

**CHEVRON REFINERY
ANNUAL COMPLIANCE REPORT
2001
PLANT #10**



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

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CHEVRON REFINERY ANNUAL REPORT, PLANT #10

January 1, 2001 – December 31, 2001

INTRODUCTION

The Bay Area Air Quality Management District (BAAQMD) Enforcement Division is committed to making an annual report to the community to review and discuss the compliance status of major petrochemical facilities within the District. The following report is a summary of District enforcement activities at the Chevron Refinery during the period of January 1, 2001 through December 31, 2001.

FACILITY SUMMARY

The Chevron Refinery in Richmond operates a 250,000 barrel per day petroleum refinery manufacturing automobile, aviation, and bunker fuels, lube oils, home and industrial fuels and propylene/polymer base stocks. The facility is permitted with the BAAQMD for the operation of approximately 600 sources, which include processing units, waste treatment units, distribution facilities, tankage, and larger pumps and compressors.

The processing units include a crude unit, 10 hydrotreating and cracking units, a fluid catalytic cracker, 2 gasoline reformers, an alkylation plant and propylene polymer plant. The facility's sulfur removal system includes 3 sulfur removal plants, 3 sulfur recovery units, and 2 sour water treatment units. The refinery wastewater treatment system consists of 3 oil/water separators and a bioreactor. Rail and truck loading facilities are used for the transfer of liquid petroleum gas (LPG), lube oils, sulfur, and ammonia. A marine vessel loading facility consists of 6 berths, 4 of which are equipped with vapor recovery. Tankage is used for storage of crude oil, intermediate stocks, product and waste.

The BAAQMD enforces regulations found in the Code of Federal Regulations (CFR), the California Health and Safety Code and the District's Rules and Regulations. In addition to regulatory enforcement, the District regularly works with facilities to achieve federal, state and local standards by conducting workshops, office conferences, public meetings and complaint investigations. This report serves as a summary of activities including Notices of Violation (NOVs) issued, complaints, episodes, inspections, office conferences, and variances.

COMPLIANCE STATUS

During the reporting period, Chevron was visited by District inspectors an average of 3 to 4 hours per day, two to four days per week. These visits included inspections of sources, episode investigations, complaint follow-up and the issuance of NOVs. The Compliance and Enforcement Division field engineers work with field inspectors during episode investigations. The Technical Services Division conducts stack source tests, and routinely audits all Continuous Emission Monitors (CEM) and Ground Level Monitors (GLM).

NOTICES OF VIOLATION

When a violation of a regulation is documented, a NOV is issued and a penalty is assessed. Eighteen NOV's were issued between January 1, 2001 and December 31, 2001, which represented 19 violations. There were three violations of: Regulation 9, Rule 2 (GLM excess H₂S), two for Regulation 8, Rule 18 (fugitive emission leaks on valves and connectors), three for Regulation 8, Rule 5 (excessive emissions from storage tanks), three for violation of Regulation 10 H₂S in Fuel Gas, four violations of Regulation 1 and three for Regulation 2, Rule 1 (permit to operate).

SEE THE ATTACHED CHRONOLOGICAL SUMMARY OF VIOLATION ACTIVITY ON PAGE 6.

DISCUSSION OF SIGNIFICANT VIOLATIONS – (Public Nuisance)

There were no Public Nuisance violations during this reporting period.

COMPLAINT SUMMARY

The District maintains a toll-free number for lodging complaints on odors, smoke, soot, fire, dust, and other potential air contaminants. Complaints are also received by referral from the Environmental Protection Agency (EPA), the California Air Resources Board (CARB). There were 33 complaints alleged against Chevron during the period of January 1, 2001 through December 31, 2001. Of these, one was confirmed and 32 were unconfirmed. These complaints can be categorized as follows:

Category:	<u>ODOR</u>	<u>SMOKE</u>	<u>OTHER</u>	<u>TOTAL*</u>
Confirmed:	0	1	0	1
<u>Unconfirmed:</u>	<u>20</u>	<u>11</u>	<u>2</u>	<u>33</u>
Total	20	12	2	34

EPISODES

The District requires Chevron to maintain and operate GLM's and CEM's. Chevron currently has 3 GLM stations, each monitoring for H₂S and SO₂. A CEM for refinery fuel-gas monitors the H₂S content and total reduced sulfur. Three SRU's have monitoring for SO₂ and the two Cogeneration plants have NO_x and CO monitors.

The District assigns episode numbers to reported equipment breakdowns, monitored emission excesses, parametric monitors, inoperative monitors, and to Pressure Relief Valve (PRV) venting. These episodes are investigated by District inspectors for compliance with applicable regulations. The District's Technical Division evaluates continuous emission monitor excesses, to determine if a violation has occurred. Between January 1, 2001, and December 31, 2001, there were three NOV's issued for CEM excesses and three GLM excesses. There were; 0 reported breakdowns, 12 CEM excesses, 3 GLM excess, 2 parametric and 88 inoperative monitor reports.

INSPECTIONS

The District has established a compliance verification inspection frequency for all sources. This varies from 6 months for loading racks, 12 months for process units and tankage, 18 months for combustion sources, and 24 months for exempt sources. One District inspector is assigned to Chevron for conducting compliance inspections, episode investigations, and responding to citizen complaints. The inspector conducts daily odor patrols around Chevron and reviews all monitor charts weekly. Chevron conducts daily inspections for fugitive emissions and daily calibrations on all emission monitors.

OFFICE CONFERENCES

The District conducts Office Conferences when three NOV's are issued to the same source within a 12-month period or when a significant episode occurs. The purpose is to discuss the severity of the violations, to develop a plan for corrective action, and to prevent future violations. Variations from this policy are at the discretion of District management. There were no Office Conferences held during this reporting period.

VARIANCES

A facility may request variance relief for a violation of any regulation if legal requirements are met. The variance cases are presented before the District's Hearing Board. For 2001 there were none.

COMPARISON TO PREVIOUS YEARS

<u>Complaints</u>	<u>2001</u>	<u>2000</u>	<u>1999</u>
Confirmed	1	0	24
Unconfirmed	<u>33</u>	<u>37</u>	<u>48</u>
Total	34	37	72

<u>Notices of Violation</u>	<u>2001</u>	<u>2000</u>	<u>1999</u>
Miscellaneous Operations	0	2	2
Storage tanks	3	1	2
Valve & connectors	2	2	15
Visible emissions/Opacity	0	2	5
H ₂ S in fuel gas	0	2	0
Regulation 1- 522 & 523	4	0	5
Oil/Water Separator	0	2	3
Public nuisance	0	0	2
SO ₂ (9-1-307)	0	1	1
GLM excess (H ₂ S)	3	0	0
Permit Condition	3	5	8
Regulation 10	3	0	1
Marine Loading	<u>0</u>	<u>0</u>	<u>1</u>
Total	18	18*	45

** Note the 2000 year was updated with NOV's issued during 2001 that occurred in 2000.*

<u>Episodes</u>	<u>2001</u>	<u>2000</u>	<u>1999</u>
Breakdowns	0	2	1
CEM	12	23	7
GLM	3	0	0
Out-of-service	88	62	34
Parametric	2	0	0
PRV	<u>0</u>	<u>1</u>	<u>1</u>
Total	105	88	43

SIGNIFICANT PERMIT ACTIVITY

No significant permit activity occurred during this reporting period.

SUMMATION OF THE YEAR'S COMPLIANCE

In summary, Chevron's compliance was good during this reporting period. The refinery received no Public Nuisance Notices of Violation for this or last years, reporting period. The overall number of complaints was slightly down from 37 to 34. The number of NOV's were eighteen during this reporting period, the same as last year. District staff will continue to closely monitor refinery activity to assist Chevron to enhance compliance.

*There were eight NOV's issued during this reporting period that occurred in the 2000 reporting period.

NOTICES OF VIOLATION – 2001

NOV #	Occurrence Date	Regulation(s)	Problem (Reason)	Corrective Action (Remedy)
09408	2/04/01	8-18-304	Connector Leak not repaired with in 7 days.	repaired on 8 th day, work order oversight
09409	5/16/01	8-18-303	2 equipment leaks, missing bull plug, braided hose	Leaks fixed same day
09412	2/10/01	9-2-301	Unknown – maybe vacuum Trk.	Chevron said “maybe Vac. Truck”
09413	2/13/01	9-2-301	Unknown – maybe vacuum Trk.	Chevron said “maybe Vac Truck”
09414	4/05/01	9-2-301	Unknown	Chevron said “No cause determined”
09421	3/18/01	10	Plant Upset	Upset brought under control
10629	9/06/01	8-5-320.2	Missing gasket on well	Install gasket on well
10630	9/06/01	8-5-322.1&.5	2 ft. gap & missing bolt on seal	Install bolt & adjust secondary seal
16031	9/24/01	8-5-320.2	Vacuum breaker missing gasket	Install gasket
10632	10/23/01	2-1-307	Pump leaks 126 A & B	Repair pump seals on 126 A & B
12967	5/11/01	2-1-307	8-hr NOx exceeded, bad NH3	Replaced NH3
10639	6/30/01	10	H2S fuel gas upset 4 Crude Unit	Reduce feed rates
10636	6/30/01	10	H2S fuel gas upset 4 Crude Unit	Reduce feed rates
10638	12/17/01	2-1-307	NOx excess, NH3 injection problem	Repaired control valve

CHEVRON REFINERY ANNUAL REPORT – NON EMISSION RELATED NOV'S 2001

NOV #	Occurrence Date	Regulation(s)	Problem	Remedy
09422	4/17/01	1-522.4	Failure to report instrument malfunction	Report malfunction, implement new procedure
10633	2/6/01	1-522.4	Failure to report instrument malfunction	Report malfunction, implement new procedure
10634	8/20/01	1-522.4	Failure to report instrument malfunction	Report malfunction, implement new procedure
10635	6/25/01	1-522.4	Failure to report instrument malfunction	Report malfunction, implement new procedure

CHEVRON'S CONTINUOUS EMISSION MONITORING LIST

SOURCE	PARAMETER	FULL SCALL	REGULATION	REG LIMT
Cogen No.1 Cogen No.2	NO _x O ₂ CO	0-25, 0-250 ppm (dry) 0-15% (dry) 0-100 ppm (dry)	2-1-307	10 ppm @ 15% O ₂ / 3 hour average
Denox 1251 Denox 1361 Denox 1551	NO _x O ₂	0-100 ppm (dry) 0-25% (dry)	2-1-307	40 ppm @ 3% O ₂ for 8 hour average
FCCU-COB	NO NO SO ₂ SO ₂ Flow LTA	0-1000 ppm (wet) 0-1000 lb/day 0-1000 ppm (wet) 0-5000 lb/day 0-400,000 DSCFM 0-50% (opacity) ?	9-1-310 6-302	1000 ppm, assume 20% H ₂ O 20% for 3 minutes
COB AUX	LTA	?	6-302	20% for 3 minutes
Fuel Gas System V-475 V-701 V-870	H ₂ S	0-300 ppm (dry)	10 – 60.104(a)(1)	160 ppm for 3 hour average
SRU # 1 SRU # 2 SRU # 3	SO ₂ SO ₂ SO ₂	750 ppm (wet) 5000 lb/day 500 ppm (wet) 3000 lb/day 500 ppm (wet) 3000 lb/day	9-1-305	250 ppm @ 0% O ₂

**GLM NETWORK – FACILITIES REQUIRED BY REGULATION TO MAINTAIN
GLM'S**

<u>COMPANY SITE</u>	<u>SITE LOCATION</u>	<u>MONITORED Pollutants</u>
<u>Chevron USA</u>		
Castro Street	Castro St. at Gate 115	SO ₂ , H ₂ S
Gertrude Avenue	W. Gertrude Ave.	SO ₂ , H ₂ S, wind
Golden Gate Avenue	W. end of Golden Gate Ave.	SO ₂ , H ₂ S
<u>Valero</u>		
GLM #1 Exxon	E. 2nd at I-680	SO ₂ , H ₂ S
GLM #2 Warehouse	Benicia Industrial Prkwy.	SO ₂ , H ₂ S
GLM #3 WWT Office	Mallard at Industrial Prkwy. Admin. Bldg., E. 2 nd	SO ₂ , H ₂ S Wind
<u>Shell Martinez Refining Co.</u>		
H ₂ S #1	Near 1622 Shell Ave.	H ₂ S
SO ₂ #2, H ₂ S #2	Pacheco Blvd. at Wygal Dr.	SO ₂ , H ₂ S
H ₂ S #4	Refinery waste ponds	H ₂ S
H ₂ S #3	Shell/Mt. View STP boundary	H ₂ S
LDU	Central refinery	Wind
10 m	East of LOP Flare	Wind
<u>Ultramar, Avon</u>		
Chenery	Old Filter Plt. - N. Mallard Res.	SO ₂ , H ₂ S
Martinez Gun Club	E. end Arthur Rd.	SO ₂
Pacheco Slough	Waterfront Rd. at Pacheco Slough	H ₂ S
Waterfront Rd.	Waterfront Rd. at Clean canal	SO ₂ , H ₂ S
Avon Coker	S. refinery near Solano Way	Wind
Office	Old Env. Bldg., near N. Gate	Wind
<u>Phillips-Rodeo</u>		
Crockett	702 Bay St. at Edward St.	SO ₂ , H ₂ S
East Refinery	Cummings Skyway at I-80	SO ₂ , H ₂ S
Rodeo	Rodeo Firehouse - 326 Third St.	SO ₂ , H ₂ S
10 m	E. of I-80, S. of Cummings Skyway	Wind
Rodeo	Hillcrest Elementry School	SO ₂ , H ₂ S

BAAQMD MAINTAINED MONITORING STATIONS

<u>COMPANY, SITE</u>	<u>SITE LOCATION</u>	<u>MONITORED POLLUTANT(S)</u>
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<u>Chevron USA</u>		
Pt. Richmond	140 Washington St.	H ₂ S
Richmond, 7th St.	1065 7th Street	H ₂ S, SO ₂
Richmond, 13th St.	1144 13th Street	O ₃ , NO ₂ , SO ₂
		CO, lead, TSP, PM ₁₀

<u>Valero</u>		
Benicia	200 East L Street	SO ₂

<u>Shell Martinez Refining Co.</u>		
Martinez	521 Jones Street	SO ₂

<u>Ultramar-Avon</u>		
Pittsburg	583 West 10th Street	O ₃ , NO ₂ , SO ₂
		CO, lead, TSP

<u>Phillips.-Rodeo</u>		
Crockett	End of Kendall Avenue	SO ₂

<u>METEOROLOGY LOCATIONS - WIND SPEED AND DIRECTION</u>		
Exxon	3400 East Second Street	
Shell Martinez Refining	SE corner of refinery near Pacheco Blvd.	
Tosco Corporation	NW corner of refinery near Waterfront Road & Pacheco Creek	
Unocal	SW corner of refinery	

METEOROLOGY STATIONS MAINTAINED AND OPERATED BY THE REFINERIES

Chevron	W. Gertrude Ave.
Valero	3400 East Second Street
Shell Martinez Refining	SE corner of refinery near Pacheco Blvd.
Ultramar - Avon	NW corner of refinery near Waterfront Road
Phillips - Rodeo	SW corner of refinery

DISTRICT RULES THAT AFFECT REFINERIES

Regulation 1 provides for General Provisions and Definitions that are used in District regulations.

Regulation 1 prohibits Public Nuisances, "emissions of air contaminants that cause injury, detriment nuisance or annoyance to a considerable number of people." Regulation 1 also provides requirements for siting, recording maintenance and reporting from continuous emission (in stack) monitors and area concentration (ground level) monitors.

Regulation 6 limits Visible Emissions (smoke) and the emission of Particulate Matter.

PM₁₀ is particulate matter that is 10 microns or less in diameter, a particular health concern. Visible emissions are determined by a certified observer, as all District inspectors are required to be, or by an opacity measuring device in a stack.

Regulation 7 limits the concentrations of Odorous Substances.

At facilities where this rule applies and upon receipt of a complaint, the District can take a sample of the odorous air and run a blind test by human observer to determine whether it is odorous. Refineries may be subject to this regulation regardless of pollutant specific regulations.

Regulation 8 limits the emissions of Organic Compounds.

Organic compounds consist of compounds containing at least one atom of carbon and hydrogen. Organic compounds, when emitted to the atmosphere in gaseous form, react in the presence of sunlight with oxides of nitrogen to form photochemical smog, or ozone. Organic compounds, by definition in Regulation 8, do not include methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates or ammonium carbonate. These compounds are not reactive.

Precursor organic compounds are those which contribute to photochemical reactivity in the atmosphere. EPA has determined some compounds not to be precursors (non-precursors). Those non-precursors include methylene chloride, 1,1,1 trichloroethane and other chlorinated and fluorinated compounds and CFCs. Many of these compounds are stratospheric ozone depleting compounds, methylene chloride is toxic.

Refineries are subject to the following rules in Regulation 8:

Rule 5: Storage of Organic Liquids

This rule sets standards for the storage of organic liquids with a vapor pressure of more than 25.8 mm Hg (0.5 psia) at storage temperature. This includes gasoline, but does not include kerosene, most jet fuels, diesel fuel, and asphalt oil.

Rule 8: Wastewater (Oil-Water) Separators

This rule controls critical precursor organic compounds in water separators used to separate oil or hydrocarbon compounds from wastewater before it can be discharged. Critical organic compounds include phenols and all precursor organic compounds with 14 carbon atoms or less.

Rule 9: Vacuum Producing Systems

This rule limits the emissions of precursor organic compounds from systems that operate under a vacuum in refineries.

Rule 10: Process Vessel Depressurization

This rule controls the emissions of precursor organic compounds from vessels or process units in refineries that operate under pressure, when those units are depressurized for service or turnaround.

Rule 18: Equipment Leaks (Valves, Connectors, Pumps, and Compressors) at Petroleum Refinery Complexes, Chemical Plants, Bulk Plants and Bulk Terminals

This rule controls the fugitive emissions of total organic compounds from valves, connectors, pumps, and compressors. Total organic compounds include the non-precursors, and methane. Methane is a global warming gas.

Rule 28: Pressure Relief Valves at Petroleum Refineries and Chemical Plants

This rule is to prevent the episodic of emissions from pressure relief devices on any equipment handling gaseous organic compounds at refineries.

Regulation 9 controls the emissions of Inorganic Compounds. Inorganic Compounds include compounds of sulfur and nitrogen. EPA has determined that sulfur dioxide is a criteria pollutant, one for which ambient air quality standards exist. Sulfur dioxide (SO₂) is an odorless gas that is produced from combustion of fossil fuels that contain sulfur, such as fuel oil and coal. Hydrogen sulfide, (H₂S), is formed by anaerobic decomposition and as a by-product of refining crude oil. Oxides of nitrogen, (NO_x), also formed from combustion sources, react with organic compounds to form photochemical smog. Carbon Monoxide, (CO), is a poisonous gas formed by incomplete combustion.

Refineries are subject to the following rules in Regulation 9:

Rule 1: Sulfur Dioxide

This rule controls the emissions of SO₂ from various processes and sets limits for concentrations measured at the property line of a facility.

Rule 2: Hydrogen Sulfide

This rule limits the concentration of H₂S at the property line of a facility.

Rule 10: Nitrogen Oxides and Carbon Monoxide From Boilers, Steam Generators and Process Heaters in Petroleum Refineries

This rule limits the emissions of NO_x and CO from combustion processes in refineries used to heat water, produce steam and heat process streams.

Regulation 10 provides for New Source Performance Standards.

These are rules promulgated by EPA that limit emissions on large sources constructed after a certain date. The District adopts these rules by reference, in order to enforce the standards. Some of the rules provide stringent limitations for units in a refinery, in many cases, existing District rules are already more stringent than these standards.

Regulation 11 controls the emissions of Hazardous Air Pollutants.

The EPA or the Air Resources Board identifies hazardous Air Pollutants. District regulations either adopt these rules by reference, to give the District enforcement authority, or go beyond the federal or state promulgations.

Rule 11: National Emission Standards for Benzene Emissions from Coke By-Product Recovery Plants and Benzene Storage Vessels

This rule consists of national standards, adopted by reference. Coke by-product recovery plants are common in refineries.

Rule 12: National Emission Standards for Benzene Emissions from Benzene Transfer Operations and Benzene Waste Operations

This rule consists of national standards, adopted by reference. Wastewater separators in refineries are affected.

ANNUAL REPORTS - GLOSSARY

Ground Level Monitor (GLM): An off-site monitor which measures the quality of the air we all breathe for a specific pollutant such as sulfur dioxide or hydrogen sulfide. May be installed and maintained by the facility as required by District regulation or by the District. Such monitors are often helpful in locating the source for an odor complaint.

Continuous Emission Monitor (CEM): Also known as an in-stack monitor, this instrument measures pollutants in the source's stack. Measurements are specific for several pollutants such as sulfur dioxide, hydrogen sulfide in fuel gas, and opacity (smoke or dust). The District requires CEMs for sources by regulations and others as a condition to their permit.

Barrel of oil is considered to be 42 gallons.

Refinery Flare(s): Large combustion sources, which serve the facility as a pressure safety relief for flammable gases from process vessels. The District requires that they burn smokelessly and without nuisance to the community.

Exempt Source: Small sources of emissions which are exempted by District permit standards from the requirements for permit or specifically exempted from District emission standards. These are usually always exempted due to very low emissions.

Source: An individual emission producing piece of equipment; i.e., boiler, incinerator, paint spray booth or flare.

Facility: A company with a single or group of permitted sources.

CO Boiler: A steam boiler associated with the fluid catalytic cracking unit (FCCU). Carbon monoxide off-gases from the FCCU feed are used as partial fuel for this special boiler. The FCCU splits heavier hydrocarbons into lighter components.

HDS: Hydrogen desulfurization = Hydrotreating. Treatment of partially refined products with hydrogen to remove sulfur.

H₂: Hydrogen. Used in a refinery to create more useful hydrocarbons.

Cogen: A steam turbine source added to a facility to provide steam and generate electricity.

De-nox: Process equipment used in combination with combustion sources to reduce nitrogen oxide emissions.

SRU: Sulfur Recovery Unit. Removes sulfur impurities naturally occurring in crude oil.

Fuel Gas: Flammable gases such as butane and propane produced from the refinery distillation process. This gas can then be used for fuel for refinery heaters and boilers.

LIST OF ACRONYMS

A/C	Authority to Construct
BAAQMD	Bay Area Air Quality Management District
CARB	California Air Resources Board
CFR	Code of Federal Regulations
CHSC	California Health and Safety Code
CO	Carbon Monoxide
EPA	Environmental Protection Agency
FCCU	Fluid Catalytic Cracking Unit
H₂S	Hydrogen Sulfide
LPG	Liquified Petroleum Gas
NOV	Notice of Violation
NO_x	Nitrogen Oxide
O₂	Oxygen
P/O	Permit to Operate
SO₂	Sulfur Dioxide
LTA	Light Transmission Attenuation (Opacity Meter)