERC was applied for the shutdown of the TAME plant.

Rule 1401 New Source Review of Toxic Air Contaminants

Amended The TAME plant emitted benzene, which is a toxic air contaminant listed in Table 1 of
2/7/03 Rule 1401. Therefore, the facility is subject to all applicable requirements of this rule. The application AN 413907 for the modification was deemed completed on April 22, 2003. As a result, the facility is subject to the version of this rule that was amended on February 7, 2003.

The cumulative MICR of the TAME plant including permit unit within 100 meters was estimated to be 8.6×10^{-7} . Therefore, the TAME plant was expected to comply with this rule. There was no cumulative increase in MICR for the modifications due to the shutdown of the TAME production. The C₅ SHU is expected to comply with all applicable requirements of this rule.



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REG XVII Prevention of Significant Deterioration (PSD)

Amended
8/13/99

The proposed project will only impact VOC emissions at this facility. VOC is not an attainment pollutant for the South Coast Air Basin. Therefore, PSD analysis is not required.

REG XXX Title V

Chevron El Segundo Refinery is subject to Reg XXX, and a Title V permit for the facility was issued on September 1, 2009. This issuance of the final PO permits to the C₅ SHU is considered a Minor Revision under Rule 3000. The modification made to P9S2 does not require any significant change in monitoring terms or conditions in the permit; does not require relaxation of any recordkeeping, or reporting requirement, or term, or condition in the permit; does not result in an increase in emissions of any pollutant; and 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. Accordingly, the proposed revision is subject to the 45 day EPA review process, but not the public noticing requirements under Rule 3006.

PART 2: STATE REGULATIONS

CEQA California Environmental Quality Act

AN 284288

The addition of TAME plant was part of Chevron's Reformulated Gasoline Project, which was determined to have a significant effect on the environment. The Environmental Impact Report (EIR) was prepared by Chevron and certified by the District on October 25, 1993. Details can be found in the PC evaluation of this application.

AN413907

The shutdown of the TAME production has no possibility to cause a significant adverse effect on the environment. Therefore, the expected impacts of the project on the environment are not significant and preparation of an EIR is not required.

PART 3: FEDERAL REGULATIONS

40CFR 60 STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

Subpart 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

GGG

The equipment in C₅ SHU which are subject to this subpart include valves, pumps, pressure relief devices, sampling connectors, open-ended valves or lines. It requires monthly inspection for valves in gas and light liquid services against quarterly inspection by Rule 1173. In general, the equipment leak inspection and monitoring requirements of District Rule 1173 are more stringent than requirements specified at §60.482-1a through §60.482-10a. However, pertinent requirements will be incorporated into Chevron's leak detection and repair (LDAR) Program for fugitive components. Compliance with this regulation is expected.



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40CFR 63 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES

Subpart CC National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries

It was determined that D3639 (Miscellaneous Fugitive Emissions, in Process 9, system 2) contains fugitive leak components that are in "organic HAP service" as defined at §63.641 of this regulation. So C₅ SHU is subject to this regulation. It is required to comply with the requirements described in the Section J in the Facility Permit under 40CFR 63 Subpart CC, #5A 6-23-2003. Continued compliance with these requirements is expected.

RECOMMENDATION/CONCLUSION:

Issue Permit to Operate for the C₅ SHU subject to the conditions indicated on pages 3 to 7.