

**ANNUAL COMPLIANCE REPORT
2001**

**PHILLIPS 66 REFINERY
PLANT #16**

RODEO, CALIFORNIA



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PHILLIPS 66 REFINERY ANNUAL REPORT, PLANT #16

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 Phillips 66 Refinery during the period of January 1, 2001 through December 31, 2001.

FACILITY SUMMARY

The Phillips 66 Refining Company in Rodeo processes Alaskan North Slope and San Joaquin Valley crude oil, which is received by ship and pipeline. In addition to crude, some intermediate products are also shipped to the refinery for finishing. The refinery produces gasoline, diesel fuel, jet fuel, coke, sulfur, and butane. These products are shipped from the refinery by pipeline, tanker, barge, rail and truck. Some of the intermediate products produced at the Rodeo refinery are also shipped to other off-site Phillips 66 facilities for finishing, such as the coke which is trucked to Phillips 66 Chemical Company on Highway 4 in Rodeo for complete processing.

The facility has BAAQMD permits to process approximately 80,000 barrels of crude oil per day and operate approximately 274 sources, including process units, a wastewater treatment plant, tankage, and a marine terminal. The various processes include crude distillation, fractionating, isomerization, desulfurization, reforming, hydrocracking, cracking, and coking. There is also a sulfur production plant and a steam and electric power plant.

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, including Notices of Violation (NOV) issued, complaints, episodes, inspections, office conferences and variances.

COMPLIANCE STATUS

During the reporting period, Phillips 66 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. Five NOV's were issued between January 1, 2001 and December 31, 2001, which represented 5 violations. This year there were no violations of Regulation 9, Rule 1 or 2 (GLM excess of SO₂ H₂S). There was one violation of Regulation 8, Rule 18, Section 307 (fugitive emission leaks on valves and connectors). One on Regulation 8, Rule 5, Section 321.3.2 (excessive emissions from storage tanks). One violation for Regulation 2, Rule 1, Section 307 (failure to meet permit conditions), one for Regulation 6, Section 301 (excessive visible emissions). One violation for Regulation 8, Rule 8, Section 302.4 excessive emissions from the oil water separator.

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

DISCUSSION OF SIGNIFICANT VIOLATIONS - (Public Nuisance)

Phillips 66 Refining Company did not experience any 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 39 complaints were alleged against Phillips 66. One was confirmed and 36 unconfirmed. These complaints can be categorized as follows:

Category:	<u>ODOR</u>	<u>SMOKE</u>	<u>OTHER</u>	<u>TOTAL*</u>
Confirmed:	1	0	0	1
Unconfirmed:	37	2	0	38
Total	37	2	0	39

EPISODES

The District requires Phillips 66 to maintain and operate GLM's and CEM's. Phillips 66 currently has 4 GLM stations, each monitoring for H₂S and SO₂. A CEM for refinery fuel-gas monitors the H₂S content and total reduced sulfur. Phillips 66 monitors the Isomax Furnace, Reboiler 201 and three Turbines for 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, Phillips 66 reported 2 CEM/GLM excesses, 3 breakdowns, no parametric episodes, and 3 monitor out-of-service episodes. Of these 8 reported episodes, 3 resulted in notices of violation as the final outcome of 3 breakdowns.

INSPECTIONS

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 Phillips 66 for conducting compliance inspections, episode investigations, and responding to citizen complaints. The inspector conducts daily odor patrols around Phillips 66 and reviews all monitor charts weekly. Phillips 66 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. Phillips 66 submitted a request for variance relief of Regulation 8-5 in this reporting period. The variance was granted for the period of five days for needed repairs on tank 180 source #129. (details are on variance docket number 3362).

Phillips 66 currently operates under an unconditional order of abatement (docket # 3051) as a result of leaking and venting sour (containing H₂S) tanks and a major odor episode that occurred in August 1996. Unocal representatives, owners of the refinery

prior to Phillips 66 acquiring ownership on September 17, 2001, agreed to the unconditional order of abatement. The District Hearing Board issued the order on December 1996. This order covers all regulated fixed roof tanks connected to the odor abatement system, compressors and the collection system. Phillips 66 has made some improvements to the vapor recovery system which abates these tanks and has installed new equipment and instrumentation to closely monitor the pressure at most of the tanks increasing their ability to control venting. The District staff will continue to inspect these sources for compliance with District rules and regulations.

COMPARISON TO PREVIOUS YEARS

<u>Complaints</u>	<u>2001</u>	<u>2000</u>	<u>1999</u>
Confirmed	1	22	4
Unconfirmed	38	68	32
Total	39	90	36

<u>Notices of Violation</u>	<u>2001</u>	<u>2000</u>	<u>1999</u>
Storage tanks	1	2	1
Permit Conditions	0	3	5
Valve & connectors	1	0	8
Visible emissions	1	1	1
H ₂ S in fuel gas	0	2	0
Off-property odors	0	0	0
Monitor maintenance	0	0	1
Oil/Water Separator	1	1	0
Public nuisance	0	2	0
Open burning	0	0	0
GLM excess (H ₂ S)	0	0	0
No Permits to operate	0	0	0
SO ₂ stack excesses	0	0	0
NOx Excesses	1	1	1
Marine Loading	0	0	1
Total	5	12	18

<u>Episodes</u>	<u>2001</u>	<u>2000</u>	<u>1999</u>
Breakdowns	3	6	3
CEM	2	6	15
GLM	0	9	0
Parametric	0	0	1
Out-of-service	3	0	10
PRV	0	0	0
Total	8	21	29

SIGNIFICANT PERMIT ACTIVITY

Phillips 66 Refining Corporation filed one permit application during this reporting period for the construction of a storage tank.

SUMMATION OF THE YEAR'S COMPLIANCE

In summary, Notices of Violations decreased compared to the prior reporting period. Fugitive emission violations on valve and connectors were eliminated because of Phillips's leak detection and repair program (LDAR). Phillips needs to continue improving its tank inspections and operations to eliminate violations and avoid causing a Public Nuisance. The number of complaints alleged against Phillips decreased by 57% in this period.

**NOTICES OF VIOLATIONS FOR 2001
Emission-Related Notices of Violation**

NOV #	Occurrence Date	Regulation(s)	Problem	Remedy
A09979	7/24/01	8=18-307	Hydrocarbon liquid leak > than 3 drops per minute	Tighten flange
A09980	7/27/01	6-301	Excessive visible emissions for a period > than three minutes	Air intake louvers were modified with a mechanical stop
A09981	7/06/01	2-1-307	Exceeded NOx emissions throughput limit	Lowered NOx emissions
A09982	11/01/01	8-8-302.4	Five VOC leaks (offences) > 1K PPM on oil water separator	Tightened fittings & sealed openings
A09983	10/29/01	8-5-321.3.2	Breakdown #03H54.primary seal exceeding 1 ½ inch gap	Primary seal repaired

Non-Emission-Related Notices of Violation

There weren't any non-emission-related Notices of Violations reported for this period.

Phillips 66 Rodeo's Continuous Emission Monitoring List

COMPANY NAME	SOURCE	NO _x	SO ₂	CO	O ₂	CO ₂	H ₂ S	FLOW	LTA
PHILLIPS RODEO	F-202	X			X				
PHILLIPS RODEO	F267	X			X				
PHILLIPS RODEO	Fuel Gas H2S						X		
PHILLIPS-RODEO	Isom. Furn.	X			X				
PHILLIPS-RODEO	Reboiler B-201	X			X				
PHILLIPS-RODEO	Turbine A	X			X				
PHILLIPS-RODEO	Turbine A	X		X	X			X	
PHILLIPS-RODEO	Turbine B	X		X	X			X	
PHILLIPS-RODEO	Turbine C	X		X	X			X	

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

<u>COMPANY MONITORED</u>	<u>SITE LOCATION</u>	<u>POLLUTANT</u>
<u>CHEVRON</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	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	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
LDU	Central refinery	Wind, 10 m
<u>Tezoro Refinery</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	Main Office	wind
<u>Phillips 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, Wind

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
Tezoro		
Pittsburg	583 W. 10th St.	O ₃ , NO ₂ , SO ₂
		CO, lead, TSP
Phillips 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.
Tezoro	NW corner of refinery near Waterfront Rd. & Pacheco Creek
Phillips Corp. 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, 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
LDAR	Leak Detection and Repair

SR:rc

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