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Director of Compliance and Enforcement
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

Attn: Title V Reports

Subject: Phillips 66 Company
San Francisco Refinery – Plant No. A0016
Six-month Monitoring Report for July 1, 2019 through December 31, 2019

Director:

Phillips 66 is submitting its Monitoring Report covering the period of July 1, 2019 through December 31, 2019 as required by Section I.F in its Title V permit.

If you have any questions or require additional information on the information contained in this report, please contact Wilma Dreessen at (510) 245-5893.

Sincerely,

Brent Eastep, Team Lead
Environmental Department

Attachments

cc: Ms. Deborah Jordan
Director of Air Division
USEPA, Region IX
75 Hawthorne Street
San Francisco, CA 94105
Attention: Air-3

BAAQMD Title V Permit
6 Month Deviation Summary Report
From 7/1/2019 to 12/31/2019
San Francisco Refinery, A0016

Certification Statement

I certify under penalty of law that based on the information and belief formed after reasonable inquiry, the statements and information in this document and in all attachments and other materials are true, accurate, and complete.

x Carl Perkins	Carl Perkins	Refinery Manager	01/28/2020
Signature of Responsible Official	Print Name	Title	Date

BAAQMD Title V Permit
6 Month Deviation Summary Report

From 7/1/2019 *to* 12/31/2019

A0016 Phillips 66 Company San Francisco Refinery

Facility Address:	Mailing Address:
1380 San Pablo Ave	1380 San Pablo Ave
City: Rodeo	City: Rodeo
State: CA	State: CA
Zip Code: 94572-	Zip Code: 94572-

Contact: Wilma Dreessen Title: Senior Environmental Cons Phone: (510) 245-5893

Title V deviations for the reporting period are summarized below:

					May have resulted in a deviation from:
Deviation No:	030-19	Source Number(s):	306; 308; 339; 350; 355; 370	Permit:	
Event Started:	7/25/2019	Abatement Device(s) :		AQMD:	*; 8-18-309; 8-18-407
Stopped:	8/1/2019	Emission Point(s):		Other:	40 CFR 60.482-6a

Event Description: The following OELs were discovered at the following dates and times:
- 2 OELs at U267 (S370) on 7/25/2019
- 1 OEL at U267 on 7/29/2019
- 1 OEL at U80 (S339) on 7/30/2019

An additional four components (one each in S370, S355, S308, and S306) were discovered on 8/1/2019 that missed required recurrent leaker monthly monitoring in 2019 – one in May and June, and 3 in June and July.

Probable Cause: For the OELs, the plugs were not replaced after usage of the line or bleeders. For the four recurrent leakers the LDAR database logic designed to track recurrent leakers was not applied correctly to all components.

Corrective actions or preventative steps taken: For the OELs plugs were replaced after discovery. Operations was notified and coached to always re-attach plugs after using process lines for sampling or other purposes.

May have resulted in a deviation from:

Deviation No: 034-19 | Source Number(s): 465 | Permit: 22964-3

Event Started: 8/6/2019 9:45 AM | Abatement Device(s) : | AQMD:

Stopped: 8/6/2019 9:50 AM | Emission Point(s): | Other:

Event Description: Unit 235 Sulfur Recovery Unit (SRU) utilizes a degassing system for emissions control from the sulfur header (S465) where liquid sulfur is routed. The vent gases from S465 are normally routed to the front-end portion of Unit 235 for control. These gases can also be routed for control to the Unit 238 SRU Claus Reaction Furnace. On August 6, 2019, the routing of the vent gases was being switched from Unit 235 to Unit 238. During the re-routing, the valve that redirects air between the two plants experienced a brief delay that caused a pressure spike, which tripped closed the U235 vent gas ejector. The vent gas ejector provides air which is the motive force for routing vent gases from S465 to the front-end of Unit 235 or Unit 238. When the ejector tripped, it is possible that gases may have vented to the atmosphere from the sulfur header vent instead of being pushed to the front end of Unit 238 as intended. During this period there were no reports of visible evidence of emissions being vented to the atmosphere (i.e. no visible emissions). The operator immediately reset the equipment and re-established the vent gas flow within approximately 5 minutes and gases were then routed to the front end of Unit 238 as required.
Note that PC 22964-3 currently indicates vent gases to be routed to the front of Unit 235 only (not Unit 238). Based on historic permitting documentation, including a BAAQMD permit Statement of Basis, this appears to have been an oversight in the permit language. Including control by Unit 238 as represented in initial permitting and the BAAQMD Statement of Basis is under review in a permit revision with BAAQMD.

Probable Cause: Due to the pressure dynamics in the vent system at the time of the switch there was a minor delay in the valve switch operation

Corrective actions or preventative steps taken: Following the mechanical trip in the system the vent gas flow to control was re-established as quickly as possible. The switching valves were also checked by instrumentation technicians with no anomalies found. Additional work is underway to further evaluate the process of switching between the two controlled vent locations.

May have resulted in a deviation from:

Deviation No: 035-19 | Source Number(s): 128; 254; 257; 258 | Permit:

Event Started: 8/19/2019 | Abatement Device(s) : | AQMD: 8-5-401; 8-5-402; 8-5-404

Stopped: 8/19/2019 | Emission Point(s): | Other:

Event Description: External floating roof tanks S-128 Tank 174 and S254 Tank 1001 were returned to service in September 2018 and November 2018, respectively. Upon return to service, these tanks were hydrotested and then inspected for seal gaps per Regulation 8-5-401 after the product was introduced. However, Phillips 66 cannot locate documentation of the seal gap inspections and cannot determine whether the seal inspection results were submitted to the BAAQMD within 60 days of the inspections. Neither of these tanks had seal gap failures to report and these tanks were in compliance with each individual requirement associated with the inspections, as determined by the documented inspections in first quarter 2019. Tank 1001 was returned to service as a diesel tank. Although the current Title V permit indicates that the Regulation 8-5-401 inspections are applicable, inspections are not required for tanks in diesel service per Regulation 8-5-117. Therefore, there was no violation of 8-5 for Tank 1001.

In September 2015, two internal floating roof tanks, S-257 Tank 1004 and S-258 Tank 1005 were scheduled to be visually inspected. Although we believe these tanks were inspected as scheduled, Phillips 66 cannot locate documentation of these visual inspections and cannot determine whether the inspection results were submitted to the BAAQMD within 60 days of the inspections.

Probable Cause: Documentation of seal inspections in limited instances could not be located.

Corrective actions or preventative steps taken: Record tracking with better Quality Assurance is being implemented to ensure that recordkeeping and/or reporting requirements are satisfied. Return to service inspections will be documented.

May have resulted in a deviation from:

Deviation No:	037-19	Source Number(s):	195; 307; 370	Permit:	
Event Started:	6/30/2019	Abatement Device(s) :		AQMD:	
Stopped:	9/24/2019	Emission Point(s):		Other:	8-18-306; 8-18-306.4; 8-18-309; 8-18-407.1

Event Description: 1) LDAR Tag 19603 in Unit 228 was found to have one missed monitoring event in June 2019. [8-18-407.1]
2) LDAR Tag 39693 in Unit 240 was initially placed on DOR in April 2016. However, it was incorrectly kept on DOR after a backup pump was put in service and it was not in use after July 2016. Monthly monitoring was not conducted in May, June, and July 2016, although we do not believe that the District intended equipment on DOR to fall within the ambit of Reg 8-18-310 and be required to have monthly inspections.
3) A valve in Unit 100 related to Tank-501 was found to have a plug missing and was an Open-Ended Line. Valve was inspected and the reading was 0 ppm. (8-18-309)

Probable Cause: 1) During the scheduled period for inspection, the area around the location of the tag was inaccessible due to maintenance work and the component could not be inspected. No follow-up check was performed by the end of the month.
2) Operational conditions changed allowing pump with LDAR tag 39693 that had been on DOR to be repaired before a process unit turnaround.
3) The plug was not replaced on the valve.

Corrective actions or preventative steps taken: 1) LDAR contractor implemented a new process to track components unable to be monitored and to schedule follow up inspections.
2) Delay of Repair Process has been updated to ensure only Essential Equipment as defined by Reg 8-18 is allowed to be placed on DOR.
3) Operations was notified, and the plug was replaced.

May have resulted in a deviation from:

Deviation No:	038-19	Source Number(s):	300	Permit:	
Event Started:	11/30/2018	Abatement Device(s) :		AQMD:	
Stopped:	8/27/2019	Emission Point(s):		Other:	63.654(c)(4)(i)

Event Description: During review of the MACT Heat Exchange System Monitoring program, the heat exchanger E-523 in Unit 200 was found to not be sampled from November 2018 through July 2019.

Probable Cause: Internal miscommunication after a process unit turnaround caused the wrong location to be sampled instead of E-523.

Corrective actions or preventative steps taken: The correct sampling location was installed and used for the August sampling event. Results from the August sampling of E-523 showed that all parameters sampled for were within acceptable limits and, based on operating conditions between November 2018 through the August sampling event, we believe that the results from the August sampling are representative of the conditions that existed during the time period of missed sampling.

May have resulted in a deviation from:

Deviation No: 040-19 | Source Number(s): 398 | Permit:
Event Started: 10/4/2019 6:30 AM | Abatement Device(s) : | AQMD:
Stopped: 10/5/2019 3:15 AM | Emission Point(s): | Other: 40 CFR 63.670(e)

Event Description: On October 4 and 5, 2019 there were periods of intermittent flaring associated with equipment clearing and nitrogen purging during the planned shutdown of Unit 246 Hydrocracker. During the process of shutting down the Unit, the process vessels are cleared and then purged with nitrogen. The nitrogen is vented to the flare to minimize emissions to atmosphere. The EPA Refinery Sector Rule (RSR) requires that the Net Heating Value Combustion Zone (NHVcz) be at or above 270 Btu/scf (15-min avg) during periods of greater than 15 minutes of continuous flaring. During flaring on 10/4/2019 and 10/5/2019 there were four 15-minute periods when the minimum NHVcz limit of 270 Btu/scf was not met. These periods occurred on 10/4/2019 from 6:30-6:45 AM, 6:45-7:00 AM, and on 10/5/2019 from 2:45-3:00 AM and 3:00-3:15 AM.

Probable Cause: Excess nitrogen sent to the flare as part of the Unit 246 shutdown resulted in lower than typical heating value of the flare gases being combusted. During the shutdown related flaring, there were periods where the steam rate was too high and periods where the natural gas purge was not high enough to meet the NHVcz limit.

Corrective actions or preventative steps taken: Operational changes were made by either reducing steam or increasing natural gas purge to ensure that the NHVcz limit was met. In addition, a review of flare operation and controls will be conducted to determine if any improvements are required.

May have resulted in a deviation from:

Deviation No: 043-19 | Source Number(s): 1010 | Permit: .
Event Started: 10/20/2019 9:00 AM | Abatement Device(s) : 424 | AQMD: 9-1-307
Stopped: 10/20/2019 11:00 AM | Emission Point(s): | Other:

Event Description: On 10/20/2019, as the unit was in the process of shutting down, SO2 concentrations exceeded the 250-ppm 1-hour average limit at S-1010 (U235) at 9:00 a.m. and 10:00 a.m. The maximum hourly average concentration was 628 ppm during this event. BAAQMD was notfied of the excess (07P57).

In the process of reducing feed to the unit during the planned unit shutdown, feed flow meters began to read inaccurately due to low flow rates. This led to excess air being added to the reaction section relative to the amount of H2S being fed. Conversion of H2S into SO2 is normally controlled by the amount of air added to the reaction system, and remaining H2S in the unit is then captured by MDEA through absorption prior to combustion downstream in the tailgas incinerator. During this event, excess air in the reaction system led to an increased conversion of H2S to SO2 prior to absorption by MDEA. SO2 is not absorbed by MDEA; therefore, elevated SO2 concentrations were observed from the tailgas incinerator at this time. Feed to the unit was cut at approximately 9:45 a.m., and SO2 emissions began to decrease. SO2 emissions were below the 250-ppm 1-hour average limit by 11:00 a.m. and were controlled throughout the remainder of the shutdown period.

Probable Cause: Feed flow meters began to read inaccuratley due to low flow rates. As the air to feed ratio became off balance, elevated amounts of H2S were converted to SO2 in the reaction system prior to absorption by MDEA. Elevated conversion of H2S led to increased SO2 emissions from S-1010 (U235).

Corrective actions or preventative steps taken: Feed to the unit was cut as the unit proceeded to shutdown, and SO2 emissions decreased below the 250-ppm 1-hour average limit. Updates will be made to the U235 shutdown procedure to more accurately monitor unit feed ratios.

May have resulted in a deviation from:

Deviation No: 044-19	Source Number(s): 352; 353; 354; 355; 356; 357	Permit: 18629-IX-D.3	
Event Started: 10/18/2019 5:00 AM	Abatement Device(s) :	AQMD:	
Stopped: 10/18/2019 7:00 PM	Emission Point(s):	Other:	

Event Description: On October 18, 2019 the Steam Power Plant (SPP) gas turbines and duct burners exceeded their combined firing rate duty limit of 1,048 MMBtu/hr for a period of approximately 2 hours. The instances occurred on 10/18/19 at 4:00 a.m. (1,126 MMBtu/hr, +7%) and 10/18/19 at 6:00 p.m. (1,052 MMBtu/hr, +0.4%). The exceedances occurred while a refinery turnaround was underway. On this day the third-party Air Liquide Hydrogen (H2) Plant, H2 and steam provider, was in the process of conducting a planned shutdown. Due to the refinery turnaround and the Air Liquide shutdown there were significant changes in fuel quality to the SPP and periods in which the steam demand at SPP increased. Per design, when there is additional steam demand at the refinery the SPP supplies the additional steam through immediate, increased firing. The brief production of additional steam resulted in the exceedance of the combined firing limit for the turbines. The individual limit of 466 MMBtu/hr for each Turbine/duct burner set was not exceeded. There were no other permit or regulatory exceedances during these periods at SPP.

Probable Cause: The increased steam demand due to the Air Liquide Hydrogen Plant shutdown led to the increased SPP firing rate. Changes in fuel gas quality, such as heating value and specific gravity, can impact SPP normal fuel composition and flows, which ultimately impact firing rates.

Corrective actions or preventative steps taken: Guidelines were established to target lower steam production values. Measures were taken to reduce some steam demand from refinery steam consumers. Measures included the following: switching from steam operating pumps to electric, shutting down some steam operating unit equipment, reducing steam usage at some steam preheaters, etc., and reduction in SPP firing below its combined firing rate limit of 1,048 MMBtu/hr.

					May have resulted in a deviation from:
Deviation No:	052-19		Source Number(s):	296	Permit:
Event Started:	9/25/2019	9:56 AM	Abatement Device(s) :		AQMD:
Stopped:	9/25/2019	7:00 PM	Emission Point(s):		Other: 40 CFR 60.103a(h); 40 CFR 60.107a(a)

Event Description: Flaring occurred at the Main flare on September 25, 2019 from 9:56 AM until approximately 6:58 PM. The flaring occurred during the unplanned shutdown of the G-501 Wet Gas Compressor (WGC). Analysis of the timely flare samples indicated that H2S was present in the fuel gas at concentrations greater than 162 ppm (3-hour avg), which is in excess of the NSPS Subpart Ja H2S limit at 40 CFR 60.103a(h).

In addition, NSPS Ja monitoring requirements at 40 CFR 60.107a(a)(2) require an H2S CEMs for any flaring of gas that is not process upset gas, non-routine relief valve leakage, or results from an emergency malfunction. Phillips 66 Company submitted an Alternative Monitoring Plan (AMP) application to EPA on March 1, 2016 requesting that BAAQMD Regulation 12-11 sampling be used in lieu of the Subpart Ja H2S CEMs required by section 60.107a(a)(2). We are currently awaiting EPA's approval of the AMP and do not have any indication that the AMP will not be approved. However, because we are still awaiting EPA approval of our AMP, we were in "technical" non-compliance with the section 60.107a(a)(2) requirements to have an H2S CEMs during the October 30 flaring. Said another way, if EPA had timely acted on our AMP request, we would not be reporting this part of the Title V Permit deviation.

Probable Cause: The primary cause of the flaring was the unscheduled shutdown of G-501, which caused excess gas to be sent to the Flare Gas Recovery System (FGRS). The amount of gas being sent to the FGRS exceeded the recovery capacity of the system and the excess was flared.

Upon investigation, it was discovered that the G-501 WGC shut down due to a motor high amperage (AMPs) safety shutdown activation. Motor AMPs are an indication of load being pulled on a compressor.

During the previous shift, the Unit 200 Coker was operating on only the B side. At that time the G-501 WGC spillback had been placed in manual mode to allow the G-501 WGC to operate at reduced gas recovery load. The G-501 WGC spillback is not normally in manual mode when the Coker is operating both sides (i.e., both A and B). On the morning of September 25, 2019, the A side of the Unit 200 Coker was being placed back into service. The unit operator was unaware that the compressor had been previously placed in manual mode. As feed to the A side of the U200 Coker was being introduced, the G-501 WGC began to load up with additional wet gas being produced. As a result, the G-501 compressor received a high AMP alarm. Soon after the high AMP alarm activated, the G-501 WGC shut down due to a high AMP motor protective shutdown function.

During the investigation it was identified that prior to this incident the high motor AMP alarm had been periodically triggered. The high motor AMP alarm set point led to the alarm triggering relatively frequently without consequence to the motor and had become normal for operations. In this incident no actions were taken to respond to the motor AMP alarm during the A side Coker startup. There was not heightened awareness that this AMP alarm may indicate G-501 shutdown nor that the compressor may be operating in an abnormal mode of operation.

EPA's delay in approving the AMP resulted in the flaring event technically running afoul of the NSPS Ja H2S CEMs requirement.

Corrective actions or preventative steps taken: The G-501 Reliability Operating Limit and Independent Protective Layer alarm set points were updated on 9/26/19 to ensure proper notification of potential equipment shutdown. In addition, Phillips 66 will improve internal communication to ensure that unusual modes of operation, such as the WGC spillback operating in manual mode, are effectively communicated to the appropriate personnel.

Phillips 66 will continue to work with EPA to ensure EPA finalizes review and approval of the AMP application that was submitted.

May have resulted in a deviation from:

Deviation No:	054-19	Source Number(s):	354; 357	Permit:	18629-IX-F
Event Started:	11/18/2019 5:00 PM	Abatement Device(s) :		AQMD:	
Stopped:	11/18/2019 7:00 PM	Emission Point(s):		Other:	

Event Description: On 11/18/19, the SPP C turbine (S-354/357) exceeded the 15.6 lb/hr SO2 3-hour average limit for two, 3-hour averaging periods between 5:00-7:00 p.m. The maximum 3-hour average SO2 emissions during this event was 17.8 lb/hr (14.1% above limit). A breakdown request was submitted to BAAQMD (ID 07P99).

Probable Cause: A broken pressure transmitter resulted in a spike in the steam pressure indication at the SPP steam header at approximately 5:11 p.m. on November 18, 2019. The steam vent at SPP subsequently opened due to the false high-pressure indication in order to maintain proper steam pressure. As steam pressure decreased below the proper set point, steam injection to the turbines was shutdown. Upon losing steam injection, air is blown through the steam injection line on all turbines to clear the lines of moisture and prevent water from entering the turbines. The SPP B turbine was unable to sustain minimum required instrument air pressure, and the SPP B turbine and supplemental duct burners shutdown at approximately 5:18 p.m. In order to maintain steam production and meet refinery steam demand, refinery fuel gas (RFG) flow was increased to the SPP C supplemental duct burners to compensate for the loss of the steam production from SPP B. Refinery fuel gas had slightly elevated sulfur concentrations due to the ongoing Unicracker turnaround and absence of A gas. The increased RFG flow to SPP C therefore resulted in elevated SO2 emission calculations using the daily average sulfur samples. Earlier in the day at approximately 3:38 p.m., the SPP A supplemental duct burners had shutdown due to a fuel gas pressure issue unrelated to the events occurring after 5:00 p.m. Air Liquide was also shutdown during this time undergoing turnaround maintenance. With Air Liquide and the SPP A supplemental duct burners shutdown, the subsequent loss of SPP B left the SPP C duct burners as the only option to increase steam production. The SPP A supplemental duct burners were brought back online at approximately 5:59 p.m., reducing RFG usage at the SPP C turbine supplemental duct burners and lowering SO2 emissions. SO2 emissions from SPP C were in compliance by 7:00 p.m. on 11/18/19. During this event, the combined turbine three-hour average SO2 emissions reached a maximum of 33.4 lb/hr and did not exceed the 44 lb/hr limit.

Corrective actions or preventative steps taken: Unit throughput at U200 and U267 was reduced at approximately 5:20 p.m. to limit steam demand from SPP. The SPP A supplemental duct burners were restored at approximately 5:59 p.m. to further alleviate steam demand from SPP C. SPP B was brought back online at approximately 2:26 a.m. on 11/19/19.

May have resulted in a deviation from:

Deviation No:	057-19	Source Number(s):	352; 353; 354; 355; 356; 357	Permit:	18629-IX-F
Event Started:	12/2/2019 8:00 AM	Abatement Device(s) :		AQMD:	
Stopped:	12/2/2019 10:00 AM	Emission Point(s):		Other:	

Event Description: Phillips 66 is reporting this deviation in an abundance of caution. On 12/2/19, elevated sulfur concentrations were detected in the refinery fuel gas (RFG) at the Steam Power Plant (SPP) gas turbines (S-352 through 357) beginning at approximately 12:30 p.m. In order to remain in compliance with the SPP SO2 limits, RFG usage at SPP was reduced. Actual SO2 emissions were calculated using RFG flow and lab sample results for the same time period and were in compliance with the SO2 limits. Therefore, Phillips 66 does not believe that actual SO2 emissions exceeded any of the rolling 3-hour average SO2 limits.

However, when using the lab sample daily average of the total sulfur in the RFG (439 ppm) as the language in the permit requires, excess emissions are indicated from 5:00 a.m. through 12:00 p.m. The average total sulfur in the RFG from 5:00 a.m. through 12:00 p.m. was actually 207 ppm based on the 3 lab samples taken during this time period. Using the actual average during this period indicates SO2 emissions below the SPP SO2 limits. Applying the daily average total sulfur results as the permit language strictly requires (439 ppm versus 207 ppm), results in SPP A turbine (S-352/355) and SPP B turbine (S-353/356) exceedances of the 15.6 lb/hr SO2 3-hour average limit. The daily average lab results also indicate that the 44lb/hr SO2 3-hour average limit for all three turbine and duct burner combinations (S-352 through 357) was also exceeded.
Based on average daily total sulfur, the maximum 3-hour average SO2 emissions were approximately 16.9 lb/hr (8.3 % above limit) and 16.6 lb/hr (6.4% above limit) for the SPP A and B turbines respectively. The maximum 3-hour average SO2 emissions for the SPP turbines and duct burner combinations was approximately 49 lb/hr.

Probable Cause: The daily average sulfur concentration incorrectly biases the emission estimates when applied to previous hours before elevated sulfur concentrations were observed in the fuel gas.

Corrective actions or preventative steps taken: Refinery fuel gas to SPP was reduced to limit the amount of sulfur combusted and meet compliance with the permitted limits. Additional samples were taken after changes to the fuel gas compositions were made to enhance monitoring of the event.

May have resulted in a deviation from:

Deviation No:	058-19	Source Number(s):	45	Permit:	22962.4.a
Event Started:	12/3/2019 12:00 AM	Abatement Device(s) :		AQMD:	
Stopped:	12/3/2019 2:00 AM	Emission Point(s):		Other:	

Event Description: U246 B-801 A/B exceeded the 5-ppm NOx 3-hour average limit for 2, 3-hour averaging periods beginning at 12:00 a.m. on 12/3/19 as the unit was leaving standby conditions. Excess emissions were reported to BAAQMD (ID 07Q39). Total excess NOx emissions during this event are estimated to be 1.2 lbs.

Probable Cause: Excess emissions were observed from U246 B-801 A/B as the heater was increasing rate after being in standby mode. Standby conditions are defined as no fresh process feed to the unit and SCR temperature below 475F. As the unit was starting up, the SCR temperature achieved 475F at approximately 9:05 p.m. on 12/2/19 and was no longer considered in standby conditions. Ammonia injection initially began at 9:56 p.m., however, the SCR skid shutdown on low vaporizer outlet temperature due to an electrical contactor fault. Immediately following the shutdown, the other ammonia vaporizer was started, however, the skid shutdown again on low vaporizer outlet temperature. Electricians were called to troubleshoot the electrical equipment. After the electricians finished tightening all connections, the ammonia vaporizer was restarted, and ammonia injection resumed at approximately 11:30 p.m. Before ammonia injection resumed, however, NOx emissions were above the 5-ppm 3-hour NOx limit for two, 3-hour averaging periods.

Corrective actions or preventative steps taken: Electricians were called to repair electrical equipment. Ammonia injection began at approximately 11:30 p.m. to control NOx emissions below permitted limits.

May have resulted in a deviation from:

Deviation No: 059-19	Source Number(s): 1002; 1010; 338	Permit:	
Event Started: 12/11/2019 5:00 AM	Abatement Device(s) :	AQMD:	
Stopped: 12/12/2019 9:00 AM	Emission Point(s):	Other:	

Event Description: On December 11, 2019, SRU 235 (S-1010) and 236 (S-1002) experienced a process upset described below. At SRU 235, the 1-hour 250-ppm SO2 limit (ID 07Q56), the 12-hour 250-ppm SO2 limit (ID 07Q58), the 24-hour 50-ppm SO2 limit (ID 07Q57), the 1-hour 75-ppm CO limit (ID 07Q55), and the 1409F incinerator temperature limit (ID 07Q54) were exceeded. At SRU 236, the 12-hour 250-ppm SO2 limit (ID 07Q61) was exceeded. The event was reported to BAAQMD as a breakdown (ID 07Q45).

Based on process knowledge and engineering judgement, Phillips 66 also believes that the NSPS Subpart J fuel gas 3-hour 162-ppm H2S limit may have been exceeded on December 11, 2019. The H2S continuous analyzer used to determine compliance with the H2S concentration limit did not indicate H2S concentrations in excess of the 162-ppm limit during this period. An inoperative monitor notice was reported to BAAQMD (ID 07Q47) for the H2S analyzer during this period.

Probable Cause: During normal operation, gas flow within the Unicracker (U240) flows through the F-304 sponge oil pre-saturator before being sent to the D-401 contactor where lean DGA (DGA with no H2S) is used to remove the H2S from the gas. The rich DGA (DGA saturated with H2S) exiting D-401 is then sent to the DGA regenerators at the sulfur plants for processing. On the morning of December 11, at approximately 5:00 a.m., the F-304 level controller failed which resulted in condensed hydrocarbon liquids carrying over into D-401. The hydrocarbons from F-304 were then pumped along with the rich DGA to the DGA regenerators where the hydrocarbons then went overhead with the amine acid gas as feed to the refinery sulfur recovery units.

The amount of air injected into the reaction section of the sulfur plants to adequately treat H2S is determined by an air to acid gas ratio controller. As hydrocarbons entered into the sulfur recovery units and were combusted, the air injected into the unit was consumed. Therefore, not enough air was available to create the required chemistry for conversion of H2S to elemental sulfur. Elevated SO2 concentrations were then observed from U235 and U236. The Unit 235 and U236 sulfur plants were shutdown due to hydrocarbons in the feed. Sour gas then was routed to the Unit 233 fuel gas treatment unit where the amount of H2S in the gas overwhelmed the capacity of the unit, causing elevated H2S to be present in the refinery fuel gas being combusted in downstream sources.

A breakdown occurred because the level transmitter on F-304 that failed during this event receives routine maintenance and did not have a history of failure. The level transmitter was serviced on November 24, 2019. At the time that the instrument was serviced, there were no indications that the transmitter had any reason to fail.

Corrective actions or preventative steps taken: The refinery emergency Sulfur Plant shutdown procedure was implemented to minimize the environmental impact of this event. Process levels within the vessels at the Unicracker were verified by visual inspections. The level indicator on F-304 was determined to be stuck, and the vessel discharge pump was manually started to stop the vessel from overfilling. U200 feed rate was reduced by bypassing half of the coker at approximately 6:15 a.m. to limit the amount of sour gas requiring treatment. In addition, Unit 250 and Unit 246 were reduced to minimum processing rates. SRU 236 was stabilized at approximately 8:00 a.m. to resume sour gas treatment, and SRU 235 was stabilized at approximately 1:50 p.m. During this event, the refinery received no complaints from the public or outside agencies. In addition, no excess emissions were detected by the GLMs or the fenceline monitoring system. The level indicator was inspected by maintenance and verified to read accurately against the field site glass. The level indicator was returned to service. Operator instructions for unit startup will be updated to include routine inspection of gas plant level indication.

May have resulted in a deviation from:

Deviation No: 066-19	Source Number(s): 1010	Permit:	
Event Started: 12/12/2019 3:00 PM	Abatement Device(s) :	AQMD: 9-1-307	
Stopped: 12/13/2019 5:00 PM	Emission Point(s):	Other:	

Event Description: The U235 (S-1010) Sulfur Recovery Unit exceeded the 1-hour 250-ppm SO2 limit for two, 1-hour averaging periods at 3:00 p.m. on 12/12/19 and 4:00 p.m. on 12/13/19 as the D-922 Sour Water Stripper was in the process of starting up. The 1-hour average emissions during this time were 268 ppm and 413 ppm, respectively. Excess emissions were reported to BAAQMD (ID 07Q59 and ID 07Q63). Total excess SO2 emissions during this event are estimated to be 14.2 lbs.

Probable Cause: On 12/12/19 and 12/13/19, as D-922 was in the process of starting up, the change in the generation rate of ammonia acid gas was greater than typical when starting up. The relatively sudden increase in ammonia acid gas being sent to Unit 235 did not allow Unit 235 to adequately convert the H2S in the feed to sulfur, and the excess H2S was sent to the incinerator stack to be combusted into SO2. Elevated SO2 emissions were observed until the Unit 235 feed rate was reduced.

Corrective actions or preventative steps taken: D-922 startup resumed at approximately 7:30 p.m. on 12/13/19, and SO2 emissions remained in compliance as the D-922 Sour Water Stripper was successfully restarted. The existing D-922 startup procedures will be reviewed and clarified to prevent future upsets during startup.

BAAQMD Title V Permit
6 Month Monitoring Report

A0016 Phillips 66 Company San Francisco Refinery

Facility Address:
1380 San Pablo Ave

City: Rodeo
State: CA
Zip Code: 94572-

Mailing Address:
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Contact: Wilma Dreessen **Title:** Senior Environmental Cons **Phone** (510) 245-5893

Inoperable monitors as defined by BAAQMD Regulations 1-522 and 1-523 for the reporting period are summarized below:

Started		Stopped		Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
7/4/2019	12:00 PM	7/5/2019	3:30 PM	☑ 027-19	461		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The NOx CEM analyzer at S-461 (U250 B-701) failed calibration on 7/4/19 at approximately 12:00 PM. Adjustments were made, and the analyzer successfully passed calibration at approximately 3:30 PM on 7/5/19.

Started		Stopped		Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
7/6/2019	12:00 PM	7/8/2019	10:30 AM	☑ 028-19	9		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The NOx CEM analyzer at S-9 (U240 B-2) failed calibration on 7/6/19 at approximately 12:00 PM. Repairs were made and the analyzer successfully calibrated at approximately 10:30 AM on 7/8/19.

Started	Stopped	Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
8/3/2019 9:30 AM	8/5/2019 9:30 AM	☑ 031-19	4		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The NOx CEM analyzer at S-4 (U231 B-101) failed calibration at approximately 9:30 a.m. on 8/3/2019. Repairs were made, and the anlayzer successfully calibrated at approximately 9:30 a.m. on 8/5/2019.

Started	Stopped	Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
8/4/2019 10:00 PM	8/6/2019 10:40 AM	☑ 032-19	351		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The NOx CEM analyzer at S-351 (U267 B-601/602) began to drop due to plugging in the sample system at approximately 10:00 p.m. on 8/4/2019. The sample system was cleared, and the analyzer was succesfully calibrated at approximately 10:40 a.m. on 8/6/2019.

Started	Stopped	Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
8/17/2019 8:00 AM	8/19/2019 8:00 AM	☑ 036-19	4		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The Nox CEM analyzer at S-4 (U231 B-101) failed calibration at approximately 8:00 a.m. on 8/17/19. Repairs were made and the analyzer successfully calibrated at approximately 8:00 a.m. on 8/19/19.

Started	Stopped	Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
9/22/2019 8:23 AM	9/24/2019 10:58 AM	☑ 004-20			

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑

Event Description: The flare camera which shows images for both the Main (S296) and MP30 (S398) Flares stopped showing an image at approximately 9/22/2019 at 8:23 AM. The camera was inoperative for a period >24 hours on 9/23/19 at 8:24 AM. This inoperative is being reported in accordance with 12-11-506.1. Repairs are underway to restore the video camera display and recordings.

Camera feed was restored at 9/24/2019 10:58 AM.

Started	Stopped	Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
10/10/2019 1:30 AM	10/11/2019 8:00 AM	☑ 041-19	1010		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The total flow analzyer alarmed at approximately 1:30 a.m. on 10/10/19. The analyzer lens was cleaned, and the analzyer was placed back in service at approximately 8:00 a.m. on 10/11/19.

10/13/2019 8:00 AM	10/14/2019 8:50 AM	☑ 042-19	10		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The NOx CEM analyzer at S-10 (U240 B-101) failed calibration at approximately 8:00 a.m. on 10/13/2019 due to a plugged filter in the sample system. The filter was replaced, and the analyzer successfully calibrated at approximately 8:50 a.m. on 10/14/2019.

10/25/2019 3:56 PM	10/28/2019 6:50 AM	☑ 045-19			

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☐	☑	☐	☐	☐	☑	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The Tormey GLM and other GLMs associated with the Phillips 66 Refinery and Carbon Plant lost power.

10/26/2019 11:00 PM	10/28/2019 4:40 PM	☑ 046-19			

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☐	☑	☐	☐	☐	☑	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The Crockett GLM and other GLMs associated with the Phillips 66 Refinery and Carbon Plant lost power.

Started	Stopped	Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
10/26/2019	8:00 PM 10/28/2019 2:40 PM	☑	047-19		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☐	☑	☐	☐	☐	☑	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The East Refinery GLM and other GLMs associated with the Phillips 66 Refinery and Carbon Plant lost power.

Started	Stopped	Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
10/26/2019	11:00 PM 10/28/2019 4:45 PM	☑	048-19		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☐	☑	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The Cummings GLM and other GLMs associated with the Phillips 66 Refinery and Carbon Plant lost power.

Started	Stopped	Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
10/31/2019	12:30 PM 11/4/2019 12:30 PM	☑	049-19	338	

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: At approximately 12:30 p.m. on 10/31/19, the H2S CEM analyzer at U233 (S-338) failed calibration due to excess moisture in the sample system. The analyzer subsequently failed validation on 11/1/19, resulting in more than 24 hours of inoperation. The sample system was cleared of excess moisture, and the tape was replaced. The analyzer was placed back in service and successfully calibrated at approximately 12:30 p.m. on 11/4/19.

Started	Stopped	Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
11/29/2019	8:00 AM 12/2/2019 8:00 AM	☑	056-19	1002	

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The sample system for the SO2 CEM analyzer at S-1002 (U236) began to plug at approximately 8:00 a.m. on 11/29/2019. The sample system was cleared, and the analyzer was recalibrated at approximately 8:00 a.m. on 12/2/2019.

Started	Stopped	Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
12/11/2019 7:50 AM	12/11/2019 11:45 AM	☑ 060-19	1002		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The analyzer indication for the O2 CEMS at S-1002 (U236) began reading erratically at approximately 7:50 a.m. on 12/11/2019. The sample system was cleared of excessive moisture, and the analyzer successfully calibrated at approximately 11:45 a.m.

12/11/2019 7:50 AM	12/11/2019 1:00 PM	☑ 061-19			

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: At approximately 7:50 AM on 12/11/19, the H2S analyzer indication at S-338 (U233 Fuel Gas Center) flatlined. Repairs were made to the sample system and the analyzer successfully passed calibration at approximately 1:00 PM on 12/11/19.

12/14/2019 9:30 PM	12/16/2019 9:30 AM	☑ 064-19	438		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The NOx CEM analyzer at S-438 (U110 H-1) lost indication at approximately 9:30 p.m. on 12/14/19. The pressure sensor was replaced and the analyzer successfully calibrated at approximately 9:30 a.m. on 12/16/19.

12/14/2019 1:15 PM	12/14/2019 1:15 PM	☑ 065-19	13		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The NOx CEM analyzer at S-13 (U240 B-301)was determined not to have been inoperative.

Started	Stopped	Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
12/21/2019	7:06 AM 12/23/2019 7:50 AM	☑ 069-19	3		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The U230 B-201 heater did not achieve a good calibration cycle. Work was conducted on the CEMs and the calibration cycle passed on the morning of 12/23/19.

Started	Stopped	Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
12/22/2019	6:50 AM 12/23/2019 8:20 AM	☑ 068-19	15; 16; 17; 18; 19		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The NOx CEM analyzer on the East stack of U244 B-501 through 505 (S-15 through S-19) failed calibration on 12/22/19 at approximately 6:50 due to a plugged sample line. The sample line was cleared, and the analyzer was recalibrated at approximately 8:20 on 12/23/19.

Started	Stopped	Deviation #	Source (S#)	Abatement Device (A#)	Emission Point (P#)
12/22/2019	9:08 AM 12/23/2019 10:13 AM	☑ 070-19	1003		

CEM	GLM	Fuel Gas	Parametric	NOx	SO2	CO	H2S	TRS	NH3	O2	CO2	H2O	Opacity/ LTA	Lead	Steam	Flow	Wind Dir.	Wind Speed	pH	Temp.	VOC.	Gauge Press.
☑	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Event Description: The SO2 and O2 CEM analyzer at S-1003 (U238) became inoperative due to a sample pump issue. The sample pump was replaced which restored the CEMs operation.