

217/782-2113

CONSTRUCTION PERMIT - NESHAP SOURCE - NSPS SOURCE

PERMITTEE

ConocoPhillips Wood River Refinery  
Attn: Neal Sahni  
900 S. Central Avenue  
Roxana, Illinois 62084

Application No.: 04050026

I.D. No.: 119090AAA

Applicant's Designation:

Date Received: May 11, 2004

Subject: Ultra Low Sulfur Diesel Project

Date Issued: TO BE DETERMINED

Location: 900 S. Central Avenue, Roxana

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of a ultra low sulfur diesel project, that is, various changes to the refinery to produce lower sulfur diesel, 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: Ultra Low Sulfur Diesel Project

1.1.1 Description

The ultra low sulfur diesel (uLSD) project will enable the refinery to produce low sulfur diesel fuel for on-road motor vehicles, as required by federal regulation. Diesel is made from a number of distinct blend stocks or streams produced at the refinery. This project allows the refinery to remove more sulfur from these streams, to the level needed to produce ultra low sulfur diesel by revamping and expanding the existing hydrocracking unit (HCU) and utilizing some of that equipment for a new ultra low sulfur diesel hydrotreater (ULD) unit.

The ULD unit will be a continuous operation that improves the quality of high sulfur feedstock by removing sulfur, nitrogen and metal compounds. The existing reactors will be reconfigured to accomplish the enhanced sulfur removing capabilities.

The reactors require heat which will be provided by an existing heater and one new heater. The existing heater currently has sufficient capacity to handle the required increased firing.

The sulfur recovery unit (SRU) will experience an additional loading of sulfur due to the incremental sulfur removed in the ULD Unit. The SRU currently has sufficient sulfur production capacity to handle this increased loading.

The ULD unit requires hydrogen to operate. This project also involves the construction of a new hydrogen plant.

These projects do not involve modifications to other process units at the refinery, including the Fluidized Catalytic Cracking Unit (FCCU) and Coker Unit.

1.1.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Emission Control Equipment
ULD Unit	Convert 1st stage of the existing hydrocracking unit HCU into an ultra low sulfur diesel hydrotreater (ULD) unit; Reconfigure reactor; New Heater (HTR-ULD-H4)	None
HP-1	Hydrogen Plant No. 1 (HP-1); new 578 mmBtu/hr process heater; new 3,000 gpm cooling tower	Flare for emergency venting

1.1.3 Applicability Provisions and Applicable Regulations

- a. The "affected heaters" for the purpose of these unit-specific conditions are the fuel gas combustion devices HP-1 and HTR-ULD-H4 listed in Conditions 1.1.1 and 1.1.2.
  - i.
    - A. This permit is issued based upon the affected heaters 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 heaters any fuel gas that contains hydrogen sulfide (H<sub>2</sub>S) in excess of 230 mg/dscm (0.10 gr/dscf) [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 affected heaters except as provided below [35 IAC 212.123(a)].

- B. The emission of smoke or other particulate matter from the affected heaters 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 (1000 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 each affected heater to exceed 200 ppm, corrected to 50 percent excess air [35 IAC 216.121].
- iv. This permit is issued based upon the affected heaters being subject to National Emission Standards for Hazardous Air Pollutants For Industrial, Commercial, and Institutional Boilers and Process Heaters, 40 CFR 63, Subpart DDDDD. 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 Part 63 Subpart DDDDD.
- b. This permit is issued based upon the components associated with the HCU being subject to 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, Subparts A and CC.

Note: The Permittee has indicated that it generally complies with the equipment leak requirements specified in 40 CFR 63, Subpart CC by complying with the Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry 40 CFR 60, Subpart VV.

- c. This permit is issued based upon the components associated with the ULD unit and HP-1 being subject to Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries, 40 CFR 60, Subparts A and GGG. 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, Subparts A and GGG.
- d. This permit is issued based on the affected components associated with the HCU, ULD and HP-1 being subject to 35 IAC Part 219 Subpart R: Petroleum Refining and Related Industries; Asphalt Materials.

Note: When the requirements for equipment leaks under 40 CFR Part 63 Subpart CC or 40 CFR 60 Subpart GGG are more stringent than the LDAR requirements in 35 IAC 219.445-452, compliance with 40 CFR Part 63 Subpart CC and 40 CFR Part 60 Subpart GGG shall be deemed compliance with 35 IAC 219.445-452.

#### 1.1.4 Non-Applicability of Regulations of Concern

- a. This permit is issued based on this project not triggering the applicability of New Source Performance Standards (NSPS) for Petroleum Refineries, 40 CFR Part 60, Subpart J for the Sulfur Recovery Plant because it has the capacity to handle additional acid gas without a capital expenditure.
- b. The Permittee has addressed the applicability of 40 CFR 52.21, Prevention of Significant Deterioration (PSD) and 35 IAC Part 203, Major Stationary Sources Construction and Modification (MSSCAM) to this project. The limits in this permit are intended to ensure that the project addressed in this construction permit does not constitute a major modification pursuant to these rules, as further explained in Attachments 1 through 4.
  - i. This permit is issued based upon increases in emissions from equipment as follows (PSD pollutants only):

<u>Equipment</u>	<u>CO (T/Yr)</u>	<u>SO<sub>2</sub> (T/Yr)</u>	<u>PM/PM<sub>10</sub> (T/Yr)</u>
HTR-ULD-H1	10.3	0.6	0.9
HTR-DU1-F301	1.4	0.1	0.1
HTR-DU1-F302	2.5	0.1	0.2
HTR-CR2-N	8.5	0.5	0.8
SRU	---	2.6	---

ii. This permit is issued based upon a negligible increase of 0.2 tons of VOM per year attributable to an incremental increase in various tank throughputs.

c. The above requirements and the limitations in Conditions 1.1.9 and 1.1.10 become effective when the Permittee begins operation of units in the ULSD Project to produce ultra low sulfur diesel for commercial sale.

1.1.5 Operational and Production Limits and Work Practices

a. i. The affected heaters shall be equipped, operated, and maintained with ultra low NO<sub>x</sub> burners. These burners shall be operated and maintained in conformance with good air pollution control practices.

ii. The firing rate of the heaters shall not exceed the following:

<u>Heater</u>	<u>Firing Rate (mmBtu/hr)<sup>1</sup></u>
HTR-ULD-H1	70.0
HTR-ULD-H4	75.0
HP-1 Process Heater	578.0
HTR-CR2-N	275.0 <sup>2</sup>
HTR-DU1-F301	120.0 <sup>2</sup>
HTR-DU1-F302	200.0 <sup>2</sup>
HTR-HCU-H3	165.0

<sup>1</sup> Limits are based on a 12-month rolling average

<sup>2</sup> For the purposes of calculating future projected actual emissions for the attainment pollutants, these heaters are not projected to achieve the firing rate limits in this table as a result of implementing this project. The

nonattainment pollutants emission limits are based on these maximum firing rates.

- iii. A. Natural gas, PSA (Pressure Swing Adsorption) vent gas, or a combination of such fuels shall be the only fuels fired in the HP-1 process heater.
- B. Except as provided in Condition 1.1.5(a)(iii)(A), only gaseous fuels shall be burned in the heaters.
- b. The maximum rated capacity of the cooling tower shall not exceed 3,000 gallons/minute.
- c. Pursuant to 40 CFR 63.7505(b), the Permittee shall always operate and maintain the affected heaters, including air pollution control and monitoring equipment, according to the provisions in 40 CFR 63.6(e)(1)(i).
- d. Pursuant to 40 CFR 63.7505(e), the Permittee shall develop and implement a written startup, shutdown, and malfunction plan (SSMP) according to the provisions in 40 CFR 63.6(e)(3).

1.1.6 Emission Limitations

- a. i. Emissions from the affected heater HTR-ULD-H4 shall not exceed the following limits:

<u>Pollutant</u>	<u>Emissions</u>	
	<u>(Ton/Mo)</u>	<u>(Tons/Year)</u>
NO <sub>x</sub>	1.1	13.1
SO <sub>2</sub>	0.7	7.7
CO	0.6	6.6
VOM	0.2	1.7
PM/PM <sub>10</sub>	0.2	2.4

- ii. Emissions from affected heater HP-1 shall not exceed the following limits:

<u>Pollutant</u>	<u>Emissions</u>	
	<u>(Tons/Mo)</u>	<u>(Tons/Year)</u>
NO <sub>x</sub>	7.4	88.6
SO <sub>2</sub>	5.0	59.1
CO	4.7	51.2
VOM	1.0	11.0
PM/PM <sub>10</sub>	1.1	11.9

- iii. Emissions from heater HTR-HCU-H3 shall not exceed the following limits:

<u>Pollutant</u>	<u>Emissions</u>	
	<u>(Tons/Mo)</u>	<u>(Tons/Year)</u>
NO <sub>x</sub>	14.7	175.8
CO	4.4	52.7
VOM	0.3	3.5
PM/PM <sub>10</sub>	0.4	4.8

Note: this permit does not rely on a decrease in SO<sub>2</sub> emissions from HTR-HCU-H3.

- iv. Pursuant to 40 CFR 63.7500(a)(1) and 63.7505(a), CO emissions from the affected heaters shall not exceed 400 ppm by volume on a dry basis corrected to 3 percent oxygen (30-day rolling average for HP-1, 3-run average for HTR-ULD-H4), except during periods of startup, shutdown, and malfunction.
- v. Emissions from HTR-ULD-H1, HTR-CR2-N, HTR-DU1-F301, and HTR-DU1-F302 shall not exceed the following limits:

<u>Unit</u>	<u>NO<sub>x</sub> Emissions</u>		<u>VOM Emissions</u>	
	<u>(T/Mo)</u>	<u>(T/Yr)</u>	<u>(T/Mo)</u>	<u>(T/Yr)</u>
HTR-ULD-H1	1.2	13.3	0.2	1.5
HTR-CR2-N	24.5	293.0	0.5	5.8
HTR-DU1-F301	10.7	127.9	0.3	2.5
HTR-DU1-F302	17.8	213.1	0.4	4.2

- b. i. Emissions of VOM from the new<sup>3</sup> components (i.e., valves, pumps, flanges, etc.) associated with the ULD unit shall not exceed 0.2 tons per year.
  - ii. Emissions of VOM from the new<sup>3</sup> components (i.e., valves, pumps, flanges, etc.) associated with the hydrogen plant shall not exceed 0.2 tons per year.
- <sup>3</sup> This limit does not address components that are already present at the refinery with the existing process units.
- c. Emissions and operation of the HP-1 cooling tower shall not exceed the following limits:

<u>Pollutant</u>	<u>Emissions</u>	
	<u>(Tons/Mo)</u>	<u>(Tons/Yr)</u>
VOM	0.4	4.7
PM/PM <sub>10</sub>	1.3	15.0

- d. Emissions from the hydrogen plant which includes the HP-1 flare (including start up, shut down or malfunction); affected heater HP-1, HP-1 cooling tower; and HP-1 fugitive emissions shall not exceed the following limits:

<u>Pollutant</u>	<u>Emissions</u> <u>(Tons/Yr)</u>
NO <sub>x</sub>	90.5
CO	67.8
VOM	22.2
SO <sub>2</sub>	59.2
PM/PM <sub>10</sub>	26.9

- e. 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

##### a. Hydrogen Sulfide Testing

In accordance with 40 CFR 60.8, within 60 days after achieving the maximum production rate at which the affected heaters will be operated, but not later than 180 days after initial startup of the affected heaters 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 H<sub>2</sub>S content of the fuel gas to the affected heaters is monitored by an existing CEM.

##### b. Nitrogen Oxides Testing.

- i. Within 60 days after achieving the maximum production rate at which the affected heaters will be operated, but not later than 180 days after initial startup, the NO<sub>x</sub> emissions of the affected heaters shall be measured during

conditions which are representative of maximum emissions.

- ii. The following methods and procedures shall be used for testing of emissions, unless another method is approved by the Illinois EPA: Refer to 40 CFR 60, Appendix A, for USEPA test methods.

Location of Sample Points	USEPA Method 1
Gas Flow and Velocity	USEPA Method 2
Flue Gas Weight	USEPA Method 3
Moisture	USEPA Method 4
Nitrogen Oxides	USEPA Method 7

c. Carbon Monoxide Testing.

- i. Pursuant to 40 CFR 63.7510(g), the Permittee shall demonstrate initial compliance with the CO emission limits no later than 180 days after startup of the affected heaters.

- A. The Permittee shall use the applicable performance tests and procedures specified by 40 CFR 63.7520 and 63.7530.
- B. Pursuant to 40 CFR 63.7510(c), for the affected heater HTR-ULD-H4, the initial compliance demonstration is conducting a performance test for carbon monoxide according to Table 5 of 40 CFR 63 Subpart DDDDD.
- C. Pursuant to 40 CFR 63.7510(c), for the affected heater HP-1, the initial compliance demonstration is conducting a performance evaluation of the continuous emission monitoring system for carbon monoxide according to 40 CFR 63.7525(a).

- ii. Pursuant to 40 CFR 63.7515(e), the Permittee shall conduct all applicable performance tests for affected heater HTR-ULD-H4 according to 40 CFR 63.7520 on an annual basis. Annual performance tests must be completed between 10 and 12 months after the previous performance test.

1.1.8 Monitoring Requirements

- a. i. The Permittee shall comply with the monitoring requirements specified in 40 CFR 60.105 for

the affected heaters by installing, calibrating, maintaining and operating an instrument for continuously monitoring and recording the concentration (dry basis) of H<sub>2</sub>S in fuel gases before being burned in the affected heaters.

- 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 heaters, the Permittee shall determine compliance with the H<sub>2</sub>S standard in 40 CFR 60.104(a)(1) as follows: Method 11, 15, 15A, or 16 shall be used to determine the H<sub>2</sub>S 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 heaters, the Permittee shall maintain records of the concentration (dry basis) of H<sub>2</sub>S in fuel gases before being burned in the affected heaters to demonstrate compliance with Condition 1.1.3(a)(i)(B).
- d. i. Pursuant to 40 CFR 63.7525(a), the Permittee shall install, calibrate, maintain and operate a continuous emissions monitoring system (CEMS) according to the procedures in 40 CFR 63.7525(a)(1) through (6) for emissions of CO from affected heater HP-1.  
ii. The Permittee shall demonstrate continuous compliance by following the continuous compliance requirements of 40 CFR 63.7535 and 63.7540.
- e. Pursuant to 40 CFR 63.7505(d), the Permittee shall develop a site-specific monitoring plan according to the requirements in 40 CFR 63.7505(d)(1) through (4).

#### 1.1.9 Recordkeeping Requirements

- a. The Permittee shall maintain records of the following items for the affected heaters and heaters HTR-ULD-

H1, HTR-DU1-F301, HTR-DU1-F302, HTR-CR2-N, and HTR-HCU-H3:

- i. Firing rate of the heaters (mmBtu/hr on a 12-month rolling average);
  - ii. Heat content of the fuel gas (btu/scf);
  - iii. NO<sub>x</sub>, CO, VOM, SO<sub>2</sub>, PM and PM<sub>10</sub> emissions from affected heaters HP-1 and HTR-ULD-H4 (tons/month and tons/year), as determined by methods in Condition 1.1.11;
  - iv. NO<sub>x</sub> and VOM emissions from the heaters HTR-ULD-H1, HTR-DU1-F301, HTR-DU1-F302 and HTR-CR2-N (tons/month and tons/year), as determined by methods in Condition 1.1.11; and
  - v. NO<sub>x</sub>, CO, VOM, PM and PM<sub>10</sub> emissions from heater HTR-HCU-H3 (tons/month and tons/year), as determined by methods in Condition 1.1.11.
- b. The Permittee shall carryout the following recordkeeping related to changes in emissions of SO<sub>2</sub>, CO and PM/PM<sub>10</sub> from heaters HTR-ULD-H1, HTR-DU1-F301, HTR-DU1-F302, and HTR-CR2-N:
- i. Before beginning actual construction of the project, the Permittee shall document and maintain a record of the following information [40 CFR 52.21(r)(6)(i)]:
    - A. A description of the project;
    - B. Identification of the emissions unit(s) whose emissions of a regulated PSD pollutant could be affected by the project; and
    - C. A description of the applicability test used to determine that the project is not a major modification for any regulated PSD pollutant, including the baseline actual emissions, the projected actual emissions, the amount of emissions excluded under 40 CFR 52.21(b)(41)(ii)(c) and an explanation for why such amount was excluded, and any netting calculations, if applicable.
  - ii. The Permittee shall keep records for the emissions of any regulated PSD pollutant that

could increase as a result of the project and that is emitted by any emissions unit identified in 40 CFR 52.21(r)(6)(i)(b) (See also Condition 1.1.9(b)(i)(B)) and calculate and maintain a record of the annual emissions, in tons per year on a calendar year basis, for a period of 5 years following resumption of regular operations after the change, or for a period of 10 years following resumption of regular operations after the change if the project increases the design capacity of or potential to emit that regulated PSD pollutant at such emissions unit [40 CFR 52.21(r)(6)(iii)].

- c. The Permittee shall maintain records of the following items for fugitive emissions from components:
  - i. Number of new components by unit or location and type in the ultra low sulfur diesel project; and
  - ii. Calculated VOM emissions including supporting calculations, attributable to these components (tons/year), based on the methods in Condition 1.1.11(a).
- d. The Permittee shall comply with the applicable recordkeeping requirements specified by 40 CFR 63.7555.
- e. The Permittee shall maintain a file containing the maximum design circulation for the cooling tower with supporting documentation and maximum emissions of VOM and PM/PM<sub>10</sub> with supporting calculations.
- f. The Permittee shall maintain records of the following items relating to the startup, shutdown or malfunction of the hydrogen plant.
  - i. Maximum emission rate of each pollutant emitted during each event (lb/hour);
  - ii. Duration of each event; and
  - iii. NO<sub>x</sub>, CO, VOM, SO<sub>2</sub>, and PM/PM<sub>10</sub> emitted during each event (tons).
- g. Total emissions of NO<sub>x</sub>, CO, SO<sub>2</sub>, VOM, and PM/PM<sub>10</sub> from all emission units included in the hydrogen plant, which includes the affected heater HP-1, HP-1 cooling tower, HP-1 flare, HP-1 fugitives with supporting

documentation and calculations (tons/month and tons/year).

1.1.10 Reporting Requirements

- a. The Permittee shall notify the Illinois EPA of any deviations with the permit requirements as follows. Reports shall be submitted within 30 days. Reports shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken.
- b. The Permittee shall submit a report to the Illinois EPA and USEPA if the annual emissions of any PSD regulated pollutant, in tons per year, from this project (See also Condition 1.1.9(b)(i)), exceed the baseline actual emissions (as documented and maintained pursuant to 40 CFR 52.21(r)(6)(i)(c)), by a significant amount (as defined in 40 CFR 52.21(b)(23)) for that regulated PSD pollutant, and if such emissions differ from the preconstruction projection as documented and maintained pursuant to 40 CFR 52.21(r)(6)(i)(c). Such report shall be submitted to the Illinois EPA and USEPA within 60 days after the end of such year. The report shall contain the following [40 CFR 52.21(r)(6)(v)]:
  - i. The name, address and telephone number of the major stationary source;
  - ii. The annual emissions as calculated pursuant to 40 CFR 52.21(r)(6)(iii); and
  - iii. Any other information that the Permittee wishes to include in the report (e.g., an explanation as to why the emissions differ from the preconstruction projection).
- c. Pursuant to 40 CFR 63.7515(g), the Permittee shall report the results of performance tests within 60 days after the completion of the performance tests. This report should also verify that the operating limits for affected heaters have not changed or provide documentation of revised operating parameters established according to 40 CFR 63.7530 and Table 7 to 40 CFR Part 63 Subpart DDDDD, as applicable. The reports for all subsequent performance tests should include all applicable information required in 40 CFR 63.7550.

- d. The Permittee shall comply with the applicable notification and recordkeeping requirements specified by 40 CFR 63.7545 and 63.7550, respectively.
- e. The Permittee shall notify the Illinois EPA within 30 days of producing ultra low sulfur diesel for commercial sale, pursuant to this permit.

1.1.11 Compliance Procedures

- a. i. Compliance with the SO<sub>2</sub> limits in Condition 1.1.6(a) (i) and (ii), when burning refinery fuel gas, shall be based on the operating records required by Condition 1.1.9 and the sulfur content of refinery fuel gas as monitored in accordance with Condition 1.1.8.
- ii. Compliance with the other emission limits in Condition 1.1.6(a) (i) for affected heater HTR-ULD-H4 shall be based on the operating records required by Condition 1.1.9 and appropriate emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>
NO <sub>x</sub>	0.04 lb/mmBtu <sup>4</sup>
CO	0.02 lb/mmBtu <sup>4</sup>
VOM	5.5 lb/mmscf
PM/PM <sub>10</sub>	7.6 lb/mmscf

<sup>4</sup> When available, results from representative stack tests in accordance with the methods described in Condition 1.1.7(b) (ii) or in 40 CFR Part 60, Appendix A shall be used in lieu of these emission factors to represent actual emissions.

- iii. Compliance with the other emission limits in Condition 1.1.6(a) (ii) for affected heater HP-1 shall be based on the operating records required by Condition 1.1.9 and appropriate emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>
NO <sub>x</sub>	0.035 lb/mmBtu <sup>5</sup>
CO	0.02 lb/mmBtu <sup>5,6</sup>
VOM	0.0043 lb/mmBtu
PM/PM <sub>10</sub>	0.0047 lb/mmBtu

<sup>5</sup> When available, results from representative stack tests in accordance with the methods described in Condition 1.1.7(b) (ii) or in 40 CFR Part 60, Appendix A shall be used in lieu of these emission factors to represent actual emissions.

<sup>6</sup> Compliance with the CO emission limits in Condition 1.1.6(a) (ii) is determined by continuous monitoring in accordance with Condition 1.1.8(d) (or monthly operating records and emission calculations, until such monitors are operational).

iv. Compliance with the emission limits in Condition 1.1.6(a) (iii) for heater HTR-HCU-H3 shall be based on the operating records required by Condition 1.1.9 and appropriate emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>
NO <sub>x</sub>	280 lb/mmscf <sup>7</sup>
CO	84 lb/mmscf <sup>7</sup>
VOM	5.5 lb/mmscf
PM/PM <sub>10</sub>	7.6 lb/mmscf

<sup>7</sup> When available, results from representative stack tests in accordance with the methods described in Condition 1.1.7(b) (ii) or in 40 CFR Part 60, Appendix A shall be used in lieu of these emission factors to represent actual emissions.

v. Compliance with the emission limits in Condition 1.1.6(a) (v) for heaters HTR-DU1-F301, HTR-DU1-F302, and HTR-CR2-N shall be based on the operating records required by Condition 1.1.9 and appropriate emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>
NO <sub>x</sub>	280 lb/mmscf <sup>8</sup>
VOM	5.5 lb/mmscf

<sup>8</sup> When available, results from representative stack tests in accordance with the methods described in Condition 1.1.7(b) (ii) or in 40 CFR Part 60, Appendix A shall be used in lieu of these emission factors to represent actual emissions.

- vi. Compliance with the emission limits in Condition 1.1.6(a) (v) for heater HTR-ULD-H1 shall be based on the operating records required by Condition 1.1.9 and appropriate emission factors:

<u>Pollutant</u>	<u>Emission Factor</u>
NO <sub>x</sub>	50 lb/mmscf <sup>9</sup>
VOM	5.5 lb/mmscf

<sup>9</sup> When available, results from representative stack tests in accordance with the methods described in Condition 1.1.7(b) (ii) or in 40 CFR Part 60, Appendix A shall be used in lieu of these emission factors to represent actual emissions.

- b. Compliance with the emission limits in Condition 1.1.6(b) for VOM attributable to leaking components shall be based on the recordkeeping requirements in Condition 1.1.9 and applicable standard emission estimate methodology published by USEPA in "Protocol for Equipment Leak Emission Estimates", EPA-453/R-95-017 (November 1995).
- c. Compliance with the emission limits in Condition 1.1.6(c) for the HP-1 Cooling Tower shall be based on the operating records required by Condition 1.1.9 and appropriate emission factors such as the following:

<u>Pollutant</u>	<u>Emission Factor</u> <u>(lb/10<sup>6</sup> gal)</u>
PM/PM10	19
VOM	6

- d. Compliance with the emission limits in Condition 1.1.6(d) for the HP-1 flare shall be based on the operating records required by Condition 1.1.9 and appropriate emission factors such as the following:

<u>Pollutant</u>	<u>Emission Factor</u> <u>(lb/mmBtu)</u>
NO <sub>x</sub>	0.042
CO	0.37
SO <sub>2</sub>	0.00035
VOM	0.14

2. The emission units addressed by this construction permit may be operated under this permit until renewal of the CAAPP permit or a modification of the CAAPP permit is issued provided the Permittee submits a timely application to amend the current CAAPP permit to incorporate this project.

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:psj

cc: Region 3  
Lotus Notes  
CES

Attachment 1

PSD Applicability - NO<sub>x</sub> Netting Analysis

Contemporaneous Time Period of January 2000 Through March 2006

**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>
Hydrogen Plant	New	90.5	90.5
HTR-ULD-H4	New	13.1	13.1
HTR-ULD-H1	7.2	13.3	6.1
HTR-DU1-F301	119.3	127.9	8.6
HTR-DU1-F302	179.5	213.1	33.6
HTR-CR2-N	197.1	293.0	95.9
HTR-HCU-H3	198.8	175.8	-23.0
		Total:	224.8

**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>
Rental Package Boilers	November 2000	11.0
RAU Deethanizer Reboiler	October 2001	24.8
Low Sulfur Gasoline - Step 1	October 2002	99.2
CCU-1 Alterations	September 2003	1.8
Hartford Integration Project	April 2004	<u>524.2</u>
	Total:	661.0

**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>
Boiler 15 (Fuel Switch)	July 1999	24.6
Boiler 16 (Fuel Switch)	July 1999	36.2
Charge Heater (CDU Shutdown)	September 1999	3.3
Oil Heater (DAU Shutdown)	September 1999	1.5
Asphalt Solution Heater (DAU Shutdown)	September 1999	1.8
DU-2 Mixed Crude Heater West, F-202 (Fuel Switch)	May 2000	17.8
DU-2 Mixed Crude Heater East, F-203 (Fuel Switch)	May 2000	20.2
RAU Deethanizer Heater Shutdown	October 2001	19.6
CR-3 Charge Heater, H-4 (Fuel Switch)	November 2002	115.8
CR-3 1 <sup>st</sup> Reheat Heater, H-5 (Fuel Switch)	November 2002	113.1

<u>Item of Equipment</u>	<u>Commencement of Operational Change Date</u>	<u>Emissions Decrease (Tons/Year)</u>
CR-3 2nd Reheat Heater, H-6 (Fuel Switch)	November 2002	86.7
DU-1 Primary Heater South, F-301 (Fuel Switch)	February 2000	0.0
DU-1 Secondary Heater North, F-302 (Fuel Switch)	February 2000	0.0
CR-1 Feed Preheat, H-1 (Fuel Switch)	February 2002	19.5
CR-1 1 <sup>st</sup> Interreactor Heater, H-2 (Fuel Switch)	February 2002	19.1
CR-1 2nd Interreactor Heater, H-3 (Fuel Switch)	February 2002	32.1
Fluidized Catalytic Cracking Unit Shutdown at Hartford	October 2002	320.0
Reroute/Elimination of Flare Streams at Hartford	October 2002	<u>17.4</u>
	Total:	848.7

**Table IV - Net Emissions Change**

	<u>(Tons/Year)</u>
Increases and Decreases Associated With The Proposed Modification	224.8
Creditable Contemporaneous Emission Increases	661.0
Creditable Contemporaneous Emission Decreases	<u>-848.7</u>
	37.1

Attachment 2

PSD Applicability - SO<sub>2</sub> Netting Analysis

Contemporaneous Time Period of January 2000 Through March 2006

**Table I - Emissions Increases and Decreases Associated With the Proposed Modification**

<u>Item of Equipment</u>	<u>Actual (Tons/Yr)</u>	<u>Projected Actual (Tons/Yr)</u>	<u>Emissions Change (Tons/Year)</u>
Hydrogen Plant	New	59.2	59.2
HTR-ULD-H4	New	7.7	7.7
HTR-ULD-H1	0.7	1.3	0.6
HTR-DU1-F301	2.0	2.1	0.1
HTR-DU1-F302	3.0	3.2	0.1
HTR-CR2-N	3.3	3.8	0.5
SRU	87.3	89.8	<u>2.6</u>
		Total:	70.8

**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>
Rental Package Boilers	November 2000	0.1
RAU Deethanizer Reboiler	October 2001	0.9
Low Sulfur Gasoline - Step 1	October 2002	28.1
CCU-1 Alterations	September 2003	0.1
Hartford Integration Project	April 2004	<u>17.3</u>
	Total:	46.5

**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>
DU-2 Mixed Crude Heater West, F-202 (Fuel Switch)	May 2000	527.5
DU-2 Mixed Crude Heater East, F-203 (Fuel Switch)	May 2000	554.2
RAU Deethanizer Heater Shutdown	October 2001	1.0
CR-3 Charge Heater, H-4 (Fuel Switch)	November 2002	663.0
CR-3 1 <sup>st</sup> Reheat Heater, H-5 (Fuel Switch)	November 2002	646.6
CR-3 2nd Reheat Heater, H-6 (Fuel Switch)	November 2002	339.0

<u>Item of Equipment</u>	<u>Commencement of Operational Change Date</u>	<u>Emissions Decrease (Tons/Year)</u>
DU-1 Primary Heater South, F-301 (Fuel Switch)	February 2000	75.9
DU-1 Secondary Heater North, F-302 (Fuel Switch)	February 2000	126.2
CR-1 Feed Preheat, H-1 (Fuel Switch)	February 2002	309.1
CR-1 1 <sup>st</sup> Interreactor Heater, H-2 (Fuel Switch)	February 2002	303.6
CR-1 2nd Interreactor Heater, H-3 (Fuel Switch)	February 2002	146.2
Fluidized Catalytic Cracking Unit Shutdown at Hartford	October 2002	73.9
Reroute/Elimination of Flare Streams at Hartford	October 2002	<u>0.0</u>
	Total:	3,766.2

**Table IV - Net Emissions Change**

	<u>(Tons/Year)</u>
Increases and Decreases Associated With The Proposed Modification	70.8
Creditable Contemporaneous Emission Increases	46.5
Creditable Contemporaneous Emission Decreases	<u>-3,766.2</u>
	-3,648.9

Attachment 3

PSD Applicability - PM Netting Analysis

Contemporaneous Time Period of January 2000 Through March 2006

**Table I - Emissions Increases and Decreases Associated With the Proposed Modification**

<u>Item of Equipment</u>	<u>Actual (Tons/Yr)</u>	<u>Projected Actual (Tons/Yr)</u>	<u>Emissions Change (Tons/Year)</u>
Hydrogen Plant	New	26.9	26.9
HTR-ULD-H4	New	2.4	2.4
HTR-ULD-H1	1.1	2.0	0.9
HTR-DU1-F301	3.2	3.4	0.1
HTR-DU1-F302	4.9	5.1	0.2
HTR-CR2-N	5.4	6.1	0.8
HTR-HCU-H3	5.4	4.8	<u>-0.6</u>
		Total:	30.7

**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>
Rental Package Boilers	November 2000	1.9
RAU Deethanizer Reboiler	October 2001	1.3
Low Sulfur Gasoline - Step 1	October 2002	5.4
CCU-1 Alterations	September 2003	<u>0.1</u>
	Total:	8.7

**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>
DU-2 Mixed Crude Heater West, F-202 (Fuel Switch)	May 2000	15.6
DU-2 Mixed Crude Heater East, F-203 (Fuel Switch)	May 2000	15.6
RAU Deethanizer Heater Shutdown	October 2001	1.5
CR-3 Charge Heater, H-4 (Fuel Switch)	November 2002	21.6
CR-3 1 <sup>st</sup> Reheat Heater, H-5 (Fuel Switch)	November 2002	21.1
CR-3 2nd Reheat Heater, H-6 (Fuel Switch)	November 2002	11.1
DU-1 Primary Heater South, F-301 (Fuel Switch)	February 2000	2.0
DU-1 Secondary Heater North, F-302 (Fuel Switch)	February 2000	3.2

<u>Item of Equipment</u>	<u>Commencement of Operational Change Date</u>	<u>Emissions Decrease (Tons/Year)</u>
CR-1 Feed Preheat, H-1 (Fuel Switch)	February 2002	9.3
CR-1 1 <sup>st</sup> Interreactor Heater, H-2 (Fuel Switch)	February 2002	9.2
CR-1 2nd Interreactor Heater, H-3 (Fuel Switch)	February 2002	4.4
Fluidized Catalytic Cracking Unit Shutdown at Hartford	October 2002	<u>323.3</u>
	Total:	437.9

**Table IV - Net Emissions Change**

	<u>(Tons/Year)</u>
Increases and Decreases Associated With The Proposed Modification	30.7
Creditable Contemporaneous Emission Increases	8.7
Creditable Contemporaneous Emission Decreases	<u>-437.9</u>
	-398.5

Attachment 4

PSD Applicability - PM<sub>10</sub> Netting Analysis

Contemporaneous Time Period of January 2000 Through March 2006

**Table I - Emissions Increases and Decreases Associated With the Proposed Modification**

<u>Item of Equipment</u>	<u>Actual (Tons/Yr)</u>	<u>Projected Actual (Tons/Yr)</u>	<u>Emissions Change (Tons/Year)</u>
Hydrogen Plant	New	26.9	26.9
HTR-ULD-H4	New	2.4	2.4
HTR-ULD-H1	1.1	2.0	0.9
HTR-DU1-F301	3.2	3.4	0.1
HTR-DU1-F302	4.9	5.1	0.2
HTR-CR2-N	5.4	6.1	0.8
HTR-HCU-H3	5.4	4.8	<u>-0.6</u>
		Total:	30.7

**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>
Rental Package Boilers	November 2000	1.9
RAU Deethanizer Reboiler	October 2001	1.3
Low Sulfur Gasoline - Step 1	October 2002	5.4
CCU-1 Alterations	September 2003	<u>0.1</u>
	Total:	8.7

**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>
DU-2 Mixed Crude Heater West, F-202 (Fuel Switch)	May 2000	10.7
DU-2 Mixed Crude Heater East, F-203 (Fuel Switch)	May 2000	10.7
RAU Deethanizer Heater Shutdown	October 2001	1.5
CR-3 Charge Heater, H-4 (Fuel Switch)	November 2002	15.6
CR-3 1 <sup>st</sup> Reheat Heater, H-5 (Fuel Switch)	November 2002	15.4
CR-3 2nd Reheat Heater, H-6 (Fuel Switch)	November 2002	8.0
DU-1 Primary Heater South, F-301 (Fuel Switch)	February 2000	1.3
DU-1 Secondary Heater North, F-302 (Fuel Switch)	February 2000	1.9

<u>Item of Equipment</u>	<u>Commencement of Operational Change Date</u>	<u>Emissions Decrease (Tons/Year)</u>
CR-1 Feed Preheat, H-1 (Fuel Switch)	February 2002	6.5
CR-1 1 <sup>st</sup> Interreactor Heater, H-2 (Fuel Switch)	February 2002	6.4
CR-1 2nd Interreactor Heater, H-3 (Fuel Switch)	February 2002	3.0
Fluidized Catalytic Cracking Unit Shutdown at Hartford	October 2002	<u>323.3</u>
	Total:	404.3

**Table IV - Net Emissions Change**

	<u>(Tons/Year)</u>
Increases and Decreases Associated With The Proposed Modification	30.7
Creditable Contemporaneous Emission Increases	8.7
Creditable Contemporaneous Emission Decreases	<u>-404.3</u>
	-364.9

## PROJECT SUMMARY

### I. Introduction

A construction permit application has been submitted by ConocoPhillips for an Ultra Low Sulfur Diesel (uLSD) project. The uLSD project will enable the refinery to produce low sulfur diesel as required by federal regulation. This project does not involve modifications to other process units at the refinery, including the Fluidized Catalytic Cracking Unit (FCCU) and Coker Unit. The conditions in the proposed permit for the project are based on the project not being a major modification under 40 CFR 52.21, Prevention of Significant Deterioration (PSD) or 35 IAC Part 203, Major Stationary Sources Construction and Modification (MSSCAM). The proposed permit conditions include emission limitations, testing requirements, monitoring requirements, recordkeeping requirements, and reporting requirements.

### II. Source Description

ConocoPhillips operates a petroleum refinery located in Roxana, Illinois, Madison County. Madison County is designated as attainment for all pollutants except ozone, which is designated as moderate nonattainment.

The ultra low sulfur diesel (uLSD) project will enable the refinery to produce low sulfur on-road diesel fuel as required by federal regulation. Diesel is made from a number of distinct blend stocks or streams produced at the refinery. This project allows the refinery to remove sulfur from certain streams at the level required to produce ultra low sulfur diesel.

The ultra low sulfur diesel (uLSD) project will enable the refinery to produce low sulfur diesel fuel for on-road motor vehicles, as required by federal regulation. Diesel is made from a number of distinct blend stocks or streams produced at the refinery. This project allows the refinery to remove more sulfur from one of these streams, to the level needed to produce ultra low sulfur diesel by revamping and expanding the existing hydrocracking unit (HCU) and utilizing some of that equipment for a new ultra low sulfur diesel hydrotreater (ULD) unit.

The ULD unit will be a continuous operation that improves the quality of high sulfur feedstock by removing sulfur, nitrogen and metal compounds. The existing reactors will be reconfigured to accomplish the enhanced sulfur removing capabilities.

The reactors require heat which will be provided by an existing heater and one new heater. The existing heater currently has sufficient capacity to handle the required increased firing.

The sulfur recovery unit (SRU) will experience an additional loading of sulfur due to the incremental sulfur removed in the ULD Unit. The SRU currently has sufficient sulfur production capacity to handle this increased loading.

The ULD unit requires hydrogen to operate. This project also involves the construction of a new hydrogen plant.

These projects do not involve modifications to other process units at the refinery, including the Fluidized Catalytic Cracking Unit (FCCU) and Coker Unit.

#### IV. Applicable Emission Standards

All emission sources in Illinois must comply with the Illinois Pollution Control Board's emission standards. The Board's emission standards represent the basic requirements for sources in Illinois. The Board has standards for sources of nitrogen oxides, carbon monoxide, volatile organic material, sulfur dioxide, and particulate matter. This site readily complies with all applicable Board standards.

#### V. Proposed Permit

The conditions of the permit would contain limitations and requirements that are intended to assure that this project will not trigger the requirements of PSD or MSSCM. The permit conditions establish appropriate compliance procedures, including monitoring requirements, recordkeeping requirements, and reporting requirements. The Permittee must carry out these procedures on an on-going basis to demonstrate that the refinery is operating within the limitations set by the permit.

#### VI. Request for Comments

It is the Illinois EPA's preliminary determination that the facility meets all applicable state and federal air pollution control requirements, subject to the conditions proposed in the draft permit. The Illinois EPA is therefore proposing to issue a permit with federally enforceable limits for this project. Comments are requested on this proposed action by the Illinois EPA and the proposed conditions on the draft permit.