

217/782-2113

CONSTRUCTION PERMIT -- NSPS SOURCE -- REVISED

PERMITTEE

Marathon Ashland Petroleum LLC  
Attn: Michael S. Armbrester  
Marathon Avenue  
Robinson, Illinois 62454

Application No.: 99020080  
Applicant's Designation: ROBOPTPROJ  
Subject: FCCU Flue Gas Scrubber  
Date Issued: October 25, 2000  
Location: Marathon Avenue, Robinson

I.D. No.: 033808AAB  
Date Received: February 22, 1999

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of upgrading the Crude Unit, Coker Unit, and Fluid Catalytic Cracking Unit (FCCU), including a Coker Heater (87F-104) and a Flue Gas Scrubber on the FCCU's regenerator flue gas vent as described in the above-referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

1. Description

Marathon Ashland has requested a permit for improvements to the refinery's Crude Unit, Coker Unit, and Fluid Catalytic Cracking Unit (FCCU). For the FCCU, the project includes an increase in throughput and the installation of a flue gas scrubber to control particulate matter and sulfur dioxide emissions in the regenerator flue gas vent with the replacement of the air blower, various other improvements to improve reliability of operation, and other replacements as part of routine periodic maintenance. Other portions of the project include putting an idled process heater previously permitted under permit 72110549 into new service at the Coker Unit (87F-104), and various other improvements at the Coker Unit and Crude Unit.

In addition to summarizing the future emissions as limited by Condition 6, a comparison of past actual emissions to future permitted emissions are described in Attachment A (see also Condition 6(d)).

2. List of Emission Units and Pollution Control Equipment

Unit	Description	Emission Control Equipment
Coker Heater (87F-104)	48 mmBtu/hr	None
FCCU	113,000 scf/min. blower rate	Flue Gas Scrubber Using a Sodium Carbonate Solution as the Scrubbant

3. Applicability Provisions and Applicable Regulations

- a. The Coker Heater (fuel gas combustion device) and the FCCU (fluid catalytic cracking unit catalyst regenerator) are 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.
  - i. Pursuant to Subpart J, no owner or operator subject to the provisions of 40 CFR 60 Subpart J shall discharge or cause the discharge into the atmosphere from any fluid catalytic cracking unit catalyst regenerator emissions in excess of the following limits. Compliance with these limitations shall apply in accordance with 40 CFR 60.8 and 60.11. The FCCU is subject to these limitations because the Permittee has not demonstrated that the FCCU will not be modified.
    - A. Particulate matter: 1.0 kg/1000 kg (1.0 lb/1000 lb) of coke burn-off in the catalyst regenerator [40 CFR 60.102(a)(1)].
    - B. Opacity: 30 percent opacity, except for one six-minute average opacity reading in any one hour period [40 CFR 60.102(a)(2)].
    - C. Carbon monoxide: 500 ppm by volume (dry basis) [40 CFR 60.103(a)].
    - D. Sulfur dioxide: The Permittee shall comply with one of the following [40 CFR 60.104(b)]. Compliance shall be determined daily on a 7-day rolling average basis using the appropriate procedures outlined in 40 CFR 60.106 [40 CFR 60.104(c)]. A minimum of 22 valid days of data shall be obtained every 30 rolling successive calendar days when complying with Condition (I) [40 CFR 60.104(d)].
      1. With an add-on control device, reduce sulfur dioxide emissions to the atmosphere by 90 percent or maintain sulfur dioxide emissions to the atmosphere less than or equal to 50 ppm by volume (vppm), whichever is less stringent; or [40 CFR 60.104(b)(1)]
      2. Without the use of an add-on control device, maintain sulfur oxides emissions calculated as sulfur dioxide to the atmosphere less than or equal to 9.8 kg/1,000 kg coke burn-off; or [40 CFR 60.104(b)(2)]
      3. Process in the fluid catalytic cracking unit fresh feed that has a total sulfur content no greater than 0.30 percent by weight [40 CFR 60.104(b)(3)]. Owners or operators who seek to comply with by this Condition shall meet the standard at all times, including periods of startup, shutdown, and malfunction [40 CFR 60.108(b)].

ii. Pursuant to 40 CFR 60.104(a), no owner or operator subject to 40 CFR 60 Subpart J shall:

A. Burn in any fuel gas combustion device any fuel gas that contains hydrogen sulfide (H<sub>2</sub>S) 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)].

b. The FCCU is subject to 35 IAC 212.381, which provides that no person shall cause or allow the PM emission rate from catalyst regenerators of fluidized catalytic converters to exceed in any one hour period the rate determined using the following equations:

$$E = 4.10(P)^{0.67} \quad - \text{ for } P \text{ less than or equal to } 30 \text{ T/hr}$$

$$E = (55.0(P)^{0.11}) - 40.0 \quad - \text{ for } P \text{ greater than or equal to } 30 \text{ T/hr}$$

Where:

E = Allowable emission rate in lbs/hr, and  
P = Catalyst recycle rate, including the amount of fresh catalyst added, in T/hr.

c. The FCCU is subject to 35 IAC 216.361, which provides that no person shall cause or allow the emission of a carbon monoxide waste stream into the atmosphere from a petroleum process unless such waste gas stream is burned in a direct flame afterburner or carbon monoxide boiler so that the resulting concentration of carbon monoxide in such waste gas stream is less than or equal to 200 ppm corrected to 50 percent excess air.

d. The FCCU and the Coker Heater (87F-104) are each subject to 35 IAC 212.123(a), which provides that no person shall cause or allow the emission of smoke or other particulate matter with an opacity greater than 30 percent, except as allowed by 35 IAC 212.123(b) and 212.124.

e. The FCCU and the Coker Heater (87F-104) are each subject to 35 IAC 214.301, which provides that no person shall cause or allow the emission of sulfur dioxide into the atmosphere from any process emission source to excess 2000 ppm.

f. The Coker Heater (87F-104) is subject to 35 IAC 216.121, which provides that no person shall cause or allow the emission of carbon monoxide (CO) into the atmosphere from any fuel combustion emission source with actual heat input greater than 2.9 MW (10 mmBtu/hr) to exceed 200 ppm, corrected to 50 percent excess air.

g. Operation of the FCCU in excess of the limitations in Condition 3(b), (c), (d), and (e) is allowed during startup and is subject to the following:

- i. Startup shall be conducted in accordance with a startup plan that includes all reasonable measures to be taken to minimize the quantity of emissions, the length of each startup, and the number of startups, e.g., the regenerator air rates will be adjusted to minimize the carbon level on the circulating catalyst. A description of the startup procedure including time periods for each phase for the fluid catalytic unit, CO boiler, and associated equipment shall be submitted to the Illinois EPA's Compliance Section for review within 30 days of any change to the startup procedure currently of file with the Illinois EPA. This shall include any proposed venting of emissions to stack not monitored by the continuous opacity monitor.
  - ii. Within 7 days following any startup, the Illinois EPA's regional office shall be notified of the estimated amount of catalyst lost during the startup. If the 7 day period includes normal operation, the total loss shall be divided into estimated losses during normal operation and during startup.
  - iii. If startup of the FCCU results in operation in excess of applicable emission standards for 40 hours or more, the Permittee shall immediately notify the Illinois EPA's regional field office by telephone of the additional length of time required to complete the startup, if any.
  - iv. As a condition to the operating permit for the FCCU, the Illinois EPA may impose additional conditions on operation during startup, in accordance with 35 Ill. Adm. Code 210.149.
  - v. Note: This authorization does not apply to Condition 3(a)(i)(CC) [NSPS for CO], for which startup, shutdown, and malfunction is addressed by 40 CFR 60.8 and 60.11.
- h. Operation of the FCCU in excess of Condition 3(c) during malfunction or breakdown is allowed as necessary to prevent injury to personnel or severe damage of equipment until the FCCU can be repaired, shutdown, or shifted to the **Afull burn@ mode\*** of operation, subject to the requirements below.

\* - The FCCU Unit typically operated with CO emissions controlled by combustion in the CO boiler to discharge to the atmosphere. The FCCU also has the capability to operate without the CO boiler, with CO emissions controlled by combustion within the regenerator vessel. Because of the nature of the FCCU, operation of the unit with a reduced load, using the **Afull burn@** approach to combust CO emissions will typically result in significantly lower emissions than would occur if the unit were to be completely shutdown, and then started back up. Excess emissions during startup of the unit, typically exceed excess emissions from a malfunction and breakdown both in magnitude and duration.

- i. The Permittee shall take all reasonable measures to minimize the quantity of excess emissions and the duration of the malfunction or breakdown including but not limited to reduction in FCCU charge rate or shift to the ~~A~~full burn@ mode of operation.
- ii.
  - A. The Permittee shall notify the Collinsville Regional Office (618-346-5120) of any malfunction or breakdown of the FCCU, including the CO Boiler by telephone as soon as possible during normal office hours.
  - B. The Permittee shall comply with all reasonable and safe directives of the regional office regarding such malfunctions and breakdowns.
- iii.
  - A. CO emissions may exceed the limit of Condition 3(c) for up to 48 hours during a malfunction or breakdown. However, the Illinois EPA's Regional Office in Collinsville, on a case-by-case basis, may extend this period if the Permittee can demonstrate that emissions will be less by continuing to operate at a reduced rate rather than shutting down and restarting.
  - B. The Permittee shall notify the Collinsville Regional Office (618-346-5120) as soon as possible during normal office hours after it has been determined that the duration of exceedance will or may exceed 48 hours, with the estimated amount of emissions during the continued malfunction or breakdown.
- iv. The Permittee shall maintain the following records for each occurrence of malfunction or breakdown that results in excess emissions and submit a summary of the information to the Illinois EPA's Compliance Section and Regional Office within 5 working days following the end of such occurrence:
  - A. Date and duration of the occurrence.
  - B. A detailed description of the occurrence, including its nature, cause for significant events during the occurrence, and the date, time and means by which the occurrence was terminated including:
    - 1. If the CO Boiler was shutdown.
    - 2. If the FCCU was shifted to the ~~A~~full burn@ mode of operation.
    - 3. If the FCCU resumed normal operation with the CO Boiler.
  - C. The charge rate to the FCCU and the catalyst recirculation rate, on a hourly basis, barrels/hr and tons/hr, respectively.

- D. An estimated of the quantity of emissions, including the CO concentration corrected to 50% excess air.
- E. The steps taken to prevent similar malfunctions or breakdowns or reduce their frequency and severity.
- F. If the alternative monitoring method is used to monitor opacity from the FCCU.

4. Non-Applicability of Regulations of Concern

None

5. Operation and Production Limits and Work Practices

- a. At all times, the Permittee shall also, to the extent practicable maintain and operate the FCCU and the Coker Heater (87F-104), including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions.
- b.
  - i. This permit is issued based on the flue gas scrubber being used to control PM and SO<sub>2</sub> emissions from the FCCU, so as to comply with 40 CFR 60 Subpart A and J.
  - ii. For the FCCU:
    - A. Maximum air blower rate for input to the FCCU regenerator: 113,000 scf/min.
    - B. Maximum refinery fuel gas input to the CO boiler: 175 mmscf/month and 1,400 mmscf/year.
- c.
  - i. The fuel to the Coker Heater (87F-104) shall be natural gas, other commercial gas, or refinery fuel gas complying with 40 CFR Subpart J.
  - ii. Operation of the Coker Heater (87F-104) shall not exceed the following fuel usage: 41 mmscf/month and 325 mmscf/year. (Note: mm = 1,000,000)
- d. Operation of equipment affected by this project shall not exceed the following limits:

Equipment	Gas Firing		Fuel Oil Firing	
	(mmscf/Mo)	(mmscf/Yr)	(mgal/Mo)	(mgal/Yr)
1F-1	494	3950	158	1260
1F-2	90	715	14	105
3F-1	281	2250	-	-
3F-2	156	1250	-	-
7F-1	148	1180	-	-
15F-1	113	900	-	-
15F-2	47	375	-	-
82F-1	50	50	-	-
82F-2	86	685	-	-
87F-103 & 87F-104	113	900	-	-
Boilers	233	1863	280	840

These limits are based on the requested limits as described in the permit application. The equipment is identified in Attachment A. (Note: mm = 1,000,000 and m = 1,000)

6. Emission Limitations

- a. Monthly emissions of equipment affected by this project shall not exceed the following:

<u>Equipment</u>	<u>NO<sub>x</sub></u> <u>(Ton/Mo)</u>	<u>SO<sub>2</sub></u> <u>(Ton/Mo)</u>	<u>CO</u> <u>(Ton/Mo)</u>	<u>PM</u> <u>(Ton/Mo)</u>	<u>VOM</u> <u>(Ton/Mo)</u>
FCCU (Regen Vent)	73.0	55.0	56.0	17.0	0.5
1F-1	37.2	43.0	22.0	4.1	1.4
1F-2	6.9	4.2	3.8	0.6	0.3
3F-1	19.7	3.8	12.0	1.1	0.8
3F-2	11.0	2.1	6.6	0.6	0.5
7F-1	7.4	2.0	6.2	0.6	0.5
15F-1	15.8	1.5	4.7	0.5	0.4
15F-2	2.4	0.6	2.0	0.2	0.2
82F-1	2.5	0.7	2.1	0.2	0.2
82F-2	4.3	1.2	3.6	0.4	0.3
87F-103 & 87F-104	3.9	1.5	4.8	0.4	0.4
Boilers	34.4	66.0	11.0	4.8	0.8

These limits are based on the operation limits specified in Condition 5 and emission factors in Condition 12. The equipment is identified in Attachment A.

- b. Annual emissions of equipment affected by this project shall not exceed the following:

<u>Equipment</u>	<u>NO<sub>x</sub></u> <u>(Ton/Yr)</u>	<u>SO<sub>2</sub></u> <u>(Ton/Yr)</u>	<u>CO</u> <u>(Ton/Yr)</u>	<u>PM</u> <u>(Ton/Yr)</u>	<u>VOM</u> <u>(Ton/Yr)</u>
FCCU (Regen Vent)	585.0	436.0	445.0	134.0	3.9
1F-1	297.0	337.0	169.0	33.0	12.0
1F-2	54.0	34.0	30.0	4.2	2.0
3F-1	158.0	31.0	95.0	8.6	6.2
3F-2	88.0	17.0	53.0	4.8	3.4
7F-1	59.0	16.0	50.0	4.5	3.2
15F-1	126.0	13.0	38.0	3.4	2.5
15F-2	19.0	5.1	16.0	1.4	1.0
82F-1	2.5	0.7	2.1	0.2	0.2
82F-2	35.0	9.2	29.0	2.6	1.9
87F-103 & 87F-104	30.7	13.0	38.0	3.4	2.5
Boilers	228.5	215.0	80.0	19.0	5.4

These limits are based on the operation limits in Condition 5 and emission factors in Condition 12. The equipment is identified in Attachment A.

- c. 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).

- d. This permit is issued based on this project not constituting a major modification in accordance with 40 CFR 52.21, Prevention of Significant Deterioration of Air Quality (PSD), as described in Attachment A. Maximum potential emission increases of pollutants other than NO<sub>x</sub> are less than significant net levels. The net change in NO<sub>x</sub> emissions based on contemporaneous increases and creditable decreases are less than significant net levels.

7. Testing Requirements

- a. Pursuant to 40 CFR 60.8, within 60 days after achieving the maximum production rate at which the FCCU will be operated, but not later than 180 days after initial startup, the owner or operator shall conduct applicable performance test(s) of 40 CFR 60.106 and 40 CFR 60.108 and furnish the Illinois EPA a written report of the results.
- b. The Illinois EPA shall be notified prior to these tests to enable the Illinois EPA to observe these tests. Notification of the expected date of testing shall be submitted minimum of thirty (30) days prior to the expected date. Notification of the actual date and expected time of testing shall be submitted a minimum of five (5) working days prior to the actual date of the test. The Illinois EPA may at its discretion accept notifications with shorter advance notice provided that the Illinois EPA will not accept such notifications if it interferes with the if interferes with the Illinois EPA's ability to observe testing.
- c. At least 30 days prior to the actual date of testing, a written test plan shall be submitted to the Compliance Section of the Division of Air Pollution Control for review. This plan shall describe the specific procedures for testing, including as a minimum:
  - i. The person(s) who will be performing sampling and analysis and their experience with similar tests.
  - ii. The specific conditions under which testing will be performed, including a discussion of why these conditions will be representative of maximum emissions and the means by which the operating parameters for the emission unit and any control equipment will be determined.
  - iii. The specific determinations of emissions and operation which are intended to be made, including sampling and monitoring locations.
  - iv. The test method(s) that will be used, with the specific analysis method, if the method can be used with different analysis methods.
  - v. Any minor changes in standard methodology proposed to accommodate the specific circumstances of testing, with justification.

- vi. Any proposed use of an alternative test method, with detailed justification.
  - vii. The format and content of the Source Test Report.
  - d. Copies of the Final Reports(s) for these test shall be submitted to the Illinois EPA with 14 days after the test results are compiled and finalized.
  - e. The Final Report shall include as a minimum:
    - i. A summary of results.
    - ii. General information.
    - iii. Description of test method(s), including description of sample points sampling train, analysis equipment, and test schedule.
    - iv. Detailed description of test conditions, including:
      - A. Process information, i.e., mode(s) of operation, process rate, e.g., fuel or raw material consumption.
      - B. Control equipment information, i.e., equipment condition and operating parameters during testing.
      - C. A discussion of any preparatory actions taken, i.e., inspections, maintenance and repair.
    - v. Data and calculations, including copies of all raw data sheets and records of laboratory analyses, sample calculations, and data on equipment calibration.
    - vi. An explanation of any discrepancies among individual tests of anomalous data.
8. Monitoring Requirements
- a. For the FCCU, the Permittee shall monitor emissions of carbon monoxide, sulfur dioxide, and opacity in accordance with the applicable monitoring requirements of 40 CFR 60.105. Pursuant to 40 CFR 60.13(i), after receipt and consideration of written application, the Illinois EPA may approve alternative monitoring procedures including the following: Alternative monitoring requirements when installation of a continuous monitoring system or monitoring device would not provide accurate measurements due to liquid water or other interferences caused by substances with the effluent gases.
  - b. For the Coker Heater (87F-104), the Permittee shall monitor sulfur dioxide in accordance with the applicable monitoring requirements of 40 CFR 60.105.

9. Recordkeeping Requirements

The Permittee shall maintain monthly records of the following items:

- a. Air blower rate for input to the FCCU regenerator (scf/minute);
- b. Refinery fuel gas input to the CO boiler (mmscf/month and mmscf/year);
- c. Coker Heater (87F-104) fuel usage (mmscf/month and mmscf/year);
- d. Gas usage for each fuel combustion emission unit affected by this permit (mmscf/month and mmscf/year);
- e. Fuel Oil usage for each fuel combustion emission unit affected by this permit (mgal/month and mgal/year); and
- f. Emissions of NO<sub>x</sub>, CO, SO<sub>2</sub>, PM and VOM from each emission unit affected by this permit (tons/month and tons/yr).

10. Reporting Requirements

- a. The Permittee shall promptly notify the Illinois EPA (MC 40), Compliance Section, P.O. Box 19276, Springfield, IL 62794-9276 of noncompliance with the permit requirements as follows. Reports shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken:
  - i. Operation in excess of the limits in Conditions 3 and 5.
  - ii. Emissions in excess of the limits in Condition 6.
  - iii. The Permittee shall comply with the applicable reporting requirements of Subpart J, 40 CFR 60.107.
- b. Two (2) copies of required reports, performance testing or continuous monitoring system shall be sent to:

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

and one (1) copy shall be sent to the Illinois EPA's regional office at the following address unless otherwise indicated:

Illinois Environmental Protection Agency  
Division of Air Pollution Control  
2009 Mall Street  
Collinsville, Illinois 62234

11. Operational Flexibility/Anticipated Operating Scenarios

This condition establishes an alternate scenario for the initial startup and shakedown of the modified FCC Unit in the event that the Permittee does not undertake the upgrade of the Crude Unit and Coker Unit as allowed by this Construction Permit.

- a. The modified FCC Unit may be operated for a period of 180 days from initial startup under this Permit. This period may be extended upon written request of the Permittee if the Illinois EPA determines that additional time is needed to reasonably complete shakedown of the FCC Unit.
- b. During this period, the Permittee shall be subject to all applicable requirements of this permit related to the FCC Unit (including the associated air preheater (82F-1) and charge heater (82F-2)):
  - i. Applicable state and federal emission standards (See Condition 3;
  - ii. Operational and production limits and work practices (See Condition 5(a) and (b));
  - iii. Monitoring requirements (See Condition 8(a));
  - iv. Recordkeeping requirements (See Condition 9(a), (b), (d), (e) and (f)); and
  - v. Compliance Procedures (See Condition 10(a)).
- c. During this period, notwithstanding other conditions of this permit, the Permittee shall not be subject to requirements of this permit related to the Coker Unit, Crude Unit, boilers or heaters (82F-2). In particular, the following requirements shall not apply:
  - i. The operating limitations for these units set in Condition 5;
  - ii. The emission limitations for these units set in Condition 6;
- d. During this period, the emissions from the FCC Regen Vent and the Boilers shall not exceed the following limits, which is the sum of the individual limits for these units:

<u>Pollutant</u>	<u>Emissions</u>	
	<u>(Tons/Mo)</u>	<u>(Total Tons)</u>
NO <sub>x</sub>	107.4	474.55
SO <sub>2</sub>	121.0	379.75
CO	67.0	612.50
PM	21.8	178.50
VOM	1.3	10.85

- e. This Permit is issued based on the provisions for this alternate scenario being sufficient to ensure that operation of the modified FCC Unit would not be accompanied by a significant net increase in emissions, so that it would not constitute a major modification under the federal rules for Prevention of Significant Deterioration (PSD), 40 CFR 52.21.

12. Compliance Procedures

- a. Emissions from the FCCU regeneration vent shall be determined from site-specific test data. Until testing is performed for a pollutant, the following factors shall be used:

<u>Equipment</u>	<u>Pollutant</u>	<u>Emission Factor</u>
FCCU Regen Vent	NO <sub>x</sub>	140.0 vppm in vent gas
	SO <sub>2</sub>	75.0 vppm in vent gas
	CO	175.0 vppm in vent gas
	PM	3.9 lbs/mmscf vent gas
	VOM	5.5 lbs/mmscf fuel gas to CO Boiler

The NO<sub>x</sub> and PM emission factors are based on concentrations determined from stack testing. SO<sub>2</sub> and CO emission factors are based on concentration measured by continuous emissions monitors. VOM emission factor is based on standard AP-42 emission factors.

- b. Emission from heaters and boilers when fired with refinery fuel gas are determined as follows:

<u>Equipment</u>	<u>NO<sub>x</sub></u> <u>(Lb/mmscf)</u>	<u>SO<sub>2</sub></u> <u>(Lb/mmscf)</u>	<u>CO</u> <u>(Lb/mmscf)</u>	<u>PM</u> <u>(Lb/mmscf)</u>	<u>VOM</u> <u>(Lb/mmscf)</u>
1F-1	129*	27	84	7.6	5.5
1F-2	141*	27	84	7.6	5.5
3F-1	140	27	84	7.6	5.5
3F-2	140	27	84	7.6	5.5
7F-1	100	27	84	7.6	5.5
15F-1	280	27	84	7.6	5.5
15F-2	100	27	84	7.6	5.5
82F-1	100	27	84	7.6	5.5
82F-2	100	27	84	7.6	5.5
87F-103	50	27	84	7.6	5.5
87F-104	100	27	84	7.6	5.5
Boilers	215*	27	84	7.6	5.5

The NO<sub>x</sub> emission factors indicated by an asterisk are derived from 1997 stack test data. Other NO<sub>x</sub> emission factors are standard AP-42 emission factors. The SO<sub>2</sub> emission factors are derived from a mass balance for the hydrogen sulfide content of refinery fuel gas, as measured by a continuous emissions monitor. The CO, PM, and VOM emission factors are standard AP-42 emission factors.

- c. Emission from heaters and boilers when fired with fuel oil are determined as follows:

<u>Equipment</u>	<u>NO<sub>x</sub></u> <u>(Lb/mgal)</u>	<u>SO<sub>2</sub></u> <u>(Lb/mgal)</u>	<u>CO</u> <u>(Lb/mgal)</u>	<u>PM</u> <u>(Lb/mgal)</u>	<u>VOM</u> <u>(Lb/mgal)</u>
1F-1	67	450	5	28	0.76
1F-2	67	450	5	28	0.76
Boilers	67	450	5	28	0.76

The NO<sub>x</sub>, CO, PM, and VOM emission factors are standard AP-42 emission factors. The SO<sub>2</sub> emission factors are derived from a mass balance for the sulfur content of fuel oil, as measured by laboratory analysis.

It should be noted that this permit has been revised to allow start-up and operation of the enhanced FCC Unit in the event that the upgrade of the Crude Unit and Coke Unit are not carried out (Refer to Condition 11).

If you have any questions on this, please call 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 A

Table 1 - Future Allowed Emissions with this Project

<u>Equipment</u> <u>(Ton/Yr)</u>	<u>(Ton/Yr)</u>	<u>Designation</u>	<u>NO<sub>x</sub></u> <u>(Ton/Yr)</u>	<u>SO<sub>2</sub></u> <u>(Ton/Yr)</u>	<u>CO</u> <u>PM</u> <u>VOM</u> <u>(Ton/Yr)</u>
FCCU Regenerator Vent 134.0	3.9	FCCU	585.0	436.0	445.0
Special Coker Heaters 3.4	2.5	87F-103 & 87F-104	30.6	13.0	38.0
Crude Atoms Heater 33.0	12.0	1F-1	297.0	337.0	169.0
Crude Vac Heater 4.2	2.0	1F-2	54.0	34.0	30.0
Ultraformer Preheater 8.6	6.2	3F-1	158.0	31.0	95.0
Ultraformer Preheater 4.8	3.4	3F-2	88.0	17.0	53.0
Alky DIB Reboiler 4.5	3.2	7F-1	59.0	16.0	50.0
Regular Coker Heater 3.4	2.5	15F-1	126.0	13.0	38.0
Coker Preheater 1.4	1.0	15F-2	19.0	5.1	16.0
FCCU Air Preheater 0.2	0.2	82F-1	2.5	0.7	2.1
FCCU Charge Heater 2.6	1.9	82F-2	34.0	9.2	29.0
Boilers <u>19.0</u>	<u>5.4</u>	Boilers	<u>228.5</u>	<u>215.0</u>	<u>80.0</u>
		Totals:	1681.6	1127.0	1045.1
219.1	44.2				

Table 2 - Past Actual Emissions

<u>Equipment</u> <u>(Ton/Yr)</u>	<u>(Ton/Yr)</u>	<u>Designation</u>	<u>NO<sub>x</sub></u> <u>PM</u> <u>(Ton/Yr)</u>	<u>SO<sub>2</sub></u> <u>VOM</u> <u>(Ton/Yr)</u>	<u>CO</u> <u>(Ton/Yr)</u>
FCCU Regenerator Vent		FCCU	336.0	3270.0	387.0
158.0	3.2				
Special Coker Heaters		87F-103 & 87F-104	15.0	1.2	26.0
2.3	1.7				
Crude Atoms Heater		1F-1	225.0	95.0	136.0
20.0	9.0				
Crude Vac Heater		1F-2	47.0	22.0	26.0
3.6	1.7				
Ultraformer Preheater		3F-1	285.0	3.9	85.0
7.7	5.6				
Ultraformer Preheater		3F-2	155.0	2.1	46.0
4.2	3.0				
Alky DIB Reboiler		7F-1	53.0	2.0	45.0
4.0	2.9				
Regular Coker Heater		15F-1	85.0	1.2	26.0
2.3	1.7				
Coker Preheater		15F-2	11.0	0.4	8.9
0.8	0.6				
FCCU Air Preheater		82F-1	1.9	0.1	1.6
0.1	0.1				
FCCU Charge Heater		82F-2	19.0	0.7	16.0
1.4	1.0				
Boilers		Boilers 3, 4, 5, 6	<u>371.0</u>	<u>21.0</u>	<u>144.0</u>
<u>14.0</u>	<u>9.5</u>				
		Totals:	1603.9	3419.6	947.5
218.4	40.0				

Note: Past actual emissions are based on the average of 1997 and 1998 data.

Table 3 - Emission Increases with this Project

<u>Description</u>	<u>(Ton/Yr)</u>	NO <sub>x</sub>	SO <sub>2</sub>	CO
		PM <u>(Ton/Yr)</u>	VOM <u>(Ton/Yr)</u>	<u>(Ton/Yr)</u>
Table 1 - Future Allowable Emissions	1681.6	1127.0	1045.1	219.1
Table 2 - Past Actual Emissions	44.2 <u>1603.9</u>	<u>3419.6</u>	<u>947.5</u>	<u>218.5</u>
	<u>40.0</u>			
	Totals:	77.7	- 2292.6	97.6
1.0	4.2			

Table 4 - Contemporaneous NO<sub>x</sub> Emission Increases and Decreases

NO <sub>x</sub>	<u>Description</u>	<u>Permit</u>	<u>(Ton/Yr)</u>
		Crude Atmospheric Heater Retube	96080079
	Platformer Heater Burner Replacement	96120040	0.0
	Unicraker Charge Valve Replacement	98030141	<u>27.1</u>
			Total: -
72.9			

Table 5 - Net Contemporaneous Change in NO<sub>x</sub> Emissions

NO <sub>x</sub>	<u>Description</u>	<u>(Ton/Yr)</u>
	Table 3 - Emission Increases from this Project	77.7
	Table 4 - Contemporaneous NO <sub>x</sub> Emission Increases and Decreases	<u>- 72.9</u>

Change = 4.8

Net Contemporaneous

JMS:99020080:jar