

217/782-2113

JOINT CONSTRUCTION AND OPERATING PERMIT - NSPS SOURCE - NESHAP SOURCE

PERMITTEE

Wood River Refinery
Attn: Gina P. Nicholson
P.O. Box 76
Roxana, Illinois 62084

Application No.: 01120044
Applicant's Designation: WRR-69
Subject: Tier 2 Project
Date Issued: June 13, 2002

I.D. No.: 119090AAA
Date Received: December 28, 2001

Operating Permit Expiration
Date: June 13, 2007

Location: 900 South Central Avenue, Roxana

This Permit is hereby granted to the above-designated Permittee to CONSTRUCT and OPERATE 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 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.

The light oil treater-east train (ELOT) will be modified to reduce the sulfur content of the LCN from the CNS and other streams through the use of caustic technology. Installation of a new LOT flare will remove hydrocarbon rich vent gas from this process.

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	None
HCNHT	Heavy Catalytic Naphtha Hydrotreater	None
ELOT	Modification to the Light Oil Treater - East Train for Caustic Extraction Section and Addition of New Caustic Regeneration Section	LOT 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. An "affected fuel gas combustion device" for the purpose of these unit-specific conditions, is the F-1 Charge Heater and the new LOT Flare as described in Conditions 1.1.1 and 1.1.2.
 - i.
 - A. This permit is issued based upon the affected fuel gas combustion devices being subject to the NSPS for Petroleum Refineries, 40 CFR 60 Subparts A and J. The Illinois EPA administers the NSPS for subject sources in Illinois pursuant to a delegation agreement with the USEPA.
 - B. The Permittee shall not burn in the affected fuel gas combustion device any fuel gas that contains hydrogen sulfide (H₂S) in excess of 230 mg/dscm (0.10 gr/dscf). The combustion in a flare of process upset gases or fuel gas that is released to the flare as a result of relief valve leakage or other emergency

malfunctions is exempt from this paragraph [40 CFR 60.104(a)(1)].

- ii. 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 F-1 Charge Heater except as provided below [35 IAC 212.123(a)].
 - B. The emission of smoke or other particulate matter from the F-1 Charge 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 m (1,000 ft) 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)].
- iii. The Permittee shall not cause or allow the emission of carbon monoxide (CO) into the atmosphere from the F-1 Charge Heater to exceed 200 ppm, corrected to 50 percent excess air [35 IAC 216.121].
- b. This permit is issued based upon the equipment leaks associated with CNS Unit, HCNHT Unit, and EL0T being subject to the Standards of Performance 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.

- c. i. This permit is issued based upon the caustic regenerator vent associated with the ELOT being subject to the National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries, 40 CFR 63, Subparts A and CC. The Illinois EPA administers the NESHAP for subject sources in Illinois pursuant to a delegation agreement with the USEPA. The Permittee shall comply with all applicable requirements of 40 CFR 63, Subpart CC.
- ii. The Permittee shall reduce emissions of organic HAP's from the caustic regenerator vent using a flare that meets the requirements of 40 CFR 63.11(b) [40 CFR 63.643(a)(1)].

1.1.4 Non-Applicability of Regulations of Concern

- a. This permit is issued based on the F-1 Charge Heater not being subject to 40 CFR 60 Subpart Db, NSPS for Industrial-Commercial-Institutional Steam Generating Units because the F-1 Charge Heater is not a steam generating unit.
- 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 Attachment 1). 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.

1.1.5 Operational and Production Limits and Work Practices

- a. i. The firing rate of the F-1 Charge Heater shall not exceed 25.0 mmBtu/hr (daily average).
- ii. The quantity of gas burned in the LOT Flare shall not exceed 58.7 mmscf/yr.
- iii. Only gaseous fuels shall be burned in the F-1 Charge Heater and the LOT flare.
- b. This permit is issued based on the Boiler 17 firing at an increase rate (additional 132 mmBtu/hr) due to increased steam demand for the new naphtha splitter column reboilers (T-5032/T-5033). Note: the Boiler 17 will continue to operate within its designed capacity.
- c. This permit is issued based on the alky HM-1 heater firing at an increase rate (additional 7.93 mmBtu/hr) 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 HCNHT F-1 Charge Heater shall not exceed the following limits:

<u>Pollutant</u>	<u>Emissions</u>	
	<u>(Ton/Mo)</u>	<u>(Tons/Year)</u>
NO _x	0.90	10.74
SO ₂	0.01	0.06
CO	0.76	9.02
VOM	0.05	0.59
PM/PM ₁₀	0.07	0.82

- ii. Emissions from LOT flare shall not exceed the following limits:

<u>Pollutant</u>	<u>Emissions</u>	
	<u>(Tons/Mo)</u>	<u>(Tons/Year)</u>
NO _x	0.29	2.03
SO ₂	2.58	18.06
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 the Boiler 17 as follows:

<u>Pollutant</u>	<u>Emissions (Tons/Year)</u>
NO _x	83.03
SO ₂	2.89
CO	47.77
VOM	3.13
PM/PM ₁₀	4.32

The NO_x and SO₂ emissions shall be calculated using a continuous emission monitor, 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:

<u>Pollutant</u>	<u>Emissions (Tons/Year)</u>
NO _x	3.42
SO ₂	0.17
CO	2.87
VOM	0.19
PM/PM ₁₀	0.26

The SO₂ emissions shall be calculated using a continuous emission monitor, 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:

<u>Pollutant</u>	<u>Emissions (Tons/Year)</u>
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

Hydrogen Sulfide Testing

In accordance with 40 CFR 60.8, within 60 days after achieving the maximum production rate at which the affected fuel gas combustion devices will be operated, but not later than 180 days after initial startup of the affected fuel gas combustion devices and at such other times as may be required by the Illinois EPA, the Permittee shall conduct performance test(s) in accordance with 40 CFR 60.106(e) and furnish the Illinois EPA a written report of the results of such performance test(s).

Note: The hydrogen sulfide testing requirement is not necessary if the H₂S content of the fuel gas to the affected heaters is monitored by an existing CEM.

1.1.8 Monitoring Requirements

- a.
 - i. The Permittee shall comply with the monitoring requirements specified in 40 CFR 60.105 for the affected fuel gas combustion devices by installing, calibrating, maintaining and operating an instrument for continuously monitoring and recording the concentration (dry basis) of H₂S in fuel gases before being burned in the affected fuel gas combustion devices.
 - ii. Pursuant to 40 CFR 60.13(i), after receipt and consideration of written application, the USEPA may approve alternative monitoring procedures.
- b. For the affected fuel gas combustion devices, the Permittee shall determine compliance with the H₂S standard in 40 CFR 60.104(a)(1) as follows: Method 11, 15, 15A, or 16 shall be used to determine the H₂S concentration in the fuel gas. The gases entering the sampling train should be at about atmospheric pressure. If the pressure in the refinery fuel gas

lines is relatively high, a flow control valve may be used to reduce the pressure. If the line pressure is high enough to operate the sampling train without a vacuum pump, the pump may be eliminated from the sampling train. The sample shall be drawn from a point near the centroid of the fuel gas line [40 CFR 60.106(e) (1)].

- c. For the affected fuel gas combustion devices, the Permittee shall maintain records of the concentration (dry basis) of H₂S in fuel gases before being burned in the affected heaters to demonstrate compliance with Condition 1.1.3(a) (i) (B).

1.1.9 Recordkeeping Requirements

- a. The Permittee shall maintain records of the following items:
 - i. Firing rate of the F-1 Charge Heater (mmBtu/hr on a daily average);
 - ii. The quantity of gas burned in the LOT Flare (mmscf/month);
 - iii. Steam demand for the naphtha splitter column reboilers (T-5032/T-5033) from Boiler 17 (lb/hr, daily average);
 - iv. Emissions of NO_x, CO, VOM, SO₂, PM and PM₁₀ 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);
 - v. Emissions of NO_x, CO, VOM, SO₂, PM and PM₁₀ 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
 - vi. Emissions of NO_x, CO, VOM, SO₂, PM and PM₁₀ from the affected fuel gas combustion devices (tons/month and tons/year).
- b. The Permittee shall maintain records of the following items for fugitive emissions from 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).

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. For affected fuel gas combustion devices, the Permittee shall comply with the reporting requirements specified in 40 CFR 60.107(e) and (f) and 40 CFR 60.105(e) (3).

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) (ii) and 1.1.3(a) (iii), respectively, is considered inherent in the normal operation of the F-1 Charge Heater firing refinery fuel gas or natural gas.
- b.
 - i. Compliance with the SO₂ limits in Condition 1.1.6(a) (ii) shall be based on the operating records required by Condition 1.1.9 and the sulfur or H₂S content of refinery fuel gas as monitored in accordance with Condition 1.1.8.
 - ii. Compliance with the emission limits in Condition 1.1.6(a) (i) for the F-1 Charge Heater shall be based on the operating records required by Condition 1.1.9 and appropriate emission factors:

<u>Pollutant</u>	<u>Emission Factor</u> <u>(Lbs/mmscf)</u>
NO _x	100
CO	84
VOM	5.5
PM/PM ₁₀	7.6
SO ₂	0.6

Note: the 0.6 lb/mmscf emission factor for SO₂ is appropriate for combustion of natural gas; however, if refinery fuel gas is burned, emissions shall be calculated using operating records and the sulfur or H₂S content of the refinery fuel gas.

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

<u>Pollutant</u>	<u>Emission Factor (Lbs/mmscf)</u>
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).

Please note that the Permittee should update their CAAPP application to include this equipment by submitting form 505-CAAPP - "Supplement to CAAPP Application" along with all other appropriate information.

If you have any questions on this permit, please contact Jason Schnepf at 217/782-2113.

Donald E. Sutton, P.E.
Manager, Permit Section
Division of Air Pollution Control

DES:JMS:jar

cc: Region 3

Attachment 1

PSD Applicability - NO_x Netting Analysis

Contemporaneous Time Period of October 1997 Through October 2002

Table I - Emissions Increases and Decreases Associated With The Proposed Modification

<u>Item of Equipment</u>	<u>Past Actual (Tons/Yr)</u>	<u>Future Potential (Tons/Yr)</u>	<u>Emissions Change (Tons/Year)</u>	<u>Permit Number</u>
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
LOT Flare	0.00	2.03	<u>2.03</u>	00120044
		Total:	<u>99.22</u>	

Table II - Source-Wide Creditable Contemporaneous Emission Increases

<u>Item of Equipment</u>	<u>Commencement of Operation Date</u>	<u>Emissions Increase (Tons/Year)</u>	<u>Permit Number</u>
RAU Deethanizer Reboiler Project	October 2001	24.82	01060090

Table III - Source-Wide Creditable Contemporaneous Emission Decreases

<u>Item of Equipment</u>	<u>Commencement of Operational Change Date</u>	<u>Emissions Decrease (Tons/Year)</u>	<u>Permit Number</u>
Boiler 15 (Fuel Switch)	July 1999	24.55	92110025
Boiler 16 (Fuel Switch)	July 1999	36.24	92110025
DU-2 Mixed Crude Heater West, F-202 (Fuel Switch)	May 2000	17.82	92110025
DU-2 Mixed Crude Heater East, F-203 (Fuel Switch)	May 2000	20.18	92110025
CDU Charge Heater Shutdown	September 1999	3.25	72110625
DAU Oil Heater Shutdown	September 1999	1.51	72110625
DAU Asphalt Solution Heater Shutdown	September 1999	1.80	72110625
RAU Deethanizer Heater Shutdown	October 2001	<u>19.60</u>	01060090
	Total:	<u>124.95</u>	

Table IV - Net Emissions Change

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

* 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.