

**ANNUAL COMPLIANCE REPORT
2001**

**VALERO BENICIA REFINERY
PLANT #12626**

BENICIA, CALIFORNIA



PREPARED BY:

DAVID FARR, AIR QUALITY INSPECTOR

REVIEWED BY:

F. MICHAEL RACETTE, SUPERVISING A.Q. INSPECTOR
TONY GAMBARDILLA, PRINCIPLE A.Q. SPECIALIST

APPROVED BY:

JACK BEAN, INSPECTIONS MANAGER

**BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 ELLIS STREET
SAN FRANCISCO, CALIFORNIA 94109**

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VALERO REFINERY ANNUAL REPORT, PLANT #12626

December 31, 2001

INTRODUCTION

The Bay Area Air Quality Management District (BAAQMD) Compliance and 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 Valero Refinery during the period of January 1, 2001 through December 31, 2001.

FACILITY SUMMARY

This refinery was built in 1969, and processes up to 135,000 barrels of crude oil per day. This refinery is considered a "High-Conversion" refinery because it can convert 90-95% of its crude oil into motor fuels (gasoline, diesel, jet fuel, etc.). Valero is currently permitted by the Bay Area Air Quality Management District (District) to operate 211 sources. These sources include a variety of petroleum process units, storage tanks, wastewater treating facilities, pumps, compressors, and associated combustion sources (heaters, furnaces, and boilers). The major process units include a crude distillation unit, fluid catalytic cracking unit, coker unit, hydrocracker unit, catalytic reformer unit, alkylation unit, dimersol unit, hydrogen plant, five hydrofining units, a cracked light-ends process unit, and the new reformulated gasoline process unit. Tanks are used for storage of organic liquids (unrefined, intermediate, and finished products). The wastewater treating system includes two parallel flows through diversion/surge tanks, corrugated plate separators, and induced static floatation cells, three biooxidation cells and final treatment ponds before discharging to the Suisun Bay.

The District enforces regulations stipulated in the Code of Federal Regulations, the California Health and Safety Code and the District's regulations and rules. In addition to regulatory enforcement, the District 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 events that occurred during the period of January 1, 2001 – December 31, 2001, including Notices of Violation (NOV) issued, complaints, episodes, inspections, office conferences and variances.

COMPLIANCE STATUS

During the reporting period, Valero 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 NOV's. 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. Nine NOV's were issued between January 1, 2001 and December 31, 2001, which represented nine violations. This year there were three violations of Regulation 9, Rule 9 (Nox excesses), one violation for Regulation 9, Rule 1 or 2 (GLM excess of SO₂ H₂S), no violations for Regulation 8, Rule 18 (fugitive emission leaks on valves and connectors). There were three violations of Regulation 8, Rule 5 (excessive emissions from storage tanks) and two violations of Regulation 1.

SEE THE ATTACHED CHRONOLOGICAL SUMMARY OF VIOLATION ACTIVITY ON PAGE 7.

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 of odors, smoke, fires, dust, fall-out, and other related air pollutants. Complaints can also be referred from the Environmental Protection Agency (EPA) and California Air Resources Board (CARB). Between January 1, 2001 and December 31, 2001 a total of 35 complaints alleged Valero. One was confirmed and 34 were unconfirmed. These complaints can be categorized as follows:

Category:	<u>ODOR</u>	<u>DUST</u>	<u>OTHER</u>	<u>TOTAL*</u>
Confirmed:	1	0	0	1
Unconfirmed:	33	1	0	34
Total	34	1	0	35

EPISODES

The District requires Valero to maintain and operate GLM's and CEM's. Valero currently has 3 GLM stations, each monitoring for H₂S and SO₂. The main stack at Valero is equipped with a CEM, recording opacity, NO_x, and SO₂ from the catalytic cracking and coker units. A CEM for refinery fuel-gas monitors the H₂S content and total reduced sulfur. A large furnace at the hydrocracker has a CEM for NO_x and CO. The Reformulated Fuels Unit has a CEM for NO_x. A large gas turbine/steam boiler was retrofitted with an SCR unit to control NO_x, and is equipped with a CEM for monitoring NO_x.

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 was three NOVs issued for a CEM excesses. There were 11 reported breakdowns, 20 CEM excesses, and 1 PRV (pressure relief valve) excess and 14 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 Valero for conducting compliance inspections, episode investigations, and responding to citizen complaints. The inspector conducts daily odor patrols around Valero and reviews all monitor charts weekly. Valero conducts daily inspections for fugitive emissions and daily calibrations on all emission monitors. Currently, the District is conducting a PRV audit on all refineries within the nine bay area counties including Valero Refining Company. Results of audit to be available in 2002.

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	1	21
Unconfirmed	<u>34</u>	<u>46</u>	<u>19</u>
Total	35	47	40

<u>Notices of Violation</u>	<u>2001</u>	<u>2000</u>	<u>1999</u>
Storage tanks	3	3	2
Valve & connectors	0	0	3
Visible emissions/Opacity	0	1	1
H ₂ S in fuel gas	0	1	0
Monitor maintenance	1	0	1
Oil/Water Separator	0	0	0
Public nuisance	0	0	1
NO _x excess	3	0	0
GLM excess (H ₂ S)	1	0	0
Source Test	0	0	2
Permit Condition	0	0	3
Miscellaneous Operations	<u>0</u>	<u>0</u>	<u>1</u>
Total	8	5	14

<u>Episodes</u>	<u>2001</u>	<u>2000</u>	<u>1999</u>
Breakdowns	11	3	6
CEM	20	7	7
GLM	0	5	2
Out-of-service	14	11	8
Parametric	0	1	0
PRV	<u>1</u>	<u>0</u>	<u>1</u>
Total	46	27	24

SIGNIFICANT PERMIT ACTIVITY

Valero and the District staff are continuing to work on facilities Title V permit. Permit to be issued mid 2002.

SUMMATION OF THE YEAR'S COMPLIANCE

In summary, Valero's overall compliance is very good. Fugitive emission violations on valve and connectors continues in compliance because of Valero's leak detection and repair program (LDAR). Valero needs to continue improving its tank inspection and communications program to eliminate violations.

VALERO REFINERY ANNUAL REPORT – EMISSION RELATED NOVs

<u>NOV #</u>	<u>OCCURRENCE DATE(S)</u>	<u>REGULATION(S)</u>	<u>PROBLEM (Reason)</u>	<u>CORRECTIVE ACTION (Remedy)</u>
3849	01/09/01	8-5-301.1	Missing submerged fill pipes	Installed submerged fill pipes
10626	04/24/01	8-5-320.2	Gap on floating roof tank >.32 cm	Installed new gasket
10861	05/12/01	9-9-301.3	NOx exceedance >9ppm 3hr. average	Installed new injector plugs on S#45
10863	06/21/01-06/26/01	9-9-301.3	NOx exceedance >9ppm 3 hr. average	Installed slide gate on S#45
10866	10/19/01	9-9-301.3	NOx exceedance >9ppm 3 hr. average	Clean and install new injector quills
10862	10/1/01	8-5-311.3	Inspection hatch >10,000 PPM. Not repaired within 24 hours	Clean and plugged inspection hatch.
10627	3/26/01	9-2-301	Exceeded H2S limit	Restarted Sulfur Recovery Unit #B

VALERO REFINERY ANNUAL REPORT -- NON-EMISSION RELATED NOVs

<u>NOV #</u>	<u>OCCURRENCE DATE(S)</u>	<u>REGULATION(S)</u>	<u>PROBLEM (Reason)</u>	<u>CORRECTIVE ACTION (Remedy)</u>
10859	8/30/00-5/30/01	1-522.8	Failure to submit monthly CEM reports	Facility began submitting required monthly reports as of 6/1/01

BAY AREA AIR QUALITY MANAGEMENT DISTRICT - VALERO'S CONTINUOUS EMISSION MONITORING LIST

SOURCE	PARAMETERS	FULL SCALE	REGULATION	REG. LIMIT AND COMMENTS
FCCU - Coker (main stack)	NO _x	0 - 600 ppm	9-10-303	300 ppm/24-hour avg.
	SO ₂	0 - 1200 ppm (wet)	9-1-310	1000 ppm
	LTA	0 - 50% (opacity)	6-302	20% for 3 minutes
Hydrocracker Furnace (F-401)	NO _x	0 - 100 ppm (wet)	2-1-307	40 ppm @ 3% O ₂ for 8-hour avg
	O ₂	0 - 10% (dry)		
Fuel gas system	H ₂ S	0 - 300 (dry)	10-60.104 (9)(1)	160 ppm for 3-hour avg
	TRS	0 - 350 ppm	2-1-307	65 ppm daily average, for calendar Yr.
Dump stack	Water seal level	0 - 100%	6-301	Implied violation if stack is utilized. (> 20% / 3 min.)
Hot Oil Furnace (F-4460)	NO _x	0 - 50 ppm 0 - 10% 0 - 25%	2-1-307	10 ppm @ 3% O ₂
Gas Turbine/Boiler(GT-702)	NO _x	0 - 20 ppm 0 - 25 ppm	9-9-301.3	9 ppm @ 15% O ₂
Steam Generator (SG 1032)	NO _x	0 -20 ppm	2-1-307	9 ppm @ 3% O ₂ 3hr Avg.

**GLM NETWORK - FACILITIES REQUIRED BY
REGULATION TO MAINTAIN GLM**

<u>COMPANY, SITE</u>	<u>SITE LOCATION</u>	<u>MONITORED POLLUTANT</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 Corp.</u>		
GLM #1 Exxon	E. 2nd at I-680	SO ₂ , H ₂ S
GLM #2 Warehouse	Benicia Industrial Pk.	SO ₂ , H ₂ S, wind
GLM #3 WWT Office	Mallard at Industrial Pk.	SO ₂ , H ₂ S Wind
<u>Pacific Refining</u>		
Wells	540 Vallejo St.	H ₂ S, SO ₂
Rodeo Firehouse	(see Unocal)	
2nd & A St.	2nd & A St.	H ₂ S
<u>Martinez Refining Co. (formally Shell)</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
Lube Distillation Unit	Central refinery	Wind Sp
10 m*	Near 1801 Marina Vista	Wind Sp
<u>Ultramar Refinery (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
Office	150 Solano Way	Wind Sp
<u>Tosco Corp. (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	San Pablo Ave/Gate 100	Wind

* 10 meter station, required location 10 meters off ground

BAAQMD MAINTAINED MONITORING STATIONS

Company, Site	Site Location	Pollutant/s Monitored
Chevron USA		
Pt. Richmond	140 Washington St.	H ₂ S
Richmond - 7th St.	1065 - 7th St.	H ₂ S, SO ₂
Richmond - 13th St.	1144 - 13th St.	O ₃ , NO ₂ , CO SO ₂ , PM ₁₀ Lead, TSP
Valero Corp.		
Benicia	200 E. L St.	SO ₂
Martinez Refining Co.		
Martinez	521 Jones St.	SO ₂
Ultramar (Avon)		
Pittsburg	583 W. 10th St.	O ₃ , NO ₂ , SO ₂ CO, lead, TSP
Tosco Corp. (Rodeo)		
Crockett	End of Kendall Ave.	SO ₂

Meteorology Locations - Wind Speed And Direction

Valero Corp.	3400 E. Second St.
Martinez Refining Co.	SE corner of refinery near Pacheco Blvd.
Ultramar . Avon	NW corner of refinery near Waterfront Rd. & Pacheco Creek
Tosco Corp. Rodeo	SW corner of refinery

Valero's Refining Continuous Emission Monitors (CEM)

COMPANY NAME	SOURCE	NO_x	SO₂	CO	O₂	CO₂	H₂S	FLOW	LTA
Valero	F-401	x			x				
Valero	H ₂ S Monitor						x		
Valero	Main Stack	x	x	x				x	x
Valero	F-4460	x			x			x	
Valero	SG-1032	X		x	x				
Valero	GT-702	x			x				

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, the freons or 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 at Petroleum Refinery Complexes, Chemical Plants, Bulk Plants and Bulk Terminals

This rule controls the fugitive emissions of total organic compounds from valves and flanged, screwed or other joined pipefittings, and pump 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 controls fugitive emissions from valves intended to vent to atmosphere when refinery process units exceed safe pressures.

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 9: Nitrogen Oxides from Stationary Gas Turbines. This rule limits the emissions of Nitrogen Oxides from stationary gas turbines.

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 adopts 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 smokeless 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 and 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	Liquefied 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)
LDAR	Leak Detection and Repair

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