

217/782-2113

CONSTRUCTION PERMIT - PSD APPROVAL - REVISED

PERMITTEE

Mobil Oil Corporation  
Attn: Refinery Production Manager  
I-55 & Arsenal Road  
Joliet, Illinois 60434

<u>Application No.:</u> 97030078	<u>I.D. No.:</u> 197800AAA
<u>Applicant's Designation:</u> CUP PROJ	<u>Date Received:</u> May 2, 2001
<u>Subject:</u> Crude Upgrade Project	
<u>Date Issued:</u> July 10, 2001	
<u>Location:</u> I-55 & Arsenal Road, Joliet	

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of upgrading the existing Crude Unit, including the relocation of an existing heater which is to be fitted with very low-NO<sub>x</sub> burners as described in the above referenced application. This Permit is granted based upon and subject to the findings and conditions which follow.

In conjunction with this permit, approval is given with respect to the Prevention of Significant Deterioration of Air Quality Regulations (PSD) to construct the above referenced equipment, in that the Illinois Environmental Protection Agency (IEPA) finds that the application fulfills all applicable requirements of 40 CFR 52.21. This approval is issued pursuant to the Clean Air Act, as amended, 42 U.S.C. 7401 *et. seq.*, the Federal regulations promulgated thereunder at 40 CFR 52.21 for Prevention of Significant Deterioration of Air Quality (PSD), and a Delegation of Authority agreement between the United States Environmental Protection Agency and the Illinois EPA for the administration of the PSD Program. This approval becomes effective in accordance with the provisions of 40 CFR 124.15 and may be appealed in accordance with the provisions of 40 CFR 124.19. This approval is also based upon and subject to the findings and conditions which follow.

FINDINGS

1. Mobil Oil Corporation has requested a permit to increase the design capacity of the Crude Unit by relocating an existing gas/liquid fired process heater to preheat the feedstock to the Crude Unit. As part of relocation of the heater, low-NO<sub>x</sub> burners will be installed. In addition, the capability to fire liquid fuel (fuel oil) in the heater will be reduced to 48 million Btu/hour, 20% of the total rated heat input capacity of the heater, with oil burners that must only be operated periodically, (rather than with a trickle of oil) to prevent clogging. The changes at the Crude Unit will allow increases in the throughput of downstream units and associated changes in emissions have been evaluated as part of this project. The units that are affected, along with the effect is summarized and limited in Condition 6(b)(ii).

2. Mobil Oil - Joliet Refinery is located in Channahon Township in Will County. The area is currently designated attainment for all National Ambient Air Quality Standards (NAAQS) except ozone.
3. The proposed project, including all effects on downstream units will potentially increase NO<sub>x</sub> emissions by 440.7 tons/year, particulate matter (PM) emissions by 108.4 tons/year, and PM<sub>10</sub> emissions by 107.8 tons/year as further described in Tables 3, 4, and 5, respectively. The project is therefore subject to PSD review as a major modification to an existing source for NO<sub>x</sub>, PM, and PM<sub>10</sub> emissions, potentially increasing emissions by more than 40, 25, and 15 tons/year respectively.
4. After reviewing the materials submitted by Mobil Oil Corporation, Illinois EPA has determined that the project will (i) be in compliance with applicable Board emission standards and (ii) utilize Best Available Control Technology (BACT) on the relocated heater for emissions of NO<sub>x</sub>, and PM/PM<sub>10</sub>.
5. The Illinois EPA has determined that the proposed project complies with all applicable Illinois Air Pollution Board Regulations and the federal Prevention of Significant Deterioration of Air Quality Regulations (PSD), 40 CFR 52.21.
6. A copy of the application and the Illinois EPA's formal review of the application and a draft of this permit were placed in a location in the vicinity of the project, and the public was given notice and an opportunity to examine this material and to submit comments and to participate in a public hearing on this matter.

The Illinois EPA is issuing approval to construct the proposed project subject to the following conditions and consistent with the specifications and data included in the application. Any departure from the conditions of this approval or terms expressed in the application would need to receive prior written authorization by Illinois EPA.

#### CONDITIONS

1. Standard conditions for issuance of construction permits, attached hereto and incorporated herein by reference, shall apply to this project, unless superseded by the following special conditions.
- 2a. The nitrogen oxides (NO<sub>x</sub>) emissions from the Crude Unit Feed Preheater shall not exceed 0.033 lb/million Btu, except during time periods when the Preheater fires a combination of gaseous fuel and liquid fuel as addressed by Condition 2(b)(ii) and (iii), below, when the NO<sub>x</sub> emissions shall not exceed 0.103 lb/million Btu.
- b. The use of fuel oil in the Crude Unit Feed Preheater shall be minimized to the extent that it is used only:

- i. As needed for routine maintenance, to prevent clogging of burners;
  - ii. For purposes of emission testing; and/or
  - iii. When sufficient refinery fuel gas or natural gas is unavailable to the refinery, such as when the FCC Unit and/or Coker Unit are shutdown, malfunctioning, or operated at a substantially reduced level, or sufficient natural gas is unavailable due to interruption or reduction in the normal supply, or when there are emergency situations at the Propane Vaporizer, or the PtR Complex that substantially reduce the availability of refinery fuel gas.
- c.
- i. The capacity factor for fuel oil input to the Preheater shall not exceed 4 percent, per year.
  - ii. The Preheater shall fire fuel oil, as addressed by Condition 2(b)(iii) for no more than 500 hours per year or 10 percent of the total operating hours per year, whichever is greater.
  - iii. Compliance with these limits shall be determined on a monthly basis, from a running total of 12 months of data.
- d.
- i. The refinery fuel gas fired in the Preheater shall be supplied from the central Refinery Fuel Gas System(s).
  - ii. The fuel oil fired in the Preheater shall be low sulfur fuel oil, containing less than 1% sulfur.

Condition 2 represents the application of the Best Available Control Technology to the Crude Unit Feed Preheater as required by Section 165 of the Clean Air Act. Emission limits are to be met on an hourly basis, as demonstrated by emission tests in accordance with Condition 7 and recordkeeping and reporting in accordance with Conditions 8, 9, 10, and 11.

- 3a. Pursuant to 35 IAC 212.123 the emissions of smoke or other particulate matter into the atmosphere from this Crude Unit Feed Preheater shall not be greater than 30 percent except as provided below.
- b. The smoke or other particulate matter emissions from the Crude Unit Feed Preheater may have an opacity greater than 30 percent but not greater than 60 percent (A more opaque emissions@) for a period or periods aggregating 8 minutes in any 60 minute period, provided that such periods of more opaque emissions are limited to three (3) times in any 24-hour period, and such periods of more opaque emissions may not simultaneously occur at other such emission units located within a 305 m (1,000 ft) radius of the Crude Unit Feed Preheater when the heater is experiencing periods of more opaque emissions and the Permittee records appropriate instantaneous opacity data (i.e., values of at least every 15 seconds) when the Permittee relies on this exception.
- c. Operation of the ACrude Unit Feed Preheater@ in excess of the Board emission limits is allowed during startup once a year when the heater

is decoked. Heater decoking is a 12 to 48 hour process, when steam is turned into the heater tubes to remove coke deposits by spalling the material from the tubes, followed by introduction of air and steam to complete removal of deposits, with the effluent resulting from decoking vented to the atmosphere through a water-filled Adecoking drum.® As related to such activity, this condition supersedes Standard Condition 8(a) as it applies to startup. The Permittee shall maintain the records required by Standard Condition 8(b).

4. This permit is issued based on the Crude Unit Feed Preheater not being subject to the requirements of 40 CFR 60 Subpart J, Standard of Performance for Petroleum Refineries, because this is an existing heater and a modification, pursuant to 40 CFR 60.14, will not occur as a result of this project. Past actual emission rates for sulfur dioxide (SO<sub>2</sub>) from this unit were 111.0 lb/hr. Future potential emission rates from this unit are expected to be substantially lower (58.2 lb/hr) than the past actual emission rates.
- 5a. The new components associated with the Crude Upgrade Project are subject to 40 CFR Part 63, Subpart CC - National Emission Standard for Hazardous Air Pollutants From Petroleum Refineries. The Illinois EPA is administering this regulation in Illinois on behalf of the United States EPA under a delegation agreement.
- b. Pursuant to 40 CFR 63.648(a) the Permittee shall comply with the applicable design and equipment standards, and markings, inspection, monitoring, tagging, repair and testing requirements in 40 CFR 63, Subpart H, for the following sources in hazardous air pollutant service:
  - i. General Provisions (40 CFR 63.162)
  - ii. Pumps (40 CFR 63.163)
  - iii. Compressors (40 CFR 63.164)
  - iv. Pressure relief devices in gas/vapor service (40 CFR 63.165)
  - v. Sampling connection systems (63.166)
  - vi. Open-ended valves or lines (40 CFR 63.167)
  - vii. Valves in gas/vapor service and in light liquid service (40 CFR 63.168)
  - viii. Pumps, valves, connectors, and agitators in heavy liquid service; instrumentation systems; and pressure relief devices in liquid service (40 CFR 63.169)
  - ix. Surge control vessels and bottoms receivers (40 CFR 63.170)
  - x. Closed-vent systems and control devices (40 CFR 63.172)

- xi. Agitators in gas/vapor service and in light liquid service (40 CFR 63.173)
  - xii. Connectors in gas/vapor service and in light liquid service (40 CFR 63.174)
  - c. Delayed repair of leaks is allowed as provided in 40 CFR 63.171.
  - d. At all times the Permittee shall maintain and operate sources in HAP service, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions.
- 6a.
- i. This permit is issued based upon a contemporaneous decrease in SO<sub>2</sub> and VOM emissions so that the net increase in emissions is not significant. Therefore, this permit is not subject to Rules for Prevention of Significant Deterioration of Air Quality, 40 CFR 52.21 with respect to VOM and SO<sub>2</sub>, nor is it subject to the Major Stationary Sources Construction and Modification Rules of 35 IAC 203 for Non Attainment Area New Source Review for VOM.
    - A. The decrease in SO<sub>2</sub> emissions occurred as a result of reduced use of the South Sulfur Recovery Unit when the more efficient new North Sulfur Recovery Unit became operational. The reduction in the use of the South Sulfur Recovery Unit coupled with the restriction of SO<sub>2</sub> emissions from the North Sulfur Recovery Unit and a restriction on SO<sub>2</sub> emissions from both sulfur recovery units combined, created a credible decrease in actual SO<sub>2</sub> emissions in excess of 1,100 tons/year. As a result this permit does not represent a significant net increase in emissions of SO<sub>2</sub>, as further explained in paragraph 6(b)(i), (ii), (iii), and (vi); Attachment 1 - Table 1; and Attachment 2.
    - B. The decrease in VOM emissions occurred as a result of the upgrade of the seal in storage tank (402) to mechanical shoe seals that resulted in a creditable decrease in VOM emissions of 25 tons/year. To assure that these reductions are creditable, in the event that a seal is ever replaced on this tank, the new seal must at least maintain an equivalent level of control. As a result this permit does not represent a significant net increase in emissions of VOM, as further explained in paragraph 6(b)(v) and (vi); Attachment 1 - Table 2; and Attachment 2.
  - ii. This permit is issued based on the increase in emission of CO from the Crude Unit Feed Preheater itself, and the entire Crude Upgrade Project as a whole being less than significant and as a result not being subject to Rules for Prevention of Significant Deterioration of Air Quality, 40 CFR 52.21, as further explained in Condition 6(b)(i); Attachment 1 - Table 6; and Attachment 2.

- b. i. Annual emissions of the Crude Unit Feed Preheater shall not exceed the following limits. Compliance with these limits shall be determined from a running total of 12 months of data.

<u>Emission Unit</u>	<u>Annual Emission Limits (Ton/Year)</u>					
	<u>NO<sub>x</sub></u>	<u>SO<sub>2</sub></u>	<u>CO</u>	<u>VOM</u>	<u>PM</u>	<u>PM<sub>10</sub></u>
Crude Unit Feed Preheater	42.0	50.4	19.1	2.9	4.5	3.9

- ii. Annual emissions from process equipment associated with this Crude Upgrade Project shall not exceed the following limits. These limits do not address Afugitive@ losses from leaking components, which are not affected by this project and which are controlled by various leak detection and repair programs. Compliance with these limits shall be determined from a running total of 12 months of data. Further explanation of the basis of these limits can be found in Tables 1-6.

<u>Emission Unit</u>	<u>Annual Emission Limits (Ton/Year)</u>					
	<u>NO<sub>x</sub></u>	<u>SO<sub>2</sub></u>	<u>CO</u>	<u>VOM</u>	<u>PM</u>	<u>PM<sub>10</sub></u>
Process Heaters 1-B-3/13-B-4; 17-B-1; 2-B-3, 4,5,6; 3-B-1; 16-B-1A and 16-B-1B (total)	454.5	155.8	108.2	14.1	16.6	16.0
Process Heaters	454.5	155.8	108.2	14.1	16.6	16.0
FCC Unit and North and South Sulfur Units (Combined)	2,130.8	-	2,816	3.4	469.1	469.1
Tanks* 403-405, 421, 422, 431, 432, 441-444, 233, and Wharf Loading of Asphalt	-	-	-	31.93*	-	-

\* The increase in VOM emissions results solely from working losses associated with the increase in throughput resulting from this project. The breathing losses will remain unchanged as a result in this increase in throughput and will not be affected by this project. Therefore, this limitation applies solely to the working losses of these tanks and the wharf loading. Condition 6(b)(iv)(C) addresses breathing losses from this equipment.

- iii. A. This permit is issued based on all H<sub>2</sub>S gas streams produced by treatment of refinery fuel gas being processed by one of

the sulfur recovery units except in the event of malfunction/breakdown or shutdown of the units, and then appropriate steps shall be taken to minimize emissions. There shall be no emissions attributable to bypassing except during a malfunction/breakdown or shutdown as addressed above. This provision is established for the purposes of addressing any potential bypassing of these units.

B. The following limits have been carried through from existing operating permit 91030116 for clarification with respect to this project. The NSPS requirements of 40 CFR 60 Subpart J, recordkeeping, monitoring, and reporting requirements of Operating Permit 91030116 are not altered by this permit.

1. Emissions of sulfur dioxide (SO<sub>2</sub>), particulate matter<sub>10</sub> (PM<sub>10</sub>), nitrogen oxides (NO<sub>x</sub>), hydrogen sulfide (H<sub>2</sub>S), and carbon monoxide (CO) from the North Sulfur Recovery Unit's thermal oxidizer shall not exceed the following:

<u>Contaminant</u>	<u>Emissions</u>	
	<u>(Lb/Hr)</u>	<u>(Ton/Yr)</u>
SO <sub>2</sub>	63.9	280.0
PM <sub>10</sub>	0.2	0.9
NO <sub>x</sub>	9.0	39.4
H <sub>2</sub> S	1.4	6.1
CO	10.1	44.2

2. Emissions of sulfur dioxide from the South Sulfur Recovery Units (Application Nos. 72110570 and 91030116) shall not exceed 3,029 lb/hr and 13,267 ton/yr.

3. Combined emissions of SO<sub>2</sub> from both the North and South Sulfur Recovery Units (Application Nos. 72110570 and 91030116) shall not exceed 3,092.9 lb/hr and 13,547 ton/yr.

4. The South Sulfur Recovery Unit (i.e. South Sulfur Recovery Unit, Trains 1 and 2) shall not exceed 4,218 lb/hr of SO<sub>2</sub> emissions when the North Sulfur Recovery Unit is out of service.

5. Any bypass emissions shall be accounted for and be considered emissions associated with the South Sulfur Recovery Unit.

iv. Annual SO<sub>2</sub> emissions from the FCC Unit and North & South Sulfur Recovery Units (combined) shall not exceed the 26,184 tons/year.

- v. A. This permit is issued based on a reduction in actual VOM emissions of 25 tons/yr as a result of upgrading the seal in storage tank 402 to mechanical shoe seal.
- B. Emissions of VOM from storage tank 402 shall not exceed 10 tons/year. This limit places minimum control requirements on this tank so that the permanent reduction of 25 tons/yr is assured. Further explanation can be found in Table 2.
- C. Only VOM emissions attributable to working losses at storage tanks 233, 403-405, 421, 422, 431, 432, and 441-444 have been accounted for in this project since breathing losses will not change as a result of this project. To ensure that the breathing losses do not change, the Permittee shall only operate these tanks with material that is similar in characteristics (i.e., vapor pressure) to the material that was used to estimate the future potential emissions from these tanks as a result of this project. Specifically, tank 233 shall be used to store asphalt or a less volatile material, tanks 403-405 shall be used to store gasoline or a less volatile material, and tanks 421\*, 422\*, 431, 432, and 441-444 shall be used to store distillates or a less volatile material.

\* Exceptions: Tanks 421 and 422 may be used to store other material provided breathing losses attributable to the storage of such other material is accounted for when quantifying annual emissions from working losses as required in Condition 7(h).

- vi. Limitations are being imposed to establish the future potential of all contemporaneous increases that have been considered with respect to netting of SO<sub>2</sub> and VOM emissions related to this CUP project. Annual emissions of SO<sub>2</sub> and VOM shall not exceed the following limits. Compliance with annual limits shall be determined from a running total of 12 months of data.

<u>Equipment</u>	<u>Annual Emission (Ton/Year)</u>		
	<u>Permit</u>	<u>SO<sub>2</sub></u>	<u>VOM</u>
Coker/Hvy Crude - Heater	92090035	46.0	4.5
Coker/Hvy Crude - Fugitives	92090035	--	0.53
CCR - Heaters	91100021	77.4	7.5
CCR - Wash Tower	91100021	5.3	--
CCR - Fugitives	91100021	--	17.9
MWSP Cooling Tower	91060085	--	2.5
Tank 309	72110577	--	6.8
P/P Sales Unit	95050158	--	0.67
Truck Loading Facility	97050137	--	17.1

- 7a. The Permittee shall maintain records of the following items for the Crude Unit Feed Preheater to demonstrate compliance with Conditions 2 and 6(b)(i) and (ii).

- i. A. Heat and sulfur content of refinery fuel gas burned, with supporting documentation, on a representative frequency, i.e., sulfur content shall be determined in accordance with the NSPS 40 CFR 60.105, as the NSPS is applicable to certain heaters at the refinery, and heat content shall be determined at least weekly;
  - B. Heat and sulfur content of fuel oil, with supporting documentation, on a representative frequency, i.e., sulfur and heat content shall be determined for each batch or lot of oil added to the storage tank serving the Preheater;
  - ii. A. Quantity of each fuel, i.e., refinery fuel gas, natural gas and fuel oil burned in the Crude Unit Feed Preheater, daily;
  - B. If fuel oil was burned, the reason for its use if burned for purposes other than routine maintenance and supporting information to show that the refinery's supply of gaseous fuel was inadequate or that emission testing was being performed;
  - iii. Individual and combined fired fuel duty (gross) from the Crude Unit Feed Preheater, daily;
  - iv. Emissions of NO<sub>x</sub>, PM and PM<sub>10</sub>, in tons/month, with supporting calculations;
  - v. Annual capacity factor for firing fuel oil, with supporting calculations;
  - vi. Annual operating hours for firing fuel oil, as addressed by Condition 2(b)(iii) and (c)(ii); and
  - vii. Annual emissions of NO<sub>x</sub>, PM, and PM<sub>10</sub> from the Crude Unit Feed Preheater for the current month and the previous 11 months, tons/year.
- b. The Permittee shall maintain records of the following items for the Crude Unit Feed Preheater to demonstrate compliance with the SO<sub>2</sub>, CO, and VOM limits of Condition 6(b)(i) and (ii).
- i. Operating condition of the fuel gas desulfurization system, once per shift;
  - ii. Quantity of each fuel burned for the Crude Unit Feed Preheater, daily;
  - iii. The sulfur content of each fuel burned in the Crude Unit Feed Preheater, with supporting documentation;

- iv. Actual emissions of VOM, CO, and SO<sub>2</sub> in tons/month from the Crude Unit Feed Preheater, with supporting calculations; and
  - v. Annual emissions of VOM, CO, and SO<sub>2</sub> for the current month and the previous 11 months from the Crude Unit Feed Preheater, tons/year.
- c. The Permittee shall maintain appropriate records for the Crude Unit Feed Preheater so as to allow the Illinois EPA to verify compliance with 35 IAC 212.123 (Condition 3).
- d. The Permittee shall maintain records of the following items for the both North and South Sulfur Recovery Units and FCC Unit to demonstrate compliance with the annual limits of Conditions 6(b)(iii) and (iv).
- i. The quantity of gas treated by each of the sulfur recovery units, million cubic feet per month;
  - ii. Actual emissions of SO<sub>2</sub>, PM, PM<sub>10</sub>, NO<sub>x</sub>, H<sub>2</sub>S, and CO from the North Sulfur Recovery Unit, tons/month as determined from the monitoring and recordkeeping specified in the permit for this unit, e.g. continuous emission monitoring for SO<sub>2</sub>;
  - iii. Actual emissions of SO<sub>2</sub>, PM, PM<sub>10</sub>, NO<sub>x</sub>, and CO from the South Sulfur Recovery Unit, tons/month as determined from the monitoring and recordkeeping specified in the permit for this unit;
  - iv. Actual emissions SO<sub>2</sub>, PM, PM<sub>10</sub>, NO<sub>x</sub>, VOM, and CO from both North and South Sulfur Recovery Units combined, tons/month;
  - v. Annual emissions of SO<sub>2</sub>, PM, PM<sub>10</sub>, NO<sub>x</sub>, H<sub>2</sub>S, and CO from the North Sulfur Recovery Unit for the current month and the previous 11 months, tons/year;
  - vi. Annual emissions of SO<sub>2</sub>, PM, PM<sub>10</sub>, NO<sub>x</sub>, VOM, and CO from both sulfur recovery units combined for the current month and the previous 11 months, tons/year; and
  - vii. The time periods when the North Sulfur Recovery Unit is not operating, date and hours, and the sulfur emissions from the South Sulfur Recovery Unit during these time periods, total tons.
  - viii. Actual emissions of SO<sub>2</sub>, NO<sub>x</sub>, CO, VOM, PM, and PM<sub>10</sub> in tons/month from the FCC Unit, as determined in accordance with the monitoring and recordkeeping provisions specified in the permit for the FCC Unit, with supporting documentation;
  - ix. Actual emissions of SO<sub>2</sub>, NO<sub>x</sub>, CO, VOM, PM, and PM<sub>10</sub> in tons/month from the FCC Unit and both North and South Sulfur Recovery Units combined, with supporting documentation;
  - x. Annual emissions of SO<sub>2</sub>, NO<sub>x</sub>, CO, VOM, PM, and PM<sub>10</sub> from the FCC Unit for the current month and the previous 11 months, tons/year.

- xi. Annual emissions of SO<sub>2</sub>, NO<sub>x</sub>, CO, VOM, PM, and PM<sub>10</sub> from the FCC Unit and both North and South Sulfur Recovery Units combined for the current month and the previous 11 months.
- e. The Permittee shall maintain records of the following items for refinery fuel gas and process heaters (other than the Crude Unit Feed Preheater) to demonstrate compliance with the limits of Condition 6(b)(ii).
- i. Operating condition of the fuel gas desulfurization system, once per shift;
  - ii. Quantity of each fuel burned in the Process Heaters (1-B-3/13-B-4; 17-B-1; 2-B-3,4,5,6; 3-B-1; 16-B-1A & 16-B-1B), daily;
  - iii. The sulfur content of each fuel burned in the Process Heaters (1-B-3/13-B-4; 17-B-1; 2-B-3,4,5,6; 3-B-1; 16-B-1A & 16-B-1B), with supporting documentation;
  - iv. Actual emissions of SO<sub>2</sub>, NO<sub>x</sub>, CO, VOM, PM, and PM<sub>10</sub> in tons/month with supporting documentation for the Process Heaters (1-B-3/13-B-4; 17-B-1; 2-B-3,4,5,6; 3-B-1; 16-B-1A & 16-B-1B);
  - v. Annual emissions of SO<sub>2</sub>, NO<sub>x</sub>, CO, VOM, PM, and PM<sub>10</sub> from the Process Heaters (1-B-3/13-B-4; 17-B-1; 2-B-3,4,5,6; 3-B-1; 16-B-1A & 16-B-1B) for the current month and the previous 11 months, tons/year; and
- f. The Permittee shall maintain records of the following items for certain heaters and other operations to demonstrate compliance with the SO<sub>2</sub> and VOM limits of Condition 6(b)(vi).
- i. Quantity of each fuel burned for each of the following: the Coker/Hvy Crude - Heater, the CCR - Heater, and the CCR Wash Tower, daily;
  - ii. The sulfur content of each fuel burned for each of the following: the Coker/Hvy Crude - Heater, the CCR - Heater, and the CCR Wash Tower, with supporting documentation;
  - iii. Actual emissions of SO<sub>2</sub> in tons/month from each of the following: Coker/Hvy Crude - Heater, the CCR - Heater, and the CCR Wash Tower, with supporting documentation;
  - iv. Actual emissions of VOM in tons/month from each of the following: Coker/Hvy Crude - Heater, Coker/Hvy Crude - Fugitives, CCR - Heater, CCR - Fugitives, MWSP Cooling Tower, Tank 309, P/P Sales Unit and the Truck Loading Facility, with supporting documentation;

- v. Annual emissions of SO<sub>2</sub> for each of the following: the Coker/Hvy Crude - Heater, the CCR - Heater, and the CCR Wash Tower for the current month and the previous 11 months, tons/year;
  - vi. Annual emissions of VOM from each of the following: Coker/Hvy Crude - Heater, Coker/Hvy Crude - Fugitives, CCR - Heater, CCR - Fugitives, MWSP Cooling Tower, Tank 309, P/P Sales Unit and the Truck Loading Facility for the current month and the previous 11 months, tons/year.
- g. The Permittee shall maintain records of the following items for Tank 402 to demonstrate compliance with the limits of Condition 6(b)(v)(B):
- i. The type and characteristic of each material stored in tank 402;
  - ii. Actual emissions of VOM on a monthly basis from Tank 402, tons/month;
  - iii. Annual emissions of VOM from tank 402 for the current month and the previous 11 months, tons/year.
- h. The Permittee shall maintain records of the following items for Material Storage and Handling (other than Tank 402) to demonstrate compliance with the limits of Conditions 6(b)(ii) and 6(b)(v)(C):
- i. The type and characteristic of each material stored in each of the following tanks: 233, 403-405, 421, 422, 431, 433, and 441-444;
  - ii. Actual emissions of VOM attributable to working losses, on a monthly basis from tanks 233, 403-405, 421, 422, 431, 433, and 441-444, tons/month;
  - iii. Actual emissions of VOM from the wharf loading of asphalt, tons/month; and
  - iv. Annual emissions of VOM attributable to working losses from tanks 233, 403-405, 421\*\*, 422\*\*, 431, 433, and 441-444 and the wharf loading of asphalt combined for the current month and the previous 11 months, tons/year.
- \*\* Breathing losses from the storage of material that is more volatile than distillate oil shall also be included in this total.
- i. Pursuant to 40 CFR 63.654, for components in HAP service, the Permittee shall comply with the recordkeeping and reporting requirements of 40 CFR 63.181 and 63.182.
8. The Permittee shall notify the Illinois EPA, Compliance Section within 30 days of exceedance of the limits in Conditions 2, 3, or 6. This notification shall include:

- a. Identification of the limit that may have been exceeded;
  - b. Duration of the possible exceedance;
  - c. An estimate of the amount of emissions in excess of the applicable standard;
  - d. A description of the cause of the possible exceedance; and
  - e. When compliance was reestablished.
9. The Permittee shall submit the following information along with its annual emission report:
- a. The annual emissions of NO<sub>x</sub>, CO, PM, PM<sub>10</sub>, VOM, and SO<sub>2</sub> from the Crude Unit Feed Preheater for each month of the previous calendar year, to demonstrate compliance with Condition 6(b)(i), tons/year (e.g., for the month of January, the emissions from February of the preceding year through January, for the month of February, the emissions from March of the preceding calendar year through February, 12 months in all);
  - b. The annual emissions of NO<sub>x</sub>, CO, PM, PM<sub>10</sub>, VOM, and SO<sub>2</sub> from the Process Heaters (1-B-3/13-B-4; 17-B-1; 2-B-3,4,5,6; 3-B-1; 16-B-1A & 16-B-1B), for each month of the previous calendar year, to demonstrate compliance the Condition 6(b)(ii), tons/year (e.g., for the month of January, the emissions from February of the preceding year through January, for the month of February, the emissions from March of the preceding calendar year through February, 12 months in all);
  - c. The annual emissions of NO<sub>x</sub>, CO, PM, PM<sub>10</sub>, VOM, and SO<sub>2</sub> from the FCC Unit, for each month of the previous calendar year, to demonstrate compliance the Condition 6(b)(ii), tons/year (e.g., for the month of January, the emissions from February of the preceding year through January, for the month of February, the emissions from March of the preceding calendar year through February, 12 months in all);
  - d. The annual emissions of NO<sub>x</sub>, CO, PM, PM<sub>10</sub>, VOM, and SO<sub>2</sub> from the North Sulfur Recovery Unit and the South Sulfur Recovery Unit on a per plant basis, for each month of the previous calendar year, to demonstrate compliance the Condition 6(b)(iii)(A), tons/year (e.g., for the month of January, the emissions from February of the preceding year through January, for the month of February, the emissions from March of the preceding calendar year through February, 12 months in all);
  - e. The annual emissions of NO<sub>x</sub>, CO, PM, PM<sub>10</sub>, VOM, and SO<sub>2</sub> from the North and South Sulfur Recovery Units (combined), for each month of the previous calendar year, to demonstrate compliance the Condition 6(b)(ii) and 6(b)(iii)(B), tons/year (e.g., for the month of January, the emissions from February of the preceding

year though January, for the month of February, the emissions from March of the preceding calendar year through February, 12 months in all);

- f. A summarization of the time periods when the North Sulfur Recovery Unit was not in operation including the dates it was out of service and the total hours it was out of service and the emissions of SO<sub>2</sub> from the South Sulfur Recovery Unit during these time periods, with sufficient information to show the average hourly emissions from the South Sulfur Recovery Unit during the North Sulfur Recovery Unit downtime.
- g. The annual emissions of VOM attributable to working losses, from the Storage Tanks and Wharf Loading (tanks 233, 403-405, 421\*\*, 422\*\*, 431, 432, 441-444 and wharf asphalt loading) for each month of the previous calendar year, to demonstrate compliance the Condition 6(b)(ii), tons/year (e.g., for the month of January, the emissions from February of the preceding year though January, for the month of February, the emissions from March of the preceding calendar year through February, 12 months in all);
- h. The annual emissions of VOM, from Storage Tank 402 for each month of the previous calendar year, to demonstrate compliance the Condition 6(b)(iv)(B), tons/year (e.g., for the month of January, the emissions from February of the preceding year though January, for the month of February, the emissions from March of the preceding calendar year through February, 12 months in all); and
- i. A summary of exceedances of the limits in Conditions 2, 3, or 6, if any, which required notification to the Compliance Section in accordance with Condition 8.

\*\* Breathing losses from the storage of material that is more volatile than distillate oil shall also be included in this total.

10. The following addresses should be utilized for the submittal of reports and notifications.

- a. Illinois EPA - Air Regional Field Office

Illinois Environmental Protection Agency  
Division of Air Pollution Control  
9511 West Harrison  
Des Plaines, Illinois 60016

- b. Illinois EPA - Air Compliance Section

Illinois Environmental Protection Agency  
Division of Air Pollution Control  
Compliance Section (#40)  
P.O. Box 19276  
Springfield, Illinois 62794-9276

Page 15

It should be noted that this permit has been revised to change the basis of the past actual and future potential NO<sub>x</sub> emissions for the FCC Unit.

If you have any questions concerning 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 1  
USEPA Region V

ATTACHMENT 1

Table 1 - Net changes in SO<sub>2</sub> emissions that accompany this project.

<u>Emission Group &amp; Included Emission Units</u>	SO <sub>2</sub> Emissions (Tons/Year)		Net Emission Increase by <u>Unit</u>	<u>Net Emission Increase by Group</u>
	<u>Past Actual</u>	<u>Future Potential</u>		
<u>Process Heaters</u>				
Crude Unit Feed Preheater (1-B-3/13-B-4)	0	50.4	50.4	
Pretreater Unit Charge Heater (17-B-1)	1.4	8.4	7.0	
Reformer Unit Charge Heater (2-B-3,4,5,6)	9.8	49.9	40.1	
CHD Unit Charge Heater (3-B-1)	2.5	12.3	9.8	
Coker Unit Heaters (16-B-1A & 1B)	7.9	34.8	26.9	
Sub-total:	21.6	155.8	134.2	134.2
<u>FCC Unit, North &amp; South Sulfur Units</u>				
FCC Unit	12,187	-		
South Sulfur Unit	14,730	13,267		
North Sulfur Unit	0	280*		
Sub-total:	26,917	26,184**	-733	-733
			CUP Project Total:	-598.8
<u>Past Project Increases</u>				
Coker/Hvy Crude (92090035)	28.5	46.0	17.5	
CCR Heater (91100021)	43.3	77.4	34.1	
CCR Wash Tower (91100021)	0	5.3	5.3	
Sub-total:	71.8	128.7	56.9	56.9
			Contemporaneous Total:	-541.9

\* Permit Special Condition. North Sulfur Recovery Unit by itself is limited to 280 tons/year.

\*\* Permit Special Condition. FCC Unit and North & South Sulfur Recovery Units combined are limited to 26,184 tons/year.

- For past actual, not addressed individually; for future potential, no limits established.

Table 2 - Net changes in VOM emissions that accompany this project and all other projects over the last five years.

<u>Emission Group &amp; Included Emission Units</u>	VOM Emissions (Tons/Year)		Net Emission Increase by <u>Unit</u>	<u>Net Emission Increase by Group</u>
	<u>Past Actual</u>	<u>Future Potential</u>		
<u>Process Heaters</u>				
Crude Unit Feed Preheater (1-B-3/13-B-4)	0	2.9	2.9	
Pretreater Unit Charge Heater (17-B-1)	0.6	0.8	0.2	
Reformer Unit Charge Heater (2-B-3,4,5,6)	4.3	5.4	1.1	
CHD Unit Charge Heater (3-B-1)	1.0	1.3	0.3	
Coker Unit Heaters (16-B-1A & 1B)	3.3	3.7	0.4	
Sub-total:	9.2	14.1	4.9	4.9
<u>FCC Unit, North &amp; South Sulfur Units</u>				
FCC Unit	2.1	-		
South Sulfur Unit	-	-		
North Sulfur Unit	0	0.44*		
Sub-total:	2.1	3.4	1.3	1.3
<u>Tanks and Asphalt Wharf Loading</u>				
Tanks 403-405, 421, 422, 431, 432, 441, 442, 443, 444, and 233 (combined - working losses only)**	23.7	28.9	5.2**	
Wharf Loading	2.5	3.0	0.5	
Sub-total:	26.2	31.9	5.7	5.7
CUP Project Total:				11.9

Table 2 - (Continued)

Past Project Credits for Reduction

Upgraded Tank Seals

Tank 402 - total losses	35	10	-25	
Sub-total:	35	10	-25	-25

Past Project Increases

Tank 309 - Install (94010066)	0	2.9	2.9	
Tank 309 - Changes (72110577)	2.9	6.8	3.9	
P/P Sales Unit (95050158)	0	0.7	0.7	
Truck Loading Facility (97050137)	0	17.1	17.1	
Sub-total:	2.9	27.5	24.6	24.6

Contemporaneous Total: 11.5

- \* Permit Special Condition. North Sulfur Recovery Unit by itself is limited to 0.44 tons/year.
- \*\* Only emissions from working losses have been accounted for here, as there will be no change in breathing loss emissions as a result of this project.
- For past actual, not addressed individually; for future potential, no limits established.

Table 3 - Net changes in NO<sub>x</sub> emissions that accompany this project.

<u>Emission Group &amp; Included Emission Units</u>	NO <sub>x</sub> Emissions (Tons/Year)		Net Emission Increase by Unit	Net Emission Increase by Group
	<u>Past Actual</u>	<u>Future Potential</u>		
<u>Process Heaters</u>				
Crude Unit Feed Preheater (1-B-3/13-B-4)	0	42.0	42.0	
Pretreater Unit Charge Heater (17-B-1)	30.1	42.1	12.0	
Reformer Unit Charge Heater (2-B-3,4,5,6)	126.4	160.2	33.8	
CHD Unit Charge Heater (3-B-1)	52.2	63.2	11.0	
Coker Unit Heaters (16-B-1A & 1B)	71.9	147.0	75.1	
Sub-total:	280.6	454.5	173.9	173.9
<u>FCC Unit, North &amp; South Sulfur Units</u>				
FCC Unit	1,700.2	2,080.5	380.3	380.3
South Sulfur Unit	50	-		
North Sulfur Unit	0	39.4*		
Sub-total:	50	50.3	0.3	0.3
CUP Project Total:				554.5
<u>Past Project Credits for Reduction</u>				
Coker/Hvy Crude (92090035)	177.13	176.34	-0.79	
Heater 13-B-1 low-NO <sub>x</sub> burners (72110572)	126.80	84.23	-42.57	
Sub-total:	303.93	260.57	-43.36	-43.36
<u>Past Project Increases</u>				
CCR Wash Tower (91100021)	0	8.80	8.80	8.80
Contemporaneous Total:				519.9

\* Permit Special Condition. North Sulfur Unit by itself is limited to 39.4 tons/year.

- For past actual, not addressed individually; for future potential, no limits established.

Table 4 - Net changes in PM emissions that accompany this project.

<u>Emission Group &amp; Included Emission Units</u>	PM Emissions (Tons/Year)		Net Emission Increase by <u>Unit</u>	<u>Net Emission Increase by Group</u>
	<u>Past Actual</u>	<u>Future Potential</u>		
<u>Process Heaters</u>				
Crude Unit Feed Preheater (1-B-3/13-B-4)	0	4.5	4.5	
Pretreater Unit Charge Heater (17-B-1)	0.6	0.9	0.3	
Reformer Unit Charge Heater (2-B-3,4,5,6)	4.6	5.8	1.2	
CHD Unit Charge Heater (3-B-1)	1.1	1.4	0.3	
Coker Unit Heaters (16-B-1A & 1B)	3.5	4.0	0.5	
Sub-total:	9.8	16.6	6.8	6.8
<u>FCC Unit, North &amp; South Sulfur Units</u>				
FCC Unit	366.2	467.8	101.6	101.6
South Sulfur Unit	1.3	-		
North Sulfur Unit	0	0.9*		
Sub-total:	1.3	1.314	0.014	0.0
CUP Project Total:				108.4
<u>Past Project Credits for Reduction</u>				
Coke Conveyor System (95120272)	38.8	31.7	-7.1	-7.1
<u>Past Project Increases</u>				
Coker/Hvy Crude - Heater (92090035)	5.0	8.0	3.0	
Coker/Hvy Crude -Coke Handling (92090035)	33.0	38.8	5.8	
CCR - Heater (91100021)	7.5	13.6	6.1	
CCR - Wash Tower (91100021)	0	0.5	0.5	
Sub-Total:	45.5	60.9	15.4	15.4
Contemporaneous Total:				116.7

\* Permit Special Condition. North Sulfur Recovery Unit by itself is limited to 0.9 tons/year.

- For past actual, not addressed individually; for future potential, no limits established.

Table 5 - Net changes in PM<sub>10</sub> emissions that accompany this project.

<u>Emission Group &amp; Included Emission Units</u>	PM <sub>10</sub> Emissions (Tons/Year)		Net Emission Increase by <u>Unit</u>	<u>Net Emission Increase by Group</u>
	<u>Past Actual</u>	<u>Future Potential</u>		
<u>Process Heaters</u>				
Crude Unit Feed Preheater (1-B-3/13-B-4)	0	3.9	3.9	
Pretreater Unit Charge Heater (17-B-1)	0.6	0.9	0.3	
Reformer Unit Charge Heater (2-B-3,4,5,6)	4.6	5.8	1.2	
CHD Unit Charge Heater (3-B-1)	1.1	1.4	0.3	
Coker Unit Heaters (16-B-1A & 1B)	3.5	4.0	0.5	
Sub-total:	9.8	16.0	6.2	6.2
<u>FCC Unit, North &amp; South Sulfur Units</u>				
FCC Unit	366.2	467.8	101.6	101.6
South Sulfur Unit	1.3	-		
North Sulfur Unit	0	0.9*		
Sub-total:	1.3	1.314	0.014	0.0
CUP Project Total:				107.8
<u>Past Project Credits for Reduction</u>				
Coke Conveyor System (95120272)	15.5	12.7	-2.8	-2.8
<u>Past Project Increases</u>				
Coker/Hvy Crude - Heater (92090035)	5.0	8.0	3.0	
Coker/Hvy Crude -Coke Handling (92090035)	13.2	15.5	2.3	
CCR - Heater (91100021)	7.5	13.6	6.1	
CCR - Wash Tower (91100021)	0	0.5	0.5	
Sub-Total:	25.7	37.6	11.9	11.9
Contemporaneous Total:				116.9

\* Permit Special Condition. North Sulfur Recovery Unit by itself is limited to 0.9 tons/year.

- For past actual, not addressed individually; for future potential, no limits established.

Table 6 - Net changes in CO emissions that accompany this project.

<u>Emission Group &amp; Included Emission Units</u>	CO Emissions (Tons/Year)		Net Emission Increase by <u>Unit</u>	<u>Net Emission Increase by Group</u>
	<u>Past Actual</u>	<u>Future Potential</u>		
<u>Process Heaters</u>				
Crude Unit Feed Preheater (1-B-3/13-B-4)	0	19.1	19.1	
Pretreater Unit Charge Heater (17-B-1)	7.5	10.5	3.0	
Reformer Unit Charge Heater (2-B-3,4,5,6)	22.1	38.7	16.6	
CHD Unit Charge Heater (3-B-1)	13.1	15.8	2.7	
Coker Unit Heaters (16-B-1A & 1B)	21.3	24.1	2.8	
Sub-total:	64.0	108.2	44.2	44.2
<u>FCC Unit, North &amp; South Sulfur Units</u>				
FCC Unit	597	597	0.0	0.0
South Sulfur Unit	2,174.3	-		
North Sulfur Unit	0	44.2*		
Sub-total:	2,174.3	2219	44.7	44.7
CUP Project Total:				88.9

\* Permit Special Condition. North Sulfur Recovery Unit by itself is limited to 44.2 tons/year.

- For past actual, not addressed individually; for future potential, no limits established.

## ATTACHMENT 2

### Explanation of Years Used To Establish Past Actual Emissions

All past actual emissions were established based on the two year time frame of 1995 and 1996 except as noted below.

#### 1. FCC Unit

In general, as the Crude Upgrade Project increases the amount of crude oil that may be processed in the Crude Unit, it generally increases the amount of available intermediate feed material to be processed through other downstream units at the refinery. For downstream units that have been operating at less than capacity and will potentially process more material, an increase in throughput will generally result in a proportionate increase in emissions to the extent that emissions that are related to throughput. This consequence of the Crude Upgrade Project has generally been evaluated by comparing past actual emissions of affected units in 1995 and 1996 to the emissions now allowed by this permit.

However, the circumstances are different for the FCC Unit. The Permittee has demonstrated that the operation and SO<sub>2</sub> emissions of the FCC Unit are essentially independent of the Crude Upgrade Project. In particular, unlike other units, the FCC Unit is operated at and governed by the main blower limit for the catalyst decoking process, except due to physical outages or upsets. This project does not reduce the number of outages of the FCC Unit. Although SO<sub>2</sub> emissions of the FCC Unit have varied greatly over recent years, this has been due to variability in the quality of the FCC feed, primarily its sulfur content, which is a different factor than utilization of the FCC Unit. Thus, SO<sub>2</sub> emissions from the FCC are higher when it is processing low quality feed, which the FCC can only process effectively at a relatively low throughput rate. The FCC can process higher quality feed effectively at a much higher rate, with lower or no more SO<sub>2</sub> emissions. In this respect, the Crude Upgrade Project is expected to enhance the Permittee's ability to produce its own "high quality" feed for the FCC Unit. In its application, the Permittee recognized that an increase in annual FCC Unit throughput could occur since more high quality feed would be available. However, the project does not change the ability of the FCC Unit to process a range of feed material. In addition, the increased processing of higher quality feed does not result in an increase in SO<sub>2</sub> emissions.

In its application, the Permittee addressed the circumstances of the FCC Unit by looking at specific operating history of the FCC Unit. It used the historical operation of the FCC Unit as a basis to select years that were more representative than 1995 and 1996 to evaluate actual SO<sub>2</sub> emissions of the FCC Unit.

In 1995, there was a major disruption in a pipeline supplying crude oil to the refinery that affected the mix of crude processed by the FCC Unit. In 1996, the FCC was also processing an atypical mix of crude. In other years, the operation of the FCC Unit also was affected by shutdowns and refinery turnarounds. Not until 1989 & 1990, did the FCC

Unit process a representative mix of crude oil at a normal level of throughput.

The Illinois EPA accepted this demonstration because it also demonstrates that operation of the FCC Unit, as related to SO<sub>2</sub> emissions, is independent of this project and need not be included in the netting evaluation for PSD applicability. Nevertheless the Illinois EPA included limits on the SO<sub>2</sub> emissions from the FCC Unit in this permit, consistent with the application, as the FCC Unit is a major element in the emissions of any refinery and should be addressed in a comprehensive refinery permit.

Although similar circumstances may exist for emissions of other pollutants from the FCC Unit, the Permittee did not demonstrate that this was the case. The Permittee only operates an emission monitoring system for SO<sub>2</sub> and does not have comparable unit-specific data for other pollutants to use in place of emissions factors based on unit throughput. Therefore, for pollutants other than SO<sub>2</sub>, this permit assumes that emissions are related to throughput and the FCC Unit was included in the netting evaluation based on actual emissions in 1995 and 1996.

2. Sulfur Recovery Units

Two year prior South Sulfur Recovery Unit emissions for CO are based on the 1996 annual value. In 1995 the South Sulfur Recovery Unit's CO emissions were lower than historical levels due to pilot testing for CO control during part of the year. The North Sulfur Recovery Unit's CO, NO<sub>x</sub>, VOC, Part, PM-10, & SO<sub>2</sub> annual averages are based on the maximum permitted annual limits listed in the Operating Permit granted 3/14/95. This was done because the unit had not completed a full two years of operation under the permit. SO<sub>2</sub> for the North & South Sulfur Recovery Units is based on their combined annual limit in the Operating Permit granted 3/14/95, again because operation of both units had not completed a full two years of operation under the permit.

3. Storage Tanks

Two year prior tank emission losses are based on the 1995 & 1996 annual average for only the working or throughput losses from tanks #233, 421, 431, 432, 441, 442, 443, 444, 401, 402, 403, 404, 405, & 406.

For tanks "Past Actual", "CUP Increase", and "Future Potential" include only tank throughput and working losses and do not include standing or breathing losses, which are independent of throughput.

4. Barge Loading

Two year prior Wharf Barge Loading emissions are based only on the 1996 annual value for asphalt barges loaded, other products loaded were not included because the only increase in the use of the Wharf Barge Loading associated with this project will be for asphalt. Any increase

in production of other materials will result in additional material being shipped via pipeline. In 1995 the river locks were closed to all barge traffic during the majority of the asphalt season.

"Future Potential" only includes tank throughput or working losses from listed tanks, and Wharf Barge Loading losses due to asphalt loading only because the only increase in the use of the Wharf Barge Loading associated with this project will be for asphalt. Any increase in production of other materials will result in additional material being shipped via pipeline.

JMS:jar