217/785-1705

CONSTRUCTION PERMIT -- REVISED
NSPS SOURCE -- NESHAP SOURCE

PERMITTEE

Phillips 66 Company
Attn: Brian Wulf
900 South Central Avenue
Roxana, Illinois 62084

Application No.: 01120044 I.D. No.: 119090AAA
Applicant's Designation: WRR-69 Date Received: August 29, 2013
Subject: Tier 2 Project
Date Issued: March 17, 2014
Location: 900 South Central Avenue, Roxana

This Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of a the first phase of a Tier 2 project, that is, various changes to the refinery to produce lower sulfur gasoline, as described in the above-referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

1.0 Unit Specific Conditions

1.1 Unit: Tier 2 Project

1.1.1 Description

This construction permit is the first phase of a single project that will allow the refinery to produce lower sulfur gasoline by 2004, as required by the USEPA Tier 2 gasoline sulfur requirements. Phase 1 will accomplish desulfurization of light catalytic naphtha (LCN), heavy catalytic naphtha (HCN), and light straight run (LSR) gasoline.

The catalytic naphtha splitter (CNS) will fractionate feed into light, intermediate, and heavy catalytic naphthas. Reboilers required in this process will demand additional steam from the existing boiler 17.

HCN will feed the new heavy catalytic naphtha hydrotreater (HCNHT), which uses hydrodesulfurization to reduce the sulfur content of gasoline. Existing heater F-1 will be modified to effectively heat the feed to the reactor.

A previously idled flare, Lubes Flare, will be repurposed as the LSG Flare and will remove hydrocarbon rich vent gas from the CNS and HCNHT Units. The original application addressed emissions from a vent stream from a new Caustic

Extraction Unit sent to the LSG Flare. Because this Caustic Extraction Unit was not built as part of this project, this permit no longer authorizes installation of that unit.

The gasoline hydrotreater (GHT) will be modified so that it can hydrotreat LSR gasoline. As a result, the existing alky HM-1 heater will have to fire at a higher rate. There will be additional sulfur loading to the Sulfur Plant from the Tier 2 (Phases 1 and 2), however, the Sulfur Plant will continue to operate within its design capacity.

These modifications will not result in an increase in crude throughput.

1.1.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Emission Control Equipment
CNS	Catalytic Naphtha Splitter	LSG Flare
HCNHT	Heavy Catalytic Naphtha Hydrotreater	LSG Flare
GHT	Gasoline Hydrotreater	None
Fugitives	Fugitive Emissions from New Components Associated with the Tier 2 Project	None

1.1.3 Applicability Provisions and Applicable Regulations

a. The “affected heater” for the purpose of these unit-specific conditions, is the HCNHT F-1 Charge Heater described in Conditions 1.1.1 and 1.1.2.

i. A. The Permittee shall not cause or allow the emission of smoke or other particulate matter, with an opacity greater than 30 percent, into the atmosphere from the affected heater except as provided below [35 IAC 212.123(a)].

B. The emission of smoke or other particulate matter from the affected heater may have an opacity greater than 30 percent but not greater than 60 percent for a period or periods aggregating 8 minutes in any 60 minute period provided that such opaque emissions permitted during any 60 minute period shall occur from only one such emission unit located within a 305 meter (1,000 foot) radius from the center point

of any other such emission unit owned or operated by such person, and provided further that such opaque emissions permitted from each such emission unit shall be limited to 3 times in any 24 hour period [35 IAC 212.123(b)].

ii. A. The Permittee shall not cause or allow the emission of carbon monoxide (CO) into the atmosphere from the affected heater to exceed 200 ppm, corrected to 50 percent excess air [35 IAC 216.121].

B. Notwithstanding the above, subject to the following terms and conditions, the Permittee is authorized to operate the affected heater in violation of 35 IAC 216.121 during startup. This authorization is provided pursuant to 35 IAC 201.149, 201.161 and 201.262, as the Permittee has applied for such authorization in its application, generally describing the efforts that will be used "…to minimize startup emissions, duration of individual starts, and frequency of startups."

1. This authorization does not relieve the Permittee from the continuing obligation to demonstrate that all reasonable efforts are made to minimize startup emissions, duration of individual startups and frequency of startups.

2. The Permittee shall conduct startup of the affected heater in accordance with written procedures which shall be maintained at the refinery, that are specifically developed to minimize emissions from startups.

3. The Permittee shall fulfill applicable recordkeeping and reporting requirements of Condition 1.1.9(d) and 1.1.10(b).

4. As provided by 35 IAC 201.265, this authorization for excess emissions during startup does not shield a Permittee from enforcement for any violation of applicable emission standard(s) that occurs during

startup and only constitutes a prima facie defense to such an enforcement action provided that the Permittee has fully complied with all terms and conditions connected with such authorization.

b. This permit is issued based upon the equipment leaks associated with the CNS Unit and the HCNHT Unit being subject to the New Source Performance Standards (NSPS) for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry, 40 CFR 60, Subparts A and VV. The Illinois EPA administers the NSPS for subject sources in Illinois pursuant to a delegation agreement with the USEPA. The Permittee shall comply with all applicable requirements of 40 CFR 60, Subpart VV and 40 CFR 63, Subpart CC.

Note: Applicability of Subpart VV is triggered because the refinery is subject to the National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries, 40 CFR 63, Subparts A and CC and the Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries, 40 CFR 60, Subparts A and GGG. The Permittee has indicated that they will comply with the equipment leak requirements specified in 40 CFR 63, Subpart CC and 40 CFR 60, Subpart GGG by complying with 40 CFR 60, Subpart VV.

1.1.4 Non-Applicability of Regulations of Concern

a. i. This permit is issued based on the affected heater not being subject to 40 CFR 60 Subpart Db, NSPS for Industrial-Commercial-Institutional Steam Generating Units because the affected heater is not a steam generating unit.

ii. This permit is issued based on the affected heater not being subject to 40 CFR 60 Subpart J, NSPS for Petroleum Refineries because the affected heater is not considered a fuel gas combustion device as this heater burns exclusively natural gas (See also 40 CFR 60.101(d) and (g)).

b. This permit is issued based on the Tier 2 project not being subject to NSPS for Standards of Performance for VOC Emissions From Petroleum Refinery Wastewater Systems, 40 CFR 60 Subpart QQQ, because no new or modified individual drain systems will be added as part of the Tier 2 project.

c. The source has addressed the applicability and compliance of 40 CFR 52.21, Prevention of Significant Deterioration (PSD) and 35 IAC Part 203, Major Stationary Sources Construction and Modification (See Attachments 1 and 2). The limits established by this permit are intended to ensure that the modification addressed in this construction permit does not constitute a major modification pursuant to these rules.

d. Compliance with 40 CFR 60, Subpart VV shall serve as the Alternative Program for Leaks as allowed by 35 IAC 219.450.

e. This permit is issued based on the changes authorized by this permit for the LSG Flare not triggering the requirements of the NSPS for Petroleum Refineries, 40 CFR 60 Subpart J. This is because no physical modifications were made to this idled flare when it was returned to service. Physical connections were made, but these connections did not trigger NSPS J applicability.

Note: The Permittee is subject to certain requirements in the Consent Decree, United States of America and the States of Illinois, Louisiana and New Jersey, Commonwealth of Pennsylvania and the Northwest Clean Air Agency v. ConocoPhillips Company; Civil Action No. H-05-0258, entered by the District Court for the Southern District of Texas on January 27, 2005. Paragraph 138 of this Consent Decree requires that affected flares, including the LSG Flare, become an affected facility for purposes of NSPS Subpart J. The facility accepted NSPS J applicability for this flare on December 30, 2011.

1.1.5 Operational and Production Limits and Work Practices

a. i. The firing rate of the affected heater shall not exceed 25.0 mmBtu/hour (12-month rolling average).

ii. The quantity of gas burned in the LSG Flare shall not exceed 58.7 mmscf/year.

iii. A. Only gaseous fuels shall be burned in the LSG Flare.

B. Only natural gas shall be burned in the affected heater.

b. This permit is issued based on Boiler 17 firing at an increase rate (additional 132 mmBtu/hour) due to increased steam demand for the new naphtha splitter

column reboilers (T-5032/T-5033). Note: Boiler 17 will continue to operate within its design capacity.

c. This permit is issued based on the alky HM-1 heater firing at an increase rate (additional 7.93 mmBtu/hour) to preheat the feed entering the GHT. Note: the alky HM-1 heater will continue to operate within its designed capacity.

d. These requirements, and the emission limitations in Condition 1.1.6, become effective following completion of the Tier 2 Project when the Refinery first begins to process low-sulfur gasoline for commercial sale.

1.1.6 Emission Limitations

a. i. Emissions from the affected heater shall not exceed the following limits:

Pollutant	Emissions (Tons/Month)	(Tons/Year)
NO_x	1.08	10.74
SO_2	0.01	0.10
CO	0.91	9.02
VOM	0.06	0.59
PM/PM_{10}	0.09	0.82

ii. Emissions from LSG Flare shall not exceed the following limits:

Pollutant	Emissions (Tons/Month)	(Tons/Year)
NO_x	0.29	2.03
SO_2	0.43	3.00
CO	1.58	11.04
VOM	0.60	4.18

b. Emissions of VOM from the new components (i.e., valves, pumps, flanges, etc.) associated with the Tier 2 Project shall not exceed 29.55 tons per year. This value shall be divided by 12 to calculate a monthly emission rate for purposes of Condition 1.1.6(f).

c. This permit is issued based upon emissions attributable to the additional steam load (required by naphtha splitter column reboilers T-5032/T-5033) placed on Boiler 17 as follows:

Pollutant	Emissions (Tons/Year)
NO_x	83.03

Pollutant	Emissions (Tons/Year)
SO_2	26.40
CO	47.77
VOM	3.13
PM/PM_{10}	4.32

The NO_x emissions shall be calculated using a continuous emission monitor (CEM), the SO_2 emissions shall be calculated using a CEM for hydrogen sulfide and periodic sampling and analysis for other sulfur compounds, and the CO, PM, and VOM emissions shall be calculated using USEPA emission factors.

d. This permit is issued based upon emissions attributable to the heat input required to preheat the feed entering the GHT Unit as follows:

Pollutant	Emissions (Tons/Year)
NO_x	3.42
SO_2	1.60
CO	2.87
VOM	0.19
PM/PM_{10}	0.26

The SO_2 emissions shall be calculated using a CEM for hydrogen sulfide and periodic sampling and analysis for other sulfur compounds, and the NO_x, CO, PM, and VOM emissions shall be calculated using USEPA emission factors.

e. This permit is issued based upon emissions attributable to the additional sulfur loading placed on the Sulfur Plant as follows:

Pollutant	Emissions (Tons/Year)
SO_2	6.81

Note: This emission rate represents the additional loading to the sulfur plant from both Phase 1 and 2 of the Tier 2 project.

f. Compliance with annual limits shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 month total).

1.1.7 Testing Requirements

None

1.1.8 Monitoring Requirements

None

1.1.9 Recordkeeping Requirements

a. The Permittee shall maintain records of the following items:

i. Firing rate of the affected heater (mmBtu/hour on a 12-month rolling average);

ii. The quantity of fuel burned, by type, in the affected heater and LSF Flare (mmscf/month and mmscf/year and mmBtu/month and mmBtu/year) with supporting documentation including heat content of the fuel burned;

iii. For the LSG Flare, Boiler 17 and Heater HM-1, records for the sulfur content of the fuel gas that addresses all sulfur compounds in the fuel gas, based on a combination of continuous monitoring for hydrogen sulfide and periodic sampling and analysis for other sulfur compounds;

iv. Steam demand for the naphtha splitter column reboilers (T-5032/T-5033) from Boiler 17 (lbs/hour, daily average);

v. Emissions of NO_x, CO, VOM, SO_2, PM and PM_{10} from Boiler 17 attributable to the additional steam demand required by the naphtha splitter column reboilers (T-5032/T-5033) (tons/month and tons/year);

vi. Emissions of NO_x, CO, VOM, SO_2, PM and PM_{10} from the alky HM-1 heater attributable to the increased firing rate required to preheat the feed to the GHT (tons/month and tons/year); and

vii. Emissions of NO_x, CO, VOM, SO_2, PM and PM_{10} from the affected heater and LSG Flare (tons/month and tons/year).

b. The Permittee shall maintain records of the following items for components associated with the Tier 2 project:

i. Number of new components by unit or location and type in the Tier 2 Project; and

ii. Calculated VOM emissions including supporting calculations, attributable to these components (tons/year), based on the methods in Condition 1.1.12(c).

c. The Permittee shall maintain records of the amount of sulfur attributable to the Tier 2 Project (Phases 1 and 2) loading to the Sulfur Plant (long ton sulfur/month and long ton sulfur/year).

d. Records for Startup

The Permittee shall maintain the following records for the affected heater:

i. Date and duration of each startup, i.e., start time and time normal operation is achieved.

ii. For each startup in which refractory must be cured after maintenance and each other startup if normal operation was not achieved within 6 hours:

A. A detailed description of the startup, including whether startup was conducted in accordance with the written procedures required by Condition 1.1.3(a)(ii)(B)(2) and why the startup could have been completed more quickly.

B. An explanation why established startup procedures could not be performed, if not performed.

C. Whether exceedance of 35 IAC 216.121 may have occurred during startup. If an exceedance may have occurred, an explanation of the severity and duration during the startup and at the conclusion of startup.

iii. A maintenance and repair log for the affected heater, listing each activity performed with date.

1.1.10 Reporting Requirements

a. The Permittee shall notify the Illinois EPA of deviations of permit requirements as follows. Reports shall describe the probable cause of such

deviations, and any corrective actions or preventive measures taken.

b. Reporting of Startups

The Permittee shall submit semi-annual startup reports to the Illinois EPA. These reports may be submitted along with other semi-annual reports required for the source, e.g., CAAPP semi-annual reports, and shall include the following information for startups of the affected heater during the reporting period:

i. A list of the startups of the affected heater, including the date, duration and description of each startup, accompanied by a copy of the records pursuant to Condition 1.1.9(d) for each startup for which such records were required.

ii. If there have been no startups of the affected heater during the reporting period, this shall be stated in the report.

1.1.11 Operational Flexibility/Anticipated Operating Scenarios

N/A

1.1.12 Compliance Procedures

a. Compliance with the particulate matter and carbon monoxide emission limitations specified in Conditions 1.1.3(a)(i) and 1.1.3(a)(ii), respectively, is considered inherent in the normal operation of the affected heater firing natural gas.

b. i. Compliance with the SO_2 limits in Condition 1.1.6(a)(ii) shall be based on the operating records required by Condition 1.1.9 and the sulfur content of the refinery fuel gas.

ii. Compliance with the emission limits in Condition 1.1.6(a)(i) for the affected heater shall be based on the operating records required by Condition 1.1.9 and appropriate emission factors:

Pollutant	Emissions (Lbs/mmscf)
NO_x	100
CO	84
VOM	5.5
PM/PM_{10}	7.6

Pollutant	Emissions (Lbs/mmscf)
SO_2	0.6

iii. Compliance with the NO_x, CO, and VOM emission limits in Condition 1.1.6(a)(ii) for the LSG Flare shall be based on the operating records required by Condition 1.1.9 and appropriate emission factors:

Pollutant	Emissions (Lbs/mmscf)
CO	376.14
VOM	142.32
NO_x	69.13

c. Compliance with the emission limits for VOM leaks in Condition 1.1.6(b) shall be based on the recordkeeping requirements in Condition 1.1.9(b) and applicable standard emission estimate methodology published by USEPA in "Protocol for Equipment Leak Emission Estimates", EPA-453/R-95-017 (November 1995).

It should be noted that this permit has been revised at the request of the Permittee to revise the SO_2 emission increases for the project (see Condition 1.1.6(a), (c) and (d)). These revisions account for additional sulfur compounds in the fuel gas besides hydrogen sulfide. A summary of the changes in SO_2 emissions for the Tier 2 project is provided in Attachment 2. This revised permit also addresses potential exceedances of 35 IAC 216.121 by the HCNHT F-1 Charge Heater during startup.

If you have any questions on this permit, please contact Jason Schnepp at 217/524-3724.

Raymond E. Pilapil Date Signed: _____
Acting Manager, Permit Section
Division of Air Pollution Control

REP:JMS:psj

cc: Region 3
Lotus Notes

Attachment 1

PSD Applicability – NO_x Netting Analysis

Contemporaneous Time Period of October 1997 Through October 2002

Table I – Emissions Changes Associated With The Proposed Modification

Item of Equipment	Actual (Tons/Yr)	Potential (Tons/Yr)	Change (Tons/Year)	Permit Number
Boiler 17 Utilization	*	*	83.03	00120044
F-1 Charge Heater (Modified)	0.00	10.74	10.74	00120044
Alky HM-1 Heater	*	*	3.42	00120044
LSG Flare	0.00	2.03	2.03	00120044
		Total:	99.22	

* These units, which have historically been capable of firing at maximum capacity, will not be increasing capacity. However, both units will realize a quantifiable incremental increase in utilization.

Table II – Source-Wide Creditable Contemporaneous Emission Increases

Item of Equipment	Date	Increase (Tons/Year)	Permit Number
RAU Deethanizer Reboiler Project	10/2001	24.82	01060090

Table III – Source-Wide Creditable Contemporaneous Emission Decreases

Item of Equipment	Date	Decrease (Tons/Year)	Permit Number
Boiler 15 (Fuel Switch)	7/1999	24.55	92110025
Boiler 16 (Fuel Switch)	7/1999	36.24	92110025
DU-2 Heater West, F-202 (Fuel Switch)	5/2000	17.82	92110025
DU-2 Heater East, F-203 (Fuel Switch)	5/2000	20.18	92110025
CDU Charge Heater Shutdown	9/1999	3.25	72110625
DAU Oil Heater Shutdown	9/1999	1.51	72110625
DAU Asphalt Solution Heater Shutdown	9/1999	1.80	72110625
RAU Deethanizer Heater Shutdown	10/2001	19.60	01060090
	Total:	124.95	

Table IV – Net Emissions Change

	(Tons/Year)
Changes Associated With The Proposed Modification	99.22
Creditable Contemporaneous Emission Increases	24.82
Creditable Contemporaneous Emission Decreases	- 124.95
	- 0.91

Attachment 2 – Summary of Changes in SO_2 Emissions for the Project

Item of Equipment	Actual Tons/Yr	Potential Tons/Yr	Change Tons/Yr
HCNHT F-1 Charge Heater	0	0.10	0.10
LSG Flare (previously Lubes Flare)	0	3.00	3.00
Boiler 17 (additional steam load)	*	*	26.40
Alky HM-1 Heater (additional steam load)	*	*	1.60
Sulfur Recovery Unit	*	*	6.81
		Total Increases:	37.91
		Significance Threshold:	40
		Greater Than Significant?	No

* These units, which have historically been capable of achieving maximum capacity, will not be increasing capacity. However, these units will potentially experience increases in utilization.