IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF MICHIGAN

UNITED STATES OF AMERICA, Plaintiff, and COUNTY OF WAYNE, MICHIGAN, STATE OF LOUISIANA, STATE OF MINNESOTA, Plaintiff-Intervenors, v. MARATHON ASHLAND PETROLEUM LLC Defendant.	)	Civil No.

CONSENT DECREE

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CONSENT DECREE

WHEREAS, plaintiff the United States of America ("Plaintiff" or "the United States"), by the authority of the Attorney General of the United States and through its undersigned counsel, acting at the request and on behalf of the United States Environmental Protection Agency ("EPA"), alleges upon information and belief that defendant Marathon Ashland Petroleum LLC ("MAP") has violated and/or continues to violate the requirements of the Clean Air Act and the regulations promulgated thereunder at its petroleum refineries at Robinson, Illinois; Garyville, Louisiana; Texas City, Texas; Catlettsburg, Kentucky; Detroit, Michigan; Canton, Ohio; and St. Paul Park, Minnesota.

WHEREAS, the United States alleges that MAP has violated and continues to violate the following statutory and regulatory provisions:

1) Prevention of Significant Deterioration ("PSD") requirements at Part C of Subchapter I of the Clean Air Act (the "Act"), 42 U.S.C. §§ 7475, and the regulations promulgated thereunder at 40 C.F.R. § 52.21 (the "PSD Rules"), and "Plan Requirements for Non-Attainment Areas" at Part D of Subchapter I of the Act, 42 U.S.C. §§ 7502-7503, and the regulations promulgated thereunder at 40 C.F.R. § 51.165(a) and (b), Part 51, Appendix S, and § 52.24 ("PSD/NSR Regulations") for heaters and boilers and fluid catalytic cracking unit catalyst regenerators for NOx, SO_2, CO and PM;

2) New Source Performance Standards ("NSPS") for sulfur recovery plants, fuel gas combustion devices, and fluid catalytic cracking unit catalyst regenerators found at 40 C.F.R. Part 60, Subparts A and J, under Section 111 of the Act, 42 U.S.C. § 7411 ("Refinery NSPS Regulations");

3) Leak Detection and Repair ("LDAR") regulations found at 40 C.F.R. Part 60 Subparts VV and GGG, under Section 111 of the Act, and 40 C.F.R. Part 63, Subparts F, H, and CC, under Section 112(d) of the Act ("LDAR Regulations"); and

4) National Emission Standards for Hazardous Air Pollutants ("NESHAP") for Benzene Waste, 40 C.F.R. Part 61, Subpart FF, and Section 112(e) of the Act, 42 U.S.C. § 7412(e) ("Benzene Waste NESHAP Regulations").

WHEREAS, the United States also alleges with respect to the refineries identified above that, upon information and belief, MAP has been and continues to be in violation of the state implementation plans ("SIPs") and other state rules adopted by the states in which the aforementioned refineries are located to the extent that such plans or rules implement, adopt or incorporate the above-described Federal requirements;

WHEREAS, the United States further alleges that pursuant to Section 3008 of the Resource Conservation and Recovery Act ("RCRA"), 42 U.S.C. § 6928, MAP has violated and continues to violate certain requirements of RCRA at its Detroit and Robinson Refineries;

WHEREAS, pursuant to Section 325(c)(1) of the Emergency Planning and Community Right-to-Know Act ("EPCRA"), 42 U.S.C. § 11045(c)(1), and Section 109(c) of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9609(c), the United States alleges that MAP violated Section 313 of EPCRA, 42 U.S.C. § 11023, and Section 103(a) of CERCLA, 42 U.S.C. § 9603(a), and the regulations promulgated thereunder at its Detroit Refinery;

WHEREAS, the State of Minnesota, State of Louisiana, and Wayne County, Michigan ("Plaintiff-Intervenors") have sought to intervene in this matter alleging violations of their respective applicable SIP provisions and other state rules incorporating and implementing the foregoing federal requirements;

WHEREAS, the United States and MAP agree that the environmental projects (or measures) identified in the Consent Decree will reduce annual emissions from MAP's refineries by the following amounts: 1) nitrogen oxide by approximately 8,000 tons; 2) sulfur dioxide by approximately 12,800 tons; 3) volatile organic compounds by approximately 120 tons; 4) particulate matter ("PM") by approximately 800 tons; and 5) carbon monoxide by approximately 1850 tons.

WHEREAS, with respect to the provisions of Paragraph 22 ("Acid Gas and Sour Water Stripper Gas Flaring") of this Consent Decree, EPA maintains that "[i]t is the intent of the proposed standard [40 C.F.R. § 60.104] that hydrogen-sulfide-rich gases exiting the amine regenerator [or sour water stripper gases] be directed to an appropriate recovery facility, such as a Claus sulfur plant," see Information for Proposed New Source Performance Standards: Asphalt Concrete Plants, Petroleum Refineries, Storage Vessels, Secondary Lead Smelters and Refineries, Brass or Bronze Ingot Production Plants, Iron and Steel Plants, Sewage Treatment Plants, Vol. 1, Main Text at 28;

WHEREAS, EPA further maintains that the failure to direct hydrogen-sulfide-rich gases to an appropriate recovery facility -- and instead to flare such gases under circumstances that are not sudden or infrequent or that are reasonably preventable -- circumvents the purposes and intentions of the standards at 40 C.F.R. Part 60, Subpart J;

WHEREAS, EPA recognizes that "Malfunctions," as defined in Paragraph 11.X of this Consent Decree and 40 C.F.R. § 60.2, of the "Sulfur Recovery Plants" or of "Upstream Process Units" may result in "AG Flaring" of "Acid Gas" or "Sour Water Stripper Gas" on occasion, as those terms are defined herein, and that such AG Flaring does not violate 40 C.F.R. § 60.11(d) if the owner or operator, to the extent practicable, maintains and operates such units in a manner

consistent with good air pollution control practice for minimizing emissions during these periods;

WHEREAS, with respect to Paragraph 22 of the Consent Decree, MAP maintains that with respect to NSPS: (i) Flaring is not regulated with respect to sulfur dioxide emissions except for flares subject to 40 C.F.R. § 60.104(a)(1); and (ii) 40 C.F.R. § 60.104(a)(1) applies only to flares that are otherwise subject to NSPS and that are maintained to combust Acid Gases or Sour Water Stripper Gases on a continuous basis as a part of normal refinery operations;

WHEREAS, EPA recognizes that the combustion in a flare subject to 40 C.F.R. § 60.104(a)(1) of process upset gases or fuel gas that is released to the flare as a result of relief valve leakage or other emergency malfunctions does not violate 40 C.F.R. § 60.104(a)(1);

WHEREAS, EPA agrees that the following emissions control projects required by this Consent Decree are "environmentally beneficial projects" that could be considered to be pollution control projects where appropriate for New Source Review purposes: wet gas scrubbers, ultra low-NOx burners, SO_2selective catalytic reduction and selective non-catalytic reduction for NOx, pollutant-reducing catalyst additives, electrostatic precipitators, add-on controls for benzene waste, and sulfur recovery unit reliability improvements;

WHEREAS, EPA expects that MAP will design, operate and maintain the controls identified in the preceding Paragraph in a manner consistent with standard and reasonable air pollution control practices, and that collateral emissions increases will be adequately addressed by MAP;

WHEREAS, by entering into this Consent Decree MAP is committed to pro-actively resolving environmental concerns related to its operations;

WHEREAS, discussions between the Parties have resulted in the settlement embodied in the Consent Decree;

WHEREAS, MAP has waived any applicable Federal or state requirements of statutory notice of the alleged violations;

WHEREAS, MAP has denied and continues to deny the violations alleged in the Complaint, maintains that it has been and remains in compliance with all applicable regulations, and is not liable for civil penalties and injunctive relief. However, in the interest of settlement and to accomplish its objectives of cooperatively reconciling the United States' and MAP's goals under the Clean Air Act, MAP has agreed to undertake the installation of air pollution control equipment and enhancements to its air pollution management practices at its seven refineries to reduce air emissions;

WHEREAS, notwithstanding the foregoing reservations, MAP, the United States, and the Plaintiff-Intervenors agree that: a) settlement of the matters set forth in the Complaint (filed herewith) and with the Consent Decree is in the best interests of the Parties and the public; and b) entry of the Consent Decree without litigation is the most appropriate means of resolving this matter;

WHEREAS, the Parties recognize, and the Court by entering the Consent Decree finds, that the Consent Decree has been negotiated at arms-length and in good faith and that the Consent Decree is fair, reasonable, and in the public interest;

NOW THEREFORE, with respect to the matters set forth in the Complaint and in Section XV of the Consent Decree ("Effect of Settlement"), and before the taking of any testimony, without adjudication of any issue of fact or law, and upon the consent and agreement of the Parties to the Consent Decree, it is hereby ORDERED, ADJUDGED and DECREED as follows:

I. JURISDICTION AND VENUE

1. A. This Court has jurisdiction over the subject matter of this action and over the Parties pursuant to 28 U.S.C. §§ 1331, 1345 and 1355. In addition, this Court has jurisdiction over the subject matter of this action pursuant to Section 113(b) and 167 of the CAA, 42 U.S.C. § 7413(b) and 7477. The United States' Complaint states a claim upon which relief may be granted for injunctive relief and civil penalties against MAP under these same provisions of the Clean Air Act. Further, the United States and MAP agree that this Court has jurisdiction over the RCRA claims under Sections 3004 and 3005 of RCRA, 42 U.S.C. §§ 6924 and 6925, and of the EPCRA claims under Sections 325(a), (b), and (c) of EPCRA, 42 U.S.C. § 11045(a), (b), and (c). Authority to bring this suit is vested in the United States Department of Justice by 28 U.S.C. §§ 516 and 519, Section 305 of the CAA, 42 U.S.C. § 7605, Section 325 of EPCRA, 42 U.S.C. § 11045, and Section 109(c) of CERCLA, 42 U.S.C. § 9609(c).

B. Venue is proper in the District of Eastern District of Michigan pursuant to Section 113(b) of the CAA, 42 U.S.C. § 7413(b), Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), Section 325(b) of EPCRA, 42 U.S.C. § 11045(b) and 28 U.S.C. §§ 1391(b) and (c), and 1395(a). MAP consents to the personal jurisdiction of this Court and waives any objections to venue in this District.

2. Notice of the commencement of this action has been given to the: a) State of Ohio, State of Minnesota, State of Louisiana, State of Texas, State of Illinois, Commonwealth of Kentucky, and the State of Michigan in accordance with Section 113(a)(1) of the Clean Air Act, 42 U.S.C. § 7413(a)(1), and as required by Section 113(b) of the CAA, 42 U.S.C. § 7413(b); and b) the State of Michigan and State of Illinois as required by Section 3008(a)(2) of RCRA, 42 U.S.C. § 6928(a)(2).

3. Marathon Ashland Petroleum LLC is a limited liability company doing business at Robinson, Illinois; Garyville, Louisiana; Texas City, Texas; Catlettsburg, Kentucky; Detroit, Michigan; Canton, Ohio; and St. Paul Park, Minnesota. MAP has its principal operating offices in Findlay, Ohio.

4. MAP is a "person" within the meaning of Section 302(e) of the CAA, 42 U.S.C. § 7602(e), and Section 1003(15) of RCRA, 42 U.S.C. § 6902(15), and Section 329(7) of EPCRA, 42 U.S.C. § 11049(7).

II. APPLICABILITY

5. The provisions of the Consent Decree shall apply to, and be binding upon MAP with respect to the refineries located at Robinson, Illinois; Garyville, Louisiana; Texas City, Texas; Catlettsburg, Kentucky; Detroit, Michigan; Canton, Ohio; and St. Paul Park, Minnesota. In addition, with respect to each such Refinery, the Consent Decree shall be binding upon MAP and its officers, successors, and assigns, and upon the United States, and the Plaintiff-Intervenors.

6. MAP agrees not to contest the validity of the Consent Decree in any subsequent proceeding to implement or enforce its terms.

7. A. Effective from the Date of Entry of the Consent Decree until its termination, MAP agrees that the refineries identified herein are covered by this Consent Decree. Effective from the Date of Lodging of the Consent Decree, MAP shall give written notice of the Consent Decree to any successors in interest prior to transfer of ownership or operation of any portion of any petroleum refinery that is the subject of the Consent Decree and shall provide a copy of the Consent Decree to any successor in interest. MAP shall notify the United States in accordance with the notice provisions set forth in Paragraph 84 (Notice), of any successor in interest at least thirty (30) days prior to any such transfer.

B. MAP shall condition any transfer, in whole or in part, of ownership of, operation of, or other interest (exclusive of any non-controlling non-operational shareholder interest) in, any refinery that is the subject of the Consent Decree upon the execution by the transferee of a modification to the Consent Decree, which makes the terms and conditions of the Consent Decree that apply to such refinery applicable to the transferee. The Parties shall file that modification with the Court promptly upon such transfer. In the event of any such transfer of ownership or other interest in any refinery, MAP shall be released from the obligations and liabilities of this Consent Decree provided that, at the time of such transfer, the transferee has the financial and technical ability to assume and has contractually agreed with MAP to assume these obligations and liabilities.

8. MAP shall provide a copy of the applicable provisions of this Consent Decree to each consulting or contracting firm that is retained to perform work required under this Consent Decree, upon execution of any contract relating to such work. MAP shall also provide a copy of the applicable provisions of this Consent Decree to each consulting or contracting firm that MAP has already been retained to perform the work required under this Consent Decree no later than thirty (30) days after the Date of Lodging of the Consent Decree. Copies of the Consent Decree do not need to be supplied to firms who are retained to supply materials or equipment to satisfy requirements under this Consent Decree.

III. OBJECTIVES

9. It is the purpose of the Parties in entering this Consent Decree to further the objectives of the Clean Air Act as described at Section 101 of the Clean Air Act, 42 U.S.C. § 7401, and, with respect to the Detroit and Robinson Refineries, it is the intention of MAP and the United States to further the purposes of RCRA, as described at Section 1002 of RCRA, 42 U.S.C. §

6902, and, with respect to the Detroit Refinery, it is the intention of MAP and the United States to further the purposes of Section 325(c)(1) of the EPCRA, 42 U.S.C. § 11045.

IV. DEFINITIONS

10. Unless otherwise defined herein, terms used in the Consent Decree shall have the meaning given to those terms in the Clean Air Act, and the implementing regulations promulgated thereunder. In addition, terms used in the Consent Decree in the provisions that relate specifically to obligations under RCRA shall have the meaning given to those statutes and implementing regulations promulgated thereunder.

11. The following terms used in the Consent Decree shall be defined for purposes of the Consent Decree and the reports and documents submitted pursuant thereto as follows:

A. "Acid Gas" shall mean any gas that contains hydrogen sulfide and is generated at a refinery by the regeneration of an amine solution.

B. "AG Flaring" shall mean, for purposes of this Consent Decree, the combustion of Acid Gas and/or Sour Water Stripper Gas in a AG Flaring Device.

C. "AG Flaring Device" shall mean any device at the refineries that are subject of this Consent Decree that is used for the purpose of combusting Acid Gas and/or Sour Water Stripper Gas, except facilities in which gases are combusted to produce sulfur or sulfuric acid. The AG Flaring Devices currently in service at the refineries are identified in Appendix A to the Consent Decree. To the extent that, during the duration of the Consent Decree, any covered refinery utilizes AG Flaring Devices other than those specified herein for the purpose of combusting Acid Gas and/or Sour Water Stripper Gas, those AG Flaring Devices shall be covered under this Consent Decree.

D. "AG Flaring Incident" shall mean the continuous or intermittent combustion of Acid Gas and/or Sour Water Stripper Gas that results in the emission of sulfur dioxide equal to, or in

excess of, five-hundred (500) pounds in any twenty-four (24) hour period; provided, however, that if five-hundred (500) pounds or more of sulfur dioxide have been emitted in a twenty-four (24) hour period and Flaring continues into subsequent, contiguous, non-overlapping twenty-four (24) hour period(s), each period of which results in emissions equal to, or in excess of five-hundred (500) pounds of sulfur dioxide, then only one AG Flaring Incident shall have occurred. Subsequent, contiguous, non-overlapping periods are measured from the initial commencement of Flaring within the AG Flaring Incident.

E. "Calendar quarter" shall mean the three month period ending on March 31st, June 30th, September 30th, and December 31st.

F. "Canton Refinery" shall mean the refinery owned and operated by MAP at Canton, Ohio.

G. "Catlettsburg Refinery" shall mean the refinery owned and operated by MAP at Catlettsburg, Kentucky.

H. "CEMS" shall mean continuous emissions monitoring system.

I. "Consent Decree" or "Decree" shall mean this Consent Decree, including any and all appendices attached to the Consent Decree.

J. "Controlled Heaters and Boilers" shall mean Heaters and Boilers that meet the criteria specified in Paragraph 13.A and that are used to meet the requirements of Paragraph 13.B.

K. "CO" shall mean carbon monoxide.

L. "Current Generation Ultra-Low NOx Burner" is defined as those burners currently on the market that are designed to achieve a NOx emission rate of 0.030 to 0.040 lb/mmBTU higher heating value ("HHV") when firing natural gas at 3% stack oxygen at full design load without air preheat.

M. "Date of Lodging of the Consent Decree" shall mean the date the Consent Decree is filed for lodging with the Clerk of the Court for the United States District Court for the Eastern District of Michigan.

N. "Date of Entry of the Consent Decree" shall mean the date the Consent Decree is approved or signed by the United States District Court Judge.

O. "Day" or "Days" as used herein shall mean a calendar day or days.

P. "Detroit Refinery" shall mean the refinery owned and operated by MAP at Detroit, Michigan.

Q. "FCCU" as used herein shall mean a fluidized catalytic cracking unit and its regenerator and associated CO boiler(s) where present.

R. "Fuel Oil" shall mean any liquid fossil fuel with sulfur content of greater than 0.05% by weight.

S. "Garyville Refinery" shall mean the refinery owned and operated by MAP at Garyville, Louisiana.

T. "Hydrocarbon Flaring" shall mean, for purposes of this Consent Decree, the combustion of refinery-generated gases, except for Acid Gas and/or Sour Water Stripper Gas and/or Tail Gas, in a Hydrocarbon Flaring Device.

U. "Hydrocarbon Flaring Device" shall mean, a flare device used to safely control (through combustion) any excess volume of a refinery-generated gas other than Acid Gas and/or Sour Water Stripper Off Gas and/or Tail Gas. To the extent that the refinery utilizes flaring devices that are functionally equivalent and are in the same service as those specified above, those flaring devices shall be covered under this Consent Decree. The Hydrocarbon Flaring Devices are identified in Appendix A to this Consent Decree.

V. "Hydrocarbon Flaring Incident" (or "HC Flaring Incident") shall mean the continuous or intermittent flaring of refinery process gases, except for Acid Gas or Sour Water Stripper Gas or Tail Gas, at a Hydrocarbon Flaring Device that results in the emissions of sulfur dioxide equal to, or greater than five hundred (500) pounds in a 24-hour period; provided, however, an incident which extends for more than a 24-hr period will constitute one (1) Hydrocarbon Flaring Incident. The duration of a Hydrocarbon Flaring Incident shall be determined from the initial commencement until the time of its final termination. A Hydrocarbon Flaring Incident may entail the sulfur dioxide emissions from multiple sources within a 24-hour period provided that the flaring is associated with one common event.

W. "Low NOx Combustion Promotor" shall mean a catalyst that is added to a FCCU or a RCCU consistent with Appendix B that minimizes NOx emissions while maintaining its effectiveness as a combustion promotor.

X. "Malfunction" shall mean as specified in 40 C.F.R. Part 60.2 "any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions."

Y. "MAP" shall mean:

i. With respect to the Canton Refinery and St. Paul Park Refinery, Marathon Ashland Petroleum LLC, its predecessors Ashland Inc. and Ashland Petroleum Company, its successors and assigns, and its officers, directors and/or Board of Managers, and employees in their capacities as such;

ii. With respect to the Catlettsburg Refinery, Marathon Ashland Petroleum LLC, its wholly-owned subsidiary Catlettsburg Refining, LLC, its predecessors Ashland Inc. and Ashland Petroleum Company, its successors and assigns, and its officers,

directors and/or Board of Managers, and employees in their capacities as such; and

iii. With respect to the Detroit Refinery, Garyville Refinery, Robinson Refinery, and Texas City Refinery, Marathon Ashland Petroleum LLC, its predecessors Marathon Oil Company and Marathon Petroleum Company, its successors and assigns, and its officers, directors and/or Board of Managers, and employees in their capacities as such.

Z. "Next Generation Ultra-Low NOx Burner" is defined as those burners that are designed to achieve a NOx emission rate of 0.012 to 0.018 lb/mmBTU HHV when firing natural gas at 3% stack oxygen at full design load without air preheat.

AA. "NOx" shall mean nitrogen oxides.

BB. "NOx Reducing Catalyst Additive" shall mean a catalyst additive that is introduced to an FCCU or an RCCU to reduce NOx emissions through reduction or controlled oxidation of intermediates consistent with Appendix B.

CC. "Paragraph" shall mean a portion of this Consent Decree identified by an arabic numeral.

DD. "PM" shall mean particulate matter.

EE. "Parties" shall mean each of the signatories to the Consent Decree.

FF. "Prior Actual Level of Emissions" is defined as actual emissions of NOx in tons per year during calendar years 1999 and 2000 or other representative two year period (or prior allowable emissions where actuals exceed allowable) as presented in Appendix C (Two Year Actual Heater and Boiler NOx Emissions by Unit) to this Consent Decree.

GG. "Robinson Refinery" shall mean the refinery owned and operated by MAP at Robinson, Illinois.

HH. "Root Cause" shall mean the primary cause(s) of an AG Flaring Incident(s), Hydrocarbon Flaring, or a Tail Gas Incident(s) as determined through a process of investigation

II. "Scheduled Maintenance" shall mean any shutdown of any emission unit or control equipment that MAP schedules at least fourteen (14) days in advance of the shutdown for the purpose of undertaking maintenance of such unit or control equipment.

JJ. "Shutdown" shall mean the cessation of operation of equipment for any purpose.

KK. "Sour Water Stripper Gas" or "SWS Gas" shall mean the gas produced by the process of stripping refinery sour water. For the purposes of this Consent Decree, the off-gas from the de-salter (benzene) strippers at the Canton, Detroit, Garyville and Robinson refineries shall not be considered "Sour Water Stripper Gas."

LL. "SO_2 Adsorbing Catalyst Additive" shall mean a catalyst additive that is introduced to an FCCU or an RCCU to reduce SO_2 emissions by adsorption consistent with Appendix B .

MM. "Startup" shall mean the setting in operation of equipment for any purpose.

NN. "SO_2" shall mean sulfur dioxide.

OO. "St. Paul Park Refinery" shall mean the refinery owned and operated by MAP at St. Paul Park, Minnesota.

PP. "Sulfur Recovery Plant" shall mean a process unit that recovers sulfur from hydrogen sulfide by a vapor phase catalytic reaction of sulfur dioxide and hydrogen sulfide.

QQ. "Tail Gas Unit" ("TGU") shall mean a control system utilizing a technology for reducing emissions of sulfur compounds from a Sulfur Recovery Plant.

RR. "Tail Gas Incident" shall mean, for the purpose of this Consent Decree, combustion of Tail Gas that either is:

i. Combusted in a flare and results in 500 pounds of SO_2 emissions in any 24 hour period ; or

ii. Combusted in a thermal incinerator and results in 500 pounds of SO_2 emissions in any 24-hour period. Only those time periods which are in excess of SO_2 concentration of 250 ppm (rolling twelve-hour average) shall be used to determine the amount of excess SO_2 emissions from the incinerator;

MAP shall use engineering judgment and/or other monitoring data during periods in which the SO_2 continuous emission analyzer has exceeded the range of the instrument or is out of service.

SS. "Texas City Refinery" shall mean the refinery owned and operated by MAP at Texas City, Texas.

TT. "Upstream Process Units" shall mean all amine contactors, amine scrubbers, and sour water strippers at the refineries that are subject to the Consent Decree, as well as all process units at these refineries that produce gaseous or aqueous waste streams that are processed at amine contactors, amine scrubbers, or sour water strippers.

V. AFFIRMATIVE RELIEF/ENVIRONMENTAL PROJECTS (OR MEASURES)

12. **NOx and CO Emission Reductions from FCCUs**: MAP shall apply the use of NOx Reducing Catalyst Additives and Low NOx Combustion Promotor at each of its FCCUs and the Catlettsburg RCCU. MAP shall also reduce NOx emissions with the installation and operation of Selective Non-Catalytic Reduction ("SNCR") systems or an equivalent technology ("NOx Reducing System") at the Catlettsburg FCCU/RCCU, the Texas City FCCU and another at either the Robinson FCCU, the Detroit FCCU or the Garyville FCCU. MAP shall incorporate into operating permits NOx emissions limitations reflecting the NOx emissions continuously achievable with the application of these controls and will demonstrate future compliance with these lower emission limits through the use of continuous emissions monitoring systems ("CEMS").

A. **NOx Reducing Catalyst Additive and Low NOx Combustion Promotor ("Additives")**: MAP shall begin to add Low NOx Combustion Promotor and, subsequently, NOx Reducing Catalyst Additive to determine the optimized additive addition rate at each of the following FCCUs/RCCU by no later than the dates specified:

i. Canton FCCU - March 31, 2002

ii. Detroit FCCU - March 31, 2002;

iii. Garyville FCCU - March 31, 2002;

iv. Robinson FCCU - March 31, 2002;

v. St. Paul Park FCCU - November 31, 2002; and

vi. Texas City FCCU - December 31, 2002;

vii. Catlettsburg FCCU (if not shut down by December 31, 2004) - June 30, 2005; and

viii. Catlettsburg RCCU - June 30, 2004;

The optimized additive addition rate shall be determined in accordance with Appendix B to this Consent Decree, which is incorporated herein by reference. MAP will demonstrate the performance of catalyst additives at each FCCU/RCCU at the optimized additive addition rate over a twelve-month period to yield the lowest NOx emission concentration feasible (hereinafter "Catalyst Additive Demonstration"). Catalyst Additive Demonstrations shall begin no later than four (4) months after the dates specified in this Paragraph 12.A.

B. **Optimized Additive Addition Rate**: By no later than thirty (30) days prior to beginning each Catalyst Additive Demonstration, MAP shall notify EPA in writing of the optimized additive addition rate to be used during the demonstration and provide an explanation and supporting data that demonstrates that the requirements of Appendix B have been met in establishing that optimized additive addition rate. During the Catalyst Additive Demonstration, MAP shall add additives at the optimized rate. No later than sixty (60) days after the completion

of each twelve-month demonstration, MAP shall report to EPA the results of the Catalyst Additive Demonstration (hereinafter "Catalyst Additive Report"). Each such report shall include, at a minimum, the following information on at least a daily, and where available on a hourly basis:

a. Regenerator flue gas temperature and flow rate;

b. Coke burn rate;

c. FCCU feed rate;

d. FCCU feed sulfur content;

e. CO boiler firing rate and fuel type;

f. Total fresh catalyst addition rate;

g. NOx Reducing Catalyst Additive and SO_2 Adsorbing Catalyst Additive addition rates;

h. Low-NOx and conventional CO promotor addition rates;

i. Temperature profiles (in duct work after regenerator and in the CO Boiler);

j. Hourly average NOx and O_2 concentration; and

k. Cost.

As required in Paragraph 12.I and J, MAP shall determine the NOx concentrations at the point of emission to the atmosphere by CEMS. As required in Paragraph 12.I and J, and where applicable MAP shall determine the O_2 concentrations, after combustion in the CO boiler, by process analyzer(s) calibrated in accordance with the manufacturer's recommendations, where analyzer(s) are installed. MAP shall report the data or measurements to EPA in electronic format.

C. **SNCR (Or Equivalent Technology)**: MAP shall complete installation and begin operation of an SNCR System or an equivalent technology as approved by EPA (hereinafter collectively referred to as "NOx Reducing System"), at the Catlettsburg RCCU, the Catlettsburg

FCCU (if not shutdown), the Texas City FCCU, and at one of Detroit FCCU, Garyville FCCU, or Robinson FCCU in accordance with the schedules in Paragraph 12.D through 12.F.

D. **Installation and Operation of NOx Reducing Systems/Low NOx Burners at the Catlettsburg Refinery**:

i. Unit No. 109: By no later than June 30, 2004, MAP shall complete installation and begin operation of:

a. Low NOx burners on both CO boilers (Equipment Nos. 2-116-B1 and 2-116-B2) at the Catlettsburg RCCU (hereinafter "Unit No. 109"); and

b. A NOx Reducing System at one of the CO boilers (Equipment Nos. 2-116-B1 or 2-116-B2) at Unit No. 109.

After start-up of the foregoing units and emission control technologies, MAP shall undertake an analysis of the technical feasibility of continued operation of the NOx Reducing System installed at Unit No. 109 pursuant to Paragraph 12.D.i.b, and the technical and economic feasibility of installing and operating a second NOx Reducing System (in combination with the baghouse) on the CO boiler (Equipment Nos. 2-116-B-1 or 2-116-B-2) at Unit No. 109 that is not initially controlled pursuant to Paragraph 12.D.i.b. MAP shall include in the analysis required above an evaluation of the effect of the first NOx Reducing System on the operation and maintenance of the baghouse and MAP's ability to minimize ammonia slip while maintaining NOx Reducing System effectiveness. No later than eighteen (18) months after start-up of the first NOx Reducing System at Unit No. 109, MAP shall report its findings to EPA for EPA's review and approval. MAP may discontinue the use of this NOx Reducing System required to be installed by Paragraph 12.D.i.b at Unit No. 109, if EPA determines that continued operation of the first NOx Reducing System is not feasible. MAP shall install and operate a second NOx Reducing System at Unit No. 109 on the CO boiler (Equipment Nos. 2-116-B-1 or 2-116-B-2) at Unit No.

109 that is not initially controlled pursuant to Paragraph 12.D.i.b by no later than December 31, 2008, if EPA determines that installation of a second NOx Reducing System is feasible .

ii. Unit No. 1: By no later than December 31, 2004, MAP shall either install a NOx Reducing System at the Catlettsburg FCCU (hereinafter "Unit No. 1") or shutdown Unit No. 1.

iii. MAP shall design and operate the NOx Reducing Systems and low NOx burner installations for the Catlettsburg Refinery to reduce NOx emissions as much as technologically feasible, provided that level of control to be achieved is not cost prohibitive.

E. **Installation and Operation of NOx Reducing System at the Texas City FCCU**: By no later than December 31, 2005, MAP shall complete installation and begin operation of a NOx Reducing System at the Texas City FCCU. MAP shall design and operate the Texas City FCCU and its add-on NOx emissions control system to achieve a NOx concentration of 20 ppmvd or lower on a 365-day rolling average at 0% oxygen.

F. **Installation and Operation of the NOx Reducing System at the Robinson, Garyville or Detroit Refineries**: By no later than December 31, 2005, MAP shall complete installation and begin operation of an NOx Reducing System at one of the following FCCUs: Robinson FCCU, Garyville FCCU or Detroit FCCU. MAP shall design and operate the NOx Reducing System to reduce NOx emissions as much as technologically feasible, provided that level of control to be achieved is not cost prohibitive.

G. **NOx Reducing System Design Requirements**: By no later than eighteen (18) months prior to installing each NOx Reducing System required by Paragraphs 12.D, 12.E and 12.F, MAP shall submit to EPA the process design specifications for the NOx Reducing System. MAP and EPA agree to consult on the development of the proposed process design specifications for each NOx Reducing System prior to submission of MAP's final proposal. The proposed process design specifications shall, at a minimum, consider the design parameters identified in

Appendix D to this Consent Decree. EPA will provide comments to MAP within (60) sixty days of receipt of the process design specifications. Within sixty (60) days of receipt of EPA's comments on the proposed design, MAP shall modify the proposal to address EPA's comments, and submit the design to EPA for final approval. Upon receipt of EPA's final approval, MAP shall implement the design. MAP shall notify EPA of any substantial changes to the design of the NOx Reducing System that may affect its performance.

H. **NOx Reducing System Optimization Studies**: By no later than three (3) months after installation and start-up of each NOx Reducing System required by Paragraph 12.D, 12.E and 12.F, MAP shall begin to establish or re-establish the optimized catalyst additive addition rate(s) in accordance with the criteria in Appendix B while operating the NOx Reducing System. By no later than seven (7) months after installation and start-up of each NOx Reducing System, MAP shall begin a twelve-month study to optimize the performance of the NOx Reducing System in combination with NOx Reducing Catalyst Additive and Low NOx CO Promotor to minimize NOx emissions (hereinafter "Optimization Study"). No later than thirty (30) days prior to beginning each such study, MAP shall identify the optimized additive addition rate and submit the protocol to be used to EPA for its approval. The protocol(s) shall consider the operating parameters identified in Appendix D to this Consent Decree. During the Optimization Study, MAP shall monitor and evaluate NOx emissions from the respective FCCUs and the operating considerations identified in Appendix D to identify the optimum operating levels for the minimization of NOx emissions. MAP shall submit the results of the Optimization Study to EPA in a written report no later than sixty (60) days after the completion of the study (hereinafter "Optimization Study Report"). This report shall identify the relevant operating parameters, the levels that result in the minimization of NOx emissions, and the date and information to support

the report's recommendations. The report shall include, at a minimum, the following information on at least a daily, and where available on a hourly, basis:

a. Regenerator flue gas temperature and flow rate;

b. Coke burn rate;

c. FCCU feed rate;

d. FCCU feed sulfur content;

e. CO boiler firing rate and fuel type;

f. Total fresh catalyst addition rate;

g. NOx Reducing Catalyst Additive and SO_2 Adsorbing Catalyst Additive addition rates;

h. Low-NOx and conventional CO promotor addition rates;

i. Reductant addition rates, where applicable;

j. Temperature profiles (in duct work after regenerator and in the CO Boiler);

k. Hourly average NOx and O_2 concentration; and

l. Cost.

In accordance with the requirements of Paragraph 12.J, MAP shall determine the NOx concentrations at the point of emission to the atmosphere by CEMS. In accordance with the requirements of Paragraph 12.J, MAP shall determine the O_2 concentrations, after combustion in the CO boiler, by process analyzer(s) calibrated in accordance with the manufacturer's recommendations, where analyzer(s) are installed. MAP shall report the data or measurements to EPA in electronic format.

I. **FCCU NOx Emission Limits**: In each Catalyst Additive Report and each Optimization Study Report required by this Paragraph 12, MAP shall propose concentration-based NOx emission limits based on 3-hour rolling and 365-day rolling averages, each at 0% oxygen, except with respect to Texas City for which MAP shall propose only a 3-hour rolling

average at 0% oxygen. MAP shall comply with the emission limits it proposes beginning immediately upon submission of its Catalyst Additive Report or Optimization Study Report, respectively, to EPA. EPA will use the CEMS data collected during the Catalyst Additive Demonstration and the Optimization Study, respectively, and all other available and relevant information to establish limits for NOx emissions. EPA may establish NOx concentration-based emission limits based on 3-hour rolling and 365-day rolling averages, each at 0% oxygen, except with respect to Texas City for which EPA may establish only a limit based on the 3-hour rolling average at 0% oxygen. EPA will determine the limits based on the level of performance during the Catalyst Additive Demonstration or Optimization Study, a reasonable certainty of compliance, process variability, and all other available and relevant information. EPA will notify MAP of its determination of concentration-based NOx emissions limit and averaging times for each unit. MAP shall immediately (or within thirty (30) days if EPA's limit is different from MAP's proposed limit) comply with the EPA-established emission limits.

J. **Demonstrating Compliance with FCCU NOx Emission Limits**: MAP shall use a NOx CEMS to monitor performance and to report compliance with the terms and conditions of this Consent Decree at the following units, as soon as practicable but, by no later than the following dates:

a. Catlettsburg FCCU and RCCU -- Date of Lodging of the Consent Decree;

b. Robinson FCCU -- December 31, 2001;

c. Garyville FCCU -- December 31, 2001;

d. Canton FCCU -- December 31, 2001;

e Detroit FCCU -- December 31, 2001;

f. St. Paul Park FCCU -- May 31, 2002; and

g. Texas City FCCU -- November 30, 2002;

MAP shall make all CEMS data collected during the life of this Consent Decree available to EPA upon demand as soon as practicable. MAP shall install, certify, calibrate, maintain, and operate all CEMS required by this Consent Decree in accordance with the requirements of 40 CFR §§ 60.11, 60.13 and Part 60 Appendix A, the applicable performance specification test of 40 C.F.R. Part 60 Appendices B and F. With respect to 40 C.F.R. Part 60 Appendix F, in lieu of the requirements of 40 C.F.R. Part 60 Appendix F §§ 5.1.1, 5.1.3 and 5.1.4, MAP shall conduct either a Relative Accuracy Audit ("RAA") or a Relative Accuracy Test Audit ("RATA") once every twelve (12) calendar quarters, provided that a Cylinder Gas Audit is conducted each calendar quarter. Where installed, CEMS will be used to demonstrate compliance with emission limits established under this Consent Decree. MAP shall install, calibrate, maintain, and operate all process analyzers required by this Consent Decree in accordance with the manufacturer's specifications. The NOx CEMS sampling point on the Detroit FCCU shall be located on the FCCU regenerator flue gas line prior to the heat recovery boiler, until such time as the heat recovery boiler is shutdown, whereupon the CEMS sampling point shall be in the FCCU regenerator stack.

K. **CO Emissions Control:**

i. For each refinery that implements a PAL for CO pursuant to Paragraph 26 of this Consent Decree, MAP shall limit carbon monoxide ("CO") emissions from its FCCUs to 150 ppmvd on a 365-day rolling average at 0% O_2 and 250 ppmvd on a 24-hour rolling average at 0% O_2 in accordance with the following schedule:

a. Catlettsburg FCCU and RCCU -- Date of application for the PAL;

b. Robinson FCCU -- December 31, 2005;

c. Garyville FCCU -- Date of application for the PAL;

d. Canton FCCU -- Date of application for the PAL;

e. St. Paul Park FCCU -- Date of application for the PAL;

f. Detroit FCCU -- Date of application for the PAL; and

g. Texas City FCCU -- Date of application for the PAL;

ii. MAP shall install and operate CEMS pursuant to this Paragraph to monitor CO and to report compliance with the terms and conditions of this Consent Decree, as soon as practicable but by no later than the following dates:

a. Catlettsburg FCCU and RCCU -- Date of Lodging of the Consent Decree;

b. Robinson FCCU -- Date of Lodging of the Consent Decree;

c. Garyville FCCU -- Date of Lodging of the Consent Decree;

d. Canton FCCU -- December 31, 2001;

e. St. Paul Park FCCU -- May 31, 2002;

f. Detroit FCCU -- June 30, 2002; and

g. Texas City FCCU -- November 30, 2002.

Each CEMS will be installed, certified, calibrated, maintained, and operated in accordance with the applicable requirements of 40 C.F.R. §§ 60.11, 60.13 and Part 60 Appendix A, the applicable performance specification test of 40 C.F.R. Part 60 Appendices B and F. In lieu of the requirements of 40 C.F.R. Part 60 Appendix F §§ 5.1.1, 5.1.3 and 5.1.4, MAP shall conduct either a Relative Accuracy Audit ("RAA") or a Relative Accuracy Test Audit ("RATA") once every twelve (12) calendar quarters, provided that a Cylinder Gas Audit is conducted each calendar quarter. Where installed, CEMS will be used to demonstrate compliance with emission limits established under this Consent Decree. The CO CEMS sampling point on the Detroit FCCU shall be located on the FCCU regenerator flue gas line prior to the heat recovery boiler, until such time as the heat recovery boiler is shutdown, whereupon the CEMS sampling point shall be in the FCCU regenerator stack.

L. **Hydrotreater Outages:**

The 3-hour FCCU NOx emission limits established pursuant to this Paragraph 12 shall not apply during periods of hydrotreater outages at Canton, Detroit, St. Paul Park, Garyville and Catlettsburg, provided that MAP is maintaining and operating its FCCUs (including associated air pollution control equipment) in a manner consistent with good air pollution control practices for minimizing emissions in accordance with an EPA-approved good air pollution control practices plan. No later than one hundred and eighty (180) days from the Date of Lodging of the Consent Decree, MAP shall submit to EPA for its approval a plan to minimize NOx emissions from its FCCU (including associated air pollution control equipment) during hydrotreater outages. MAP shall comply with the plan at all times, including periods of start up, shut down, and malfunction of the hydrotreater. Modifications to the plan shall be summarized in an annual submittal to the appropriate EPA Regional Office and appropriate State or Local Agency.

13. **NOx Emissions Reductions from Heaters and Boilers:** MAP shall implement a program to reduce NOx emissions from refinery heaters and boilers. Reductions will be accomplished through the installation of NOx controls on the controlled heaters and boilers, the shut down of certain units and the acceptance of lower permitted emission levels. Future compliance with the lower emission limits will be determined through source testing and the use of CEMS, where installed, predictive emissions monitoring systems ("PEMS"), or monitoring of indicator parameters.

A. MAP shall install NOx emission control technology on certain specified heaters and boilers at its seven refineries. MAP shall select one or any combination of the following methods for control of NOx emissions from individual heaters or boilers controlled by MAP pursuant to Paragraph 13.B:

i. SCR or SNCR;

ii. "current generation" or "next generation" ultra-low NOx burners;

iii. other technologies which MAP demonstrates to EPA's satisfaction will reduce NOx emissions to 0.040 lbs. per mmBTU or lower;.

iv. where installation of "current generation" or "next generation" ultra-low-NOx burners is technologically infeasible for cylindrical heater and/or boiler MAP may propose an alternate SO_2single burner technology which MAP demonstrates to EPA's satisfaction will reduce NOx emissions to 0.055 lbs. per mmBTU or lower; or

v. permanent shut down of heaters and boilers with revocation of all operating permits.

The heaters and boilers proposed for control by MAP shall be identified as required by this Paragraph 13.

B. On or before December 31, 2008, MAP shall complete a program to reduce the overall NOx emissions from the Controlled Heaters and Boilers at its refineries in an amount greater than or equal to 4000 tons per year from a prior actual to future allowable basis so as to satisfy the following inequality:

$$\sum_{i=1}^{n} [(E_{actual})_i - (E_{allowable})_i] \geq 4000 \text{ tons of NOx per year}$$

Where:

$(E_{allowable})_i$ = [(The permitted allowable pounds of NOx per million BTU for heater or boiler i)/(2000 pounds per ton)] x [(the lower of permitted or maximum heat input rate capacity in million BTU per hour for heater or boiler i) x (the lower of 8760 or permitted hours per year)] ;

$(E_{Actual})_i$ = The tons of NOx per year prior actual emissions (unless prior actuals exceed allowable emissions, then use allowable) as shown in Appendix C for controlled heater or boiler i; and

n = The number of controlled heaters and boilers at all refineries applied towards satisfying the requirements of the equation set forth in this Paragraph 13 of this Consent Decree.

C. Appendix C to this Consent Decree provides the following information for each of the heaters and boilers at each MAP refineries:

i. the maximum heat input capacities and allowable heat input capacities in mmBTU/hr (HHV);

ii. the baseline actual emission rate for both calendar years 1999 and 2000 in lbs/mmBTU (HHV) and tons per year;

iii. the type of data used to derive the emission estimate (i.e. emission factor, stack test, or CEMS data) and the averaging period for the data used;

iv. the baseline utilization rate in annual average mmBTU/hr (HHV) for calendar years 1999 and 2000, or with respect to the Detroit Refinery and Robinson Refinery 1998 and 1999; and

v. MAP's initial identification of the heaters and boilers that are either already controlled and those that are likely to be controlled in accordance with Paragraph 13.A and 13.B.

D. MAP shall submit a detailed NOx control plan ("Control Plan") to EPA for review and comment by no later than four months after the Date of Lodging of the Consent Decree, with annual updates on March 31 of each year until termination of the Consent Decree. MAP shall implement the Control Plan in accordance with the requirements of the Consent Decree. The Control Plan and its updates shall describe the progress of the NOx emissions reductions program for heaters and boilers and contain the following for each heater and boiler at each refinery:

i. All of the information in Appendix C;

ii. Identification of all heaters and boilers that MAP has controlled and plans to control to reduce NOx emissions;

iii. Identification of the type of controls installed or planned with date installed or planned (including identification of the heaters and boilers to be permanently shutdown);

iv. The allowable NOx emissions (in lbs/mmBTU (HHV), with averaging period) and allowable heat input rate (in mmBTU/hr (HHV)) obtained or planned with dates obtained or planned;

v. The results of emissions tests and annual average CEMS data (in ppmvd at 3% O_2, lb/mmBTU, and tons per year) conducted pursuant to Paragraphs 13.G;

vi. The amount in tons per year applied or to be applied toward satisfying Paragraph 13.B; and

vii. A description of the achieved and anticipated annual progress towards meeting the July 31, 2005 and December 31, 2008 emission reductions described on a refinery-by-refinery basis.

E. MAP shall make two-thirds of the NOx emissions reductions required by Paragraph 13.B, by July 31, 2005. MAP shall demonstrate that it has installed NOx controls on the Controlled Heaters and Boilers and obtained or applied for enforceable limits that will achieve the required reductions pursuant to Paragraph 13 and Paragraphs 24.A and 25 (Permitting) by certifying no later than September 30, 2005, that it has complied.

F. By no later than December 31, 2008, Controlled Heaters and Boilers shall represent at least 30% of the allowable heat input capacity of all heaters and boilers greater than 40 mm/BTU at each refinery. The heater and boiler heat input capacity for each refinery shall be based on the allowable heat input capacity during the 1999-2000 baseline period.

G. By the date of installation of control on a heater and boiler, MAP shall monitor the process heaters and boilers that are being controlled to meet the requirements under Paragraph 13.B as follows:

i. For heaters and boilers with a capacity greater than 150 mmBTU/hr (HHV), install or continue to operate NOx CEMs;

ii. For heaters and boilers with a capacity of less than or equal to 150 mmBTU/hr (HHV) but greater than100 mmBTU/hr (HHV), install or continue to operate a NOx CEMS, or install a parametric emission monitoring system ("PEMS"); and

iii. For heaters and boilers with a capacity of less than or equal to 100 mmBTU/hr (HHV) conduct an initial performance test and/or utilize a portable continuous analyzer. The results of this testing shall be reported based upon the average of three (3) one hour testing periods.

Monitoring and testing conducted by MAP under this Paragraph 13.G by use of portable continuous analyzers, PEMS, or source testing shall be conducted in accordance with the requirements of Appendices E and F.

H. Within 180 days after installing the controls on a heater and boiler, MAP shall certify, calibrate, maintain, and operate all CEMS required by this Paragraph in accordance with the requirements of 40 CFR §§ 60.11, 60.13 and Part 60 Appendix A, the applicable performance specification test of 40 C.F.R. Part 60 Appendices B and F. With respect to 40 C.F.R. Part 60, Appendix F, in lieu of the requirements of 40 C.F.R. Part 60, Appendix F §§ 5.1.1, 5.1.3 and 5.1.4, MAP shall conduct either a Relative Accuracy Audit ("RAA") or a Relative Accuracy Test Audit ("RATA") once every twelve (12) calendar quarters, provided that a Cylinder Gas Audit is conducted each calendar quarter. Where installed, CEMS will be used to demonstrate compliance with emission limits established under this Consent Decree. MAP shall install, calibrate, maintain, and operate all process analyzers required by this Consent Decree in accordance with the manufacturer's specifications. The results of the performance test shall be used to develop the representative operating parameters for each unit as well as indicators of compliance with the emission limit. The operating parameters shall include, at a minimum, combustion oxygen, air preheat temperature, and firebox temperature. MAP shall evaluate the necessity of using firebox or bridgewall temperatures and additional operating parameter and agrees to use such parameter as a means of monitoring performance where MAP and EPA mutually-agree to its effectiveness.

I. The requirements of this Paragraph do not exempt MAP from complying with any and all Federal, state and local requirements that may require technology upgrades based on actions or activities occurring after the Date of Lodging of this Consent Decree.

J. MAP shall retain all records required to support their reporting requirements under this Paragraph until termination of the Consent Decree. MAP shall submit such records to EPA upon request.

K. If MAP proposes to transfer ownership of any refinery subject to Paragraph 13 before the requirements of Paragraph 13 have been met, MAP shall notify EPA of that transfer and shall submit a proposed allocation to EPA for that refinery's share of tonnage reduction requirements of Paragraph 13 that will apply individually to that refinery after such transfer.

L. **CO Emissions from Heaters and Boilers**: For each refinery seeking to implement a PAL for CO pursuant to Paragraph 26 of this Consent Decree, by the date of application to EPA for the PAL, MAP shall limit CO emissions from all heaters and boilers to 0.060 lb/mmBTU on a 24-hour rolling average basis and 0.040 lb/mmBTU on a 365-day rolling average basis. For each refinery that implements a PAL for CO pursuant to Paragraph 26 of this Consent Decree, MAP shall monitor CO emissions to demonstrate compliance with this requirement as follows:

i. For heaters and boilers with a capacity greater than 150 mmBTU/hr (HHV), install or continue to operate CO CEMs;

ii. For heaters and boilers with a capacity of less than or equal to 150 mmBTU/hr (HHV) but greater than 100 mmBTU/hr (HHV), install or continue to operate a CO CEMS, or install a parametric emission monitoring system ("PEMS"); and

iii. For heaters and boilers with a capacity of less than or equal to 100 mmBTU/hr (HHV) conduct an initial performance test and/or utilize a portable continuous analyzer. The results of this testing shall be reported based upon the average of three (3) one hour testing periods.

14. **SO_2 Emission Reductions from FCCUs**: MAP shall implement a program to reduce SO_2 emissions from refinery FCCUs by: installing and operating a new Wet Gas

Scrubber ("WGS") at the Texas City FCCU; continuing to operate the existing WGS at the Robinson FCCU and the Garyville FCCU; installing a wet gas scrubber or the permanent shutdown of Unit 1 (Catlettsburg Refinery); using SO2 absorbing catalyst additive and continued hydrotreatment at Unit 109 (Catlettsburg Refinery) and the Detroit FCCU; and using use SO_2 adsorbing catalyst additive at the Canton FCCU and the St. Paul Park FCCU. MAP shall incorporate lower SO_2 emission limits into operating permits and demonstrate future compliance with the lower emission limits through the use of CEMS. MAP shall install technologies and demonstrate the use of additives to reduce and control SO_2 emissions from the eight (8) FCCUs at its seven (7) refineries covered by this Consent Decree as follows:

A. **SO_2 Emission Limits at the Texas City FCCU:** By no later than December 31, 2002, MAP shall complete installation and begin operation of a WGS to control emissions from the Texas City FCCU. MAP shall design and operate the WGS to achieve an SO_2 concentration of 25 ppmvd or lower on a 365-day rolling average basis and 50 ppmvd on a 7-day rolling average basis, each at 0% oxygen.

B. **SO_2 Emission Limits at the Robinson FCCU**: By no later than Date of Lodging of the Consent Decree, MAP shall operate its Robinson FCCU so that SO_2 emissions from this unit do not exceed 25 ppmvd based on a 365-day rolling average and 50 ppmvd based on a 7-day rolling average, each at 0% oxygen.

C. **SO_2 Emission Limits at the Garyville FCCU:** By no later than Date of Lodging of this Consent Decree, MAP shall operate its Garyville FCCU so that SO_2 emissions from these units do not exceed 25 ppmvd based on a 365-day rolling average and 50 ppmvd based on a 7-day rolling average, each at 0% oxygen. MAP shall demonstrate compliance pursuant to its State-approved PEMS, until such time as it has installed and certified its CEMS pursuant to Paragraph 14.H of the Consent Decree.

D. **SO_2 Emission Limits for Unit No. 1 and Unit No. 109 (Catlettsburg Refinery)**:

i. Unit No. 1: By no later than June 30, 2005, MAP shall either permanently shutdown Unit No. 1 or achieve an SO_2 emission concentration of 25 ppmvd or lower on a 365-day rolling average basis and 50 ppmvd on a 7-day rolling average basis, each at 0 % oxygen, from Unit No. 1.

ii. Unit No. 109: By no later than June 30, 2004, MAP shall either:

a. Convert Unit No. 109 to a fluid catalytic cracking unit and achieve a 25 ppmvd or lower on a 365-day rolling average basis and 50 ppmvd on a 7-day rolling average basis, each at 0 % oxygen; or

b. Continue to operate Unit No. 109 as a residual catalytic cracking unit with the existing lime bed to control SO_2 emissions and complete an optimization study consistent with the requirements of this Paragraph.

iii. If required by Paragraph 14.D.ii.b, MAP shall conduct a six-month study to optimize the performance of the existing lime bed to minimize SO_2 emissions from Unit No. 109 ("Dry Scrubber Optimization Study"). MAP shall submit a protocol for this Dry Scrubber Optimization Study to EPA that includes consideration of the operating considerations described in Appendix D. As part of this study, MAP shall evaluate the effect of the operating considerations identified in Appendix D and shall monitor SO_2 emissions and the operating considerations to identify optimum levels that maximize the reductions of the SO_2 emissions. MAP shall submit the results of this study to EPA in a written report no later than sixty (60) days after the completion of the study (hereinafter "Dry Scrubber Optimization Report"). This report shall identify the relevant operating considerations and their levels that result in the maximum reductions of SO_2 emissions from Unit 109, and include, at a minimum, the following information:

a. Flue gas temperature and flow rate;

b. Coke burn rate;

c. Feed rate;

d. Feed sulfur content;

e. CO boiler firing rate and fuel type;

f. Scrubber liquor flow and pH;

g. Scrubber pressure drop;

h. Hourly average SO_2 and O_2 concentrations at the point of emission to the atmosphere, and at the inlet to the lime bed; and

i. Cost.

As required in Paragraph 12.G, MAP shall determine the SO_2 and O_2 concentrations at the point of emission to the atmosphere and at the inlet to the lime bed by a CEMS. MAP shall report the data or measurements to EPA in electronic format.

E. **Application of SO_2 Adsorbing Catalyst Additive at the Detroit FCCU, Canton FCCU and St. Paul Park FCCU**: By no later than March 30, 2002, MAP shall begin to add SO_2 Adsorbing Catalyst Additive at the Detroit FCCU and Canton FCCU, and by no later than the start of operation following the September 2002 turnaround at the St. Paul Park FCCU, in accordance with Appendix B to this Consent Decree, to establish the optimized additive addition rate. MAP will demonstrate the performance of the additive at the optimized addition rate during a twelve-month period to yield the lowest SO_2 concentration feasible from the FCCU at that optimized rate. The twelve-month demonstration at the optimized rate shall begin no later than six months after the beginning of addition of catalyst additive.

F. **Optimized SO_2 Adsorbing Catalyst Additive Addition Rate:** By no later than thirty (30) days prior to beginning the twelve month demonstration, MAP shall notify EPA in writing of the optimized additive addition rate for each FCCU with an explanation and the

supporting data that demonstrates that the requirements of Appendix B have been met in establishing the optimized rates. During the demonstration, MAP shall add SO_2 Absorbing Catalyst Additive at the optimized rate. No later than sixty (60) days after the completion of the twelve (12) month demonstration, MAP shall report to EPA the results of the demonstration for each FCCU (hereinafter "SO_2 Additive Report"). The report shall include, at a minimum, the following information on at least a daily, and where available on a hourly, basis:

a. Regenerator flue gas temperature and flow rate;

b. Coke burn rate;

c. FCCU feed rate;

d. FCCU feed sulfur content;

e. CO boiler firing rate and fuel type;

f. Total fresh catalyst addition rate;

g. NOx Reducing Catalyst Additive and SO_2 adsorbing catalyst additive addition rates;

h. Low-NOx and conventional CO promotor addition rates;

i. Reductant addition rates;

j. Temperature profiles (in duct work after regenerator and in the CO Boiler);

k. Hourly average SO_2 and O_2 concentrations; and

l. Cost.

As required in Paragraph 12.G, MAP shall determine the SO_2 and O_2 concentrations at the point of emission to the atmosphere by CEMS. As required in Paragraph 14.I, MAP shall determine the O_2 concentrations, after combustion in the CO boiler, by process analyzer(s) calibrated in accordance with the manufacturer's recommendations, where analyzer(s) are installed. MAP shall report the data or measurements to EPA in electronic format.

G. **FCCU Emission Limits for SO_2 Adsorbing Catalyst Additives**:

As part of each report required by Paragraphs 14.E and 14.H, MAP shall propose a 7-day and 365-day rolling average limits, each at 0% oxygen, for SO_2 emissions from the Detroit FCCU, Canton FCCU, and the St. Paul Park FCCU. MAP shall comply with the limits it proposes beginning immediately upon submission of its report to EPA. EPA will use the CEMS data collected during the demonstration (and during the optimization study) and all other available and relevant information to establish limits for SO_2 emissions from the Detroit, Canton, and St. Paul Park FCCUs. EPA may establish SO_2 concentration limits based on 7-day and 365-day rolling averages, each at 0% oxygen. EPA will determine the SO_2 concentration limits and averaging times based on the level of performance during the demonstration, a reasonable certainty of compliance, process variability, and any other available and relevant information. EPA will use the information provided by MAP in its respective reports, CEMs data collected during the demonstration (and during the optimization study), and all other available and relevant information to establish representative SO_2 emission limits for the Detroit, Canton, and St. Paul Park FCCUs. EPA will notify MAP of its determination of SO_2 concentration emission limits and averaging time for the units. MAP shall immediately (or within thirty (30) days if EPA's SO_2 concentration limit is more stringent than MAP's proposed limit) comply with the EPA established emission limits.

H. **Monitoring Emissions and Demonstrating Compliance with FCCU Emission Limits**: MAP shall use an SO_2 CEMS to measure SO_2 emissions and to report compliance with the terms and conditions of the Consent Decree at the following FCCUs by the dates specified:

i. Robinson FCCU - Date of Lodging this Consent Decree

ii. (Catlettsburg Refinery) Unit No.109 - Date of Lodging this Consent Decree

iii. (Catlettsburg Refinery) Unit No. 1 - Date of Lodging this Consent Decree

ii. Garyville FCCU -- December 31, 2001;

iii. Texas City FCCU -- November 30, 2002;

iv. Canton FCCU - December 31, 2001;

v. St. Paul Park FCCU - May 31, 2002;

vi. Detroit FCCU - December 31, 2001;

All CEMS data collected by MAP during the effective life of the Consent Decree shall be made available to EPA upon demand as soon as practicable. The SO_2 CEMS sampling point on the Detroit FCCU shall be located on the FCCU regenerator flue gas line prior to the heat recovery boiler, until such time as the heat recovery boiler is shutdown, whereupon the CEMS sampling point shall be in the FCCU regenerator stack.

I. **CEMS**: All CEMS installed and operated pursuant to this Paragraph will be installed, certified, calibrated, maintained, and operated in accordance with the applicable requirements of 40 C.F.R. §§ 60.11, 60.13 and 40 C.F.R. Part 60 Appendix A, the applicable performance specification test of 40 C.F.R. Part 60 Appendices A and B. In lieu of the requirements of 40 C.F.R. Part 60 Appendix F §§ 5.1.1, 5.1.3 and 5.1.4, MAP shall conduct either a Relative Accuracy Audit ("RAA") or a Relative Accuracy Test Audit ("RATA") once every twelve (12) calendar quarters, provided that a Cylinder Gas Audit is conducted each calendar quarter. Where installed, CEMS will be used to demonstrate compliance with emission limits established under this Consent Decree. MAP shall install, calibrate, maintain, and operate all process analyzers required by this Consent Decree in accordance with the manufacturer's specifications.

J. **Hydrotreater Outages:**

The 7-day FCCU SO_2 emission limits established pursuant to this Paragraph 14 shall not apply during periods of hydrotreater outages at Canton, Detroit, St. Paul Park, and at Unit Nos. 1 (until the wet gas scrubber is installed) and 109 at Catlettsburg, provided that MAP is maintaining and operating its FCCUs (including associated air pollution control equipment) in a

manner consistent with good air pollution control practices for minimizing emissions in accordance with an EPA-approved good air pollution control practices plan. No later than one hundred and eighty (180) days from the Date of Lodging of the Consent Decree, MAP shall submit to EPA for its approval a plan to minimize SO_2 emissions from its FCCU (including associated air pollution control equipment) during hydrotreater outages. MAP shall comply with the plan at all times, including periods of start up, shut down, and malfunction of the hydrotreater. Modifications to the plan shall be summarized in an annual submittal to the appropriate EPA Regional Office and appropriate State or Local Agency.

15. **SO_2 and PM Emissions Reductions from Heaters and Boilers**: MAP shall undertake the following measures to reduce SO_2 emissions from refinery heaters and boilers by eliminating or minimizing the burning of fuel oil and restricting H_2S in refinery fuel gas as follows:

A. **Elimination/Reduction of Oil Burning**: Upon the Date of Entry of the Consent Decree, MAP shall discontinue or reduce burning of Fuel Oil in all heaters and boilers at its refineries, except in instances of natural gas curtailment by suppliers, and except as provided in the alternate schedules set forth in Appendix G.

B. **NSPS Applicability To Heaters and Boilers:** Upon the Date of Entry of the Consent Decree, MAP shall accept NSPS Subpart J applicability for all heaters and boilers, except where an alternate schedule for NSPS Subpart J compliance is set forth in Appendix H.1

C. **Permitting:** MAP shall apply to incorporate into the relevant permits the NSPS Subpart J limits for hydrogen sulfide ("H_2S") content of fuel gas or SO_2 emissions, where appropriate, for each heater and boiler as set forth in this Section.

D. **Annual Report:** No later than by March 31 of each year, MAP shall submit an annual report certifying and verifying its compliance with this Paragraph 15. The report shall

include, at a minimum, the amounts and sulfur content of Fuel Oil burned in any refinery heater and boiler and provide the status of NSPS Subpart J compliance for each heater and boiler.

E. **PM Emissions from Heaters and Boilers:** For each refinery that implements a PAL for PM pursuant to Paragraph 26 of this Consent Decree, by the date of application to EPA for the PAL, MAP shall limit PM emissions from each heater and boiler to 0.005 lb/mmBTU(HHV) on a 365-day rolling average and 0.010 lb/mmBTU(HHV) on a 24-hour rolling average.

F. **PM Monitoring -- Heaters and Boilers**: MAP shall demonstrate compliance with the emissions limits set forth in Paragraph 15.E by application of 40 C.F.R. Part 60 Appendix A, Method 5, if requested by EPA or the States.

G. **Additional SO_2 Emissions Limits for Heaters and Boilers in a PAL**: For each refinery seeking to implement a PAL for SO_2 pursuant to Paragraph 26 of this Consent Decree, by the date of application to EPA for the PAL, MAP shall limit SO_2 emissions from all heaters and boilers that burn fuel gas only to 0.040 lb SO_2/mmBTU (HHV) or 125 ppmvd H_2S in fuel gas each on a 365-day rolling average basis. For purposes of determining an equivalent lbSO_2/mmBTU if the100 ppmvd H_2S option is selected for a heater or boiler, for use as the permitted concentration in section II.B. and daily concentration in section III.A.3. of Appendix P, the following equation shall be used:

> SO_2 emission rate in lb/mmBTU = [H_2S concentration ppmvd/1,000,000] x [1/(379 dscf/lb-mole)] x 34 lb/lb-mole x (64 lb/lb-mole/34 lb/lb-mole) / [fuel gas higher heating value (mmBTU/dscf)]

For each refinery that implements a PAL for SO_2 pursuant to Paragraph 26 of this Consent Decree, MAP shall monitor SO_2 emissions and calculate a daily SO_2 emission rate by measuring the H_2S content of the fuel gas to demonstrate compliance with the 0.040 lb SO_2/mmBTU requirement as follows:

Calendar daily average SO_2 emission rate in lb/mmBTU = [calendar daily average H_2S concentration ppmvd/1,000,000] x [1/(379 dscf/lb-mole)] x 34 lb/lb-mole x (64 lb/lb-mole/34 lb/lb-mole) / [calendar daily average fuel gas higher heating value (mmBTU/dscf)]

The 365-day rolling average shall be calculated on a daily basis for each heater and boiler by summing the calendar daily average SO_2 emission rate in pounds per mmBTU for the prior 365 days and then dividing by 365.

16. **NSPS Applicability and Particulate Matter Emissions -- FCCU Controls:**

A. **NSPS Applicability**: MAP's FCCU Regenerators shall be affected facilities subject to the requirements of NSPS Subpart A and J for each relevant pollutant by the dates specified in Appendix I.

B. **Particulate Matter Emissions**

i. **Canton**: MAP shall reduce PM emissions at the Canton FCCU to 1 pound per 1000 pounds of coke burned on a 3-hour rolling average basis. MAP shall achieve these reductions through installation of an electrostatic precipitator. MAP shall meet this limit by no later than December 31, 2005.

ii **St. Paul Park:** MAP shall reduce PM emissions at the St. Paul Park FCCU to 1 pound per 1000 pounds of coke burned on a 3-hour rolling average basis. MAP shall achieve these reductions through installation of an electrostatic precipitator. MAP shall meet this limit by no later than December 31, 2005.

iii. **Detroit:** MAP shall reduce PM emissions at the Detroit FCCU to 1 pound per 1000 pounds of coke burned on a 3-hour rolling average basis. MAP shall achieve these reductions through installation of an electrostatic precipitator. MAP shall meet this limit by no later than December 31, 2005.

iv. **Texas City**: MAP shall reduce PM emissions at the Texas City FCCU to 1 pound per 1000 pounds of coke burned on a 3-hour rolling average basis. MAP shall achieve these reductions through installation of a wet gas scrubber by no later than December 31, 2002

v. **Robinson & Garyville**: On the Date of Lodging of the Consent Decree, MAP shall comply with an emissions limit of 1 pound per 1000 pounds of coke burned on a 3-hour rolling average basis for PM emissions at the Robinson FCCU, Garyville FCCU.

vi. **Catlettsburg**: MAP shall reduce PM emissions at the FCCU and RCCU to 1 pound per 1000 pounds of coke burned on a 3-hour rolling average basis. MAP shall achieve these reductions through installation of an electrostatic precipitator or baghouse. MAP shall meet this limit by no later than June 30, 2004.

C. **Additional PM Limits:** For each refinery that implements a PAL for PM pursuant to Paragraph 26 of this Consent Decree, by the date of application to EPA for the PAL, MAP shall limit PM emissions from each FCCU to 0.5 pounds per 1000 pounds of coke burned on a 365-day rolling average basis and 1 pounds per 1000 pounds of coke burned on a 3-hour rolling average basis.

D. **PM Monitoring -- FCCU**: MAP shall install and operate either a continuous opacity monitoring systems or an EPA-approved alternative monitoring plan to monitor PM emissions on each FCCU and RCCU at each refinery. MAP shall demonstrate compliance with the emissions limits set forth in Paragraph 16.C by application of 40 C.F.R. Part 60 Appendix A, Method 5.

17. **Hydrocarbon Flaring/NSPS Applicability -- Flares:**

A. **Hydrocarbon Flaring**

i. **NSPS Applicability**: All Hydrocarbon Flaring Devices identified in Appendix A (except for Texas City Main flare) are subject to NSPS Subpart J as fuel gas combustion devices

and are used as emergency control devices for quick and safe release of gases generated by a Malfunction, Startup and Shutdown.

ii. **Good Air Pollution Control Practices**: MAP shall comply with the NSPS obligation to implement good air pollution control practices as required by 40 C.F.R. § 60.11(d) to minimize flaring activity.

iii. **Hydrocarbon Flaring**: For Hydrocarbon Flaring Incidents, MAP shall follow the same investigative, reporting and corrective action procedures described in Paragraph 22 of this Consent Decree for AG Flaring. Stipulated penalties under either Paragraphs 22.C or 48.A shall not apply to Hydrocarbon Flaring Incident(s). In lieu of analyzing possible corrective actions under Paragraph 22.A.i.e and taking interim and/or long-term corrective action under Paragraph 22.B.i for a Hydrocarbon Flaring Incident attributable to the start up or shut down of a unit that MAP has previously analyzed under this Paragraph 17, MAP may identify such prior analysis when submitting the report required under this Paragraph 17.

B. **NSPS Compliance Schedule - 40 CFR 60.104(a)(1)**: To comply with applicable NSPS requirements for the combustion of certain, routinely generated refinery fuel gases at the Flaring Devices identified in Appendix J, MAP will either monitor these streams or take action to eliminate their routes to a Flaring Device by the dates specified in Appendix J. The combustion of gases generated by the Startup, Shutdown or Malfunction of a refinery process unit or released to a Flaring Device as a result of relief valve leakage or other emergency Malfunction shall be exempt from the requirement to comply with 40 C.F.R. § 60.104(a)(1). For each of the routinely or continuously generated refinery fuel gas streams combusted in a Flaring Device identified in Appendix A, MAP shall monitor and report on the emissions with continuous emission monitors as required by 40 C.F.R. § 60.105(a)(4) or with a parametric monitoring system approved as an alternative monitoring systems under 40 C.F.R. § 60.13(i).

18. **Benzene Waste NESHAP Program Enhancements**:

In addition to continuing to comply with all applicable requirements of 40 C.F.R. Part 61, Subpart FF ("Benzene Waste NESHAP" or "Subpart FF"), MAP agrees to undertake, at each of the refineries that are the subject of this Consent Decree, the measures set forth in Paragraphs 18.B through 18.Q to ensure continuing compliance with Subpart FF and to minimize or eliminate fugitive benzene waste emissions.

A. Current Compliance Status. MAP shall comply with the compliance options specified below:

i. On the Date of Lodging of the Consent Decree, MAP's Garyville Refinery shall comply with the compliance option set forth at 40 C.F.R. § 61.342(c), utilizing the exemptions set forth in 40 C.F.R. § 61.342(c)(2) and (c)(3)(ii) (hereinafter referred to as the "2 Mg compliance option");

ii. On the Date of Lodging of the Consent Decree, MAP's Canton Refinery, Catlettsburg Refinery, and Texas City Refinery shall comply with the compliance option set forth at 40 C.F.R. § 61.342(e) (herein referred to as the "6BQ compliance option");

iii. By no later than June 30, 2003, MAP's Detroit Refinery shall complete implementation of all actions necessary to ensure compliance with the 6BQ compliance option, consistent with the provisions of Paragraph 19.A of this Consent Decree;

iv. By no later than December 31, 2002, MAP's Robinson Refinery shall complete implementation of all actions necessary to ensure compliance with the 6BQ compliance option, consistent with the provisions of a consent decree to be entered into in an action styled United States v. Marathon Oil Co., et al., Civil Action No. 99-4023-JPG (S.D. Ill) ("Marathon/Robinson Benzene NESHAP Civil Action");

v. On or before April 30, 2001, MAP reported that it had a TAB of less than 10 Mg/yr at its St. Paul Park Refinery, in accordance with Subpart FF.

B. **Refinery Compliance Status Changes**. Commencing on the Date of Lodging of the Consent Decree and continuing through termination, MAP shall not change the compliance status of any Refinery from the 6BQ compliance option to the 2 Mg compliance option. If at any time from the Date of Lodging of the Consent Decree through its termination, the St. Paul Park Refinery is determined to have a TAB equal to or greater than 10 Mg/yr, MAP shall not utilize the 2 Mg compliance option. MAP shall consult with EPA and the appropriate state agency before making any change in compliance strategy not expressly prohibited by this Paragraph 18.B. All changes must be undertaken in accordance with the regulatory provisions of the Benzene Waste NESHAP.

C. **One-Time Review and Verification of Each Refinery's TAB and, as applicable, Each Refinery's Compliance with the 2 Mg or 6 BQ Compliance Options**.

i. Detroit and Robinson Refineries: By no later July 30, 2001, MAP's Detroit Refinery shall have completed a review and verification of the Detroit Refinery's TAB. MAP's Robinson Refinery already has completed a review and verification of its TAB. Consistent with the agreements set forth in Paragraph 19.A of this Consent Decree and in the consent decree to be entered into in the Marathon/Robinson Benzene NESHAP Civil Action, MAP shall implement all actions necessary to ensure compliance with the 6BQ compliance option at its Detroit and Robinson Refinery, respectively. The provisions of Paragraphs 18.C.ii, 18.C.iii, and 18.D. shall not apply to the Detroit and Robinson Refineries.

ii. All Refineries Except Detroit and Robinson: Phase One of the Review and Verification Process. By no later than 270 days from the Date of Lodging of the Consent Decree, MAP shall complete a review and verification of each Refinery's TAB, and, except for

St. Paul Park, each Refinery's compliance with the 2 Mg or 6 BQ compliance option, as applicable. For each Refinery, MAP's review and verification process shall include, but not be limited to: (i) an identification of each waste stream that is required to be included in the Refinery's TAB (e.g., slop oil, tank water draws, spent caustic, desalter rag layer dumps, desalter vessel process sampling points, other sample wastes, maintenance wastes, and turnaround wastes); (ii) a review and identification of the calculations and/or measurements used to determine the flows of each waste stream for the purpose of ensuring the accuracy of the annual waste quantity for each waste stream; (iii) an identification of the benzene concentration in each waste stream, including sampling for benzene concentration at no less than 10 waste streams per Refinery consistent with the requirements of 40 C.F.R. § 61.355(c)(1) and (3); provided however, that previous analytical data or documented knowledge of waste streams may be used, 40 C.F.R. § 61.355(c)(2), for streams not sampled; and (iv) an identification of whether or not the stream is controlled consistent with the requirements of Subpart FF. By no later than thirty (30) days following the completion of Phase One of the review and verification process, MAP shall submit a Benzene Waste NESHAP Compliance Review and Verification report ("BWN Compliance Review and Verification Report") that sets forth the results of Phase One, including but not limited to the items identified in (i) through (iv) of this Paragraph 18.C.ii. At its option, MAP may submit one BWN Compliance Review and Verification Report that includes the results of all Refineries or may submit five separate BWN Compliance Review and Verification Reports.

iii. All Refineries Except Detroit and Robinson: Phase Two of the Review and Verification Process. Based on EPA's review of the BWN Compliance Review and Verification Report(s), EPA may select up to 20 additional waste streams at each Refinery for sampling for benzene concentration. MAP will conduct the required sampling and submit the results to EPA

within ninety (90) days of receipt of EPA's request. MAP will use the results of this additional sampling to recalculate the TAB and the uncontrolled benzene quantity and to amend the BWN Compliance Review and Verification Report, as needed. To the extent that EPA requires MAP to re-sample a Phase One waste stream as part of this Phase Two review, MAP may average the results of the two sampling events. MAP shall submit an amended BWN Compliance Review and Verification Report within ninety (90) days following the date of the completion of the required Phase Two sampling, if Phase Two sampling is required by EPA.

D. **All Refineries Except Robinson and Detroit: Implementation of Actions Necessary to Correct Non-Compliance**.

i. Amended TAB Reports. If the results of the BWN Compliance Review and Verification Report(s) indicate(s) that the Refinery's most recently-filed TAB report does not satisfy the requirements of Subpart FF, MAP shall submit, by no later than sixty (60) days after completion of the BWN Compliance Review and Verification Report(s), an amended TAB report to the appropriate state agency. MAP's BWN Compliance Review and Verification Report(s) shall be deemed an amended TAB report for purposes of Subpart FF reporting to EPA.

ii. St. Paul Park Refinery. If the results of the BWN Compliance Review and Verification Report indicate that the St. Paul Park Refinery has a TAB of over 10 Mg/yr, MAP shall submit to EPA, to Region 5 of EPA, and to the Minnesota Pollution Control Authority, by no later than 180 days after completion of the BWN Compliance Review and Verification Report, a plan that identifies with specificity the compliance strategy and schedule that MAP will implement to ensure that the St. Paul Park Refinery complies with the 6 BQ compliance option as soon as practicable.

iii. Canton, Catlettsburg, Garyville and Texas City Refineries. If the results of the BWN Compliance Review and Verification Report(s) indicate that MAP is not in compliance with the

6BQ compliance option at the Canton, Catlettsburg and/or Texas City Refineries, or the 2 Mg compliance option at the Garyville Refinery, then, for each such Refinery not in compliance, MAP shall submit to EPA, to the appropriate EPA Region, and to the appropriate state agency, by no later than sixty (60) days after completion of the BWN Compliance Review and Verification Report(s), a plan that identifies with specificity the compliance strategy and schedule that MAP will implement to ensure that the subject Refinery complies with its applicable compliance option as soon as practicable.

iv. Review and Approval of Plans Submitted Pursuant to Paragraphs 18.D.ii and 18.D.iii. Any plans submitted pursuant to Paragraphs 18.D.ii and 18.D.iii shall be subject to the approval of, disapproval of, or modification by EPA, which shall act in consultation with the appropriate state agency. Within sixty (60) days after receiving any notification of disapproval or request for modification from EPA, MAP shall submit to EPA and the appropriate state agency a revised plan that responds to all identified deficiencies. Upon receipt of approval or approval with conditions, MAP shall implement the plan. Disputes arising under this Paragraph 18.D.iv. shall be resolved in accordance with the dispute resolution provisions of this Decree.

v. Certification of Compliance with the 2 Mg or 6 BQ Compliance Option, as Applicable. By no later than thirty (30) days after completion of the implementation of all actions, if any, required pursuant to Paragraphs 18.D.ii and 18.D.iii to come into compliance with the applicable compliance option, MAP shall submit a report to EPA that, as to each Refinery, the Refinery complies with the Benzene Waste NESHAP.

E. **Carbon Canisters:** MAP shall comply with the requirements of this Paragraph 18.E at all locations at MAP's Refineries where a carbon canister(s) is utilized as a control device under the Benzene Waste NESHAP.

i. Except for the Detroit and Robinson Refineries, by no later than 270 days after the Date of Lodging of the Consent Decree, MAP shall complete installation of primary and secondary carbon canisters and operate them in series. For the Detroit and Robinson Refineries, MAP shall complete installation of primary and secondary carbon canisters and operate them in series by no later than such time as MAP completes installation and start-up of the equipment necessary to ensure compliance with the 6 BQ option at those Refineries. By no later than thirty (30) days following completion of the installation of the dual canisters, MAP shall submit a report certifying the completion of the installation. The report shall include a list of all locations within each Refinery where secondary carbon canisters were installed, the installation date of each secondary canister, and the date that each secondary canister was put into operation. From the Date of Lodging of the Consent Decree through termination, MAP shall not use single carbon canisters for any new units or installations that require control pursuant to the Benzene Waste NESHAP at any of its Refineries. For dual carbon canister systems, "breakthrough" between the primary and secondary canister is defined as any reading equal to or greater than 200 ppm volatile organic compounds ("VOC") or 5 ppm benzene. If, however, EPA determines, in consultation with MAP, that the results of the study in Paragraph 18.O.ii demonstrate that a concentration of less than 200 ppm VOCs or 5 ppm benzene is a more appropriate measure of breakthrough, then, for purposes of this Paragraph 18.E.i., "breakthrough" shall be re-defined consistent with EPA's determination.

ii. By no later than seven (7) days after the installation of each secondary carbon canister, MAP shall start to monitor for breakthrough between the primary and secondary carbon canisters at times when there is actual flow to the carbon canister, in accordance with the frequency specified in 40 C.F.R. § 61.354(d).

iii. MAP shall replace the original primary carbon canisters with fresh carbon canisters immediately when breakthrough is detected. The original secondary carbon canister will become the new primary carbon canister and the fresh carbon canister will become the secondary canister. For this Paragraph 18.E.iii., "immediately" shall mean within twenty-four (24) hours.

iv. MAP shall maintain a supply of fresh carbon canisters at each Refinery at all times.

v. Records for the requirements of Paragraph 18.E. shall be maintained in accordance with 40 C.F.R. § 61.356(j)(10).

F. **Annual Program.** MAP shall establish an annual program of reviewing process information for each Refinery, including but not limited to construction projects, to ensure that all new benzene waste streams are included in each Refinery's waste stream inventory.

G. **Laboratory Audits**. MAP shall conduct audits of all laboratories that perform analyses of MAP's benzene waste NESHAP samples to ensure that proper analytical and quality assurance/quality control procedures are followed.

i. By no later than 180 days after the Date of Lodging of the Consent Decree, MAP shall conduct audits of the laboratories used by two (2) of its Refineries. MAP shall complete audits of the laboratories used by the remaining MAP Refineries within twelve (12) months of the Date of Lodging of the Consent Decree. In addition, MAP shall audit any new laboratory used for analyses of benzene samples prior to use of the new laboratory.

ii. If MAP has completed audits of any laboratory in the one year period prior to the Date of Lodging of the Consent Decree, additional audits of those laboratories pursuant to Paragraph 18.G.i. shall not be required.

iii. During the life of this Consent Decree, MAP shall conduct subsequent laboratory audits, such that each laboratory is audited every two (2) years.

H. **Benzene Spills.** For each spill at each Refinery, MAP shall review such spills to determine if benzene waste was generated. MAP shall include benzene generated by such spills in the TAB and the uncontrolled benzene quantity calculations for each Refinery.

I. **Training.**

i. By no later than ninety (90) days from the Date of Lodging of the Consent Decree, MAP shall develop and begin implementation of annual (i.e., once each calendar year) training for all employees asked to draw benzene waste samples.

ii. Canton, Catlettsburg, Garyville, and Texas City Refineries: For the Canton, Catlettsburg, Garyville, and Texas City Refineries, by no later than 180 days from the Date of Lodging of the Consent Decree, MAP shall complete the development of standard operating procedures for all control equipment used to comply with the Benzene Waste NESHAP. By no later than 270 days thereafter, MAP shall complete an initial training program regarding these procedures for all operators assigned to this equipment. Comparable training shall also be provided to any persons who subsequently become operators, prior to their assumption of this duty. Until termination of this Decree, "refresher" training in these procedures shall be performed on a three year cycle.

iii. Detroit and Robinson Refineries: The Robinson Refinery shall comply with the provisions of Paragraph 18.I.ii; provided however, that the development of the standard operating procedures and the initial training shall be completed by no later than December 31, 2002. The Detroit Refinery shall comply with the provisions of Paragraph 18.I.ii; provided however, that the development of the standard operating procedures and the initial training shall be completed by no later than June 30, 2003.

iv. St. Paul Park Refinery: The St. Paul Park Refinery shall comply with the provisions of Paragraph 18.J.ii if and when that Refinery's TAB reaches 10 Mg/yr. MAP shall propose a

discussions between MAP and EPA pursuant to Paragraph 18.J.i, the Parties agree that controls not already in place are necessary on any waste management unit handling organic benzene wastes, the Parties shall agree, in writing, to a schedule, not to exceed two years, for the completion of the installation of the necessary controls.

iii. Aqueous Benzene Waste Streams. For purposes of calculating each Refinery's TAB pursuant to the requirements of 40 C.F.R. § 61.342(a), MAP shall include all waste/slop/off-spec oil streams that become "aqueous" until such streams are recycled to a process or put into a process feed tank (unless the tank is used primarily for the storage of wastes). For purposes of complying with the 2BQ or 6BQ compliance option, all waste management units handling aqueous benzene waste streams shall either meet the applicable control standards of Subpart FF or shall have their uncontrolled benzene quantity count toward the applicable 2 or 6 megagram limit.

iv. Plan to Quantify Uncontrolled Waste/Slop/Off-Spec Oil Streams. By no later than ninety (90) days after EPA has approved the schematics, as revised if necessary, required under Paragraph 18.J.i., MAP shall submit, for each of its Refineries, a plan(s) to quantify waste/slop/off-spec oil movements for all benzene waste streams which are not controlled. EPA will review the plan and may recommend revisions consistent with Subpart FF. Upon plan approval, MAP shall maintain records quantifying such movements.

v. Disputes under this Paragraph 18.J.. shall be resolved in accordance with the dispute resolution provisions of this Consent Decree.

K. **End of Line Sampling (6 BQ Compliance Option)**. The provisions of this Paragraph 18.K shall apply to the Canton, Catlettsburg, and Texas City Refineries from the Date of Lodging of the Consent Decree through termination; shall apply to the Detroit Refinery from

July 1, 2003, through termination; and shall apply to the Robinson Refinery from January 1, 2003, through termination (hereinafter "Applicability Dates for Paragraph 18.K").

i. By no later than four (4) months after the start of the Applicability Dates for Paragraph 18.K, MAP shall submit to EPA for approval a plan(s) for an "end of the line" ("EOL") determination of the benzene quantity in uncontrolled waste streams. MAP's proposed plan shall include, but not be limited to, sampling locations, methods for flow calculations, and the assumed volatilization rate(s) to be used in calculating the uncontrolled benzene quantity. Any disputes regarding plan approval under this Paragraph 18.K. shall be resolved in accordance with the dispute resolution provisions of the Consent Decree. Delays in the approval of the plan(s) for one or more Refineries shall not constitute grounds for delays in commencing the sampling program for Refineries that have received approval.

ii. If, during the Applicability Dates for Paragraph 18.K, changes in processes, operations, or other factors lead MAP to conclude that the approved sampling locations, approved methods for determining flow calculations, and/or assumed volatilization rates no longer provide an accurate measure of a Refinery's EOL benzene quantity, MAP shall submit a revised plan to EPA for approval.

iii. On a monthly basis, MAP shall conduct EOL sampling, commencing during the first month of the first full calendar quarter after MAP receives written approval from EPA of the sampling plan for the particular Refinery. MAP shall take, and have analyzed, three representative samples from each approved sampling location. MAP shall use the average of these three samples as the benzene concentration for the stream at the approved location. Based on the EOL monthly sampling results, the approved flow calculations, and the volatilization assumptions, MAP shall calculate the sum of the EOL benzene quantity for the three months contained within the respective quarter. Nothing in this Paragraph 18.K. shall preclude MAP

from taking representative samples more frequently within any calendar month, provided that MAP identifies the basis for the additional samples. Such samples shall be included in calculating the average monthly EOL benzene quantity.

iv. If the sum of the EOL benzene quantity for the three month period contained within a quarter equals or exceeds 1.2 Mg., MAP shall take and have analyzed three representative samples, drawn on separate days during the subsequent calendar quarter, of each uncontrolled stream containing benzene over 0.05 Mg/yr, as identified in the most recently submitted TAB report (hereinafter "Sampling of >0.05 Streams"). MAP shall undertake Sampling of >0.05 Streams for the purpose of trying to identify the cause or source of the potentially elevated benzene quantities.

v. MAP shall continue to undertake Sampling of >0.05 Streams in the second quarter after the EOL benzene quantity exceeded 1.2 Mg unless either: (i) the EOL benzene quantity in the first quarter of the Sampling of > 0.05 Streams demonstrates that the Refinery's EOL benzene quantity, prorated on a yearly basis, will be below 4.8 Mg/yr; or (ii) MAP discovers and corrects the cause of the potentially elevated benzene quantities and EPA concurs in MAP's diagnosis and corrective measures.

vi. If the sum of the EOL benzene quantity for two consecutive quarters indicates that the EOL benzene quantity, prorated on a yearly basis, will exceed 4.8 Mg/yr, and MAP has not discovered and corrected the cause of the potentially elevated benzene through the process of Sampling of >0.05 Streams, MAP shall take and have analyzed three representative samples, drawn on separate days during the third calendar quarter, of each uncontrolled stream containing benzene over 0.03 Mg/yr, as identified in the most recently submitted TAB report (hereinafter "Sampling of > 0.03 Streams"). MAP shall undertake Sampling of >0.03 Streams for the

purpose of continuing to try to identify the cause or source of the potentially elevated benzene quantities.

vii. Sampling of >0.05 and/or >0.03 Streams shall not be required if MAP advises EPA, and EPA concurs, that the potentially elevated benzene quantities can be attributed to an identifiable event, such as a spill to the sewer or a turnaround. After such an identifiable event, however, MAP shall calculate its projected uncontrolled benzene quantity for the calendar year in which the event occurs. If that projection is greater than 6 mg/yr, then MAP shall submit to EPA for approval a plan that either (a) identifies with specificity the compliance strategy and schedule that MAP will implement to ensure that the subject Refinery does not exceed 6 Megagrams of uncontrolled benzene for the calendar year; or (b) if as a result of the quantity of benzene released during the event MAP is unable to propose a plan to ensure that the subject Refinery's uncontrolled benzene for the calendar year will be 6 Megagrams or less, then MAP shall identify the actions to be taken to minimize the uncontrolled benzene for the remainder of the year. MAP shall submit this plan within thirty (30) days after the end of the quarter which resulted in a projection of greater than 6 Mg/yr of uncontrolled benzene. Sampling of >0.05 and/or >0.03 Streams shall not excuse MAP from continuing to take monthly EOL samples.

viii. If in three consecutive quarters (a) the sum of the benzene quantity indicates that MAP's EOL benzene quantity, prorated on a yearly basis, will exceed 4.8 Mg/yr; or (b) MAP's sampling of >0.05 and/or >0.03 streams indicates that MAP's projected uncontrolled benzene for the calendar year will exceed 6 Megagrams, and MAP has not discovered and corrected, with EPA's concurrence, the cause of the potentially elevated benzene through the process of Sampling of >0.05 and >0.03 Streams, then, in the fourth quarter, MAP shall retain a third party contractor to undertake a comprehensive TAB study and compliance review ("Third-Party TAB Study and Compliance Review"). By no later than the last day of the fourth quarter, MAP shall

submit a proposal to EPA that identifies the contractor, the contractor's scope of work, and the contractor's schedule for the Third-Party TAB Study and Compliance Review. Unless, within thirty (30) days after EPA receives this proposal, EPA disapproves or seeks modifications, MAP shall authorize the contractor to commence work. By no later than thirty (30) days after MAP receives the results of the Third-Party TAB Study and Compliance Review, MAP shall submit the results to EPA. MAP and EPA subsequently shall discuss informally the results of the Third-Party TAB Study and Compliance Review. By no later than ninety (90) days after MAP receives the results of the Third-Party TAB Study and Compliance Review, or such other time as MAP and EPA may agree, MAP shall submit to EPA for approval a plan that addresses any deficiencies identified in the Third-Party TAB Study and Compliance Review and any deficiencies that EPA brought to MAP's attention as a result of the Third-Party TAB Study and Compliance Review. Within sixty (60) days after receiving any notification of disapproval or request for modification from EPA, MAP shall submit to EPA a revised plan that responds to all identified deficiencies. Upon receipt of approval or approval with conditions, MAP shall implement the plan.

L. **End of Line Sampling (2 Mg Compliance Option)**. For the Garyville Refinery, from the Date of Lodging of the Consent Decree through termination:

i. MAP shall comply with the requirements of Paragraphs 18.K.i. through 18.K.viii., except that: (a) "0.4 Mg" shall be substituted at each location in Paragraph 18.K where the phrase "1.2 Mg" is used; (b) "1.6 Mg/yr" shall be substituted at each location in Paragraph 18.K where the phrase "4.8 Mg/yr" is used; (c) "2" Mg/yr shall be substituted in Paragraph 18.K.vii for "6" Mg/yr; and

ii. MAP shall measure quarterly, consistent with the requirements of 40 C.F.R. §§ 61.355(c)(1) and (3), the concentration of all waste streams that qualify for the 10 ppm

exemption (see 40 C.F.R. § 61.342(c)(2)) and contain greater than 0.1 Mg/yr of benzene. MAP shall begin this sampling during the first full calendar quarter after the Date of Lodging of the Consent Decree. After two years, EPA will evaluate the quarterly sampling results to determine the appropriateness of less frequent sampling.

M. **End of Line Sampling (TAB is less than 10 Mg/yr)**. For the St. Paul Park Refinery, from the Date of Lodging of the Consent Decree through the earlier of: (1) the time that the St. Paul Park Refinery reaches a TAB of 10 Mg/yr or more (in which case, the provisions of Paragraph 18.K of this Paragraph shall begin to apply); or (2) termination of the Consent Decree:

i. MAP shall, once per calendar year commencing in 2002, conduct sampling, consistent with the requirements of 40 C.F.R. § 61.355(c)(1) and (3), of all waste streams containing benzene that contributed 0.05 Mg/yr or more to the previous year's TAB calculation;

ii. By no later than ninety (90) days after the Date of Lodging of the Consent Decree, or such other time as is mutually agreed upon, representatives from EPA and the Minnesota Pollution Control Agency ("MPCA") shall meet at the St. Paul Park Refinery with representatives from MAP for the purpose of identifying an appropriate procedure for conducting EOL sampling and measuring EOL benzene quantities at that Refinery. EPA, the MPCA, and MAP shall confer about potential EOL sample locations, shall review process and flow information and oil movement transfers, and shall evaluate the effect of remediation activities at the St. Paul Park Refinery on EOL sampling and EOL benzene quantities. Benzene in wastes generated by remediation activities shall not be included in the calculation of the EOL benzene quantity at the St. Paul Park Refinery. By no later than thirty (30) days after EPA and the MPCA have met with MAP at the St. Paul Park Refinery, MAP shall submit a plan to EPA for approval that contains proposed sampling locations and methods for flow calculations to be used in the

EOL determination of benzene quantity. Any disputes regarding plan approval shall be resolved in accordance with the dispute resolution provisions of this Consent Decree. If, during the life of this Consent Decree, changes in processes, operations, or other factors lead MAP to conclude that either the approved sampling locations and/or the approved methods for determining flow calculations no longer provide an accurate measure of the St. Paul Park Refinery's EOL benzene quantity, MAP shall submit a revised plan to EPA for approval.

iii. On a quarterly basis, MAP shall conduct an EOL determination of benzene quantity, commencing in the first full calendar quarter after MAP receives written approval from EPA of the sampling plan for the St. Paul Park Refinery. MAP shall take, and have analyzed, at least three representative samples from each approved sampling location. MAP shall use the average of these three samples as the benzene concentration for the stream at the approved location. Based on the EOL quarterly sampling results and the approved flow calculations, MAP shall calculate the quarterly EOL benzene quantity.

iv. If the quarterly EOL benzene quantity exceeds 2.5 Mg/yr, MAP shall submit to EPA, to Region 5 of EPA, and to the MPCA, a plan that identifies with specificity the actions that MAP shall take, and the schedule for such actions, to ensure that the TAB for the St. Paul Park Refinery does not exceed 10 Mg/yr in the calender year.

v. On a quarterly basis, MAP shall also calculate a projected calendar year TAB, utilizing all EOL results for that calendar year and any other information (such as process turnarounds) to undertake the projection. If the projected calendar year calculation of the TAB at MAP's St. Paul Park Refinery equals or exceeds 10 Mg/yr, MAP shall submit to EPA, to Region 5 of EPA, and to the MPCA, a plan that identifies with specificity the actions that MAP shall take, and the schedule for such actions, to ensure that the TAB for the St. Paul Park Refinery does not exceed 10 Mg/yr in the calender year. MAP shall submit this plan within

thirty (30) days after the end of the quarter which resulted in a projection of greater than 10 Mg/yr.

vi. If it appears that appropriate actions cannot be taken to ensure that the St. Paul Park Refinery maintains a TAB of under 10 Mg/yr, then MAP shall retain a third party contractor to undertake a comprehensive TAB study and compliance review ("Third-Party TAB Study and Compliance Review"). At a mutually agreed upon date between EPA and MAP, MAP shall submit a proposal to EPA, Region 5 of EPA, and the MPCA that identifies the contractor, the contractor's scope of work, and the contractor's schedule for the Third-Party TAB Study and Compliance Review. Unless, within thirty (30) days after EPA receives this proposal, EPA disapproves or seeks modifications, MAP shall authorize the contractor to commence work. By no later than thirty (30) days after MAP receives the results of the Third-Party TAB Study and Compliance Review, MAP shall submit the results to EPA, to Region 5 of EPA, and to the MPCA. MAP, the MPCA, and EPA subsequently shall discuss informally the results of the Third-Party TAB Study and Compliance Review. By no later than 120 days after MAP receives the results of the Third-Party TAB Study and Compliance Review, or such other time as MAP and EPA may agree, MAP shall submit to EPA, to Region 5 of EPA, and to the MPCA, a plan that identifies with specificity the compliance strategy and schedule that MAP will implement to ensure that the St. Paul Park Refinery complies with the 6BQ compliance option as soon as practicable. The review and approval of this Plan shall be done in accordance with Paragraph 18.D.iv. of this Paragraph.

N. **Miscellaneous Measures.**

i. MAP shall manage all groundwater remediation conveyance systems at each of its Refineries having such systems in accordance with the Benzene Waste NESHAP.

ii. The provisions of this Paragraph18.N.ii. shall apply to: (a) the Canton, Catlettsburg, Garyville, and Texas City Refineries from the Date of Lodging of the Consent Decree through termination of the Consent Decree; (b) the Robinson Refinery by no later than December 31, 2002, through termination of the Consent Decree; (c) the Detroit Refinery by no later than June 30, 2003, through termination of the Consent Decree; and (d) the St. Paul Park Refinery, if its TAB reaches 10 Mg/yr, from such time as a compliance strategy is completed, through termination of the Consent Decree. MAP shall:

a. Conduct monthly visual inspections of all water traps within the Refinery's individual drain systems;

b. Identify and mark all area drains that are segregated stormwater drains;

c. On a weekly basis, visually inspect all conservation vents or indicators on process sewers for detectable leaks; reset any vents where leaks are detected; and record the results of the inspections. After two (2) years of weekly inspections, and based upon an evaluation of the recorded results, MAP may submit a request to the appropriate EPA Region to modify the frequency of the inspections. EPA shall not unreasonably withhold its consent. Nothing in this Paragraph 18.N.ii.c. shall require MAP to monitor conservation vents on fixed roof tanks.

d. For the Texas City Refinery and for the Robinson Refinery, conduct quarterly monitoring of the oil-water separators in accordance with the "no detectable emissions" provision in 40 C.F.R. § 61.347.

Notwithstanding Paragraph 18.N.ii.(d), for the St. Paul Park Refinery, MAP shall implement the provisions of Paragraph 18.N.ii.b from the Date of Lodging of the Consent Decree through termination.

O. **Projects/Investigations**.

i. By no later than one-hundred eighty (180) days after the Date of Entry of this Consent Decree, MAP will report that it already has installed closed purge sampling devices on sampling points on waste and process streams consistent with safety, feasibility, and cost, and with the requirements of 40 C.F.R., Part 63, Subpart CC. MAP believes that a project or investigation involving these closed loop systems will have little effect on benzene emissions.

ii. By January 31, 2002, MAP shall commence a study of the effectiveness of the benzene and VOC limits proposed under Paragraph 18.E.i. This study shall last no more than two (2) years and will be performed in accordance with the guidelines established in Appendix K. MAP shall submit a report summarizing the results of the study within ninety (90) days after the date of completion of each study.

P. **Recordkeeping and Reporting Requirements for this Paragraph**

i. **Outside of the Reports Required under 40 C.F.R. § 61.357 and under the Quarterly Progress Report Procedures of Section VIII (Recordkeeping and Reporting)**. At the times specified in the applicable provisions of this Paragraph, MAP shall submit, as and to the extent required, the following reports to EPA, to the applicable EPA Region, and to the applicable state agency:

a. BWN Compliance Review and Verification Report (¶ 18.C.ii.), as amended, if necessary (¶ 18.C.iii.);

b. Amended TAB Report, if necessary (¶ 18.D.i.);

c. Plan for St. Paul Park to come into compliance with the 6 BQ compliance option upon discovering that its TAB equals or exceeds 10 Mg/yr through the BWN Compliance Review and Verification Report (¶ 18.D.ii.), or the Third-Party TAB Study and Compliance Review that may result from EOL sampling (¶ 18.M.vi);

d. Plan for the Canton, Catlettsburg, Garyville, and/or Texas City Refineries to come into compliance with the applicable compliance option, if the BWN Compliance Review and Verification Reports indicate non-compliance (¶ 18.D.iii.);

e. Compliance certification, if necessary (¶ 18.D.v.);

f. Report certifying the completion of the installation of dual carbon canisters (¶ 18.E.i.);

g. Schematics of waste/slop/off-spec oil movements (¶ 18.J.i.), as revised, if necessary (¶ 18.J.i.);

h. Schedule to complete implementation of controls on waste management units handling organic benzene waste, if necessary (¶ 18.J.ii.);

i. Plan to quantify uncontrolled waste/slop/off-spec oil movements (¶ 18.J.iv.)

j. EOL Sampling Plans (¶¶ 18.K.i., 18.L.i, 18.M.ii.), and revised EOL Sampling Plans, if necessary (¶¶ 18.K.ii., 18.L.i., 18.M.ii.);

k. Plan to ensure that uncontrolled benzene does not equal or exceed, as applicable, 2, 6, or 10 Mg/yr -- or is minimized -- based on projected calendar year uncontrolled benzene quantities as determined through EOL sampling (¶¶ 18.K.vii., 18.L.i, 18.M.v.)

l. Proposal for a Third-Party TAB Study and Compliance Review, if necessary (¶¶ 18.K.viii., 18.L.i., 18.M.vi.);

m. Third-Party TAB Study and Compliance Review, if necessary (¶¶ 18.K.viii., 18. L.i., 18.M.vi.);

n. Plan to implement the results of the Third-Party TAB Study and Compliance Review, if necessary (¶¶ 18.K.viii., 18.L.i., 18.M.vi.);

o. Report on installation of closed purge sampling devices (¶ 18.O.i.);

p. Results of the study of "breakthrough" in carbon canisters (¶ 18.O.ii.).

ii. **As part of Either the Reports Required under 40 C.F.R. § 61.357 or the Quarterly Progress Report Procedures of Section VIII (Recordkeeping and Reporting)**.

a. Canton, Catlettsburg, Garyville, and Texas City Refineries. In addition to the information submitted in the quarterly reports required pursuant to 40 C.F.R. §§ 61.357(d)(6) and (7) ("Section 61.357 Reports"), the Canton, Catlettsburg, Garyville, and Texas City Refineries shall include the following information in those reports:

(1) Laboratory Audits. In the first Section 61.357 Report due after entry of this Consent Decree, MAP shall identify all laboratory audits that MAP completed pursuant to the provisions of Paragraph 18.G starting in the one year period prior to the Date of Lodging of the Consent Decree and continuing through the calendar quarter for which the quarterly report is due. MAP shall include, at a minimum, the identification of each laboratory audited, a description of the methods used in the audit, and the results of the audit. In each subsequent Section 61.357 Report, MAP shall identify all laboratory audits that were completed pursuant to the provisions of Paragraph 18.G during the calendar quarter, including in each such Report, at a minimum, the identification of each laboratory audited, a description of the methods used in the audit, and the results of the audit;

(2) Training. In the first Section 61.357 Report due after entry of this Consent Decree, MAP shall describe the measures that it took to comply with the training provisions of Paragraph 18.I, starting from the Date of Lodging of the Consent Decree and continuing through the calendar quarter for which the first quarterly report is due. In each subsequent Section 61.357 Report, MAP shall describe the measures that MAP took to comply with the training provisions of Paragraph 18.I during the calendar quarter;

(3) EOL Sampling Results. Once EOL sampling is required under this Paragraph 18, MAP shall include the following information in each Section 61.357 Report:

(a) Three Months of Monthly EOL Sampling Results. MAP shall report the results of the three months of monthly EOL sampling undertaken pursuant to Paragraphs 18.K.iii. and 18.L.i. for the calendar quarter. The report shall include a list of all waste streams sampled, the results of the benzene analysis for each sample, and the computation of the EOL benzene quantity for the three months contained within the respective quarter;

(b) Sampling of >0.05 Streams or Sampling of >0.03 Streams. If the quarter is one in which MAP is required to undertake Sampling of >0.05 Streams or Sampling of >0.03 Streams at any Refinery, MAP also shall: (A) submit the results of those sampling events; (B) describe the actions that MAP is taking to identify and correct the source of the potentially elevated benzene quantities; and (C) to the extent that MAP identifies actions to correct the potentially elevated benzene quantities, specifically seek EPA's concurrence with MAP's proposal;

(4) Quarterly Sampling at the Garyville Refinery of 10 ppm-exempted streams of >0.1 Mg/yr benzene. In the first Section 61.357 Report due after entry of this Consent Decree, and in each subsequent Section 61.357 Report, the Garyville Refinery shall report the results of the quarterly, non-EOL sampling required pursuant to the provisions of Paragraph 18.L.ii. The Report shall include a list of all waste streams sampled and the results of the benzene analysis for each sample.

b. Detroit and Robinson Refineries. In lieu of Section 61.357 Reports, the Detroit and Robinson Refineries shall submit information required by this Paragraph 18.P.ii.b. in Quarterly Progress Reports pursuant to the requirements of Section VIII of this Consent Decree. For each calendar quarter, those Refineries shall submit the information described in Paragraphs 18.P.ii.a.(1)-(3). After completion of work required to ensure that the Detroit and

Robinson Refineries comply with the 6BQ compliance option, those two Refineries may elect to submit the information described in Paragraphs 18.P.ii.a.(1)-(3) in their Section 61.357 Reports.

c. St. Paul Park Refinery. In lieu of a Section 61.357 Report, the St. Paul Park Refinery shall submit information required by this Paragraph 18.P.ii.c. in Quarterly Progress Reports pursuant to the requirements of Section VIII of this Consent Decree. For each calendar quarter, the St. Paul Park Refinery shall submit the information described in Paragraphs 18.P.ii.(a)(1)-(2), and the following information:

(1) The annual, non-EOL sampling required at the St. Paul Park Refinery pursuant to the requirements of Paragraph 18.M.i. (this information shall be submitted in the first quarterly progress report for the first calendar quarter of each year);

(2) The results of the quarterly EOL sampling undertaken pursuant to Paragraph M.iii. for the calendar quarter. The report shall include a list of all waste streams sampled, the results of the benzene analysis for each sample, and the computation of the EOL benzene quantity for the respective quarter. The St. Paul Park Refinery shall identify whether the quarterly benzene quantity equals or exceeds 2.5 Mg/yr and whether the projected calendar year benzene quantity equals or exceeds 10 Mg/yr. If either condition is met, the St. Paul Park Refinery shall include in the quarterly report the plan required pursuant to Paragraph 18.M.iv and/or 18.M.v., and shall specifically seek EPA's concurrence in the plan.

If, during the life of this Consent Decree, the TAB at the St. Paul Park Refinery exceeds 10 Mg/yr and the St. Paul Park Refinery completes the installation of the measures necessary to comply with the 6BQ compliance option, the St. Paul Park Refinery may elect to submit the information required in Paragraph18.P.ii.a.(1)-(3) through Section 61.357 Reports instead of the Quarterly Progress Reports due under Section VIII of this Consent Decree.

iii. A summary of the reports, plans, and certifications due under the provisions of Paragraph 18 is attached as Appendix L to this Consent Decree.

Q. **Agencies to Receive Reports, Plans and Certifications Required in the Paragraph; Number of Copies.** MAP shall submit all reports, plans and certifications required

to be submitted under this Paragraph to EPA and to the appropriate EPA Region. Where indicated, MAP also shall submit the information to the appropriate state agency. For each submission, MAP shall submit two copies to EPA and two copies to the appropriate EPA Region. By agreement between MAP and each of the offices that are to receive the materials in this Paragraph, MAP may submit the materials electronically.

19. **Benzene Measures at the Detroit and Texas City Refineries**:

A. **Benzene Waste NESHAP Compliance Measures at the Detroit Refinery**

i. **Overview**. By no later than June 30, 2003, MAP shall complete implementation of all actions necessary to ensure that the Detroit Refinery complies with the Benzene Waste NESHAP compliance option set forth at 40 C.F.R. § 61.342(e) (hereinafter "the 6BQ compliance option"). Commencing on July 1, 2003, MAP shall comply with all standards of Subpart FF that are applicable to facilities utilizing the 6BQ compliance option, and with the monitoring, recordkeeping, and reporting requirements of 40 C.F.R. §§ 61.354, 61.356, and 61.357, respectively, as applicable to facilities utilizing the 6BQ compliance option.

ii. **Closed-Vent Systems and Control Devices Currently Operating at the Refinery.** By no later than ninety (90) days after the Date of Lodging, MAP shall submit to Region 5 of U.S. EPA an identification of all closed-vent systems and control devices that already are operational at the Detroit Refinery that meet the standards of 40 C.F.R. § 61.349. Until termination of this Consent Decree, MAP shall continue to operate these systems and devices in accordance with the requirements of 40 C.F.R. § 61.349, unless MAP notifies Region 5 of U.S. EPA in writing of its intent to discontinue the operation of any such system or device, describes its reasons for seeking to discontinue the use, and does not receive an objection from U.S. EPA within sixty (60) days of U.S. EPA's receipt of the written notice.

iii. **Organic Benzene Wastes**

a. Meaning of Organic Benzene Wastes. "Organic benzene wastes" mean facility wastes that have a flow-weighted annual average benzene waste content of less than 10 percent.

b. Organic Benzene Wastes -- General. By no later than June 30, 2003, and continuing until termination, MAP shall manage and treat all organic benzene waste streams at the Detroit Refinery in accordance with the requirements of 40 C.F.R. § 61.342(c)(1), as referenced in 40 C.F.R. § 61.342(e)(1).

c. Control of Waste Management Units in Organic Benzene Waste Service. In accordance with the schedule set forth below, MAP shall complete installation of the controls necessary to comply with the applicable standards for the following waste management units that are in organic benzene waste service at the Detroit Refinery:

Unit Identification	Applicable Standard: 40 C.F.R. §:	Date of Completion
SR Platformer Aromatics Sump (aka CP Sump)	61.346	12/31/01
Piping from the CP Sump to the CP Flare Knock-Out Drum	61.346	12/31/01
CP Flare Knock-Out Drum	61.343	12/31/01
Piping from CP Flare Knock-Out Drum to Tank 8 or FCCU	61.346	12/31/01
Tank 8	61.351	6/30/01
Piping from Disulfide Separator to Tank 8	61.346	12/31/01
Piping from Relief Valve of Merox System to Tank 8	61.346	12/31/01
Tanks 508 and 23	61.351	6/30/01
Piping from Tank 507 to Tanks 508 and 23	61.346	6/30/03
Gravity Drum near Tank 507 and Gravity Drum near Tank 59	61.343	6/30/03
Tanks 6A and 6B	61.343	6/30/03

Piping from Tanks 6A and 6B to Tanks 508 and 23	61.346	6/30/03
Piping from Unifiner, Alkylation, and Crude Flare Knock-Out Drums to Tanks 23 and 508	61.346	6/30/01
Trucks that Unload into Gravity Drum near Tank 507 and into Gravity Drum near Tank 59	61.345	6/30/03
Vacuum Trucks that Unload into Tanks 23 and 507	61.345	6/30/03

d. Waste Management Units in Organic Benzene Waste Service -- Future Identification or Development. If, at any time prior to the termination of this Consent Decree, MAP: (i) identifies a waste management unit(s) in organic benzene waste service that is/are not identified in Paragraph 19.A.iii.c; or (ii) creates organic benzene waste streams that are intended to be directed to waste management units other those identified in Paragraph 19.A.iii.c. or discharged to any uncontrolled part of the individual drain system at the Refinery, then, within thirty (30) after the identification or creation, MAP shall notify Region 5 of U.S. EPA in writing of the identification or creation, shall describe the actions, if any, that MAP had to take, or will take, to comply with the requirements of 40 C.F.R. § 61.342(c)(1), and shall set forth a schedule, if necessary, for achieving compliance. MAP may proceed with its proposed actions unless U.S. EPA notifies MAP, within thirty (30) days of receipt of MAP's notice, of U.S. EPA's objections to MAP's plans.

iv. **Aqueous Benzene Wastes.**

a. Meaning of Aqueous Benzene Wastes. "Aqueous benzene wastes" mean facility wastes (including remediation and process unit turnaround waste) with a flow-weighted annual average benzene waste content of 10 percent or greater, on a volume basis as total water, or any waste stream that is mixed with water or wastes at any time such that the resulting mixture has an annual water content greater than 10 percent.

b. Aqueous Benzene Wastes -- General. Commencing no later than January 1, 2003, and continuing until termination, MAP shall manage and treat all aqueous benzene wastes at the Detroit Refinery in accordance with the requirements of 40 C.F.R. § 61.342(e)(2).

c. Compliance Measures for Aqueous Benzene Wastes.

(1) Installation, Operation, and Maintenance of a Desalter Water Flash Column. By no later than June 30, 2003, MAP shall complete the installation of a new unit -- designated by MAP as the "desalter water flash column" -- downstream of the Detroit Refinery's desalter that will serve as a "benzene treatment process," as that term is used in 40 C.F.R. § 61.348. By that same date, MAP shall complete installation of all equipment necessary to ensure that the vapor lines leading off of the vessel that will serve as the flash column and leading off of the overhead receiver comply with the requirements of 40 C.F.R. § 61.349.

(2) Individual Drain System Components in the Melvindale and Crude Tank Farms. By no later than June 30, 2003, MAP shall complete the installation of controls that comply with the requirements of 40 C.F.R. § 61.346 on all components of the individual drain system that are located in the Melvindale and Crude Tank farms at the Detroit Refinery. The Melvindale and Crude Tank farms are depicted in Appendix M to this Consent Decree.

(3) Tank 507. By no later than June 30, 2003, MAP shall complete the installation of controls on Tank 507 that comply with the requirements of 40 C.F.R. §§ 61.351(a)(1).

(4) Truck-Loading Terminal. By no later than June 30, 2003, MAP shall re-route through a system controlled pursuant to the requirements of Subpart FF the aqueous benzene wastes from the truck-loading area at the bulk gasoline terminal.

d. Testing, Monitoring, and Reporting Requirements for New Installations. Commencing no later than July 1, 2003, and continuing until termination of this Consent Decree, MAP shall comply with all applicable, Subpart FF testing, monitoring, and reporting

requirements for the new desalter water flash column, the new components of the individual drain system at the Melvindale and Crude Tank farms, Tank 507, and the new installations at the truck-loading terminal.

e. Containers, Tanks, Components of the Individual Drain System and Other Waste Management Units in Aqueous Benzene Waste Service. Commencing no later than July 1, 2003, for all containers, tanks, components of the individual drain system and any other waste management units in aqueous benzene waste service at the Detroit Refinery, MAP shall either install controls consistent with the requirements of Subpart FF or shall calculate the benzene from any uncontrolled units toward the 6 Megagram limitation of 40 C.F.R. § 61.342(e)(2).

v. **Certification of Completion of Compliance Measures**

By no later than sixty (60) days after MAP concludes that all requirements in Paragraphs 19.A.iii and 19.A.iv have been fully performed, MAP shall submit to Region 5 of U.S. EPA a report that describes with particularity the actions that MAP took to comply with the provisions of Paragraphs 19.A.iii and 19.A.iv. As part of that report, MAP shall certify completion of the requirements and that the Detroit Refinery complies with the 6BQ compliance option. At its option, U.S. EPA may elect to inspect the Refinery. If, after a review of the written report, U.S. EPA determines that any requirements have not been completed in accordance with this Consent Decree, U.S. EPA shall notify MAP in writing of the activities it must undertake to complete the requirements. MAP shall perform all activities described in U.S. EPA's notice in accordance with the specifications established therein, subject to MAP's right to invoke the dispute resolution provisions of Section XIV. When U.S. EPA concludes, based on the initial, or any subsequent request for a Certification of Completion that the requirements in Paragraphs 19.A.iii and 19.A.iv been fully performed by MAP, U.S. EPA shall so notify MAP in writing.

B. **Benzene Minimization Program at the Texas City Refinery**.

i. **Third-Party Consultant.** By no later than thirty (30) days after the Date of Lodging of the Consent Decree, MAP shall retain a third-party consultant to assist in: (i) developing and implementing a plan to investigate the possible emission sources at the Texas City Refinery that contribute to benzene in the ambient air at and around the Texas City Refinery; and (ii) recommending actions at the Texas City Refinery to minimize benzene in the ambient air.

ii. **Investigation Plan.** By no later than ninety (90) days after the Date of Lodging of the Consent Decree, MAP shall submit to EPA and the a plan to investigate ("Investigation Plan") the possible emission sources that contribute to benzene in the ambient air at and around the Texas City Refinery. In developing the Investigation Plan, MAP and its consultant shall consider, among other available materials, internal operating and maintenance records and the ten reports issued by the Laboratory and Mobile Monitoring Section and the Toxicology and Risk Assessment Section of the Texas Natural Resource Conservation Commission ("TNRCC") that date from December 12, 1995, through April 20, 2001. The Investigation Plan shall include but not be limited to, measures designed to investigate and evaluate: the sources of episodic increases in benzene in the ambient air (that is, incidents that cause short-term spikes in ambient benzene concentration); the effectiveness of the enhanced biodegradation unit in consuming the benzene that enters it; the integrity of all tanks storing or handling materials which contain benzene, including but not limited to, the clay treater charge tank 117, the plant solvent tank 115, the wet solvent tank 113, and sludge tank 132; the integrity of the hatches/covers on water draw pits for slop oil tanks at the wastewater treatment plant; the procedures used at the centrifuge to treat slop oil and sludges, including procedures for temporary storage; and the carbon canister used to control the DAF and slop oil tank emissions when the oxidizer is inoperable . The Investigation Plan shall include a schedule for conducting the investigation.

iii. **Action Plan.** After approval of the Investigation Plan, MAP shall implement it. By no later than sixty (60) days after completing the Investigation Plan, MAP shall submit the results to EPA. At the same time, MAP shall submit to EPA a plan that identifies the actions ("Action Plan") that MAP shall take to minimize benzene emissions from the sources identified in the investigation. The Action Plan shall include, but not be limited to, if and as appropriate, a schedule of implementation for one-time actions and a schedule of periodic monitoring and maintenance for ongoing actions. After approval of the Action Plan, MAP shall implement it.

iv. **Approval by EPA.** The Investigation and Action Plans shall be subject to the approval of, disapproval of, or modification by EPA. Within sixty (60) days after receiving any notification of disapproval or request for modification from EPA, MAP shall submit to EPA a revised plan that responds to all identified deficiencies. Upon receipt of approval or approval with conditions, MAP shall implement the revised plan. Disputes arising under this Paragraph shall be resolved in accordance with the dispute resolution provisions of this Decree.

20. **Leak Detection and Repair ("LDAR") Program Enhancements**:

In order to minimize or eliminate fugitive emissions of volatile organic compounds ("VOCs"), benzene, volatile hazardous air pollutants ("VHAPs"), and organic hazardous air pollutants ("HAPs") from equipment in light liquid and/or in gas/vapor service, MAP shall undertake at each of its Refineries the enhancements at Paragraph 20.A through Paragraph 20.P to each Refinery's LDAR program under Title 40 of the Code of Federal Regulations, Part 60, Subpart GGG; Part 61, Subparts J and V; Part 63, Subparts F, H, and CC; and applicable state LDAR requirements. The terms "equipment," "in light liquid service" and "in gas/vapor service" shall have the definitions set forth in the applicable provisions of Title 40 of the Code of Federal Regulations, Part 60, Subpart GGG; Part 61, Subparts J and V; Part 63, Subparts F, H and CC; and applicable state LDAR regulations.

A. **Written Refinery-Wide LDAR Program**. By no later than 120 days after the Date of Lodging of the Consent Decree, MAP shall develop and maintain, for each of its Refineries, a written, Refinery-wide program for compliance with all applicable federal and state LDAR regulations. Until termination of this Decree, MAP shall implement this program on a Refinery-wide basis, and MAP shall update each Refinery's program as necessary to ensure continuing compliance. Each Refinery-wide program shall include at a minimum:

i. An overall, Refinery-wide leak rate goal that will be a target for achievement on a process-unit-by-process-unit basis;

ii. An identification of all equipment in light liquid and/or in gas/vapor service that has the potential to leak VOCs, HAPs, VHAPs, and benzene within process units that are owned and maintained by each Refinery;

iii. Procedures for identifying leaking equipment within process units that are owned and maintained by each Refinery;

iv. Procedures for repairing and keeping track of leaking equipment;

v. Procedures for identifying and including in the LDAR program new equipment; and

vi. A process for evaluating new and replacement equipment to promote consideration and installation of equipment that will minimize leaks and/or eliminate chronic leakers.

B. **Training.** By no later than one year from the Date of Lodging of the Consent Decree, MAP shall implement the following training programs at each of its Refineries:

i. For personnel newly-assigned to LDAR responsibilities, MAP shall require LDAR training prior to each employee beginning such work;

ii. For all personnel assigned LDAR responsibilities, MAP shall provide and require completion of annual LDAR training; and

iii. For all other Refinery operations and maintenance personnel (including contract personnel), MAP shall provide and require completion of an initial training program that includes instruction on aspects of LDAR that are relevant to the person's duties. Until termination of this Decree, "refresher" training in LDAR shall be performed on a three year cycle.

C. **LDAR Audits**. Commencing upon the Date of Lodging of the Consent Decree, MAP shall implement at each of its Refineries, the Refinery-wide audits set forth in Paragraphs 20.C.i. and 20.C.ii., to ensure each Refinery's compliance with all applicable LDAR requirements. MAP's LDAR audits shall include but not be limited to, comparative monitoring, records review, tagging, data management, and observation of the LDAR technicians' calibration and monitoring techniques.

i. Third-Party Audits. MAP shall retain a contractor(s) to perform a third-party audit of each Refinery's LDAR program at least once every four years. The first third-party audit for three of MAP's seven Refineries shall be completed no later than one year from the Date of Lodging of the Consent Decree. The audits of MAP's remaining Refineries shall be completed within two years from the Date of Lodging of the Consent Decree.

ii. Internal Audits. MAP shall conduct internal audits of each Refinery's LDAR program by sending personnel familiar with the LDAR program and its requirements from one or more of MAP's other Refineries or locations to audit another MAP Refinery. MAP shall complete the first round of these internal LDAR audits by no later than two years from the date of the completion of the third-party audits required in Paragraph 20.C.i. Internal audits of each Refinery shall be held every four years thereafter for the life of this Consent Decree.

iii. To ensure that an audit at each Refinery occurs every two years, third-party and internal audits shall be separated by two years.

iv. Alternative. As an alternative to the internal audits required by Paragraph 20.C.ii., MAP may elect to retain third-parties to undertake these audits, provided that an audit of each Refinery occurs every two (2) years.

D. **Implementation of Actions Necessary to Correct Non-Compliance**.

If the results of any of the audits conducted pursuant to Paragraph 20.C at any of MAP's Refineries identify any areas of non-compliance, MAP shall implement, as soon as practicable, all steps necessary to correct the area(s) of non-compliance, and to prevent, to the extent practicable, a recurrence of the cause of the non-compliance. Until termination of the Consent Decree, MAP shall retain the audit reports generated pursuant to Paragraphs 20.C.i. and 20.C.ii. and shall maintain a written record of the corrective actions that MAP takes at each of its Refineries in response to any deficiencies identified in any audits. In the quarterly report submitted pursuant to the provisions of Section VIII of this Consent Decree (Recordkeeping and Reporting) for the first calendar quarter of each year, MAP shall submit the audit reports and corrective action records for audits performed and actions taken during the previous year.

E. **Internal Leak Definition for Valves and Pumps.**

MAP shall utilize the following internal leak definitions for valves and pumps in light liquid and/or gas/vapor service, unless other permit(s), regulations, or laws require the use of lower leak definitions.

i. Leak Definition for Valves.

a. Except as expressly provided in Paragraph 20.E.i.b., by no later than two years after the Date of Lodging, MAP shall utilize an internal leak definition of 500 ppm VOCs for all of its Refineries' valves, excluding pressure relief devices.

b. For the Catlettsburg Refinery, MAP shall utilize an internal leak definition of 500 ppm for the valves on the #5 Crude Unit and the Sat Gas Plant by no later than eighteen (18) months

after the Date of Lodging, and shall utilize an internal leak definition of 500 ppm for the valves on the RCCU, FCCU, and the #4 Vacuum Units by no later than thirty-two (32) months after the Date of Lodging.

ii. Leak Definition for Pumps. MAP shall utilize an internal leak definition of 2000 ppm for its Refineries' pumps by the following dates:

a. By no later than eighteen (18) months after the Date of Lodging of the Consent Decree, MAP shall utilize this definition for 50% of the total number of pumps that MAP has at all of its Refineries combined;

b. By no later than twenty-four (24) months after the Date of Lodging of the Consent Decree, MAP shall utilize this definition for 85% of the total number of pumps that MAP has at all of its Refineries combined;

c. By no later than forty (40) months after the Date of Lodging of the Consent Decree, MAP shall utilize this definition for all of the pumps at all of its Refineries.

F. **Reporting, Recording, Tracking, Repairing and Remonitoring Leaks of Valves and Pumps Based on the Internal Leak Definitions**.

i. Reporting. For regulatory reporting purposes, MAP may continue to report leak rates in valves and pumps against the applicable regulatory leak definition, or may use the lower, internal leak definitions specified in Paragraph 20.E.

ii. Recording, Tracking, Repairing and Remonitoring Leaks. MAP shall record, track, repair and remonitor all leaks in excess of the internal leak definitions of Paragraphs 20.E.i. and 20.E.ii. (at such time as those definitions become applicable), except that MAP shall have thirty (30) days to make repairs and remonitor leaks that are greater than the internal leak definitions but less than the applicable regulatory leak definitions.

G. **First Attempt at Repairs on Valves.** Beginning no later than ninety (90) days after the Date of Lodging of the Consent Decree, MAP shall make a "first attempt" at repair on any valve that has a reading greater than 200 ppm of VOCs excluding control valves, pumps, and components that LDAR personnel are not authorized to repair. MAP or its designated contractor, however, shall remonitor, in a given calendar day, all valves that LDAR personnel attempted to repair. Unless the remonitored leak rate is greater than the applicable leak definition, no further action will be necessary. If, after two years, MAP can demonstrate with sufficient monitoring data that the "first attempt" repair at 200 ppm will worsen or not improve the Refinery's leak rates, MAP may request that EPA reconsider or amend this requirement.

H. **LDAR Monitoring Frequency.**

i. Pumps. When the lower leak definition for pumps becomes applicable pursuant to Paragraph 20.E.ii, MAP shall monitor pumps at the lower leak definition on a monthly basis.

ii. Valves. By no later than two years after the Date of Lodging of the Consent Decree, MAP shall implement a program to monitor valves more frequently than is required by applicable regulations by monitoring valves -- other than difficult to monitor or unsafe to monitor valves -- on a quarterly basis, with no ability to skip periods on a process-unit-by-process-unit basis. If, however, a process unit is subject to the Hazardous Organic NESHAP ("HON") or the modified-HON option in the Refinery MACT, MAP must comply with the monitoring requirements in the applicable regulation.

I. **Electronic Monitoring, Storing, and Reporting of LDAR Data.**

i. Electronic Storing and Reporting of LDAR Data. At each of its Refineries, MAP has and will continue to maintain an electronic database for storing and reporting LDAR data.

ii. Electronic Data Collection During LDAR Monitoring. By no later than two years after the Date of Lodging of the Consent Decree, MAP shall use dataloggers and/or electronic

data collection devices during all LDAR monitoring, in accordance with operational specifications to be proposed by MAP and approved by EPA. MAP or its designated contractor shall use its/their best efforts to transfer, on a daily basis, electronic data from electronic datalogging devices to the electronic database of Paragraph 20.I.i. For all monitoring events in which an electronic data collection device is used, the collected monitoring data shall include a time and date stamp, an operator identification, and an instrument identification. MAP may use paper logs where necessary or more feasible (e.g., small rounds, remonitoring, or when dataloggers are not available or broken), and shall record, at a minimum, the identification of the technician undertaking the monitoring, the date, and the identification of the monitoring equipment. MAP shall transfer any manually recorded monitoring data to the electronic database of Paragraph 20.I.i. within seven days of monitoring.

J. **QA/QC of LDAR Data**. By no later than ninety (90) days after the Date of Lodging of the Consent Decree, MAP or a third party contractor retained by MAP shall develop and implement a procedure to ensure a quality assurance/quality control ("QA/QC") review of all data generated by LDAR monitoring technicians. MAP shall ensure that monitoring data provided to MAP by its contractors is reviewed for QA/QC before the contractor submits the data to MAP. At least once per calendar quarter, MAP shall perform QA/QC of the contractor's monitoring data which shall include, but not be limited to: number of components monitored per technician, time between monitoring events, and abnormal data patterns.

K. **LDAR Personnel**. By no later than the Date of Lodging of the Consent Decree, MAP shall establish a program that will hold LDAR personnel accountable for LDAR performance. MAP shall maintain a position within each Refinery responsible for LDAR management, with the authority to implement improvements.

L. **Adding New Valves and Pumps**. By no later than one hundred and twenty (120) days from the Date of Lodging, MAP shall establish a tracking program for maintenance records (e.g., a Management of Change program) to ensure that valves and pumps added to each Refinery during maintenance and construction is integrated into the LDAR program.

M. **Calibration/Calibration Drift Assessment.**

i. Calibration. MAP shall conduct all calibrations of LDAR monitoring equipment using methane as the calibration gas, in accordance with 40 C.F.R. Part 60, EPA Reference Test Method 21.

ii. Calibration Drift Assessment. Beginning no later than the Date of Lodging of the Consent Decree, MAP shall conduct calibration drift assessments of LDAR monitoring equipment at the end of each monitoring shift, at a minimum. MAP shall conduct the calibration drift assessment using, at a minimum, a 500 ppm calibration gas. If any calibration drift assessment after the initial calibration shows a negative drift of more than 10% from the previous calibration, MAP shall remonitor all valves that were monitored since the last calibration that had a reading greater than 100 ppm and shall remonitor all pumps that were monitored since the last calibration that had a reading greater than 500 ppm.

N. **Delay of Repair.** Beginning no later than the Date of Lodging of the Consent Decree, for any equipment for which MAP is allowed, under the applicable regulations, to place on the "delay of repair" list for repair:

i. For all equipment, MAP shall:

a. Require sign-off by the unit supervisor that the piece of equipment is technically infeasible to repair without a process unit shutdown, before the component is eligible for inclusion on the "delay of repair" list; and

b. Include equipment that is placed on the "delay of repair" list in MAP's regular LDAR monitoring.

ii. For valves: For valves, other than control valves, leaking at a rate of 10,000 ppm or greater, MAP shall continue to use its "drill and tap" method for fixing such leaking valves, rather than placing the valve on the "delay of repair" list, unless MAP can demonstrate that there is a safety, mechanical, or major environmental concern posed by repairing the leak in this manner. After two unsuccessful attempts to repair a leaking valve through the drill and tap method, MAP may place the leaking valve on its "delay of repair" list. If a new method develops for repairing such valves, MAP will advise EPA prior to implementing such new method.

iii. For pumps: At such time as the lower leak rate definition applies pursuant to Paragraph 20.E.ii, for pumps leaking at a rate of 2000 ppm or greater, MAP shall undertake its best efforts to isolate and repair such pumps with a first attempt at fifteen (15) days.

O. **Recordkeeping and Reporting Requirements for this Paragraph**.

i. Outside of the Reports Required under 40 C.F.R. § 63.654 and the Quarterly Progress Report Procedures of Section VIII (Recordkeeping and Reporting).

a. Written Refinery-Wide LDAR Program No later than thirty (30) days after completion of the development of the written refinery-wide LDAR programs that MAP develops pursuant to Paragraph 20.A, MAP shall submit a copy of each Refinery's Program to EPA, to the appropriate Region, and to the appropriate state agency.

b. Certification of Use of Electronic Data Collection during LDAR Monitoring. No later than two years and thirty days after the Date of Lodging of the Consent Decree, MAP shall certify that it utilizes at all of its Refineries, pursuant to the requirements of Paragraph 20.I.ii., electronic data collection devices during LDAR monitoring.

ii. As Part of Either the Reports Required under 40 C.F.R. § 63.654 or the Quarterly Progress Report Procedures of Section VIII (Recordkeeping and Reporting). Consistent with the requirements of Section VIII (Recordkeeping and Reporting), MAP shall include the following information, at the following times, in its quarterly progress reports:

a. First Quarterly Progress Report Due under the Consent Decree. At the later of: (i) the first quarterly progress report due under the Consent Decree; or (ii) the first quarterly progress report in which the requirement becomes due, MAP shall include the following:

(1) A certification of the implementation of the "first attempt at repair" program of Paragraph 20.G;

(2) A certification of the implementation of QA/QC procedures for review of data generated by LDAR technicians as required by Paragraph 20.J;

(3) An identification of the individual at each Refinery responsible for LDAR performance as required by Paragraph 20.K;

(4) A certification of the development of a tracking program for new valves and pumps added during maintenance and construction as required by Paragraph 20.L;

(5) A certification of the implementation of the calibration drift assessment procedures of Paragraph 20.M; and

(6) A certification of the implementation of the "delay of repair" procedures of Paragraph 20.N.

b. Quarterly Progress Report for the First Calendar Quarter of Each Year. Until termination of the Consent Decree, in the quarterly progress report that MAP submits for the first calendar quarter of each year, MAP shall include an identification of each audit that was conducted pursuant to the requirements of Paragraph 20.C in the previous calendar year including, for each Refinery, an identification of the auditors, a summary of the audit results, and a summary of the actions that MAP took or intends to take to correct all deficiencies identified in the audits.

c. In Each Report due under 40 C.F.R. § 63.654. In each report due under 40 C.F.R. § 63.654, MAP shall include:

(1) Training. Information identifying the measures that MAP took to comply with the provisions of Paragraph 20.B; and

(2) Monitoring. The following information on LDAR monitoring: (a) a list of the process units monitored during the quarter; (b) the number of valves and pumps monitored in each process unit; (c) the number of valves and pumps found leaking; (d) the number of "difficult to monitor" pieces of equipment monitored; (e) the projected month of the next monitoring event for that unit; and (f) a list of all equipment currently on the "delay of repair" list and the date each component was placed on the list.

iii. A summary of the reports, plans, and certifications due under the provisions of Paragraph 20 is attached as Appendix N to the Consent Decree.

P. **Agencies to Receive Reports, Plans and Certifications Required in this Paragraph; Number of Copies**. MAP shall submit all reports, plans and certifications required to be submitted under this Paragraph to EPA and to the appropriate EPA Region. Where indicated, MAP also shall submit the information to the appropriate state agency. For each submission, MAP shall submit two copies to EPA and two copies to the appropriate EPA Region. By agreement between MAP and each of the offices that are to receive the materials in this Paragraph, MAP may submit the materials electronically.

21. **NSPS Applicability Re: Sulfur Recovery Plants**: Beginning no later than the Date of Lodging of the Consent Decree, except as provided below, the following MAP Sulfur Recovery Plants ("SRPs") shall be subject to, and will continue to comply with, the applicable provisions of NSPS Part 60, Subpart A and J:

Canton Refinery (OH) SRP: Claus Trains #34 & #38;

Catlettsburg Refinery (KY) SRP: Claus Trains #1 & #2;

Detroit Refinery (MI) SRP: Claus Trains A, B & C;

Garyville Refinery (LA) SRP: Claus Trains #20 & #34;

Garyville Refinery (LA) SRP: Claus Trains #46 within 180 days after start-up.

Robinson Refinery (IL) SRP: Claus Trains #62 & #63;

St. Paul Park Refinery (MN) SRP: Claus Trains #1 & #2

Texas City Refinery (TX) SRP: MAP shall install a Sulfur Recovery Plant at the Texas City Refinery no later than July 31, 2007. Beginning no later than 180 days after the date of startup of the Sulfur Recovery Plant at the Texas City Refinery, the Sulfur Recovery Plant shall be subject to and will comply with all of the applicable provisions of NSPS Subpart A and J and any applicable provisions of this Consent Decree.

A. **Sulfur Pit Emissions**: MAP shall re-route all Sulfur Recovery Plant sulfur pit emissions from the Sulfur Recovery Plants identified at Paragraph 21, so that sulfur pit emissions to the atmosphere are either eliminated or included and monitored as part of the applicable Sulfur Recovery Plants tail gas emissions that meet the NSPS Subpart J limit for SO_2, a 12-hour rolling average of 250 ppmvd SO_2 at 0% oxygen, as required by 40 C.F.R. § 60.104(a)(2). MAP agrees to re-route all sulfur pit emissions by no later than the first turnaround of the applicable Claus train occurring six (6) months after the Date of Lodging of this Consent Decree.

B. **Sulfur Recovery Plant Emissions Compliance**:

i. By no later than the Date of Lodging of the Consent Decree, MAP shall, for all periods of operation at each of its Sulfur Recovery Plants, comply with 40 C.F.R. § 60.104(a)(2), except during periods of startup, shutdown or malfunction of the Sulfur Recovery Plant or during a malfunction of the TGU(s). For the purpose of determining compliance with the Sulfur Recovery Plant emission limits, the "start-up/shutdown" provisions set forth in NSPS Subpart A apply to the Sulfur Recovery Plant and not to the independent start-up or shut-down of its corresponding control device(s) (e.g., TGU). However, the Malfunction exemption set forth in

NSPS Subpart A (and as defined in the Consent Decree at Paragraph 11.X) shall apply to both the Sulfur Recovery Plant and its control device(s).

ii. As of the Date of Lodging of this Consent Decree, MAP shall monitor all emission points (stacks) to the atmosphere for tail gas emissions from each of its Sulfur Recovery Plants, and report excess emissions, as required by 40 C.F.R. §§ 60.7(c), 60.13, and 60.105(a)(5). During the life of this Consent Decree, MAP shall continue to conduct Sulfur Recovery Plant emissions monitoring with CEMS at all of the emission points unless an SO_2 alternative monitoring procedure has been approved by EPA, per 40 C.F.R. § 60.13(i), for any of the emission points. This requirement for continuous monitoring of the Sulfur Recovery Plant emission points is not applicable to the AG Flaring Devices used to flare the Acid Gas or Sour Water Stripper Gas for those Sulfur Recovery Plants.

iii. At all times, including periods of startup, shutdown, and malfunction, MAP shall, to the extent practicable, operate and maintain its Sulfur Recovery Plant, its TGUs, and any supplemental control devices in accordance with its obligation to minimize Sulfur Recovery Plant emissions through implementation of good air pollution control practices as required in 40 C.F.R. § 60.11(d).

C. **Good Operation and Maintenance**: By no later than 120 days from the Date of Lodging of the Consent Decree, MAP shall, for each refinery with a Sulfur Recovery Plant, submit to the applicable EPA Regional Office and applicable State or Local Agency, a summary of a plan, implemented or to be implemented, for enhanced maintenance and operation of its Sulfur Recovery Plant, the TGU(s), any supplemental control devices, and the appropriate Upstream Process Units ("PMO Plan"). The PMO Plan shall be a compilation of MAP's approaches for exercising good air pollution control practices for minimizing SO_2 emissions at each refinery. The Plan(s) shall provide for continuous operation of the Sulfur Recovery Plant

between scheduled maintenance turnarounds with minimization of emissions from the Sulfur Recovery Plant. The Plan(s) shall include, but not be limited to, sulfur shedding procedures, new startup and shutdown procedures, emergency procedures and schedules to coordinate maintenance turnarounds of its Sulfur Recovery Plant Claus trains, TGU, and any supplemental control device to coincide with scheduled turnarounds of major Upstream Process Units. The Plan shall have as a goal the elimination of AG Flaring. MAP shall comply with the Plan at all times, including periods of start up, shut down, and malfunction of the Sulfur Recovery Plant. Modifications related to minimizing Acid Gas Flaring and/or SO_2 emissions made by MAP to the Plan shall be summarized in an annual submittal to the appropriate EPA Regional Office and appropriate State or Local Agency.

D. **Optimization Studies:**

i. To date, MAP has: conducted reliability and performance improvement audits for all of its Sulfur Recovery Plants, TGUs, and amine units in December 1999 and January 2000; created a company-wide "Amine Best Practices Group," and; created a "Sulfur and Amine Technologist" position on its "Refining Engineering" staff to assist the engineering and operating staff at each refinery in resolving issues of Sulfur Recovery Plant performance and reliability. To optimize performance at its refineries, MAP shall install:

a. a redundant SCOT heater, reactor, waste heat boiler and quench tower at the Canton refinery by June 30, 2001;

b. a third Claus train with amine unit, tail gas unit and thermal oxidizer at the Garyville refinery by December 31, 2001;

c. a replacement Claus train for SRU #1 and a SCOT tail gas unit at the St. Paul Park refinery by December 31, 2003; and

d. an Sulfur Recovery Plant with amine unit and tail gas unit at the Texas City refinery by December 31, 2007.

ii. By no later than June 30, 2002, MAP shall complete an optimization study (internal or external) on each of the Sulfur Recovery Plant at the Detroit and Robinson refineries and report the results to the applicable EPA Regional Office and applicable State or Local Agency. The optimization study shall consider:

a. A detailed evaluation of plant design and capacity, operating parameters and efficiencies - including catalytic activity, and material balances;

b. An analysis of the composition of the acid gas and sour water stripper gas resulting from the processing of crude slate actually used, or expected to be used, in the Sulfur Recovery Plant;

c. A thorough review of each critical piece of process equipment and instrumentation within the Claus train that is designed to correct deficiencies or problems that prevent the Claus train from achieving its optimal sulfur recovery efficiency and expanded periods of operation;

d. Establishment of baseline data through testing and measurement of key parameters throughout the Claus train;

e. Establishment of a thermodynamic process model of the Claus train;

f. For any key parameters that have been determined to be at less than optimal levels, initiation of logical, sequential, or stepwise changes designed to move such parameters toward their optimal values;

g. Verification through testing, analysis of continuous emission monitoring data or other means, of incremental and cumulative improvements in sulfur recovery efficiency, if any;

h. Establishment of new operating procedures for long term efficient operation; and

i. Each study shall be conducted to optimize the performance of the Claus trains in light of the actual characteristics of the feeds to the SRUs.

E. **Tail Gas Incidents.** For Tail Gas Incidents, MAP shall follow the same investigative, reporting, corrective action and assessment of stipulated penalty procedures as outlined in Paragraph 22 for Acid Gas and Sour Water Stripper Gas Flaring. Those procedures shall be applied to TGU shutdowns, bypasses of a TGU, unscheduled shutdowns of a Sulfur Recovery Plant or other miscellaneous unscheduled Sulfur Recovery Plant events which results in a Tail Gas Incident.

22. **Acid Gas and Sour Water Stripper Gas Flaring:** MAP has identified causes of AG Flaring at all of its refineries for AG Flaring Incidents that occurred between 1997 and 2000. MAP has implemented (or is in the process of identifying and implementing) corrective actions to minimize the number and duration of AG Flaring events. For all MAP refineries subject to this Consent Decree, MAP agrees to implement a program to investigate the cause of future Acid Gas Flaring Incidents, take reasonable steps to correct the conditions that have caused or contributed to such Acid Gas Flaring Incidents, and minimize the flaring of acid gas and sour water stripper gases from each of the covered refineries. MAP shall follow the procedures in this Paragraph 22 to evaluate whether future acid gas/sour water stripper gas flaring incidents are due to malfunctions or are subject to stipulated penalties. The investigative and evaluative procedures in this Paragraph are also to be used for assessing if Tail Gas Incidents, as described in Paragraphs 21.E, are due to malfunctions or are subject to stipulated penalties. The procedures, as set forth below, require root cause analysis and corrective action for all types of flaring and stipulated penalties for acid/sour water stripper gas flaring incidents or tail gas incidents if the root causes were not due to malfunctions.

A. **Investigation and Reporting**

i. No later than forty-five (45) days following the end of an Acid Gas Flaring Incident, MAP shall submit to the EPA regional office in which the refinery is located, and the appropriate State or Local office, a report that sets forth the following:

a. The date and time that the Acid Gas Flaring Incident started and ended. To the extent that the Acid Gas Flaring Incident involved multiple releases either within a twenty-four (24) hour period or within subsequent, contiguous, non-overlapping twenty-four (24) hour periods, MAP shall set forth the starting and ending dates and times of each release;

b. An estimate of the quantity of sulfur dioxide that was emitted and the calculations that were used to determine that quantity;

c. The steps, if any, that MAP took to limit the duration and/or quantity of sulfur dioxide emissions associated with the Acid Gas Flaring Incident;

d. A detailed analysis that sets forth the Root Cause and all contributing causes of that Acid Gas Flaring Incident, to the extent determinable;

e. An analysis of the measures, if any, that are available to reduce the likelihood of a recurrence of an Acid Gas Flaring Incident resulting from the same Root Cause or contributing causes in the future. The analysis shall discuss the alternatives, if any, that are available, the probable effectiveness and cost of the alternatives, and whether or not an outside consultant should be retained to assist in the analysis. Possible design, operation and maintenance changes shall be evaluated. If MAP concludes that corrective action(s) is (are) required under Paragraph 22.B, the report shall include a description of the action(s) and, if not already completed, a schedule for its (their) implementation, including proposed commencement and completion dates. If MAP concludes that corrective action is not required under Paragraph 22.B, the report shall explain the basis for that conclusion;

f. A statement that: (i) specifically identifies each of the grounds for stipulated penalties in Paragraphs 22.C.i.a and 22.C.i.b of this Decree and describes whether or not the Acid Gas Flaring Incident falls under any of those grounds; (ii) if an Acid Gas Flaring Incident falls under Paragraph 22.C.i.c of this Decree, describes which Paragraph (22.C.i.c.1 or 22.C.i.c.2) applies and why; and (iii) if an Acid Gas Flaring Incident falls under either Paragraph 22.C.i.b or Paragraph 22.C.i.c.2, states whether or not MAP asserts a defense to the Flaring Incident, and if so, a description of the defense; and

g. To the extent that investigations of the causes and/or possible corrective actions still are underway on the due date of the report, a statement of the anticipated date by which a follow-up report fully conforming to the requirements of this Paragraph 22.A.i.d and 22.A.i.e shall be submitted; provided, however, that if MAP has not

submitted a report or a series of reports containing the information required to be submitted under this Paragraph within the 45 day time period set forth in Paragraph 22.A (or such additional time as U.S. EPA may allow) after the due date for the initial report for the Acid Gas Flaring Incident, the stipulated penalty provisions of Paragraph 48 shall apply, but MAP shall retain the right to dispute, under the dispute resolution provision of this Consent Decree, any demand for stipulated penalties that was issued as a result of MAP's failure to submit the report required under this Paragraph within the time frame set forth. Nothing in this Paragraph shall be deemed to excuse MAP from its investigation, reporting, and corrective action obligations under this Section for any Acid Gas Flaring Incident which occurs after an Acid Gas Flaring Incident for which MAP has requested an extension of time under this Paragraph.

h. To the extent that completion of the implementation of corrective action(s), if any, is not finalized at the time of the submission of the report required under this Paragraph, then, by no later than thirty (30) days after completion of the implementation of corrective action(s), MAP shall submit a report identifying the corrective action(s) taken and the dates of commencement and completion of implementation.

B. **Corrective Action**

i. In response to any Flaring Incident, MAP as expeditiously as practicable, shall take such interim and/or long-term corrective actions, if any, as are consistent with good engineering practice to minimize the likelihood of a recurrence of the Root Cause and all contributing causes of that Acid Gas Flaring Incident.

ii. If EPA does not notify MAP in writing within thirty (30) days of receipt of the report(s) required by Paragraph 22.A.i that it objects to one or more aspects of MAP's proposed corrective action(s), if any, and schedule(s) of implementation, if any, then that (those) action(s) and schedule(s) shall be deemed acceptable for purposes of MAP's compliance with Paragraph 22.B.i of this Decree. EPA does not, however, by its consent to the entry of this Consent Decree or by its failure to object to any corrective action that MAP may take in the future, warrant or aver in any manner that any of MAP's corrective actions in the future shall result in compliance with the provisions of the Clean Air Act or its implementing regulations. Notwithstanding EPA's review of any plans, reports, corrective measures or procedures under this Paragraph 22, MAP

shall remain solely responsible for non-compliance with the Clean Air Act and its implementing regulations. Nothing in this Paragraph 22 shall be construed as a waiver of EPA's rights under the Clean Air Act and its regulations for future violations of the Act or its regulations.

iii. If EPA does object, in whole or in part, to MAP's proposed corrective action(s) and/or its schedule(s) of implementation, or, where applicable, to the absence of such proposal(s) and/or schedule(s), it shall notify MAP of that fact within thirty (30) days following receipt of the report(s) required by Paragraph 22.A.i above. If MAP and EPA cannot agree on the appropriate corrective action(s), if any, to be taken in response to a particular Acid Gas Flaring Incident, either Party may invoke the Dispute Resolution provisions of Section XIV of the Consent Decree.

iv. Nothing in Paragraph 22 shall be construed to limit MAP's right to take such corrective actions as it deems necessary and appropriate immediately following an Acid Gas Flaring Incident or in the period during preparation and review of any reports required under this Section.

C. **Stipulated Penalties**

i. The provisions of this Paragraph 22.C shall apply to each Refinery subject to the Consent Decree. The provisions of Paragraph 22.C are intended to implement the process outlined in the logic diagram attached hereto as Appendix O to this Consent Decree. These provisions shall be interpreted and construed, to the maximum extent feasible, to be consistent with that Attachment. However, in the event of a conflict between the language of Paragraph 22 and Appendix O, the language of this Paragraph shall control.

a. The stipulated penalty provisions of Paragraph 48 shall apply to any Acid Gas Flaring Incident for which the Root Cause was one or more or the following acts, omissions, or events:

1. Error resulting from careless operation by the personnel charged with the responsibility for the Sulfur Recovery Plants, TGUs, or Upstream Process Units;

2. Failure to follow written procedures;

3 A failure of equipment that is due to a failure by MAP to operate and maintain that equipment in a manner consistent with good engineering practice; or

4. The following Root Causes shall not provide a basis for asserting a malfunction defense unless MAP can demonstrate to the EPA that such root cause substantially differs from the earlier same Root Cause:

i. Canton: SRU Air Blower Failures or Tail Gas Unit bypassing due to single train;

ii. Catlettsburg: excessive hydrocarbons in SRU feed;

iii. Detroit: DCS power failures, excessive hydrocarbon in SRU feed, or loss of air to C SRU Train;

iv. Garyville: hydrocarbon carryover from the HGO Hydrotreater, failure of acid gas feed solenoid valve, or bearing failure of main air blowers;

v. Robinson: excessive hydrocarbons in SRU feed, amine foaming/contamination, or air blower failures; and

vi. St. Paul Park: instrument freeze-up problems or corrosion on instrument wiring.

Except for a force majeure event, MAP shall have no defenses to a demand for stipulated penalties for an Acid Gas Flaring Incident falling under this Paragraph 22.C.i.a.

b. The stipulated penalty provisions of Paragraph 48 shall apply to any Acid Gas Flaring Incident that either:

1. Results in emissions of sulfur dioxide at a rate greater than twenty (20.0) pounds per hour continuously for three (3) consecutive hours or more; or

2. Causes the total number of Acid Gas Flaring Incidents in a rolling twelve (12) month period to exceed five (5).

In response to a demand by the United States for stipulated penalties, the United States and MAP both agree that MAP shall be entitled to assert a Malfunction defense with respect to any Acid Gas Flaring Incident falling under this Paragraph. In the event that a dispute arising under this Paragraph is brought to the Court pursuant to the dispute resolution provisions of this Consent Decree, nothing in this Paragraph is intended or shall be construed to stop MAP from

asserting that, in addition to the Malfunction Defense, Startup, Shutdown, and upset defenses are available for Acid Gas or Sour Water Stripper Gas Flaring Incidents under 40 C.F.R. § 60.104(a)(1), nor to stop the United States from asserting its view that such defenses are not available. In the event that a Flaring Incident falls under both Paragraph 22.C.i.a and Paragraph 22.C.i.b , then Paragraph 22.C.i.a shall apply.

c. With respect to any Acid Gas Flaring Incident other than those identified in Paragraphs 22.C .i.a and 22.C.i.b, the following provisions shall apply:

1. First Time: If the Root Cause of the Acid Gas Flaring Incident was not a recurrence of the same Root Cause that resulted in a previous Acid Gas Flaring Incident at that refinery that occurred since the effective date of this Decree, then:

   i. If the Root Cause of the Acid Gas Flaring Incident was sudden, infrequent, and not reasonably preventable through the exercise of good engineering practice, then that cause shall be designated as an agreed-upon malfunction for purposes of reviewing subsequent Acid Gas Flaring Incidents;

   ii. If the Root Cause of the Acid Gas Flaring Incident was not sudden and infrequent, and was reasonably preventable through the exercise of good engineering practice, then MAP shall implement corrective action(s) pursuant to Paragraph 22.B.i.

2. Recurrence: If the Root Cause is a recurrence of the same Root Cause that resulted in a previous Acid Gas Flaring Incident that occurred since the Effective Date of this Consent Decree, then MAP shall be liable for stipulated penalties under Paragraph 48 of the Consent Decree unless:

   i. the Flaring Incident resulted from a Malfunction, or

   ii. the Root Cause previously was designated as an agreed-upon malfunction under Paragraph 22.C.i.c.1.(i); provided, however, that in the event that a dispute arising under this Paragraph is brought to the Court pursuant to the dispute resolution provisions of this Consent Decree, nothing in this Paragraph is intended or shall be construed to stop MAP from asserting its view that, in addition to a Malfunction defense, Startup, Shutdown, and upset defenses are available for Acid Gas or Sour Water Stripper Gas Flaring Incidents under 40 C.F.R. § 60.104(a)(1), nor to stop the United States from asserting its view that such defenses are not available.

d. Other than for a Malfunction or force majeure, if no Acid Gas Flaring Incident or violation of the final emission limit for that refinery established under Paragraph 21 occurs at a

refinery for a rolling 36 month period, then the stipulated penalty provisions of Paragraph 48 no longer apply at that refinery. EPA may elect to reinstate the stipulated penalty provision if MAP has an Acid Gas Flaring Incident which would otherwise be subject to stipulated penalties. EPA's decision shall not be subject to dispute resolution. Once reinstated, the stipulated penalty provision shall continue for the remaining life of this Consent Decree for that refinery.

D. **Miscellaneous**

i. **Calculation of the Quantity of Sulfur Dioxide Emissions resulting from AG Flaring**: For purposes of this Consent Decree, the quantity of SO_2 emissions resulting from AG Flaring shall be calculated by the following formula:

Tons of SO_2 = [FR][TD][ConcH_2S][8.44 x 10^{-5}].

The quantity of SO_2 emitted shall be rounded to one decimal point. (Thus, for example, for a calculation that results in a number equal to 10.050 tons, the quantity of SO_2 emitted shall be rounded to 10.1 tons.) For purposes of determining the occurrence of, or the total quantity of SO_2 emissions resulting from, a AG Flaring Incident that is comprised of intermittent AG Flaring, the quantity of SO_2 emitted shall be equal to the sum of the quantities of SO_2 flared during each such period of intermittent AG Flaring.

ii. **Calculation of the Rate of SO_2 Emissions During AG Flaring and HC Flaring**. For purposes of this Consent Decree, the rate of SO_2 emissions resulting from AG Flaring HC Flaring shall be expressed in terms of pounds per hour, and shall be calculated by the following formula:

ER = [FR][ConcH_2S][0.169].

The emission rate shall be rounded to one decimal point. (Thus, for example, for a calculation that results in an emission rate of 19.95 pounds of SO_2 per hour, the emission rate shall be rounded to 20.0 pounds of SO_2 per hour; for a calculation that results in an emission rate of 20.05 pounds of SO_2 per hour, the emission rate shall be rounded to 20.1.)

iii. **Meaning of Variables and Derivation of Multipliers used in the Equations in Paragraph 22:**

ER =	Emission Rate in pounds of SO_2 per hour
FR =	Average Flow Rate to Flaring Device(s) during Flaring, in standard cubic feet per hour
TD =	Total Duration of Flaring in hours
ConcH_2S =	Average Concentration of Hydrogen Sulfide in gas during Flaring (or immediately prior to Flaring if all gas is being flared) expressed as a volume fraction (scf H_2S/scf gas)
8.44×10^{-5} =	[lb mole H_2S/379 scf H_2S][64 lbs SO_2/lb mole H_2S][Ton/2000 lbs]
0.169 =	[lb mole H_2S/379 scf H_2S][1.0 lb mole SO_2/1 lb mole H_2S][64 lb SO_2/1.0 lb mole SO_2]

The flow of gas to the AG Flaring and HC Flaring Device(s) ("FR") shall be as measured by the relevant flow meter or reliable flow estimation parameters. Hydrogen sulfide concentration ("ConcH_2S") shall be determined from the Sulfur Recovery Plant feed gas analyzer or from knowledge of the sulfur content of the process gas being flared.. In the event that either of these data points is unavailable or inaccurate, the missing data point(s) shall be estimated according to best engineering judgment. The report required under Paragraph 22.A.i. -- shall include the data used in the calculation and an explanation of the basis for any estimates of missing data points.

iv. **Calculation of the Quantity of SO_2 Emissions resulting from a Tail Gas Incident:** For the purposes of this Consent Decree, the quantity of SO_2 emissions resulting from a Tail Gas Incident shall be calculated by one of the following methods, based on the type of event:

a. If the Tail Gas Incident is combusted in a flare the SO_2 emissions are calculated using the methods outlined in Paragraph 22.D.iv. --, or

b. If the Tail Gas Incident is a event exceeding the 250 ppmvd (NSPS J limit), from a monitored Sulfur Recovery Plant incinerator, then the following formula applies:

ER_{TGI} = $[FR_{Inc.}]$ [Conc. SO_2 - 250] [0.169×10^{-6}] $[TD_{TGI}]$

Where:

ER_{TGI} = Emissions from Tail Gas at the Sulfur Recovery Plant incinerator, SO_2 lbs. over a 24 hour period

$FR_{Inc.}$ = Incinerator Exhaust Gas Flow Rate (standard cubic feet per hour) (actual stack monitor data or engineering estimate based on the acid gas feed rate to the Sulfur Recovery Plant)

Conc. SO_2 = Actual SO_2 concentration (CEMS data or best engineering judgment where CEMS is unavailable) in the incinerator exhaust gas, ppmvd at 0% O_2 and average over 24 hour.

0.169×10^{-6} = [lb mole of SO_2 / 379 SO_2] [64 lbs SO_2 / lb mole SO_2] [$1x\ 10^{-6}$]

TD_{TGI} = Total duration (hours) when the Incinerator CEM was exceeding 250 ppmvd at 0% O_2 on a rolling twelve hour average, in a 24 hour period.

In the event the concentration SO_2 data point is inaccurate or not available or a flow meter for FR_{Inc}, does not exist or is inoperable, then estimates will be used based on best engineering judgement.

v. Any disputes under the provisions of this Part shall be resolved in accordance with the Section XIV (Dispute Resolution) of this Consent Decree.

23. **RCRA Injunctive Measures - Detroit and Robinson:**

A. Detroit:

i. MAP certifies that for the Detroit Refinery:

a. In accordance with the requirements of RCRA, MAP has disposed of the debris discovered during a 1998 National Enforcement Investigations Center ("NEIC") inspection of the Detroit Refinery that was found in the following containers: (i) a cut-off 55 gallon drum ("Cut-off Drum") that was located at the 29T12 sump and contained debris, including personal protective equipment, contaminated with API sludge; (ii) a bottle labeled "waste freon" ("Freon Bottle") that had been stored in a cabinet in the quality control laboratory; (iii) a container labeled "hazardous

waste" in the quality control laboratory; and (iv) a 11,500 portable frac tank ("Frac Tank") located at the 29T12 pad;

b. In accordance with the requirements of RCRA, MAP has disposed of the Cut-off Drum and the Freon Bottle;

c. MAP did not own, at the time of the National Enforcement and Investigation Center ("NEIC") inspection, and no longer has custody or control over, the Frac Tank;

d. MAP has repaired the interior lining in the vault system of Tank 21V47;

e. MAP no longer uses Tank 21V47 for managing hazardous wastes; and

f. MAP has amended its RCRA contingency plan to include all information required by Michigan Rule 299.9306(1) and 40 C.F.R. § 265.52.

ii. By no later than thirty (30) days after the entry of this Consent Decree, MAP shall submit to the Waste, Pesticides and Toxics Division of EPA Region 5, a plan for the Detroit Refinery that includes: (i) procedures for managing API sludge in accordance with all applicable federal and state RCRA requirements; (ii) an identification of all satellite accumulation areas at the Detroit Refinery and a procedure for updating the identification of these areas as such areas may change from time to time; and (iii) a procedure for documenting all inspections required pursuant to federal and state RCRA requirements. The plan shall be subject to the approval of, disapproval of, or modification by EPA. Within sixty (60) days after receiving any notification of disapproval or request for modification from EPA, MAP shall submit to EPA a revised plan that responds to all identified deficiencies. Upon receipt of approval or approval with modification, MAP shall timely implement the plan. Disputes arising under this Paragraph 23.A.ii. shall be resolved in accordance with the dispute resolution provisions of this Decree.

iii. If any required action has not been taken or completed in accordance with any requirement of this Paragraph of the Consent Decree, within ten (10) calendar days after the due

date, MAP shall notify EPA of the failure, the reason for the failure, and the proposed date for compliance. Nothing in this Paragraph 23.A.iii. shall be construed to limit MAP's liability for stipulated penalties except upon the express written waiver of EPA.

B. Robinson: MAP shall (i) maintain records for documenting repairs of leaking closure devices on Level 2 hazardous waste containers subject to regulation under 40 C.F.R. § 265.1087(d)(4)(iii); and (ii) ensure that all spent material from carbon canisters is characterized properly to determine if it is a hazardous waste.

VI. PERMITTING

24. A. **Construction**: MAP agrees to obtain all required federally enforceable permits for the construction of the pollution control technology or installation of equipment to be installed required to meet the above pollution reductions. This Paragraph is not intended to prevent MAP from applying to the appropriate permitting authority for a pollution control project exclusion.

B. **Schedules of Implementation and Modifications Thereto**: For any work in Section V of this Consent Decree that requires a federal, state and/or local permit or approval, MAP shall be responsible for submitting in a timely fashion applications for federal, state and local permits and approvals for work and activities required so that permit or approval decisions can be made in a timely fashion. MAP shall use its best efforts to: (i) submit permit applications (i.e., applications for permits to construct operate or their equivalent) that comply with all applicable requirements; and (ii) secure approval of permits after filing the applications, including timely supplying additional information, if requested. If it appears that the failure of a governmental entity to act upon a timely-submitted permit application may delay MAP's performance of work according to an applicable implementation schedule, MAP shall notify the appropriate EPA regional office of any such delays as soon as MAP reasonably concludes that the delay could affect its ability to comply with the implementation schedule set forth in this Consent Decree.

MAP shall propose a modification to the applicable schedule of implementation. EPA shall not unreasonably withhold its consent to requests for modifications of schedules of implementation if the requirements of this Paragraph are met. All modifications to any dates initially set forth in this Decree or in any approved schedule of implementation shall be signed in writing by EPA and MAP, and neither the United States nor MAP shall be required to file such modifications with the Court in order for the modifications to be effective. Stipulated penalties shall not accrue nor be due and owing during any period between an originally-scheduled implementation date and an approved modification to such date; provided however, that EPA shall retain the right to seek stipulated penalties if EPA does not approve a modification to a date or dates. The failure of a governmental entity to act upon a timely-submitted permit or approval application shall not constitute a force majeure event triggering the requirements of Section XIII; this Paragraph shall apply.

C. **Commercial Unavailability of Control Equipment and/or Additives**: MAP shall be solely responsible for compliance with any deadline or the performance of any work as described in Section V of this Consent Decree that requires the acquisition and installation of control equipment and/or catalyst additive. If it appears that the commercial unavailability of any control equipment and/or catalyst additive may delay MAP's performance of work according to an applicable implementation schedule, MAP shall notify the United States in accordance with the requirements of Paragraph 67 of this Consent Decree of any such delays as soon as MAP reasonably concludes that the delay could affect its ability to comply with the implementation schedule set forth in this Consent Decree. MAP shall propose a modification to the applicable schedule of implementation. Prior to the notice required by this Paragraph 24.C, MAP must have contacted a reasonable number of vendors of such equipment or additive and obtained a written representation (or equivalent communication to EPA) from the vendor that the equipment or

additive is commercially unavailable. In the notice, MAP shall reference this Paragraph 24.C. of this Consent Decree, identify the milestone date(s) it contends it will not be able to meet, provide the United States with written correspondence to the vendor identifying efforts made to secure the control equipment or catalyst additive, and describe the specific efforts MAP has taken and will continue to take to find such equipment or additive. MAP may propose a modified schedule or modification of other requirements of this Consent Decree to address such commercial unavailability. Section XIV ("Retention of Jurisdiction/Dispute Resolution") shall govern the resolution of any claim of commercial unavailability. EPA shall not unreasonably withhold its consent to requests for modifications of schedules of implementation if the requirements of this Paragraph are met. All modifications to any dates initially set forth in this Consent Decree or in any approved schedule of implementation shall be signed in writing by EPA and MAP, and neither the United States nor MAP shall be required to file such modifications with the Court in order for the modifications to be effective. Stipulated penalties shall not accrue nor be due and owing during any period between an originally-scheduled implementation date and an approved modification to such date; provided however, that EPA shall retain the right to seek stipulated penalties if EPA does not approve a modification to a date or dates. The failure by MAP to secure control equipment and/or catalyst additive shall not constitute a force majeure event triggering the requirements of Section XIII; this Paragraph shall apply.

25. **Operation**: As soon as practicable following the Date of Lodging of the Consent Decree, but in no event later than twelve (12) months following the Date of Lodging of the Consent Decree, MAP shall submit applications to incorporate the emission limits and standards required by Paragraphs 12-16, 17.A.i, and 21 that are effective as of the Date of Entry of this Consent Decree into minor or major new source review permits or other permits (other than Title V permits) which are federally enforceable and, upon issuance of such permits shall file any

applications necessary to incorporate the requirements of those permits into the refinery's Title V permit. As soon as practicable, but in no event later than thirty (30) days after the effective date or establishment of any emission limits, standards and schedules under Section V of the Consent Decree ("Affirmative Relief/Environmental Projects (or Measures)") , MAP shall submit applications to incorporate those emission limitations into minor or major new source review permits or other permits (other than Title V permits) which are federally enforceable and, upon issuance of such permits shall file any applications necessary to incorporate the requirements of those permits into the refinery's Title V permit. The Parties agree that incorporation of the requirements of this Decree into Title V permits may be by "administrative amendment" under 40 C.F.R. 70.7(d) and analogous state Title V rules.

26. **Plant Applicability Limits** -- This Paragraph 26 sets forth a process for the establishment of partial "plant applicability limits" ("PALs") for each of the MAP petroleum refineries located at Robinson, Illinois; Garyville, Louisiana; Texas City, Texas; Catlettsburg, Kentucky; Detroit, Michigan; Canton, Ohio; and St. Paul, Minnesota for the pollutants NOx, SO_2, PM and CO. Under this Paragraph 26, MAP may not emit NOx, SO_2, PM or CO into the atmosphere from the emissions units included within a PAL in excess of the aggregate emissions limits ("Cap") established for the PAL pursuant to this Paragraph 26. The Cap established under this Paragraph 26 for each refinery shall be considered the actual emissions for the emissions units under the PAL for the purpose of determining emissions increases associated with a physical change or change in method of operation for such emissions units for Federal new source review for the life of the PAL.

A. **Covered Emissions Units:**

i. The initial PALs established pursuant to this Paragraph 26 shall include only those emissions units identified in Appendix P.

ii. MAP may expand, upon EPA approval, the universe of emissions units to be included within a particular PAL to include additional emissions units. MAP shall identify all combustion units at each refinery and will endeavor to include in the PAL such units, where practicable.

iii. For newly constructed units included within the PAL that receive major NSR permits and that reflect the application of BACT or LAER, the Cap shall be increased by an amount equal to the emissions units allowable emissions. For emissions units included within the PAL that are modified, that receive major NSR permits, and that reflect the application of BACT or LAER, the Cap shall be increased by an amount equal to the difference between the new allowable emissions rate and the emissions unit's previous contribution to the Cap as determined in reference to Appendix P.

B. **Establishing Baseline Emissions**: MAP shall establish baseline emissions for emissions units within any PAL based on emissions from the two most recent consecutive calendar years, or other such representative two calendar year period as approved by EPA. MAP shall calculate the baseline emissions covering the time period set forth in the preceding sentence and set forth in Appendix P ("Baseline Cap and Compliance Determination for the PAL(s)").

C. **Initial Cap**: On or before December 31, 2003, MAP shall provide EPA with a report that identifies its proposed level for the Cap associated with each initial PAL in tons per year on a 365-day rolling average consistent with Appendix P ("Baseline, Cap, and Compliance Determination for the PAL(s)"). The effective date of the PALs at each of MAP's petroleum refineries shall be the date EPA approves each such PAL.

D. **Changes in Cap(s)**: On or before each February 15th after the PAL is approved, and each February 15th thereafter, MAP shall submit to EPA for its approval, an application to revise the then existing Cap. MAP's proposal shall reflect the contribution to the Cap from each emissions unit covered by the PAL, including those emissions units that were controlled as

required by the Consent Decree pursuant to Section V ("Compliance Measures") in the preceding calendar year. The recalculation of the cap for emissions from units that were controlled as required by the Consent Decree in the preceding year, shall be determined by reference to Section II.B of Appendix P. In addition, MAP's proposed revision to a Cap must be consistent with any regulatory requirements enacted by a State or local authority to meet attainment objectives, effective before December 31 of that preceding calendar year. Each Cap proposed by MAP pursuant to this Paragraph 26 shall be expressed in tons per year on a 365-day rolling average consistent with Appendix P.

E. **Cap Approval and Compliance**: EPA will notify MAP of its determination of the Cap proposed by MAP. MAP will demonstrate compliance with each Cap on a 365-day rolling average beginning no later than January 1st of the calendar year following EPA's approval and on each day thereafter through December 31st of that calendar year.

F. **PSD and Major Non-Attainment NSR Major Modifications to or Affecting Emissions Units within the PAL**: During the life of a PAL, the following shall apply to determination of whether a major modification has occurred pursuant to PSD and major non-attainment NSR:

i. For a modification to an emission unit under a PAL, for a particular pollutant, that affects only other emissions units within the PAL, the net emissions change for units under the PAL shall be zero.

ii. For modifications to an emissions unit within a PAL, for a particular pollutant, that affect an emissions unit outside of the PAL:

a. the emissions change for the unit modified within the PAL shall be zero;

b. the emissions change for emissions units under the PAL that are not modified but are affected shall be zero; and

c. the emissions change for emissions units outside of the PAL that are affected shall be calculated as required by the applicable PSD and major non-attainment NSR regulations.

iii. For a modification to a unit outside of the PAL, for a particular pollutant, that affects an emissions unit within a PAL:

a. the emissions change for the emissions unit within the PAL that is affected shall be zero; and

b. the emissions change for the emissions unit outside the PAL that is affected shall be calculated as required by the applicable PSD and major non-attainment NSR regulations.

iv. For the purposes of netting for changes to units outside of the PAL, no contemporaneous increases or decreases shall be allowed or considered for emissions units under the PAL.

v. Net emissions change for emissions units not within the PAL shall always be less than the significance levels. Increased emissions allowed pursuant to issuance of a PSD or major non-attainment NSR permits shall not be considered an increase pursuant to 40 C.F.R. § 52.21, and the SIP-approved PSD and major non-attainment NSR programs.

G. **Consent Decree/NSPS/Minor NSR Applicability**:

i. This Paragraph does not in any way change, alter or modify any obligation of MAP, to comply with the concentration based limits ("ppmvd" or "lb/mmBTU") imposed by Paragraphs 12, 16, and 21.

ii. This Paragraph does not in any way change, alter or modify any obligation of MAP, whether existing or imposed by virtue of this Consent Decree, to comply with the NSPS. If any physical or operational change results in an increase in the emission rate to the atmosphere of any

pollutant from the affected facility to which a NSPS applies, MAP must comply with all applicable parts of the NSPS and the General Provisions in 40 C.F.R. Part 60, Subpart A. The determination of whether there has been an increase in emissions to the atmosphere shall be based on a comparison of the emission rate (in pounds per hour) at the maximum achievable capacity prior to and after the physical or operational change.

iii. The establishment of a PAL under this Paragraph does not in any way change, alter or modify any obligation of MAP, to comply with any applicable minor NSR permitting requirements or obligations.

H. **Notice of Changes to Emissions Unit:**

Together with its annual proposal for a Cap revision required by Paragraph 26.D, MAP shall provide a written report to EPA and the Plaintiff-Intervenors of actual construction of physical or operational changes made to emissions units included within any PAL. The report shall:

a. Describe the physical or operational change;

b. Identify the emissions unit that the physical or operational change has affected or will affect, whether or not such emissions unit is included within the Cap;

c. Provide a statement of whether or not any New Source Performance Standard ("NSPS") is applicable to the physical or operational change and the reason why the NSPS does or does not apply; and

d. A netting analysis (increases and decreases) for all emissions units not within the PAL that emit SO_2 or NOx, PM and CO for that prior calendar year.

I. **PAL and Cap Life and Renewal**

i. **PAL Life**: The life of any PAL established pursuant to this Paragraph 26 shall be no more than five (5) years from its effective date as determined under Paragraph 26.C . The

provisions of Paragraph 26.F of the Consent Decree shall apply only during those same five (5) years.

ii. **Cap Life:** Expiration of the Cap without renewal shall result in an examination of PSD/NSR applicability for all emissions units included within the PAL in accordance with the then-effective PSD and major non-attainment NSR regulations.

iii. **Second PAL**: At any time prior to three (3) months before termination of a PAL established pursuant to Paragraph 26.C, MAP may apply to EPA to renew such PAL. The baseline for any second PAL shall be calculated pursuant to Appendix P. MAP shall determine baseline emissions for emissions unit to be included in any second PAL through monitoring conducted consistent with Appendix P. MAP shall comply with the terms and conditions of Paragraph 26.A-G with respect to any renewed PAL.

J. **Cap Exceedence:** If MAP allows or causes an exceedence of the 365-day rolling average cap for any pollutant, MAP shall undertake an analysis to determine whether emission unit(s) at the source were modified for that pollutant during the life of the PAL. MAP shall complete the analysis required by the foregoing sentence within ninety (90) days of the exceedence and report such analysis to EPA. No later than 180 days from the date of the exceedence, MAP shall submit to EPA for its review and approval a proposed BACT/LAER determination for each modified emissions unit(s) identified above and a schedule for installation of any BACT/LAER controls proposed. MAP shall propose a schedule that will propose installation of controls as soon as practicable but not to exceed forty-two (42) months from the initial date of the exceedence. EPA shall review and, after consultation with the appropriate State or local permitting authority, notify MAP of its approval or rejection of the proposal. Upon EPA approval, MAP shall install BACT (or LAER as appropriate) on the emissions units modified. The modification analysis shall be conducted as though the cap is a non-enforceable limit. Except as provided in this Paragraph

26, nothing in this provision is intended to limit the applicability of 40 C.F.R. § 52.21, the SIP-approved PSD and major non-attainment NSR programs.

K. **CAP Exceedence Stipulated Penalties**: For exceeding a cap, MAP shall pay the higher of $27,500 (as adjusted for inflation) per pollutant for each succeeding day that MAP exceeds the 365-day annual rolling average or $20,000 per ton (or fraction thereof) in excess of the cap for each pollutant.

27. **Retirement of NOx Allowances/Credits**: MAP shall surrender to EPA any NOx allowances or credits allocated to the affected emissions units (e.g., NOx Budget Unit, NOx Budget Opt-In Unit, or any equivalent unit in a federally-approved NOx or ozone control program) at the seven refineries covered by this Consent Decree under any federally-approved NOx or ozone control program to the extent that such allowances or credits exceed the emissions allowed under this Consent Decree for the affected emissions units at that refinery for the period of the allocation. Each year by the deadline for transferring NOx allowances or credits for compliance under such control program, MAP shall make this surrender by transferring the unused NOx allowances or credits to an account specified by EPA. The surrendered NOx allowances or credits shall not be used for compliance under such control program. The emissions allowed under this Consent Decree for the affected emissions unit for the allocation period shall be calculated by multiplying the unit's allowed NOx emission rate (in pounds per mmBtu heat input) under this Consent Decree by that unit's total actual heat input (in mmBtu) for the allocation period divided by 2000 pounds per ton. Nothing in this Paragraph shall preclude MAP from selling or trading NOx allowances or credits allocated to an affected emissions unit at any of the seven refineries covered by this Consent Decree to the extent that such allowances or credits do not exceed the emissions allowed under this Consent Decree for the affected emission units for the allocation period. The NOx emission reductions required under this Consent Decree shall be treated as reductions required

under the Clean Air Act and shall not be treated as early reductions under any federally-approved NOx or ozone control program.

VII. ENVIRONMENTALLY BENEFICIAL PROJECTS

28. **FCCU and Heater and Boiler Controls:** MAP and the United States agree that measures to reduce NOx, SO_2, CO and PM emissions from the FCCUs and heaters and boilers at the covered petroleum refineries, to the extent that they are not otherwise required by law, shall be considered environmentally beneficial projects for penalty mitigation pursuant to the Consent Decree.

29. **Pollution Reduction -- Supplemental and Beneficial Environmental Projects**

A. During the period between the Date of Entry of this Consent Decree and three (3) years from the Date of Entry of the Consent Decree, MAP shall undertake the following environmentally beneficial projects with a collective cost to the Company of approximately $6.5 million. MAP agrees that in any public statements regarding the funding of the projects identified below, MAP will state that they are being undertaken pursuant to this settlement.

B. Fordson Island: By no later than the Date of Entry of the Consent Decree, MAP shall immediately begin discussions with Wayne County regarding the process and time for conveyance of its ownership interest in Fordson Island located in the Rouge River (subject to the approval of the Wayne County Commission), which has a current estimated market value of $500,000, to Wayne County, Michigan, located in the Rouge River and undertake the following steps:

i. Flush, cap and abandon MAP's existing hydrocarbon dock lines to the island and reroute them to an alternate location at a projected cost of $3,100,000;

ii. Remove existing MAP industrial equipment on the island at a projected cost of $300,000; and

iii. Perform an environmental evaluation of MAP's portion of the island to applicable standards for use of the property as a public park at a cost of approximately $100,000 and undertake clean up and remediation activities

C. In the event that MAP determines that the cost of clean-up and remediation will exceed $500,000, or MAP may elect to make a cash penalty payment in lieu of this project in the amount of $4 million or provide alternative, mutually agreed upon, supplemental environmental projects of an equal value.

D. St. Paul Park Thermal Oxidizer: By December 31, 2002, MAP shall install and operate at the St. Paul Park Refinery a thermal oxidizer for the control of VOC and odors from the St. Paul Park Refinery's wastewater treatment plant at a projected capital cost of $2.5 million dollars, including the piping, foundations, fuel, instrumentation, modification to the contactor covers and oxidizer. MAP shall submit to the MPCA necessary permit applications for the construction of the thermal oxidizer by July 31, 2001. In the event that MPCA does not issue the permit to construct and operate by December 31, 2001, the deadline for installation and operation shall be extended by the time that MPCA's permit issuance exceeds December 31, 2001.

E. In the event that MAP is unable to undertake any of these supplemental environmental projects, MAP shall propose to EPA alternative projects for EPA's approval or shall submit to EPA a cash penalty in the amount set forth in the paragraph relating to the project that is not undertaken within thirty (30) days of giving EPA notice that the project will not be undertaken.

30. By signing this Consent Decree, MAP certifies that it is not required, and has no liability under any federal, state or local law or regulation or pursuant to any agreements or orders of any court, to perform or develop any of the projects identified in Paragraph 29. MAP further certifies that it has not applied for or received, and will not in the future apply for or receive (1) credit as a Supplemental Environmental Project or other penalty offset in any other enforcement action for such projects, or (2) credit for any emissions reductions resulting from such projects in any federal, state or local emissions trading or early reduction program.

31. The Calendar Quarterly Report required by Paragraph 33 of this Consent Decree for the calendar quarter in which each project identified in Paragraph 29 is completed shall contain the following information with respect to such projects:

i. A detailed description of each project as implemented;

ii. A brief description of any significant operating problems encountered, including any that had an impact on the environment, and the solutions for each problem;

iii. Certification that each project has been fully implemented pursuant to the provisions of this Consent Decree; and

iv. A description of the environmental and public health benefits resulting from implementation of each project (including quantification of the benefits and pollutant reductions, if feasible).

32. MAP agrees that in any public statements regarding the funding of these SEPs, MAP must clearly indicate that these projects are being undertaken as part of the settlement of an enforcement action for alleged Clean Air Act violations.

VIII. REPORTING AND RECORDKEEPING

33. Beginning with the first full calendar quarter after the Date of Entry of the Consent Decree, MAP shall submit to EPA within thirty (30) days after the end of each calendar quarter until termination of this Consent Decree a calendar quarterly progress report ("Calendar Quarterly Report") covering each refinery subject to this Consent Decree and that is owned and operated by MAP as of the Date of Lodging of the Consent Decree. This calendar quarterly report shall contain, for each such Refinery, the following: progress report on the implementation of the requirements of Section V (Affirmative Relief/Environmental Projects (Measures)) above; a summary of the emissions data as required by Section V of this Consent Decree for the calendar quarter; a description of any problems anticipated with respect to meeting the requirements of Section V of this Consent Decree; and a description of all environmentally beneficial projects and SEP implementation activity in accordance with Paragraph 29 of the Consent Decree; and any such

additional matters as MAP believes should be brought to the attention of the United States or EPA. Each portion of the calendar quarterly report which relates to a particular refinery shall be certified by either the person responsible for environmental management and compliance for that refinery, or by a person responsible for overseeing implementation of this Decree across MAP, as follows:

> I certify under penalty of law that this information was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my directions and my inquiry of the person(s) who manage the system, or the person(s) directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

IX. CIVIL PENALTY

34. Within thirty (30) days of the Date of Entry of the Consent Decree, MAP shall pay a civil penalty of $3,800,000 as follows: 1) $3,700,000 to the United States Treasury; 2) $50,000 to the Louisiana Department of Environmental Quality; and 3) $50,000 to the Minnesota Pollution Control Agency.

Payment of monies to the United States shall be made by Electronic Funds Transfer ("EFT") to the United States Department of Justice, in accordance with current EFT procedures, referencing the USAO File Number and DOJ Case Number 90-5-2-1-07247 and the civil action case name and case number of the Eastern District of Michigan. The costs of such EFT shall be MAP's responsibility. Payment shall be made in accordance with instructions provided to MAP by the Financial Litigation Unit of the U.S. Attorney's Office for the Eastern District of Michigan. Any funds received after 11:00 a.m. (EST) shall be credited on the next business day. MAP shall provide notice of payment, referencing the USAO File Number and DOJ Case Number 90-5-2-1-07247 and the civil action case name and case number, to the Department of Justice and to EPA, as provided in Paragraph 83 (Notice).

Payment of the civil penalty owed to the State of Louisiana under this Paragraph shall be made by certified check made payable to the Louisiana Department of Environmental Quality and

sent to Darryl Serio, Fiscal Director, Office of Management and Finance, LDEQ, P.O. Box 82263, Baton Rouge 70804-2263.

Payment of the civil penalty owed to the State of Minnesota under this Paragraph shall be made by certified check made payable to Minnesota Pollution Control Agency and sent to Enforcement Penalty Coordinator, Minnesota Pollution Control Agency, 520 Lafayette Road, St. Paul, Minnesota 55155-4194.

35. The civil penalty set forth herein is a penalty within the meaning of Section 162(f) of the Internal Revenue Code, 26 U.S.C. § 162(f), and, therefore, MAP shall not treat this penalty payment as tax deductible for purposes of federal, state, or local law.

36. Upon the Date of Entry of the Consent Decree, the Consent Decree shall constitute an enforceable judgment for purposes of post-judgment collection in accordance with Federal Rule of Civil Procedure 69, the Federal Debt Collection Procedure Act, 28 U.S.C. §§ 3001-3308, and other applicable federal authority. The United States shall be deemed a judgment creditor for purposes of collection of any unpaid amounts of the civil and stipulated penalties and interest.

X. STIPULATED PENALTIES

37. MAP shall pay stipulated penalties to the United States for each failure by MAP to comply with the terms of this Consent Decree as provided herein. The stipulated penalties shall be calculated in the following amounts specified in Paragraphs 38 through 50.

38. **Paragraph 12 - Requirements for NOx and CO Emission Reductions from FCCUs.**

A. For failure to install each NOx Reducing System as required by this Consent Decree, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$1250
31st through 60th day after deadline	$3000
Beyond 60th day	$5000 or an amount equal to 1.2 times the economic benefit of MAP's delayed compliance, whichever is greater

B. For failure to use NOx Reducing Catalyst Additives as required by Paragraph 12 and Appendix B of the Consent Decree, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$1000
31st through 60th day after deadline	$1500
Beyond 60th day after deadline	$2000 or an amount equal to 1.2 times the economic benefit of MAP's delayed compliance, whichever is greater

C. For failure to meet any emissions limit proposed by MAP or established by EPA (final or interim) for NOx and CO pursuant to Paragraph 12, per day, per unit: $750 for each calendar day on which the specified 3-hour rolling average exceeds the applicable limit; and $2500 for each calendar day on which the specified 365-day rolling average exceeds the applicable limit.

D. For failure to prepare and/or submit written deliverables required by Paragraph 12, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$200
31st through 60th day after deadline	$500
Beyond 60th day after deadline	$1000

E. For failure to install NOx CEMS, per unit, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$500
31st through 60th day after deadline	$1000
Beyond 60th day after deadline	$2000 or an amount equal to 1.2 times economic benefit of delayed compliance, whichever is greater.

39. **Paragraph 13 -- Requirements for NOx Emission Reductions Heaters/Boilers.**

A. For failure to install required control technologies by the dates specified in Paragraph 13:

Period of Delay	Penalty per day
1st through 30th day after deadline	$2500
31st through 60th day after deadline	$6000
Beyond 60th day after deadline	$10,000 or an amount equal economic benefit of MAP's delayed compliance, whichever is greater

B. For failure to source test emissions on a controlled heater and boiler, per unit, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$450
31st through 60th day after deadline	$1000
Beyond 60th day after deadline	$2000

C. For failure to install CEMS or parametric emission monitoring system on a controlled heater or boiler by the required deadline, per unit, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$450
31st through 60th day after deadline	$1000

Beyond 60th day after deadline	$2000 or an amount equal to 1.2 times the economic benefit of delayed compliance whichever is greater.

D. For failure to submit the written deliverables required by Paragraph 13, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$200
31st through 60th day after deadline	$500
Beyond 60th day	$1000

40. **Paragraph 14 - Requirements for SO_2 Emission Reductions from FCCUs.**

A. For failure to install each application of a wet gas scrubber at Texas City as required by this Consent Decree, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$1250
31st through 60th day after deadline	$3000
Beyond 60th day after deadline	$5000 or an amount equal to 1.2 times the economic benefit of the delayed compliance whichever is greater

B. For failure to use SO_2 adsorbing catalyst additive during the demonstration period as required by Paragraph 14 and Appendix B of the Consent Decree, at each unit, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$1000
31st through 60th day after deadline	$1500
Beyond 60th day	$2000 or an amount equal to 1.2 times the economic benefit of the delayed compliance whichever is greater

C. For failure to conduct optimization studies as required by this Consent Decree, per unit, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$500
31st through 60th day after deadline	$1500
Beyond 60th day after deadline	$2000

D. For failure to meet emission SO_2 limits proposed by MAP or established by EPA (final or interim) pursuant to Paragraph 14, per day, per unit: $1500 for each calendar day on which the specified 7-day rolling average exceeds the applicable limit; $3000 for each calendar day on which the specified rolling average exceeds the applicable limit.

41. **Paragraph 15 - Requirements for SO_2 and PM Emission Reductions from Heaters and Boilers.**

A. For failure to cease fuel oil burning by each date specified in Paragraph 15.A of this Consent Decree, per refinery, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$1750
Beyond 31st day	$5000

B. For burning any refinery fuel gas that contains hydrogen sulfide in excess of 0.1 grains per dry standard cubic foot on a 3-hour rolling average at any fuel gas combustion device as specified in Paragraph 15.C of this Consent Decree, per refinery, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$5000
Beyond 31st day	$7500

C. For failure to submit the written deliverables to EPA pursuant to this Paragraph 15 per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$200
31st through 60th day after deadline	$500
Beyond 60th day	$1000

D. For failure to meet PM emission limits set forth in Paragraph 15.E, per day, per unit: $750 for each calendar day on which the specified 24-hour rolling average exceeds the applicable limit; $2500 for each calendar day on which the specified 365-day rolling average exceeds the applicable limit.

42. **Paragraph 16 - Requirements for Particulate Matter Emission -- FCCU Controls**

A. For failure to install each ESP or equivalent technology as required by Paragraph 16 of this Consent Decree within the specified time frame, per unit, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$1250
31st through 60th day after deadline	$3000
Beyond 60th day after deadline	$5000 or an amount equal to 1.2 times the economic benefit of the delayed compliance whichever is greater

B. For failure to meet total particulate emissions for each FCCU/RCCU exhaust gas at each refinery, per day, per unit until compliance is demonstrated: $3000

43. **Paragraph 17 -- Hydrocarbon Flaring/ NSPS Applicability - Flares**

A. For failure to perform root cause analysis and submit written report for those Hydrocarbon Flaring Incidents which exceed 500 lbs sulfur dioxide above permitted values as reflected in Paragraph 17.A of this Consent Decree:

Period of Delay	Penalty per day
1st through 30th day after deadline	$ 500 per day per incident
31st through 60th day after deadline	$1,500 per day per incident
Beyond 60th day after deadline	$2,000 per day per incident

B. For failure to meet date for achieving NSPS compliance for those flaring devices reflected in Appendix J of this consent decree:

Period of Delay	Penalty per day
1st through 30th day after deadline	$ 500 per day
31st through 60th day after deadline	$1,500 per day
Beyond 60th day after deadline	$2,000 per day

44. **Paragraph 18 - Requirements for Benzene Waste NESHAP Program Enhancements**

For each violation in which a frequency is specified in Paragraph 18, the amounts identified below shall apply on the first day of violation, shall be calculated for each incremental period of violation (or portion thereof), and shall be doubled beginning on the fourth consecutive, continuing period of violation. For requirements where no frequency is specified, penalties will not be doubled.

A. For failure to complete the BWN Compliance Review and Verification Reports as required by Paragraph 18.C.ii and C.iii:

$7,500 per month, per refinery

B. For failure to implement the actions necessary to correct non-compliance as required by Paragraph 18.D:

Period of Delay	Penalty per day
1st through 30th day after deadline	$1250
31st through 60th day after deadline	$3000
Beyond 60th day	$5000 or an amount equal to 1.2 times the economic benefit of MAP's delayed compliance, whichever is greater

C. For failure to install or operate secondary carbon canisters as required by Paragraph 18.E.i:

$5,000 per week, per carbon canister:

D. For failure to conduct required breakthrough monitoring on carbon canisters, or for failure to monitor for breakthrough on carbon canisters during actual flow:

$1,000 per monitoring event, per refinery.

E. For failure to replace carbon canisters where both primary and secondary carbon canisters are utilized immediately upon detection of the breakthrough:

$1,000 per day, per carbon canister

F. For failure to conduct each lab audit required in Paragraph 18.G:

$5,000 per month, per audit

G. For failure to implement the training requirements of Paragraph 18.I:

$10,000 per quarter, per refinery

H. For failure to submit or maintain any records or materials required by Paragraphs 18.E and 18.J of this Consent Decree:

$2,000 per record or submission

I. For failure to install controls on waste management units handling organic wastes as required by Paragraph 18.J.ii:

$10,000 per month, per waste management unit

J. For failure to conduct sampling in accordance with the sampling plans required by Paragraphs 18.K., 18.L., or 18.M:

$5,000 per week, per stream, or $30,000 per quarter, per stream, whichever is greater, but not to exceed $150,000 per quarter per refinery

K. For failure to submit the plan or retain the third-party contractor required by Paragraphs 18.K.vii, 18.K.viii, 18.L.i, 18.M.v., and 18.M.vi:

$10,000 per month, per refinery

L. For failure to comply with the miscellaneous compliance measures set forth in Paragraph 18.N.ii, as follows:

For N.ii.a, monthly visual inspections: $500 per drain not inspected;

For N.ii.b, identify/mark segregated stormwater drains: $1,000 per week per drain;

For N.ii.c, weekly monitoring of vents: $500 per vent not monitored;

For N.ii.d, quarterly monitoring of oil/water separators: $5,000 per separator not monitored;

M. For failure to complete the study required by Paragraph 18.O.ii:

$2,000 per month

N. For failure to submit the written deliverables required by Paragraph 18.P:

$1,000 per week, per report

O. If it is determined through an EPA, State, or local investigation that MAP has failed to include all benzene containing waste streams in its TAB calculation submitted pursuant to Paragraphs 18.C.ii or 18.C.iii, MAP shall pay the following per waste stream:

Period of Delay	Penalty per day
for waste streams < 0.03 Mg/yr	$250
for waste streams between 0.03 and 0.1 Mg/yr	$1000
for waste streams between 0.1 and 0.5 Mg/yr	$5,000
for waste streams > 0.5 Mg/yr	$10,000

45. **Paragraph 19 - Requirements Benzene Measures at the Detroit and Texas City Refineries:**

A. For discontinuing the use of closed-vent systems ("CVS") and control devices without complying with Paragraph 19.A.ii:

$1000 per week, per CVS or control device (as applicable)

B. For failure to submit a description of new waste management units in organic benzene waste service or take actions to comply with Subpart FF for those new units, as required in Paragraph 19.A.iii.d:

$1,000 per week

C. For failure to install the controls on waste management units as required by Paragraphs 19.A.iii.c and 19.A.iv.c

Period of Delay	Penalty per day
1st through 30th day after deadline	$1250
31st through 60th day after deadline	$3000
Beyond 60th day	$5000 or an amount equal to 1.2 times the economic benefit of MAP's delayed compliance, whichever is greater

D. For making a false certification under Paragraph 19.A.v, $27,500.

E. For failure to perform activities to complete the requirements of Paragraph 19.A, as required in Paragraph 19.A.v:

Period of Delay	Penalty per day
1st through 30th day after deadline	$1250
31st through 60th day after deadline	$3000
Beyond 60th day	$5000 or an amount equal to 1.2 times the economic benefit of MAP's delayed compliance, whichever is greater

F. For failure to retain a third-party consultant as required by Paragraph 19.B.i:

$1000 per week

G. For failure to submit the Investigation and Action Plans as required by Paragraphs 19.B.ii and iii:

$1000 per week, per plan

H. For failure to implement any part of the approved plan for minimizing benzene as required by Paragraph 19.B.iv:

Period of Delay	Penalty per day
1st through 30th day after deadline	$1250
31st through 60th day after deadline	$3000
Beyond 60th day	$5000 or an amount equal to 1.2 times the economic benefit of MAP's delayed compliance, whichever is greater

46. **Paragraph 20 - Requirements for Leak Detection and Repair Program Enhancements**

For each violation in which a frequency is specified in Paragraph 20, the amounts identified below shall apply on the first day of violation, shall be calculated for each incremental period of violation (or portion thereof), and shall be doubled beginning on the fourth consecutive, continuing period of violation. For requirements where no frequency is specified, penalties will not be doubled.

A. For failure to implement the training programs specified in Paragraph 20.B:

$10,000 per month, per program, per refinery

B. For failure to conduct any of the audits described in Paragraph 20.C:

$5,000 per month, per audit

C. For failure to implement any actions necessary to correct non-compliance as required in Paragraph 20.D:

Period of Delay	Penalty per day
1st through 30th day after deadline	$1250
31st through 60th day after deadline	$3000
Beyond 60th day	$5000 or an amount equal to 1.2 times the economic benefit of MAP's delayed compliance, whichever is greater

D. For failure to initiate an internal leak rate definition as specified in Paragraph 20.E:

$10,000 per month per process unit

E. For failure to implement the first attempt repair program in Paragraph 20.G or for failure to implement the QA/QC procedures described in Paragraph 20.J:

$10,000 per month, per refinery

F. For failure to implement the more frequent monitoring program required by Paragraph 20.H.ii:

$10,000 per month, per unit

G. For failure to designate an individual as accountable for LDAR performance as required in Paragraph 20.K, or for failure to implement the maintenance tracking program in Paragraph 20.L, or for failure to write a LDAR program that meets the requirements of Paragraph 20.A:

$3,750 per week, per refinery

H. For failure to use dataloggers or maintain electronic data as required by Paragraph 20.I.:

$5,000 per month, per refinery

I. For failure to conduct the calibration drift assessments or remonitor valves and pumps based on calibration drift assessments in Paragraph 20.M:

$100 per missed event per refinery

J. For failure to repair valves and pumps based on the delay of repair standards in Paragraph 20.N:

$5,000 per valve or pump

K. For failure to submit the written deliverables required by Paragraph 20.O:

$1,000 per week per report

L. If it is determined through an EPA, State, or local investigation that MAP has failed to include all valves and pumps in its LDAR program, MAP shall pay $175 per component that it had failed to include.

M. For failure to timely implement the monitoring program under Paragraph 20.H:

$5,000 per week, per unit

47. **Paragraph 21 - NSPS Applicability Re: Sulfur Recovery Plant**

A. For failure to re-route all sulfur pit emissions from Canton, Catlettsburg, Detroit ("C Train") and St. Paul Park to the Sulfur Recovery Plant or TO per day, per Sulfur Recovery Plant:

Period of Delay	Penalty per day
1st through 30th day after deadline	$1000
31st through 60th day after deadline	$1750
Beyond 60th day after deadline	$4000 or an amount equal to 1.2 times the amount of delayed compliance whichever is greater.

B. For failure to comply with the NSPS Subpart J emission limit or other emission limit established in Paragraph 21 per day on which the specified rolling average exceeds the applicable limit, per day:

Period of Delay	Penalty per day
1st through 30th day	$1500
31st through 60th day	$2000
Beyond 60th day	$2500

C. For failure to install TGU (or equivalent technology or practice) and install CEMs, as specified in Paragraph 21.B at each refinery, per day, per unit:

Period of Delay	Penalty per day
1st through 30th day after deadline	$2000
Beyond 31st day after deadline	$3000
Beyond 60th day after deadline	$5000 or 1.2 times the economic benefit of delayed compliance, whichever is greater;

D. For failure to conduct optimization studies as specified in Paragraphs 21.D, per refinery per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$500
Beyond 31st day after deadline	$1500
Beyond 60th day after deadline	$2000

E. For failure to develop and comply with the Operation and Scheduled Maintenance Plans as specified in Paragraph 21.C., per Refinery, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$500
Beyond 31st day after deadline	$1500
Beyond 60th day after deadline	$2000

F. For failure to submit written deliverables to EPA as specified in Paragraph 21.B. for per refinery, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$200
Beyond 31st day after deadline	$500
Beyond 60th day after deadline	$1000

48. **Paragraphs 22 and 21.E - Requirements for Acid Gas and Sour Water Stripper Gas Flaring and Tail Gas Incidents**: MAP shall be liable for stipulated penalties for violations of the requirements of this Consent Decree as set forth in this paragraph.

A. For Flaring Incidents for which MAP is liable under Paragraphs 22.C., and Tail Gas Incidents under Paragraph 21.E:

Tons Emitted in Flaring Incident	Length of Time from Commencement of Flaring within the Flaring Incident to Termination of Flaring within the Flaring Incident is 3 hours or less	Length of Time from Commencement of Flaring within the Flaring Incident to Termination of Flaring within the Flaring Incident is greater than 3 hours but less than or equal to 24 hours	Length of Time of Flaring within the Flaring Incident is greater than 24 hours
5 Tons or less	$500 per Ton	$750 per Ton	$1,000 per Ton
Greater than 5 Tons, but less than or equal to 15 Tons	$1,200 per Ton	$1,800 per Ton	$2,300 per Ton, up to, but not exceeding, $27,500 in any one calendar day
Greater than 15 Tons	$1,800 per Ton, up to, but not exceeding, $27,500 in any one calendar day	$2,300 per Ton, up to, but not exceeding, $27,500 in any one calendar day	$27,500 per calendar day for each calendar day over which the Flaring Incident lasts

For purposes of calculating stipulated penalties pursuant to this Paragraph 48, only one cell within the matrix shall apply. Thus, for example, for a Flaring Incident in which the Flaring starts at 1:00 p.m. and ends at 3:00 p.m., and for which 14.5 tons of sulfur dioxide are emitted, the penalty would be $17,400 (14.5 x $1,200); the penalty would not be $13,900 [(5 x $500) + (9.5 x $1200)]. For purposes of determining which column in the table set forth in this Paragraph applies under

circumstances in which Flaring occurs intermittently during a Flaring Incident, the Flaring shall be deemed to commence at the time that the Flaring that triggers the initiation of a Flaring Incident commences, and shall be deemed to terminate at the time of the termination of the last episode of Flaring within the Flaring Incident. Thus, for example, for Flaring within a Flaring Incident that (i) starts at 1:00 p.m. on Day 1 and ends at 1:30 p.m. on Day 1; (ii) recommences at 4:00 p.m. on Day 1 and ends at 4:30 p.m. on Day 1; (iii) recommences at 1:00 a.m. on Day 2 and ends at 1:30 a.m. on Day 2; and (iv) no further Flaring occurs within the Flaring Incident, the Flaring within the Flaring Incident shall be deemed to last 12.5 hours -- not 1.5 hours -- and the column for Flaring of "greater than 3 hours but less than or equal to 24 hours" shall apply.

B. For failure to timely submit any report required by Paragraphs 21.E or 22, or for submitting any report that does not conform to the requirements of Paragraphs 21.E or 22:

Period of Delay	Penalty per day
Days 1-30	$800
Days 31-60	$1,600
Over 60 days	$3,000

C. For those corrective action(s) which MAP: (i) agrees to undertake following receipt of an objection by U.S. EPA pursuant to Paragraph 22.B.iii and 21.E; or (ii) is required to undertake following Dispute Resolution, then, from the date of U.S. EPA's receipt of MAP's report under Paragraph 22.B or required by Paragraph 21.E of this Consent Decree until the date that either (i) a final agreement is reached between U.S. EPA and MAP regarding the corrective action or (ii) a court order regarding the corrective action is entered, MAP shall be liable for stipulated penalties as follows:

i.

Period of Delay	Penalty per day
Days 1-120	$50

Days 121-180	$100
Days 181 - 365	$300
Over 365 Days	$3,000

or

ii. 1.2 times the economic benefit resulting from MAP's failure to implement the corrective action(s).

The decision of whether to demand as a stipulated penalty Alternative (i) or Alternative (ii) shall rest exclusively within the discretion of the United States.

D. For failure to complete any corrective action under Paragraphs 21.E or 22.B.i of this Decree in accordance with the schedule for such corrective action agreed to by MAP or imposed on MAP pursuant to the Dispute Resolution provisions of this Decree (with any such extensions thereto as to which U.S. EPA and MAP may agree in writing):

Period of Delay	Penalty per day
Days 1-30	$ 1,000
Days 31-60	$ 2,000
Over 60	$ 5,000

49. **Paragraph 23 – Requirements for RCRA Injunctive Measures – Detroit and Robinson**

A. For failure to submit a plan consistent with the requirements of Paragraph 23.A.ii:

Period of Delay	Penalty per day
1st through 30th day	$1000
31st through 60th day	$2500
Beyond 60 days	$5000

B. For failure to maintain records documenting repairs of leaking closure devices on Level 2 hazardous waste containers, as required in Paragraph 23.B:

$2000 per record

C. For failure to characterize whether spent material from carbon canisters is a hazardous waste, as required in Paragraph 23.B:

$5000 per canister

50. **Paragraph 29 - Requirements for SEPs:**

For MAP's failure to perform any one of the SEPs identified in Paragraph 29 in accordance with the EPA-approved schedule, per day, per project:

Period of Delay	Penalty per day
1st through 30th day after deadline	$500
31st through 60th day after deadline	$2000
Beyond 60th day after deadline	$2500

51. **Requirements for Reporting and Recordkeeping (Section VIII) - Reports Required By Paragraph 33:**

For failure report as required by Section VIII, per day:

Period of Delay	Penalty per day
1st through 30th day after deadline	$300
31st through 60th day after deadline	$1100
Beyond 60th day	$2000

52. **Requirements to Escrow Stipulated Penalties.** For failure to pay the civil penalty as specified in Section IX of this Consent Decree, MAP shall be liable for $30,000 per day plus interest on the amount overdue at the rate specified in 28 U.S.C § 1961(a). For failure to escrow

stipulated penalties as required by Paragraph 55 of this Consent Decree, MAP shall be liable for $2,500 per day plus interest on the amount overdue at the rate specified in 28 U.S.C. § 1961(a).

53. **Payment of Stipulated Penalties:** MAP shall pay stipulated penalties upon written demand by the United States no later than sixty (60) days after MAP receives such demand. Stipulated penalties shall be paid to the United States in the manner set forth in Section IX (Civil Penalty) of this Consent Decree. EPA's demand for the payment of stipulated penalties will identify the particular violation(s) to which the stipulated penalty relates, the stipulated penalty amount EPA is demanding for each violation (as can be best estimated), the calculation method underlying the demand, and the grounds upon which the demand is based.

54. **Stipulated Penalties Dispute:** Should MAP dispute its obligation to pay part or all of a stipulated penalty, it may avoid the imposition of the stipulated penalty for failure to pay a penalty due to the United States, by placing the disputed amount demanded by the United States in a commercial escrow account pending resolution of the matter and by invoking the Dispute Resolution provisions of Section X.iv within the time provided in this Paragraph 54 for payment of stipulated penalties. If the dispute is thereafter resolved in MAP's favor, the escrowed amount plus accrued interest shall be returned to them, otherwise the United States shall be entitled to the escrowed amount that was determined to be due by the Court plus the interest that has accrued on such amount. The United States reserves the right to pursue any other non-monetary remedies to which it is entitled, including but not limited to, additional injunctive relief for MAP's violations of this Consent Decree.

XI. INTEREST

55. MAP shall be liable for interest on the unpaid balance of the civil penalty specified in Section IX, and MAP shall be liable for interest on any unpaid balance of stipulated penalties to be paid in accordance with Section X. All such interest shall accrue at the rate established pursuant to

28 U.S.C. § 1961(a) -- i.e., a rate equal to the coupon issue yield equivalent (as determined by the Secretary of Treasury) of the average accepted auction price for the last auction of 52-week U.S. Treasury bills settled prior to the Date of Lodging of the Consent Decree. Interest shall be computed daily and compounded annually. Interest shall be calculated from the date payment is due under the Consent Decree through the date of actual payment. For purposes of this Paragraph 56, interest pursuant to this Paragraph will cease to accrue on the amount of any penalty payment made into an interest bearing escrow account as contemplated by Section IX (Civil Penalty) and Section X (Stipulated Penalties) of the Consent Decree. Monies timely paid into escrow shall not be considered to be an unpaid balance under this section.

XII. RIGHT OF ENTRY

56. Any authorized representative of the EPA or an appropriate state agency, including independent contractors, upon presentation of credentials, shall have a right of entry upon the premises of the facilities of MAP's Refineries as identified herein, at any reasonable time for the purpose of monitoring compliance with the provisions of this Consent Decree, including inspecting plant equipment, and inspecting and copying all records maintained by MAP required by this Consent Decree. MAP shall retain such records for the period of the Consent Decree. Nothing in this Consent Decree shall limit the authority of EPA to conduct tests and inspections under any statutory or regulatory provision.

XIII. FORCE MAJEURE

57. If any event occurs which causes or may cause a delay or impediment to performance in complying with any provision of this Consent Decree, MAP shall notify the United States in writing as soon as practicable, but in any event within ten (10) business days of when MAP first knew of the event or should have known of the event by the exercise of due diligence. In this notice, MAP shall specifically reference this Paragraph 57 of this Consent Decree and describe the

anticipated length of time the delay may persist, the cause or causes of the delay, and the measures taken or to be taken by MAP to prevent or minimize the delay and the schedule by which those measures shall be implemented. MAP shall adopt all necessary measures to avoid or minimize such delays. The notice required by this section shall be effective upon the mailing of the same by certified mail, return receipt requested, to the appropriate EPA Regional Office as specified in Paragraph 83 (Notice).

58. Failure by MAP to substantially comply with the notice requirements of Paragraph 57 as specified above shall render this Section XIII (Force Majeure) voidable by the United States as to the specific event for which MAP has failed to comply with such notice requirement, and, if voided, is of no effect as to the particular event involved.

59. The United States shall notify MAP in writing regarding its claim of a delay or impediment to performance within thirty (30) days of receipt of the force majeure notice provided under Paragraph 58.

60. If the United States agrees that the delay or impediment to performance has been or will be caused by circumstances beyond the control of MAP including any entity controlled by MAP and that MAP could not have prevented the delay by the exercise of due diligence, the Parties shall stipulate to an extension of the required deadline(s) for all requirement(s) affected by the delay by a period equivalent to the delay actually caused by such circumstances. Such stipulation shall be filed as a modification to the Consent Decree pursuant to the modification procedures established in this Consent Decree. MAP shall not be liable for stipulated penalties for the period of any such delay.

61. If the United States does not accept MAP's claim of a delay or impediment to performance, MAP must submit the matter to the Court for resolution to avoid payment of stipulated penalties, by filing a petition for determination with the Court. Once MAP has

submitted this matter to the Court, the United States shall have twenty (20) business days to file its response to the petition. If the Court determines that the delay or impediment to performance has been or will be caused by circumstances beyond the control of MAP including any entity controlled by MAP and that the delay could not have been prevented by MAP by the exercise of due diligence, MAP shall be excused as to that event(s) and delay (including stipulated penalties), for a period of time equivalent to the delay caused by such circumstances.

62. MAP shall bear the burden of proving that any delay of any requirement(s) of this Consent Decree was caused by or will be caused by circumstances beyond its control, including any entity controlled by it, and that they could not have prevented the delay by the exercise of due diligence. MAP shall also bear the burden of proving the duration and extent of any delay(s) attributable to such circumstances. An extension of one compliance date based on a particular event may, but does not necessarily, result in an extension of a subsequent compliance date or dates.

63. Unanticipated or increased costs or expenses associated with the performance of the MAP's obligations under this Consent Decree shall not constitute circumstances beyond its control, or serve as a basis for an extension of time under this Section XIII.

64. Notwithstanding any other provision of this Consent Decree, this Court shall not draw any inferences nor establish any presumptions adverse to either party as a result of MAP serving a force majeure notice or the Parties' inability to reach agreement.

65. As part of the resolution of any matter submitted to this Court under this Section XIII, the Parties by agreement, or the Court, by order, may in appropriate circumstances extend or modify the schedule for completion of work under the Consent Decree to account for the delay in the work that occurred as a result of any delay or impediment to performance agreed to by the

United States or approved by this Court. MAP shall be liable for stipulated penalties for its failure thereafter to complete the work in accordance with the extended or modified schedule.

XIV. RETENTION OF JURISDICTION/DISPUTE RESOLUTION

66. This Court shall retain jurisdiction of this matter for the purposes of implementing and enforcing the terms and conditions of the Consent Decree and for the purpose of adjudicating all disputes (including, but not limited to, EPA's determinations under Section V (Affirmative Relief/Environmental Projects (or Measures)) of the Consent Decree) among the Parties that may arise under the provisions of the Consent Decree, and until the Consent Decree terminates in accordance with Paragraph 87 of this Consent Decree (Termination).

67. The dispute resolution procedure provided by this Section XIV shall be available to resolve all disputes arising under this Consent Decree, including assertion of commercial unavailability under paragraph 24.C of this Consent Decree, provided that the party making such application has made a good faith attempt to resolve the matter with the other party.

68. The dispute resolution procedure required herein shall be invoked upon the giving of written notice by one of the Parties to this Consent Decree to another advising of a dispute pursuant to this Section XIV. The notice shall describe the nature of the dispute, and shall state the noticing party's position with regard to such dispute. The party receiving such a notice shall acknowledge receipt of the notice and the Parties shall expeditiously schedule a meeting to discuss the dispute informally not later than fourteen (14) days from the receipt of such notice.

69. Disputes submitted to dispute resolution shall, in the first instance, be the subject of informal negotiations between the Parties. Such period of informal negotiations shall not extend beyond thirty (30) calendar days from the date of the first meeting between representatives of the United States and MAP, unless it is agreed that this period should be extended.

70. In the event that the Parties are unable to reach agreement during such informal negotiation period, the United States shall provide MAP with a written summary of its position regarding the dispute. The position advanced by the United States shall be considered binding unless, within forty-five (45) calendar days of MAP's receipt of the written summary of the United States' position, it files with the Court a petition which describes the nature of the dispute. The United States shall respond to the petition within forty-five (45) calendar days of filing.

71. In the event, that the United States and the Plaintiff-Intervenors make differing determination or take differing action that affect MAP's rights or obligations under this Consent Decree the final decisions of the United States shall be binding, unless otherwise modified by the Court.

72. Where the nature of the dispute is such that a more timely resolution of the issue is required, the time periods set out in this Section XIV may be shortened upon motion of one of the Parties to the dispute.

73. The Parties do not intend that the invocation of this Section XIV by a party to cause the Court to draw any inferences nor establish any presumptions adverse to either party as a result of invocation of this Section.

74. As part of the resolution of any dispute submitted to dispute resolution, the Parties, by agreement, or this Court, by order, may, in appropriate circumstances, extend or modify the schedule for completion of work under this Consent Decree to account for the delay in the work that occurred as a result of dispute resolution. MAP shall be liable for stipulated penalties for its failure thereafter to complete the work in accordance with the extended or modified schedule.

XV. EFFECT OF SETTLEMENT

75. The effect of settlement of this action is governed by this Paragraph 75.

A. **NSR/PSD**: For purposes of Paragraph 75.A, the following statutory and regulatory requirements shall be called "the Applicable NSR/PSD Requirements":

(1) PSD requirements at Part C of Subchapter I of the Act, 42 U.S.C. § 7475, and the regulations promulgated thereunder at 40 C.F.R. § 52.21;

(2) "Plan Requirements for Non-Attainment Areas" at Part D of Subchapter I of the Act, 42 U.S.C. §§ 7502-7503, and the regulations promulgated thereunder at 40 C.F.R. §§ 51.165 (a) and (b); Title 40, Part 51, Appendix S; and 40 C.F.R. § 52.24; and

(3) Any applicable state regulations that implement, adopt, or incorporate the specific federal regulatory requirements identified above.

i. **NOx and SO_2**: With respect to emissions of NOx, and SO_2 from each of MAP's fluidized catalytic cracking units, the Catlettsburg RCCU, and the heaters and boilers at MAP's seven refineries covered by this Consent Decree, entry of this Consent Decree shall resolve all civil liability of MAP to the United States and the Plaintiff-Intervenors for violations of the Applicable NSR/PSD Requirements that: (1) commenced and ceased prior to the Date of Entry of the Consent Decree; or (2) commenced prior to the Date of Entry of the Consent Decree and continued until the earlier of December 31, 2003, or the effective date of any PAL for NOx or SO_2 established under Paragraph 26 of the Consent Decree.

ii. **PM and PM_{10}**: At such time as MAP notifies EPA that MAP has agreed to comply with both the PM emission limits established in Paragraph 15.E (for heaters and boilers) and the PM emission limits established in Paragraph 16.B (for fluidized catalytic cracking units), then with respect to emissions of PM and PM_{10} from each of MAP's FCCUs, the Catlettsburg RCCU, and

the heaters and boilers at MAP's seven refineries covered by this Consent Decree, the civil liability of MAP to the United States and the Plaintiff-Intervenors shall be resolved for violations of the Applicable NSR/PSD Requirements that: (1) commenced and ceased prior to date of the notification; or (2) commenced prior to the date of the notification and continued until the earlier of December 31, 2003, or the effective date of any PAL for PM or PM_{10} established under Paragraph 26.

iii. **CO:** At such time as MAP notifies EPA that MAP has agreed to comply with both the CO emission limits established in Paragraph 13.L (for heaters and boilers), and the CO emission limits established in Paragraph 12.K (for FCCUs), then with respect to emissions of CO from each of MAP's fluidized catalytic cracking units, the Catlettsburg RCCU, and the heaters and boilers at MAP's seven refineries covered by this Consent Decree, the civil liability of MAP to the United States and the Plaintiff-Intervenors shall be resolved for violations of the Applicable NSR/PSD Requirements that: (1) commenced and ceased prior to the date of the notification; or (2) commenced prior to the date of the notification and continued until the earlier of December 31, 2003, or the effective date of any PAL for CO established under Paragraph 26.

iv. **Reservation of Rights:** Notwithstanding the resolution of liability in Paragraphs 75.A.i-iii, nothing in this Consent Decree precludes the United States and/or the Plaintiff-Intervenors from seeking from MAP injunctive relief, penalties, or other appropriate relief for violations by MAP of the Applicable NSR/PSD Requirements that: (1) commenced prior to the Date of Entry of the Consent Decree for units not covered by the Consent Decree; or (2) commence after the Date of Entry of the Consent Decree. For purposes of the preceding sentence, all process heaters and boilers at MAP's seven refineries are "covered" by this Consent Decree.

B. **LDAR, Benzene Waste NESHAP, and NSPS at Part 60, Subparts A and J**. With respect to the seven refineries subject to this Consent Decree, entry of this Consent Decree shall resolve all civil liability of MAP to the United States and the Plaintiff-Intervenors for violations of the following statutory and regulatory requirements that occurred prior to the Date of Entry of the Consent Decree:

i. **LDAR.** For all equipment in light liquid service and gas and/or vapor service, the LDAR requirements promulgated pursuant to Sections 111 and 112 of the Clean Air Act, and codified at 40 C.F.R. Part 60, Subparts VV and GGG; 40 C.F.R. Part 61, Subparts J and V; and 40 C.F.R. Part 63, Subparts F, H, and CC;

ii. **Benzene Waste NESHAP**. The National Emission Standard for Benzene Waste Operations, 40 C.F.R. Part 61, Subpart FF, promulgated pursuant to Section 112(e) of the Act, 42 U.S.C. § 7412(e);

iii. **NSPS**. For sulfur recovery plants, the NSPS promulgated pursuant to Section 111 of the CAA, 42 U.S.C. § 7411, and codified at 40 C.F.R. Part 60, Subparts A and J; and for heaters and boilers as fuel gas combustion devices and for fluidized catalytic cracking units catalyst regenerators, 40 C.F.R. Part 60, Subpart J; and

iv. Any applicable state regulations that implement, adopt, or incorporate the specific federal regulatory requirements identified above.

v. **Reservation of Rights**. Notwithstanding the resolution of liability in Paragraphs 75.B.i-iv, nothing in this Consent Decree precludes the United States and/or Plaintiff-Intervenors from seeking from MAP:

(1) injunctive and/or other equitable relief for violations of Benzene Waste NESHAP and/or LDAR and/or NSPS requirements that (A) commenced prior to the Date of Entry of this Consent Decree and continued after the Date of Entry; or (B) commenced after the Date of Entry of the Consent Decree; or

(2) civil penalties for violations of Benzene Waste NESHAP and/or LDAR and/or NSPS occurring on or after the Date of Entry of the Consent Decree.

C. **Other.** Entry of this Consent Decree shall resolve all civil liability of MAP to the United States and the Plaintiff-Intervenors for the violations alleged in the Complaint in this matter at Claims Seven through Fourteen and/or the violations alleged in the following Notices of Violation ("NOVs") and Findings of Violation ("FOVs"): NOV No. EPA-5-99-MI-8, dated December 30, 1998 (CAA; Detroit Refinery); FOV No. EPA-5-99-MI-32, dated July 14, 1999 (CAA; Detroit Refinery); NOV No. EPA-5-99-MI-33, dated July 14, 1999 (CAA; Detroit Refinery); NOV No. EPA-5-99-MI-34, dated July 14, 1999 (CAA; Detroit Refinery); FOV No. EPA-5-99-IL-33, dated July 30, 1999 (CAA; Robinson Refinery); NOV dated February 29, 2000, from Lorna M. Jereza, Chief, Compliance Section 1, Enforcement and Compliance Assurance Branch, Waste, Pesticides and Toxics Division, EPA Region 5, to Mike Armbruster, Facility Manager, MAP Robinson Refinery (RCRA; Robinson Refinery). This civil liability shall be resolved through the Date of Entry of this Consent Decree.

D. **Reservation Re: NSPS Applicability**: Nothing in this Consent Decree shall affect the status of any FCCU, fuel gas combustion device, or sulfur recovery plant currently subject to NSPS as previously determined by any Federal, state, or local authority or any applicable permit.

E. **Audit Policy:** Nothing in this Consent Decree is intended to limit or prohibit MAP from utilizing EPA's Audit Policy or any state audit policy for any violations or non-compliance that MAP discovers during the course of any investigation, audit, or enhanced monitoring that MAP is required to undertake pursuant to this Consent Decree.

F. **Claim/Issue Preclusion:** In any subsequent administrative or judicial proceeding initiated by the United States or the States for injunctive relief, penalties, or other appropriate relief relating to MAP for violations of the PSD/NSR, NSPS, NESHAP, and/or LDAR requirements, not identified in Paragraph 75 and/or the Complaint:

a. MAP shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, or claim-splitting. Nor may MAP assert, or maintain, any other defenses based upon any contention that the claims raised by the United States or the States in the subsequent proceeding were or should have been brought in the instant case. Nothing in the preceding sentences is intended to affect MAP's ability to assert that the claims are deemed resolved by virtue of this Paragraph 75 of the Consent Decree.

b. The United States and Plaintiff-Intervenor States may not assert or maintain that this Consent Decree constitutes a waiver or determination of, or otherwise obviates, any claim or defense whatsoever, or that this Consent Decree constitutes acceptance by MAP of any interpretation or guidance issued by EPA related to the matters addressed in this Consent Decree.

G. **Imminent and Substantial Endangerment.** Nothing in this Consent Decree shall be construed to limit the authority of the United States to undertake any action against any person, including MAP, to abate or correct conditions which may present an imminent and substantial endangerment to the public health, welfare, or the environment.

XVI. GENERAL PROVISIONS

76. **Other Laws**: Except as specifically provided by this Consent Decree, nothing in this Consent Decree shall relieve MAP of its obligation to comply with all applicable Federal, state and local laws and regulations. Subject to Paragraph 75, nothing contained in this Consent Decree shall be construed to prevent or limit the United States' rights to seek or obtain other remedies or sanctions available under other Federal, state or local statutes or regulations, by virtue of MAP's violation of the Consent Decree or of the statutes and regulations upon which the Consent Decree is based, or for MAP's violations of any applicable provision of law, other than the specific matters resolved herein. This shall include the United States' right to invoke the authority of the Court to order MAP's compliance with this Consent Decree in a subsequent contempt action.

77. **Failure of Compliance:** The United States does not, by its consent to the entry of Consent Decree, warrant or aver in any manner that MAP's complete compliance with the Consent Decree will result in compliance with the provisions of the CAA, 42 U.S.C. §§ 7401-7671q or RCRA, 42 U.S.C. §§ 6901-6992k, or EPCRA, 42 U.S.C. §§ 11001-11050. Notwithstanding EPA's review or approval by the United States of any plans, reports, policies or procedures formulated pursuant to the Consent Decree, MAP shall remain solely responsible for compliance with the terms of the Consent Decree, all applicable permits, all applicable Federal, state and local regulations, and except as provided in Section XIII (Force Majeure).

78. **Service of Process:** MAP hereby agrees to accept service of process by mail with respect to all matters arising under or relating to the Consent Decree and to waive the formal service requirements set forth in Rule 4 of the Federal Rules of Civil Procedure and any applicable local rules of this Court, including but not limited to, service of a summons. The persons identified by MAP at Paragraph 83 (Notice) are authorized to accept service of process with respect to all matters arising under or relating to the Consent Decree.

79. **Post-Lodging/Pre-Entry Obligations:** Obligations of MAP under the provisions of this Consent Decree to perform duties scheduled to occur after the Date of Lodging of the Consent Decree, but prior to the Date of Entry of the Consent Decree, shall be legally enforceable from the Date of Entry of the Consent Decree. Liability for stipulated penalties, if applicable, shall accrue for violation of such obligations and payment of such stipulated penalties may be demanded by the United States as provided in this Consent Decree, provided that stipulated penalties that may have accrued between the Date of Lodging of the Consent Decree and the Date of Entry of the Consent Decree may not be collected by the United States unless and until Consent Decree is entered by the Court.

80. **Costs**: Each party to this action shall bear its own costs and attorneys' fees.

81. **Public Documents**: All information and documents submitted by MAP to the United States pursuant to this Consent Decree shall be subject to public inspection, unless subject to legal privileges or protection or identified and supported as business confidential by MAP in accordance with 40 C.F.R. Part 2.

82. **Public Notice and Comment:**: The Parties agree to the Consent Decree and agree that the Consent Decree may be entered upon compliance with the public notice procedures set forth at 28 C.F.R. § 50.7, and upon notice to this Court from the U.S. Department of Justice requesting entry of the Consent Decree. The United States reserves the right to withdraw or withhold its consent to the Consent Decree if public comments disclose facts or considerations indicating that the Consent Decree is inappropriate, improper, or inadequate. Further, the Parties agree and acknowledge that final approval by Plaintiff-Intervenor the State of Louisiana, Department of Environmental Quality, and State of Louisiana's participation is subject to the requirements of La. R.S. 30:2050.7, which provides for public notice of this Consent Decree in newspapers of general circulation and the official journals of parishes in which the Garyville, Louisiana facility is located, an opportunity for public comment, consideration of any comments, and concurrence by the State Attorney General.

83. **Notice/Approvals**.

A. Notice: Unless otherwise provided herein, notifications to or communications with the United States or MAP shall be deemed submitted on the date they are postmarked and sent by U.S. Mail, postage pre-paid, except for notices under Section XIII (Force Majeure) and Section XIV (Retention Jurisdiction/Dispute Resolution) which shall be sent by overnight mail or by certified or registered mail, return receipt requested. Each report, study, notification or other MAP communication shall be submitted as specified in this Consent Decree, with copies to EPA Headquarters and/or the appropriate EPA Region and State. Except as otherwise provided herein,

all reports, notifications, certifications, or other communications required or allowed under this Consent Decree to be submitted or delivered to the United States, EPA, the States, MAP shall be addressed as follows:

As to the United States:

Chief
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611, Ben Franklin Station
Washington, DC 20044-7611

As to EPA:

U.S. Environmental Protection Agency
Director, Regulatory Enforcement
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Mail Code 2242-A
Washington, DC 20460

EPA Region 4:

Director
Air, Pesticides and Toxics Management Division
U.S. EPA, Region 4
61 Forsyth Street (4APTMD-AEEB)
Atlanta, Georgia 30303

EPA Region 5:

Air and Radiation Division
U.S. EPA, Region 5
77 West Jackson Blvd. (AE-17J)
Chicago, IL 60604
Attn: Compliance Tracker

And

Office of Regional Counsel
U.S. EPA, Region 5
77 West Jackson Blvd. (C-14J)
Chicago, IL 60604

EPA Region 6:

Director, Compliance Assurance and
Enforcement Division
Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

The State of Louisiana:

R. Bruce Hammatt
Administrator
Enforcement Division
Office of Environmental Compliance
P.O. Box 82215
Baton Rouge, Louisiana 70884-2215

The State of Minnesota:

Air Quality Compliance Tracking Coordinator
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Wayne County, Michigan:

Wendy Barrott
Wayne County Air Quality Management Division
640 Temple Street, Suite 700
Detroit, MI 48201
Telephone: 313-833-3528
Facsimile: 313-833-3561

As to MAP:

Environmental and Safety Manager
Refining Operations
Marathon Ashland Petroleum LLC
539 South Main Street
Findlay, Ohio 45840

And

Group Counsel, Environmental
Law Organization
Marathon Ashland Petroleum LLC
539 South Main Street
Findlay, Ohio 45840

Any party may change either the notice recipient or the address for providing notices to it by serving all other parties with a notice setting forth such new notice recipient or address. In addition, the nature and frequency of reports required by the Consent Decree may be modified by mutual consent of the Parties. The consent of the United States to such modification must be in the form of a written notification from the Department of Justice.

84. **Approvals**: All EPA approvals or comments required under this Decree shall come from EPA, Air Enforcement Division at the address listed in Paragraph 83 (Notice). All Plaintiff-Intervener approvals shall be sent from the offices identified in Paragraph 83.

85. **The Paperwork Reduction Act**: The information required to be maintained or submitted pursuant to this Consent Decree is not subject to the Paperwork Reduction Act of 1980, 44 U.S.C. §§ 3501 et seq.

86. **Modification**. The Consent Decree contains the entire agreement of the Parties and shall not be modified by any prior oral or written agreement, representation or understanding. Prior drafts of the Consent Decree shall not be used in any action involving the interpretation or enforcement of the Consent Decree. Except as specified in Paragraph 83, the Consent Decree may not be amended or modified except by written order of this Court. Any modification of the Consent Decree by the Parties shall be in writing and approved by the Court before it shall be deemed effective.

XVII. TERMINATION

87. A. This Consent Decree shall be subject to termination upon motion by the United States or MAP (under the conditions identified in Paragraph 87.B) after MAP satisfies the following requirements of this Consent Decree.

i. installation of control technology systems as specified in this Consent Decree;

ii. MAP has achieved compliance with all provisions contained in this Consent Decree;

iii. MAP has paid all penalties and other monetary obligations (including supplemental environmental projects) due under the terms of the Consent Decree and no penalties or other monetary obligations (including supplemental environmental projects) due hereunder are outstanding or owed to the United States;

iv. the receipt of permits incorporating the emission limits established under Section V (Compliance Measures);

v. EPA's receipt of the first calendar quarterly progress report following the conclusion of MAP's operation for at least one year of all units in compliance with the emission limits established herein.

vi. MAP has certified compliance pursuant to Paragraph 87.A.i-v, above, to the United States and Plaintiff-Intevenors in writing;

B. Unless either the United States or the Plaintiff-Intervenors object in writing with specific reasons within 120 days of receipt of the certification required by Paragraph 88.A.vi., the Court may upon MAP's motion order that this Consent Decree be terminated. If either the United States or the any Plaintiff-Intervenor objects to MAP's certification, then the matter shall be submitted to the Court for resolution under Section XIV (Retention of Jurisdiction/Dispute Resolution) of this Consent Decree. In such case, MAP shall bear the burden of proving that this Consent Decree should be terminated.

XVIII. SIGNATORIES

88. Each of the undersigned representatives certify that they are fully authorized to enter into the Consent Decree on behalf of such Parties, and to execute and to bind such Parties to the Consent Decree.

Dated and entered this _____ day of _____, 2001.

_____
UNITED STATES DISTRICT JUDGE

WE HEREBY CONSENT to the entry of the Consent Decree in United States, et al. v. Marathon Ashland Petroleum LLC, Civil No. _____, subject to the public notice and comment requirements of 28 C.F.R. § 50.7.

FOR PLAINTIFF THE UNITED STATES OF AMERICA:

Date: 5-10-01

JOHN C. CRUDEN
Acting Assistant Attorney General
Environment and Natural Resources Division

Date: 5.11.01

Karen H. Schodowski for
ADAM M. KUSHNER
Senior Counsel
ANNETTE LANG
Trial Attorney
Environmental Enforcement Section
Environment and Natural Resources Division

ALAN M. GERSHEL
United States Attorney for the
Eastern District of Michigan

Date: 5.11.01

By: Karen H. Schodowski
KAREN SCHODOWSKI
Assistant United States Attorney
211 W. Fort Street
Suite 2001
Detroit, MI 48226

Date: 5/10/01

SYLVIA LOWRANCE
Acting Assistant Administrator for Enforcement and Compliance Assurance
United States Environmental Protection Agency
Washington, D.C. 20460

WE HEREBY CONSENT to the entry of the Consent Decree in United States, et al. v. Marathon Ashland Petroleum LLC, Civil No. _____, subject to the public notice and comment requirements of 28 C.F.R. § 50.7.

FOR PLAINTIFF-INTERVENOR COUNTY OF WAYNE, MICHIGAN:

Approved as to Content:

Date: May 8, 2001

Wendy R Barrett
Wendy R. Barrett
DIRECTOR
DEPARTMENT OF ENVIRONMENT
AIR QUALITY MANAGEMENT DIVISION

Approved as to Form:

Date: 5-10-01

Hilda Gurley-Highgate
Hilda Gurley-Highgate
WAYNE COUNTY
CORPORATION COUNSEL

WE HEREBY CONSENT to the entry of the Consent Decree in United States, et al. v. Marathon Ashland Petroleum LLC, Civil No. _____, subject to the public notice and comment requirements of 28 C.F.R. § 50.7.

FOR PLAINTIFF-INTERVENOR STATE OF MINNESOTA

Date: MAY 10, 2001

Gordon E Wegwart

GORDON E. WEGWART, P.E.
Assistant Commissioner
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155

Date: May 10, 2001

Leah M P Hedman

LEAH M. P. HEDMAN
Assistant Attorney General
Minnesota Attorney General's Office
445 Minnesota Street
Suite 900 North Central Life Tower
St. Paul, MN 55101

PRELIMINARY APPROVAL BY PLAINTIFF-INTERVENER, THE STATE OF LOUISIANA, THROUGH THE DEPARTMENT OF ENVIRONMENTAL QUALITY:

Dated: 5/9/01

LINDA KORN LEVY
Assistant Secretary
Office of Environmental Compliance
Louisiana Department of Environmental Quality

Dated: May 09 2001

JOHN B. KING
Chief Attorney
Legal Division
Louisiana Department of Environmental Quality
P.O. Box 82282
Baton Rouge, Louisiana 70884-2282

WE HEREBY CONSENT to the entry of the Consent Decree in United States, et al. v. Marathon Ashland Petroleum LLC, Civil No. _____, subject to the public notice and comment requirements of 28 C.F.R. § 50.7.

FOR DEFENDANT MARATHON ASHLAND PETROLEUM LLC.

Date: May 10, 2001

Manfred Spindler
Executive Vice President, Refining

APPENDICES TO THE CONSENT DECREE

IN

UNITED STATES OF AMERICA, ET AL.,

. MARATHON ASHLAND PETROLEUM LLC

APPENDIX A

MAP'S LIST OF FLARING DEVICES

A. ACID GAS FLARING DEVICES

CANTON

North Flare

CATLETTSBURG

North Area Flare (2-FS-11-1)

Air Assisted Flare (2-FS-11-2)

DETROIT

G.O Unifiner Flare (0029)

Cracking Plant Flare (0031)

GARYVILLE

South Flare (69-74)

North Flare (83-74)

ROBINSON

Flare Number #1 -- #6 (84-F-1 through 6)

ST. PAUL PARK

Main Flare (CE005)

B. HYDROCARBON FLARING DEVICES

CANTON

South Flare

North Flare

CATLETTSBURG

Pitch Flare (1-14-FS-3)

Lube Petrochem Flare (1-14-FS-2)

South Area Flare (2-11-FS-1)

New North Area Flare (2-11-FS-2)

HF Alkylation Flare (2-11-FS-3)

RCCS Flare (2-11-FS-4)

Air Assisted Flare (2-11-FS-5)

DETROIT

Gas Oil/Unifiner Flare (0029)

Cracking Plant Flare (0031)

Crude Flare (0036)

Alkylation Flare (0030)

GARYVILLE

South Flare (69-74)

North Flare (83-74)

Refrigerated Butane Storage Flare

Marine Vapor Combustor

ROBINSON

Flare # 1 (84-F-1)

Flare # 2 (84-F-2)

Flare # 3 (84-F-3)

Flare # 4 (84-F-4)

Flare # 5 (84-F-5)

Flare # 6 (85-F-6)

Wastewater Treatment Flare (84-F-7)

ST. PAUL PARK

Main Flare (CE005)

Loading Rack Flare (used when Condenser is out-of-service)

TEXAS CITY

Main Flare (ES60)

Alkylation Flare (ES16)

WWTP Flare

Benzene Loading Combustor Flare

APPENDIX B

DETERMINING CATALYST ADDITIVE ADDITION RATES

At least sixty (60) days prior to beginning each program to establish the optimized catalyst addition rate, MAP shall propose to EPA for its approval the catalyst additives MAP has selected for use. All catalyst additive weight percent addition rates in this Appendix shall be in terms of a 30-day rolling average and based on total catalyst addition rate. The maximum catalyst addition rate and incremental pick-up factor may need to be adjusted based on the performance of the EPA-approved catalyst additive compared to the performance of other commercially available catalyst additives. If additional time is necessary to determine the optimized catalyst addition rates, MAP may propose to EPA for its approval, a plan that modifies the process for addition of catalyst required by this Appendix and/or the schedules required by Paragraph 12. The baseline level of emissions for the $10,000/ton cost effectiveness threshold shall be based on the 3 calendar months of CEMS data immediately preceding the commencement of the establishment (and re-establishment) of the optimized catalyst addition rate.

I. Establishing Optimized Low-NOx CO Promoter Usage for the Robinson, Garyville, Texas City, Catlettsburg, Canton, Detroit and St. Paul FCCUs

A. The usage of conventional CO promoter shall be minimized at the typical mix of conventional CO promoter activities (i.e., based on historical usage), while retaining the basic effectiveness of CO promoter.

B. Usage of Low-NOx CO promoter shall replace usage of conventional CO promoter at the established minimized rate as normalized for different activities between the conventional CO promoter and Low-NOx CO promoter (as represented by the supplier) "Initial Addition Rate").

C. The effectiveness of Low-NOx CO promoter shall be evaluated to determine whether the following criteria are met:

1. Afterburn is controlled and regenerator temperature and CO levels are adequately maintained;

2. Temperature excursions are brought under control adequately; and

3. A measurable NOx reduction occurs.

If the Low-NOx CO promoter cannot meet these criteria at the Initial Addition Rate, the addition rate shall be increased up to a maximum of two times the Initial Addition Rate. If at two times the Initial Addition Rate, the Low-NOx CO promoter fails to meet those criteria, the usage of the Low-NOx CO promoter may be discontinued.

II. Establishing Optimized NOx Reducing Catalyst Additive Addition Rates

Initial and maximum NOx Reducing Catalyst Additive addition rates shall be as follows:

A. For the Catlettsburg RCCU/FCCU (Unit 109), the initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively;

B. For the Catlettsburg FCCU (Unit 1), if operated after June 30, 2004, the initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively;

C. For the Texas City FCCU, the initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively;

D. For the Garyville FCCU:

1. If a NOx Reducing System is installed pursuant to paragraph 12.A, the initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively;

2. If a NOx Reducing System is not installed pursuant to paragraph 12.A:

   i. The initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively, provided that MAP submits to EPA for its approval by February 28, 2002, a demonstration that NOx emissions as averaged over a 30-day period are less than 100 ppmvd at 0% O2 with all of the data

required by Paragraph 12.I for that same 30-day period; or

ii. The initial and maximum addition rates shall be 1.0 weight percent and 2.0 weight percent, respectively, where the conditions in the above 2.i are not met,

E. For the Detroit FCCU:

1. The initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively, if a NOx Reducing System is installed pursuant to paragraph 12.A; or

2. The initial and maximum addition rates shall be 1.0 weight percent and 2.0 weight percent, respectively.

F. For the Robinson FCCU:

1. The initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively, if a NOx Reducing System is installed pursuant to paragraph 12.A; or

2. the initial and maximum addition rates shall be 1.0 weight percent and 2.0 weight percent, respectively.

G. For the Canton FCCU:

1. The initial and maximum addition rates shall be 0.5 weight percent and 1.0 weight percent, respectively, provided that MAP submits for EPA approval by February 28, 2002, a demonstration that NOx emissions as averaged over a 30-day period are less than 100 ppmvd at 0% O2 with all of the data required by Paragraph 12.I for that same 30-day period; or

2. The initial and maximum addition rates shall be 1.0 weight percent and 2.0 weight percent, respectively.

H. For the St. Paul Park FCCU:

1. The initial and maximum addition rates shall be 0.5 weight percent and 1.0

weight percent, respectively, provided that MAP submits for EPA approval by February 28, 2002, a demonstration that NOx emissions as averaged over a 30-day period are less than 100 ppmvd at 0% O2 with all of the data required by paragraph 12.I for that same 30-day period; or

2. The initial and maximum addition rates shall be 1.0 weight percent and 2.0 weight percent, respectively.

To establish the optimized addition rate, NOx Reducing Catalyst Additive addition shall be increased at increments of at least 0.25 weight percent of total catalyst addition from the initial addition rate up to the maximum catalyst addition rate, and, once steady state has been achieved for each increment, the effect on NOx emissions and projected annualized cost shall be evaluated. If at any increment of NOx Reducing Catalyst Additive addition, the total annualized cost-effectiveness of the NOx Reducing Catalyst Additive used exceeds $10,000 per ton of NOx removed as measured from an uncontrolled baseline, or the incremental pick-up factor is less than 1.8 pounds of NOx removed level per pound of catalyst additive, the NOx Reducing Catalyst Additive addition rate used to determine the final emission limit shall remain at that level. The maximum catalyst addition rate and incremental pick-up factor is based on the best performing commercially available product. If lower activity products are used, the maximum catalyst additive addition rate and incremental pick-up factor shall be adjusted upwards based on the difference in activity between the product used and activity of the best performing commercially available catalyst additive.

IV. Establishing Optimized SO_2 Adsorbing Catalyst Additive Addition Rates for the Canton, Detroit and St. Paul FCCUs

Initial SO_2 Adsorbing Catalyst Additive addition rate shall be 5.0 weight percent of total catalyst addition rate. Once steady state has been achieved, the effect on SO_2 emissions of this rate shall be evaluated. To establish the optimized addition rate, the SO_2 Adsorbing Catalyst Additive addition shall be increased at increments of 1.0 weight percent of total catalyst

APPENDIX C

1999-2000 ACTUAL HEATER AND BOILER NOX EMISSIONS BY UNIT

[BEGINS NEXT PAGE]

SUMMARY OF NOx EMISSIONS - MAP REFINERIES

Emission Source Category	Operating Year 1999		Operating Year 2000		Avg. 1999/2000	
	Firing Rate (MM BTU/hr)	NOx Emissions (tpy)	Firing Rate (MM BTU/hr)	NOx Emissions (tpy)	Firing Rate (MM BTU/hr)	NOx Emissions (tpy)
Process Heaters/Boilers (> 40 MM BTU/hr)						
Canton	492	616	584	621	538	618
Catlettsburg	2,613	1,984	2,523	1,945	2568	1964
Detroit	709	640	662	637	685	638
Garyville	2,622	1,866	2,508	1,561	2565	1713
Robinson	2,249	1,638	2,287	1,678	2268	1658
St. Paul Park	647	442	641	436	644	439
Texas City	710	353	677	329	693	341
Subtotal	10,043	7,539	9,882	7,206	9962	7373
Gas-Fired Reciprocating Compressors						
Detroit (4 FCC Air Blowers)	75	247	69	185	72	216
Texas City (4 FCC Wet Gas)	23	373	20	342	22	358
Subtotal	98	620	89	528	94	574
Baseline Totals (Heaters, Boilers, & Gas-Fired Compressors)						
Values for Sigma Equation	10,141	8,159	9,971	7,734	10,056	7,947
HEATERS/BOILERS (<40 MM BTU/HR) & OTHER MISCELLANEOUS SOURCES						
Canton	16	9	15	8	16	8
Catlettsburg	173	66	178	69	176	67
Detroit	57	151	57	151	57	151
Garyville	23.2	12	23.3	12	23	12
Robinson	48	21	47.5	21	48	21
St. Paul Park	99	35	96	39	97	37
Texas City	42	130	44	198	43	164
Subtotal	459	423	462	497	460	460

PROCESS HEATERS/BOILERS AT CANTON

Emission Source	Design Firing Rate	Operating Year 1999				Operating Year 2000				Basis for Emission Factor
		Fuel Consumed	Firing Rate	Emission Factor	Nox Emissions	Fuel Consumed	Firing Rate	Emission Factor	Nox Emissions	
	MM BTU/hr	(MM scf/yr) - gas (bbls/yr) - oil	(MM BTU/hr)	(lb/MM scf) - gas (lb/1000 gal) - oil	(tpy)	(MM scf/yr) - gas (bbls/yr) - oil	(MM BTU/hr)	(lb/MM scf) - gas (lb/1000 gal) - oil	(tpy)	
HEATERS/BOILRERS (> 100 MM BTU/HR)										
CCR Charge Heaters (4-33-B-1,2, 3, & 4)	234	1,506	104	280	211	1,436	116	280	201	AP-42 - 280 lb/MM scf
Crude Heater (4-0-B-6)	166	852	83	280	119	919	107	280	129	AP-42 - 280 lb/MM scf
Number 11 Boiler (4-16-B-11)										
fuel gas	130	416	38	280	58	445	49	280	62	AP-42 - 280 lb/MM scf
fuel oil		69,200	50	47	68	65,091	47	47	64	AP-42 - 47 lb/1000 gallons
HDS Charge Heater (4-32-B-1)										
fuel gas	115	426	41	280	60	415	48	280	58	AP-42 - 280 lb/MM scf
fuel oil		8,487	6	47	8	9,216	7	47	9	AP-42 - 47 lb/1000 gallons
Subtotal (> 100 MM BTU/hr)										
fuel gas	645	3,200	266	280	448	3,215	320	280	450	
fuel oil		77,687	56	47	77	74,307	54	47	73	
HEATERS/BOILRERS (>40 MM BTU/HR & <100 MM BTU/HR)										
Naphtha Pretreater (4-30-B-1)	75	242	24	100	12	209	24	100	10	AP-42 - 100 lb/MM scf
CCR Stabilizer Reboiler (4-33-B-5)	74	144	10	100	7	146	12	100	7	AP-42 - 100 lb/MM scf
Vacuum Heater (4-4-B-1)	58	371	36	100	19	431	50	100	22	AP-42 - 100 lb/MM scf
Number 12 Boiler (4-16-B-12)	50	283	27	100	14	229	27	100	11	AP-42 - 100 lb/MM scf
Number 1 Boiler (4-16-B-1)										
fuel gas	50	148	15	100	7	80	9	100	4	AP-42 - 100 lb/MM scf
fuel oil		1,586	1	47	2	2,188	2	47	2	AP-42 - 47 lb/1000 gallons
Number 2 Boiler (4-16-B-2)										
fuel gas	50	110	11	100	6	131	15	100	7	AP-42 - 100 lb/MM scf
fuel oil		1,388	1	47	1	4,548	3	47	4	AP-42 - 47 lb/1000 gallons
FCC Charge Heater (4-2-B-6)	46	187	18	100	9	303	35	100	15	AP-42 - 100 lb/MM scf
Iso-Stripper Heater (4-27-B-1)	45	281	27	100	14	280.5	32.5	100	14	AP-42 - 100 lb/MM scf
Subtotal (>40 & <100 MM BTU/hr)										
fuel gas	448	1766	168	100	88	1810	205	100	90	
fuel oil		2974	2	47	3	6736	5	47	7	
Heaters/Boilers (Applied Towards Sigma Equation)										
fuel gas	1,093	4,966	434	216	536	5,025	525	215	541	
fuel oil		80,661	58	47	80	81,043	59	47	80	
Overall	1,093		492		616		584		621	
HEATERS/BOILERS (<40 MM BTU/HR)										
DOT HEATER (4-2-B-1)	35	170	16	100	9	160.1	15	100	8	AP-42 - 100 lb/MM scf

PROCESS HEATERS BOILERS AT CATLETTSBURG

Emission Source	Design Firing Rate	Operating Year 1999				Operating Year 2000				Basis for Emission Factor
		Fuel Consumed	Firing Rate	Emission Factor	Nox Emissions	Fuel Consumed	Firing Rate	Emission Factor	Nox Emissions	
	MM BTU/hr	(MM scf/yr) - gas (bbls/yr) - oil	(MM BTU/hr)	(lb/MM BTU) - gas (lb/1000 gal) - oil	(tpy)	(MM scf/yr) - gas (bbls/yr) - oil	(MM BTU/hr)	(lb/MM scf) - gas (lb/1000 gal) - oil	(tpy)	
PROCESS HEATERS/BOILERS > 100 MM BTU/HR										
#5 Crude Charge Htr (1-41-B-1)										
Fuel Gas	300	1,795	177	0.09	70	1,470	155	0.09	61	Stack test 09/9/97 - avg 3 runs
Fuel Oil		45,321	33	47	45	68,602	49	47	68	AP-42 - 47 lbs/1000 gallons of oil
#4 Boiler (2-601-B-4)	295	1,482	151	0.34	225	1,368	146	0.34	217	Stack Test 01/28/93 - avg 3 runs
#12 Boiler (2-601-B-12)	187	1,034	105	0.14	64	978	105	0.14	64	Stack Test 01/28/93 - avg 3 runs Nox CEM - avg 75 ppmv since 09/01/00
SAT Gas Plant Htr (2-30-B-1)	162	1,121	114	0.28	140	944	101	0.28	124	AP-42 - 280 lbs/MM scf
CCR Htr (2-102-B-1B)	155	851	85	0.28	104	773	82	0.28	101	AP-42 - 280 lbs/MM scf
#10 Boiler (2-601-B-10)	147	576	59	0.28	72	461	50	0.28	61	AP-42 - 280 lbs/MM scf
#3 Crude Htr (2-23-B-3)	145	1,256	127	0.28	156	1,143	122	0.28	150	AP-42 - 280 lbs/MM scf
#3 Crude Htr (2-23-B-4)	145	1,178	128	0.28	157	1,136	122	0.28	150	AP-42 - 280 lbs/MM scf
CCR Htr (2-102-B-1A)	145	935.5	95	0.28	117	819	88	0.28	108	AP-42 - 280 lbs/MM scf
#4 Vac Htr (2-26-B-2)	145	846	85	0.04	15	729	78	0.04	14	Stack test 05/30/97 - avg 3 runs
FCC Charge Htr (2-1-B-8)	145	470	48	0.28	59	557	60	0.28	74	AP-42 - 280 lbs/MM scf
#11 Boiler (1-39-B-1)	114	405	41	0.28	50	451	48	0.28	59	AP-42 - 280 lbs/MM scf
CCR Htr (2-102-B-1C)	112	705	72	0.28	88	730	78	0.28	96	AP-42 - 280 lbs/MM scf
VGO Charge Htr (2-104-B-1)	103	521	53	0.28	65	498	53	0.28	65	AP-42 - 280 lbs/MM scf
VGO Charge Htr (2-104-B-2)	103	584	60	0.28	74	531	57	0.28	70	AP-42 - 280 lbs/MM scf
#2 DDS Stripper Reboiler (2-121-B-3)	100	476	49	0.05	11	446	48	0.05	11	Stack Test 01/8/97 - avg 3 runs
Subtotal										
Fuel Gas	2503	14,236	1,449	0.23	1,466	13,034	1,393	0.23	1,423	
Fuel Oil		45,321	33	0.31	45	45,321	49	0.32	68	
Process Heaters/Boilers (> 40 MM BTU/hr & < 100 MM BTU/hr)										
#2 Crude Charge Htr (1-2-B-3)										
Fuel Gas	99	470.6	48	0.1	21	362.4	37	0.1	16	AP-42 - 100 lbs/MM scf
Fuel Oil		38,875	26	47	38	47,502	32	47	47	AP-42 - 47 lbs/1000 gallons
Aliphatics Hot Oil Htr (1-4-B-6)	96	599	71	0.1	31	607	73	0.1	32	AP-42 - 100 lbs/MM scf
#5 Vac Rerun Htr (1-37-B-1)	95	795	79	0.1	35	27	76	0.1	33	AP-42 - 100 lbs/MM scf
Isomerization Htrs (2-35-B-1 & 2)	92	441	45	0.1	20	435	47	0.1	21	AP-42 - 100 lbs/MM scf
LPCCR No. 1 Interhtr (1-44-B-2)	90	453	54	0.045	11	464	55	0.045	11	Stack Test 01/9/97 - avg 3 runs
HF Alky Isostripper Reboiler (2-36-B-1)	86	428	43	0.1	19	324	35	0.1	15	AP-42 - 100 lbs/MM scf
DDS Stripper (2-103-B-3)	81	165	17	0.1	7	152	16	0.1	7	AP-42 - 100 lbs/MM scf
NPT Stripper Reboiler (2-101-B-2)	80	411	42	0.1	18	347	37	0.1	16	AP-42 - 100 lbs/MM scf
#7 Boiler (2-601-B-7)	71	349	41	0.1	18	347	42	0.1	18	AP-42 - 100 lbs/MM scf
#8 Boiler (2-601-B-8)	71	287	34	0.1	15	242	29	0.1	13	AP-42 - 100 lbs/MM scf
LPCCR Charge Htr (1-44-B-1)	70	431	51	0.045	10	435	52	0.045	10	Stack Test 01/9/97 - avg 3 runs
LPCCR No. 2 Interhtr (1-44-B-3)	70	270	32	0.045	6	281	34	0.045	7	Stack Test 01/9/97 - avg 3 runs
#5 Boiler (2-601-B-5)	69	229	24	0.1	11	257	27	0.1	12	AP-42 - 100 lbs/MM scf
#6 Boiler (2-601-B-6)	69	371	38	0.1	17	379	41	0.1	18	AP-42 - 100 lbs/MM scf
#1 Boiler (2-601-B-1)	68	141	14	0.1	6	15	2	0.1	1	AP-42 - 100 lbs/MM scf

Emission Source	Design Firing Rate	Operating Year 1999				Operating Year 2000				Basis for Emission Factor
		Fuel Consumed	Firing Rate	Emission Factor	Nox Emissions	Fuel Consumed	Firing Rate	Emission Factor	Nox Emissions	
	MM BTU/hr	(MM scf/yr) - gas (bbls/yr) - oil	(MM BTU/hr)	(lb/MM BTU) - gas (lb/1000 gal) - oil	(tpy)	(MM scf/yr) - gas (bbls/yr) - oil	(MM BTU/hr)	(lb/MM scf) - gas (lb/1000 gal) - oil	(tpy)	
PROCESS HEATERS/BOILERS >40 MM BTU/HR (Cont'd)										
#1 Cumene Column Reboiler (1-35-B-3)	67	399	48	0.075	16	440	53	0.075	17	Stack Test -(01/15/98) - avg 3 runs
Furfural Htr (1-38-B-2)	65	462	47	0.1	21	435	47	0.1	21	AP-42 - 100 lbs/MM scf

PROCESS HEATERS BOILERS AT CATLETTSBURG

Benzene Co[illegible]boiler (1-35-B-1)	64	357	42	0.1	18	358	43	0.1	19	AP-42 - 100 lbs/MM scf
SHU Hot Oil Htr (1-29-B-1)	63	225	27	0.1	12	0.14	0.02	0.1	0	AP-42 - 100 lbs/MM scf
SHU Reactor Htr (1-29-B-4)	63	121	14	0.1	6	125	15	0.1	7	AP-42 - 100 lbs/MM scf
DDS Charge Htr (2-103-B-1)	61	124	12	0.1	5	118	13	0.1	6	AP-42 - 100 lbs/MM scf
DDS Charge Htr (2-103-B-2)	61	103	11	0.1	5	80	9	0.1	4	AP-42 - 100 lbs/MM scf
NPT Charge Htr (2-101-B-1)	60	249	25	0.1	11	213	23	0.1	10	AP-42 - 100 lbs/MM scf
SPU Reactor Charge Htr (2-31-B-2)	59	65	8	0.1	4	71	8	0.1	4	AP-42 - 100 lbs/MM scf
ADS #2 Tower Reboiler (1-28-2)	56	90	11	0.1	5	97	12	0.1	5	AP-42 - 100 lbs/MM scf
LEP Unit Dehexanizer Reboiler (1-43-B-1)	56	429	44	0.1	19	387	41	0.1	18	AP-42 - 100 lbs/MM scf
#2 DDS Reactor Charge Htr (2-121-B-1)	55	122	13	0.055	3	140	15	0.055	4	Stack Test - (01/8/97) - Avg 3 runs
#2 DDS Reactor Charge Htr (2-121-B-2)	55	125	13	0.055	3	120	13	0.055	3	Stack Test - (01/8/97) - Avg 3 runs
LPCCR No. 3 Interhtr (1-44-B-4)	50	239	28	0.045	6	232	28	0.045	6	Stack Test - (01/9/97) - Avg 3 runs
Spec G-Oil Charge Htr (1-25-B-1)	48	225	27	0.1	12	211	25	0.1	11	AP-42 - 100 lbs/MM scf
#2 Vacuum Charge Htr (1-2-B-1)										
Fuel Gas	45	176.4	18	0.1	8	130.0	15	0.1	7	AP-42 - 100 lbs/MM scf
Fuel Oil		870	1	47	1	0	0	47	0	AP-42 - 47 lbs/1000 gallons
LPCCR Guard Case Htrs (1-4-B-7)	42	299	35	0.1	15	312	37	0.1	16	AP-42 - 100 lbs/MM scf
LPCCR Guard Case Htrs (1-4-B-8)	42	265	31	0.1	14	246	29	0.1	13	AP-42 - 100 lbs/MM scf
Pitch Htr (1-3-B-1)	40	147	17	0.1	7	170	20	0.1	9	AP-42 - 100 lbs/MM scf
Subtotal (>40 & < 100 MM BTU/hr)										
Fuel Gas	2259	10,063	1,104	0.09	433	8,560	1,049	0.09	407	
Fuel Oil		39,745	27	0.33	39	47,502	32	0.33	47	
TOTALS (ALL HEATERS/BOILERS > 40 MM BTU/HR)										
Fuel Gas	4,762	24,299	2,553	0.17	1,900	21,594	2,442	0.17	1,830	
Fuel Oil		85,066	60	0.32	84	92,823	81	0.32	115	
OVERALL	4,762		2,613	0.17	1,984		2,523	0.18	1,945	
HEATERS/BOILERS (<40 MM BTU/HR)										
Fractionator Bottoms Htr (1-2-B-4)	39	108	12	0.1	5	110	13	0.1	6	AP-42 - 100 lbs/MM scf
CCR Htr (2-102-B-1D)	35	101	10	0.1	4	67	7	0.1	3	AP-42 - 100 lbs/MM scf
Asphalt Mix Htr (2-31-B-1)	30	124	13	0.05	3	106	11	0.05	2	Stack Test (01/17/95) - Avg 3 runs
ADS Charge Htr (1-28-B-1)	27	130	15	0.1	7	136	16	0.1	7	AP-42 - 100 lbs/MM scf
CCR Debutanizer (2-102-B-2)	26	219	25	0.1	11	219	25	0.1	11	AP-42 - 100 lbs/MM scf
LPCCR Debutanizer Reboiler (1-44-B-5)	25	103	12	0.045	2	106	13	0.045	3	Stack Test (01/09/97) - Avg 3 runs
Furfural Htr (1-38-B-1)	22	122	13	0.1	6	112	12	0.1	5	AP-42 - 100 lbs/MM scf
Cumene Column Reboiler (1-35-B-2)	19	137	16	0.1	7	138	16	0.1	7	AP-42 - 100 lbs/MM scf
Asphalt Htr (1-6-B-1)	18	1.8	0.3	0.1	0	2	0	0.1	0	AP-42 - 100 lbs/MM scf
Asphalt Htr (1-6-B-2)	18	1.8	0.3	0.1	0	2	0	0.1	0	AP-42 - 100 lbs/MM scf
Oxidizer Fume Burner (1-6-B-6)	18	5.5	0.6	0.1	0	5	1	0.1	0	AP-42 - 100 lbs/MM scf
SHU/SPU Hot Oil Htr (1-29-B-2)	14	245	29	0.1	13	337	40	0.1	18	AP-42 - 100 lbs/MM scf
Road Oil Fume Burner (1-6-B-5)	12	0.0	0.0	0.1	0	0	0	0.1	0	AP-42 - 100 lbs/MM scf
SDA Hot Oil Htr (2-31-B-2)	11	244	25	0.06	7	203	22	0.06	6	Stack Test (01/17/95) - Avg 3 runs
Regenerant Vapor Superheater (2-35-B-3)	3	20	2	0.1	1	19	2	0.1	1	AP-42 - 100 lbs/MM scf
Subtotal (< 40 MM BTU/hr)	317	1,562	173	0.09	66	1,562	178	0.09	69	

PROCESS HEATERS AND BOILERS at DETROIT

Emission Source	Design Firing Rate	OPERATING YEAR 1999				OPERATING YEAR 2000				BASIS FOR EMISSION FACTOR
		Fuel Consumption	Firing Rate	Emission Factor	NOx Emissions	Fuel Consumption	Firing Rate	Emission Factor	NOx Emissions	
	(MM BTU/hr)	MMscf/yr - gas bbls/yr - oil	MM BTU/hr	lb/MM Btu - gas lb/1000 gall - oil	(tpy)	MMscf/yr - gas bbls/yr - oil	MM BTU/hr	lb/MM Btu - gas lb/1000 gall - oil	(tpy)	
HEATERS & BOILERS (> 100 MM BTU/HR)										
CO Boiler (EU00158)										
Fuel Gas	300	888	101	0.220	98	1,270	145	0.220	140	Stack Test (05/26/99) - Avg runs 1 & 2
Fuel Oil		127,095	91	47	125	114,428	82	47.000	113	AP-42 - 47 lbs/1000 gallons fuel oil
Zurn Boiler (EU00159)	210	334	38	0.100	17	247	28	0.100	12	Avg. NOx Conc of 100 ppmv - CEM
Crude Alcorn Heater (EU00070)	200	1,449	165	0.265	192	1,374	157	0.265	182	Stack Test (03/27/97) - Avg. 3 runs (Common Stack with Vacuum Heater)
SR Platformer Charge Htr (EU00141)	130	631	72	0.043	14	524	60	0.043	11	Stack Test (12/17/92) - Avg 3 runs
FCCU Preheater (EU00109)	102	475	54	0.280	67	426	49	0.280	60	AP-42 - 280 lbs/MM scf
Subtotal										
Fuel Gas	942	3,777	431	0.205	386	3,841	438	0.211	405	
Fuel Oil		127,095	91	0.313	125	114,428	82	0.313	113	
HEATERS & BOILERS (≥ 40 MM BTU/HR & < 100 MM BTU/HR)										
Crude Vacuum Heater (EU00066)	96	625	71	0.265	83	619	82	0.265	95	Stack Test (03/27/97) - Avg. 3 runs (Common Stack with Crude Heater)
G.O/Unifiner Charge Heater (EU00089)	75	186	21	0.041	4	244	7	0.041	1	Stack Test (06/07/94) - Avg. 3 runs
BT Interheater (EU00148)	65	222	25	0.100	11	422	21	0.100	9	AP-42 - 100 lbs/MM scf
BT Charge Heater (EU00147)	64	168	19	0.100	8	213	11	0.100	5	AP-42 - 100 lbs/MM scf
Alkylation Reboiler (EU0097)	53	248	28	0.100	12	195	10	0.100	4	AP-42 - 100 lbs/MM scf
NHT Charge Heater (EU00143)	40	186	21	0.100	9	191	10	0.100	4	AP-42 - 100 lbs/MM scf
Subtotal	393	1,635	187	0.156	128	1,884	141	0.193	119	
GAS FIRED RECIPROCATING COMPRESSORS										
FCC Air Blowers										
11C4	15 - (440 BHP)	4368 hrs	5	8.4 lb/hr	18	2520 hrs operation	4	8.4 lb/hr	11	Stack Test (05/22/99) - Avg 3 runs
11C5	22 - (660 BHP)	5232 hrs	10	8.4 lb/hr	22	1848 hrs operation	5	8.4 lb/hr	8	Emission factor from 05/22/99 test
11C6	50 - (1500 BHP)	7440 hrs	30	27.2 lb/hr	101	6,888 hrs operation	30	27.2 lb/hr	94	Emission factor from 05/22/99 test
11C7	50 - (1500 BHP)	7776 hrs	30	27.2 lb/hr	106	5,400 hrs operation	30	27.2 lb/hr	73	Stack Test (05/22/99) - Avg 3 runs
Total			75		247		69		185	
BASELINE TOTALS (UTILIZED IN SIGMA EQUATION)										
Fuel Gas	1,472	5,412	693	0.251	762	5,725	648	0.250	710	
Fuel Oil		127,095	91	0.313	125	114,428	82	0.313	113	
Totals	1,472		784	0.258	887		731	0.257	823	
HEATERS/BOILERS (< 40 MM BTU/HR)										
SRU Thermal Oxidizer (EU00169)	25	54	6	0.25	7	49	6	0.25	6	Stack Test (10/29/93) - Avg 3 runs
NHT Stripper Reboiler (EU00144)	24	133	15	0.1	7	133	15	0.1	7	AP-42 - 100 lbs/MM scf
KHT Charge Heater (EU00151)	14	53	6	0.1	3	55	6	0.1	3	AP-42 - 100 lbs/MM scf
Melvandale Asphalt Heater (EU00316)	14	36	4	0.1	2	39	4	0.1	2	AP-42 - 100 lbs/MM scf
Unifiner H2 Compressor #1(7C1)	15 - (440 BHP)	7,132 hrs operation	4	8.4 lb/hr	30	7,872 hrs operation	4	8.4 lb/hr	33	Emission factor from 05/22/99 test
Unifiner H2 Compressor #2 (7C2)	15 - (440 BHP)	8,333 hrs operation	4	8.4 lb/hr	35	7,800 hrs operation	4	8.4 lb/hr	33	Emission factor from 05/22/99 test
Unifiner H2 Compressor #3 (7C3)	15 - (440 BHP)	8095 hrs operation	4	8.4 lb/hr	34	7,896 hrs operation	4	8.4 lb/hr	33	Emission factor from 05/22/99 test
FCC Wet Gas Compressor (12C5)	22 - (660 BHP)	4104 hrs operation	5	8.4 lb/hr	17	5,400 hrs operation	5	8.4 lb/hr	23	Emission factor from 05/22/99 test
FCC Wet Gas Compressor (12C6)	15 - (440 BHP)	3696 hrs opeation	3	8.4 lb/hr	15	2,232 hrs operation	3	8.4 lb/hr	9	Emission factor from 05/22/99 test
Therminol Heater (North) (EU00164)	7.5	19	2	0.1	1.0	6	1	0.1	0.3	AP-42 - 100 lbs/MM scf
Therminol Heater (South) - (EU00165)	7.5	31	4	0.1	2	45	5	0.1	2	AP-42 - 100 lbs/MM scf
Subtotal (Non-Sigma Sources)	174	488	57		151	489	57		151	

PROCESS HEATERS AND BOILERS - GARYVILLE

Emission Source	Design Firing Rate	OPERATING YEAR 1999				OPERATING YEAR 2000				BASIS FOR EMISSION FACTOR
		Fuel Consumption	Firing Rate	Emission Factor	NOx Emissions	Fuel Consumption	Firing Rate	Emission Factor	NOx Emissions	
	(MM BTU/hr)	MMscf/yr -gas	MM BTU/hr	lb/MM Btu	(tpy)	MMscf/yr -gas	MM BTU/hr	lb/MM Btu	(tpy)	
PROCESS HEATERS/BOILERS (>100 MM BTU/HR)										
Platformer Heater [12-1401]	408	3767	387	0.104	176	2871	295	0.104	134	Stack Test (04/23/96) - 0.104 lb/MM BTU (Avg 3 runs)
Boiler #1 (Unit 42) [42-1401]	350	1726	197	0.138	119	1673	191	0.138	115	Stack Test (10/98) - 0.138 lb/MM BTU Avg 3 runs - heater has FGR/LNBs
Crude Atmospheric Heater [10-1401]	286	2501	257	0.28	315	2404	247	0.055	60	0.055 lb/MM BTU - Stack Test on 04/00 (New ULNBs installed in January of 2000)
Crude Atmospheric Heater [10-1402]	286	2501	257	0.28	315	2540	261	0.28	320	Stack Test (04/23/96) - 0.4 lb/MM BTU (Avg) Used AP-42 factor of 280 lb/MM scf
Hf Alky Isostripper Reboiler [27-1401 & 1402]	268	1986	204	0.268	239	1917	197	0.268	231	Stack Test (01/95) - 0.268 lb/MM BTU (Avg) Heater has air preheater
ROSE Deasphalting [7-1401]	221	1295	133	0.05	29	1343	138	0.05	30	0.05 lb/MM BTU - 04/6/99
Platformer Interheater #5 [12-1403]	210	1762	181	0.14	111	1684	173	0.14	106	Emission factor from Stack test of FCC Charge Heater
FCC Charge Heater [25-1401]	170	1441	148	0.14	91	1489	153	0.14	94	Stack Test (03/14/01) - 0.14 lb/MM BTU (Avg)
Crude Vacuum Heater [10-1403]	138	1061	109	0.122	58	944	97	0.122	52	Stack Test 05/04/95 - Avg 3 runs Low NOx Burners - Vacuum off-gas
Crude Vacuum Heater [10-1404]	138	1022	105	0.122	56	925	95	0.122	51	Stack Test 05/04/95 - Avg 3 runs Low NOx Burners - Vacuum off-gas
Old Boiler #1 [36-1601]	120	885	101	0.14	62	1090	112	0.14	69	Emission factor from Stack test of FCC Charge Heater
Old Boiler #2 [36-1602]	120	858	98	0.14	60	1110	114	0.14	70	Emission factor from Stack test of FCC Charge Heater
Subtotal (>100 MM BTU/hr)	2,715	20,804	2,177	0.171	1,632	19,991	2,073	0.147	1,332	
PROCESS HEATERS/BOILERS (>40 MM BTU/HR & < 100 MM BTU/HR)										
HGO Charge Heater [15-1401]	99	526	54	0.12	28	681	70	0.12	37	Average of stack test results of Sat's Gas Heater and Naphtha Reboiler
HGO Reboiler Heater [15-1403]	78	526	54	0.12	28	545	56	0.12	29	Average of stack test results of Sat's Gas Heater and Naphtha Reboiler
Sat's Gas Hot Heater [22-1401]	73	535	55	0.14	34	526	54	0.14	33	0.14 lb/MM BTU - 03/08/01
Distillate Hydrotreater Charge Heater [14-1401]	69	594	61	0.12	32	506	52	0.12	27	Average of stack test results of Sat's Gas Heater and Naphtha Reboiler
Distillate Hydrotreater StripperReboiler [14-1402]	62	535	55	0.12	29	565	58	0.12	30	Average of stack test results of Sat's Gas Heater and Naphtha Reboiler
Naphtha Hydrotreater Reboiler [11-1402]	61	535	55	0.1	24	526	54	0.1	24	0.10 lb/MM BTU - 03/08/01
Platformer Debutanizer Reboiler [12-1402]	61	613	63	0.12	33	526	54	0.12	28	Average of stack test results of Sat's Gas Heater and Naphtha Reboiler
Naphtha Hydrotreater Heater [11-1401]	53	467	48	0.12	25	360	37	0.12	19	Average of stack test results of Sat's Gas Heater and Naphtha Reboiler
Subtotal (>40 MM BTU/hr & <100 MM BTU/h	556	4,331	445	0.120	234	4,234	435	0.120	229	
HEATER/BOILER TOTALS (SIGMA EQ.)	3,271	25,135	2,622	0.163	1,866	24,225	2,508	0.142	1,561	
PROCESS HEATERS/BOILERS (< 40 MM BTU/HR)										
LSR Hydrotreater Charge Heater (100-85)	17	122	12.5	0.12	7	97	10	0.12	5	Average of stack test results of Sat's Gas Heater and Naphtha Reboiler
LSR Hydrotreater Reboiler (101-85)	15	94	9.7	0.12	5	91	9.3	0.12	5	Average of stack test results of Sat's Gas Heater and Naphtha Reboiler
Thermal Drying Unit Heater	4	10	1	0.12	1	39	4	0.12	2	Average of stack test results of Sat's Gas Heater and Naphtha Reboiler
Subtotal (<40 MM BTU/hr)	36	226	23.2	0.120	12	227	23.3	0.120	12	

PROCESS HEATERS BOILERS AT ROBINSON

Emission Source	Design Firing Rate	OPERATING YEAR 1999				OPERATING YEAR 2000				BASIS FOR EMISSION FACTOR
		Fuel Consumption	Firing Rate	Emission Factor	NOx Emissions	Fuel Consumption	Firing Rate	Emission Factor	NOx Emissions	
	(MM BTU/hr)	MMscf/yr -gas bbls/yr - oil	MM BTU/hr	lb/MM scf - gas lb/1000 gallons - oil	(tpy)	MMscf/yr -gas bbls/yr - oil	MM BTU/hr	lb/MM scf - gas lb/1000 gallons - oil	(tpy)	
PROCESS HEATERS/BOILERS (>100 MM BTU/HR)										
Platformer Heater [16-F-3A,3B,3C,3D]	568	3,598	390	66	119	2,833	361	66	93	Stack Test -(7/11/97) - 66 lb/MM scf (avg)
Crude Atmospheric Heater [1-F-1]	483	3,578	421	130	233	3,462	419	130	225	Stack Test -(6/24/97) - 131 lbs/MM scf (avg)
Boiler No. 3 [59-F-3]										
Fuel Gas	225	644	76	154	50	1,069	122	154	82	Estimate from Stack Test of # 4 Boiler
Fuel Oil		11,047	8	47	11	12	0	47	0	AP-42 - 47lbs/1000 gallons
Boiler No. 4 [59-F-4]										
Fuel Gas	225	975	115	154	75	1,104	126	154	85	Stack Test - (06/26/97) - 154 lb/MM scf
Fuel Oil		6,483	5	47	6	920	1	47	1	AP-42 - 47lbs/1000 gallons
Boiler No. 5 [59-F-5]										
Fuel Gas	225	498	59	336	84	664	76	336	112	Stack Test - (06/26/97) - 336 lb/MM scf
Fuel Oil		1	0	47	0	29	0	47	0	AP-42 - 47lbs/1000 gallons
Boiler No. 6 [59-F-6]										
Fuel Gas	225	383	45	336	64	670	77	336	113	Estimate from Stack Test of # 5 Boiler
Fuel Oil		3	0	47	0	694	0	47	1	AP-42 - 47lbs/1000 gallons
Ultraformer Reactor Preheater [3-F-1]	286	1,984	181	230	228	1,814	165	230	209	Stack test in January 2001
Ultraformer Reactor Preheater [3-F-2]	286	1,084	99	230	125	1,089	99	230	125	Stack test in January 2001
HF Alky Isostripper Reboiler [7-F-1]	140	1,058	124	280	148	757	93	280	106	AP-42 - 280 lbs/MM scf
Crude Vacuum Heater [1-F-2]										
Fuel Gas	130	608	71	130	40	564	68	130	37	Stack Test -(6/24/97) - 131 lbs/MM scf
Fuel Oil		1,973	1	47	2	5,777	4	47	6	AP-42 - 47lbs/1000 gallons
Regular Coker Heater [90-F-1]	122	280	33	280	39	543	66	280	76	AP-42 - 280 lbs/MM scf
Ultraformer Reactor Preheater [3-F-3]	119	622	57	280	87	587	53	280	82	AP-42 - 280 lbs/MM scf
FCC Feed Preheater [82 - F -2]	100	280	33	280	39	458	54	280	64	AP-42 - 280 lbs/MM scf
Ultraformer Stripper Heater [2-F-2]	100	481	30	280	67	326	23	280	46	AP-42 - 280 lbs/MM scf
Ultraformer Reactor Preheater [3-F-4]	100	391	36	280	55	463	42	280	65	AP-42 - 280 lbs/MM scf
Subtotal (> 100 MM BTU/hr)										
Fuel Gas	3,334	16,464	1,769	176	1,452	16,403	1,844	185	1,519	
Fuel Oil		19,507	14	47	19	7,432	5	47	7	
PROCESS HEATERS/BOILERS (>40 MM BTU/HR & < 100 MM BTU/HR)										
Special Coker Heater [87-F-103]	98	680	80	50	17	598	72	50	15	Stack Test - Avg 3 runs - 50 lb/MM scf
Unicracker Splitter Reboiler [4-F-3]	50	380	45	100	19	348	42	100	17	AP-42 - 100 lbs/MM scf
Unicracker Debutanizer Reboiler [4-F-4]	47	407	48	100	20	349	42	100	17	AP-42 - 100 lbs/MM scf
Distillate Hydrotreater Stripper [69-F-2]	80	617	73	47	14	540	63	47	13	Stack Test - (12/21/93) - 47 lb/MM scf (avg)
Hydrotreater Reactor Heater [4-F-1]	35	178	21	100	9	99	11	100	5	AP-42 - 100 lbs/MM scf
Hydrotreater Reactor Heater [4-F-2]	35	167	20	100	8	172	21	100	9	AP-42 - 100 lbs/MM scf
Ultrafiner Reactor Heater [2-F-1]	59	304	19	100	15	210	15	100	11	AP-42 - 100 lbs/MM scf

Emission Source	Design Firing Rate	OPERATING YEAR 1999				OPERATING YEAR 2000				BASIS FOR EMISSION FACTOR
		Fuel Consumption	Firing Rate	Emission Factor	NOx Emissions	Fuel Consumption	Firing Rate	Emission Factor	NOx Emissions	
	(MM BTU/hr)	MMscf/yr -gas	MM BTU/hr	lb/MM scf	(tpy)	MMscf/yr -gas	MM BTU/hr	lb/MM Btu	(tpy)	
PROCESS HEATERS/BOILERS (>40 MM BTU/HR & < 100 MM BTU/HR) - Cont'd										
Distillate Hydrotreater Charge [69-F-1A]	54	192	23	55	5	230	27	55	6	Stack Test - (12/21/93) - 55 lb/MM scf (avg)

PROCESS HEATERS BOILERS AT ROBINSON

Distillate Hy[redacted] Charge (69-F-1B)	54	160	19	55	4	[redacted]	22	55	5	Stack Test - (12/21/93) - 55 lb/MM scf (avg)
Sat's Gas #1 Debutanizer Reboiler (8-F-1)	52	224	26	100	11	203	25	100	10	AP-42 - 100 lbs/MM scf
Regular Coker Preheater (90-F-2)	50	100	12	100	5	215	26	100	11	AP-42 - 100 lbs/MM scf
Platformer Debutanizer Reboiler (16-F-4)	46	249	27	100	12	203	22	100	10	AP-42 - 100 lbs/MM scf
Ultraformer Regeneration Heater (3-F-7)	45	107	10	100	5	119	13	100	6	AP-42 - 100 lbs/MM scf
Sat's Gas #1 Debutanizer Reb. (23-F-1)	41	214	25	100	11	182	21	100	9	AP-42 - 100 lbs/MM scf
Naphtha Hydrotreater Heater (16-F-1)	40	183	20	100	9	151	16	100	8	AP-42 - 100 lbs/MM scf
Subtotal (>40 MM BTU/hr & <100 MM BTU/hr	786	4162	466	80	167	3807	438	xii	152	
TOTALS (Applied towards Sigma Equation)										
Fuel Gas	4120	20,626	2,235	157	1,619	20,210	2,282	165	1,671	
Fuel Oil		19,507	14	47	19	7,432	5	47	7	
Overall	4120		2,249		1,638		2,287		1,678	
PROCESS HEATERS & BOILERS (< 40 MM BTU/HR)										
Naphtha Hydrotreater Reboiler (16F-2)	38	175	19	100	9	163	17.5	100	8	AP-42 - 100 lbs/MM scf
Penex Heater (77F-1 & 2)	37	208	25	100	10	209	25	100	10	AP-42 - 100 lbs/MM scf
FCC Peabody Heater (82-F-1) - startup	55	30	4	100	2	40	5	100	2	AP-42 - 100 lbs/MM scf
Subtotal (< 40 MM BT/hr)	130	413	48	100	21	412	47.5	100	21	

PROCESS HEATERS BOILERS AT ST. PAUL PARK

Emission Source	Design Firing Rate (MM BTU/hr)	OPERATING YEAR 1999 Fuel Consumption MMscf/yr - gas Bbls/yr - Oil	Firing Rate MM BTU/hr	Emission Factor lb/MM BTU - gas lb/1000 gallons -oil	NOx Emissions (tpy)	OPERATING YEAR 2000 Fuel Consumption MMscf/yr - gas Bbls/yr - Oil	Firing Rate MM BTU/hr	Emission Factor lb/MM BTU - gas lb/1000 gallons -oil	NOx Emissions (tpy)	BASIS FOR EMISSION FACTOR
PROCESS HEATERS/BOILERS (> 100 MM BTU/HR)										
#2 Crude Charge (2-B-3)										
Fuel Gas	162	977	105	0.09	41	964	105	0.09	41	Stack Test (05/00) - 0.090 lb/MM BTU (avg)
Fuel Oil		15,432	11	47	15	14,569	10	47	14	AP-42 - 47 lbs/1000 gallons
HDH Charge (32-B-1)										
Fuel Gas	105	242	26	0.28	32	296	32	0.28	39	AP-42 - 280 lbs/MM scf fuel
Fuel Oil		42,557	29	47	42	42,476	29	47	42	AP-42 - 47 lbs/1000 gallons
#1 Crude Fractionator Chg (1-B-7)										
Fuel Gas	102	394	43	0.28	52	460	50	0.28	61	AP-42 - 280 lbs/MM scf fuel
Fuel Oil		28,346	20	47	28	30,651	21	47	30	AP-42 - 47 lbs/1000 gallons
Subtotal										
Fuel Gas	369	1,613	174	0.165	126	1,720	187	0.173	142	
Fuel Oil		86,335	60	47	85	87,696	61	47	87	
PROCESS HEATERS/BOILERS (>40 MM BTU/HR & < 100 MMBTU/HR)										
#2 Vac Charge (5-B-1)										
Fuel Gas	95	188	20	0.1	9	251	27	0.1	12	AP-42 - 100 lbs/MM scf fuel
Fuel Oil		13,472	9	47	13	2,150	1	47	2	AP-42 - 47 lbs/1000 gallons
H2 Reformers (38-B-1 &2)	91	478	27	0.001	0	430	23	0.001	0	Stack Test (05/00) - 0.001 lb/MM BTU (avg)
Hot Oil Heater (34-B-2)										
Fuel Gas	90	220	24	0.1	10	264	29	0.1	13	AP-42 - 100 lbs/MM scf fuel
Fuel Oil		24,111	17	47	24	27,036	19	47	27	AP-42 - 47 lbs/1000 gallons
Reformer Chg/Interheaters (36-B-2, 3,4)	75	173	19	0.123	10	183	20	0.123	11	Stack Test (05/00) - 0.123 lb/MM BTU (avg)
NU/chg/Stab Rblr/Strip Rblr (2-B-1, 2, 3)	65	325	35	0.08	12	315	34	0.08	12	Stack Test (05/00) - 0.08 lb/MM BTU (avg)
Plat Rx Charge (3-B-4)	64	404	44	0.102	20	385	42	0.102	19	Stack Test (05/00) - 0.102 lb/MM BTU (avg)
#1 Vac Charge (1-B-6)	59	292	32	0.1	14	352	38	0.1	17	AP-42 - 100 lbs/MM scf fuel
Dehex Reboiler (10-B-1)										
Fuel Gas	58	145	16	0.1	7	156	17	0.1	7	AP-42 - 100 lbs/MM scf fuel
Fuel Oil		22,182	15	47	22	21,126	15	47	21	AP-42 - 47 lbs/1000 gallons
Guard Case Rx Charge (36-B-1)	57	126	14	0.134	8	129	14	0.134	8	Stack Test (05/00) - 0.134 lb/MM BTU (avg)
#4 Boiler (16-B-4)										
Fuel Gas	53	132	14	0.1	6	126	14	0.1	6	AP-42 - 100 lbs/MM scf fuel
Fuel Oil		4,918	3	47	5	3,979	3	47	4	AP-42 - 47 lbs/1000 gallons
#6 Boiler (16-B-6)										
Fuel Gas	53	127	14	0.1	6	129	14	0.1	6	AP-42 - 100 lbs/MM scf fuel
Fuel Oil		5,382	4	47	5	5,630	4	47	6	AP-42 - 47 lbs/1000 gallons

Emission Source	Design Firing Rate (MM BTU/hr)	OPERATING YEAR 1999 Fuel Consumption MMscf/yr - gas Bbls/yr - Oil	Firing Rate MM BTU/hr	Emission Factor lb/MM BTU - gas lb/1000 gallons -oil	NOx Emissions (tpy)	OPERATING YEAR 2000 Fuel Consumption MMscf/yr - gas Bbls/yr - Oil	Firing Rate MM BTU/hr	Emission Factor lb/MM BTU - gas lb/1000 gallons -oil	NOx Emissions (tpy)	BASIS FOR EMISSION FACTOR
PROCESS HEATERS/BOILERS (>40 MM BTU/HR & < 100 MMBTU/HR) - Cont'd										

PROCESS HEATERS BOILERS AT ST. PAUL PARK

Preflash Reboiler (1-B	53	150	16	0.1	7	157	17	0.1	7	AP-42 - 100 lbs/MM scf fuel
Plat No. 1 Interheater (3-B-7)	50	401	43	0.132	25	126	14	0.132	8	Stack Test (05/00) - 0.132 lb/MM BTU (avg)
FCC Charge (8-B-1)	50	98	11	0.1	5	364	39	0.1	17	AP-42 - 100 lbs/MM scf fuel
Isostripper Reboiler (28-B-1)										
Fuel Gas	50	155	17	0.1	7	100	11	0.1	5	AP-42 - 100 lbs/MM scf fuel
Fuel Oil		9,000	6	47	9	181	0	47	0	AP-42 - 47 lbs/1000 gallons
DU Chg/Depent Reboiler (29-B-1 & 2)	47	130	14	0.1	6	11,563		0.1	0	AP-42 - 100 lbs/MM scf fuel
Subtotal										
Fuel Gas	1010	3544	359	0.097	153	15030	352	0 096	148	
Fuel Oil		79,065	55	47	78	60,102	42	47	59	
HEATER/BOILER TOTALS (Applied Towards Signia Equation)										
Fuel Gas	1379	5,157	533	0.119	279	16,750	539	0.123	290	
Fuel Oil		165,400	114	47	163	147,798	102	47	146	
Total	1379		647		442		641		436	
HEATERS/BOILERS (<40 MM BTU/HR)										
Plat No. 2 Interheater (3-B-8)	36	154	17	0.11	8	144	16	0.11	8	Stack Test (06/00) - Avg 3 runs
#5 Boiler (16-B-5)	36	53	6	0.1	3	144	16	0.1	7	AP-42 - 100 lbs/MM scf fuel
No. 2 Interheater (36-B-6W)	35	85	9	0.13	5	95	10	0.13	6	Stack Test (06/00) - Avg 3 runs
DDS Charge (37-B-1)	35	298	32	0.047	7	84	9	0.047	2	Stack Test (06/00) - Avg 3 runs
Stripper Reboiler (37-B-2)	26	172	19	0 059	5	216	23	0 059	6	Stack Test (06/00) - Avg 3 runs
No. 3 Interheater (36-B-6E)	21	33	4	0.115	2	165	18	0.115	9	Stack Test (06/00) - Avg 3 runs
Desulf Charge (34-B-1)	30	117	13	0.1	6	35	4	0.1	2	AP-42 - 100 lbs/MM scf fuel
Subtotal	219	912	99	0.080	35	883	96	0 093	39	

PROCESS HEATERS AND BOILERS AT TEXAS CITY

Emission Source	Design Firing Rate	OPERATING YEAR 1999				OPERATING YEAR 2000				BASIS FOR EMISSION FACTOR
		Fuel Consumption	Firing Rate	Emission Factor	NOx Emissions	Fuel Consumption	Firing Rate	Emission Factor	NOx Emissions	
	(MM BTU/hr)	MMscf/yr	MM BTU/hr	lb/MM BTU	(tpy)	MMscf/yr	MM BTU/hr	lb/MM BTU	(tpy)	
PROCESS HEATERS/BOILERS (> 100 MM BTU/HR)										
Alky Heater (H-8)	197	1216	139	0.068	41	1079	124	0 068	37	0.075 lb/MM BTU - 1994 0.068 lb MM BTU - 06/00
#5 Topper Htr. (H-92)	182	1402	168	0.176	130	1259	149	0.176	115	0.176 lb/MM BTU - 12/99
Subtotal (>100 MM BTU/hr)	379	2618	307	0.13	171	2338	273	0.13	152	
PROCESS HEATERS/BOILERS (> 40 MM BTU/HR & < 100 MM BTU/HR)										
Boiler #1 (B-2A)	77	557	64	0.14	39	496	58	0.14	35	0.185 lb/MM BTU - 11/99 0.10 lb/MM BTU - 09/00 Avg Factor of 0.14 lb/MM BTU (Combined Stack for all boilers)
Boiler #2 (B-2B)	77	270	31	0.14	19	432	50	0.14	31	
Boiler #3 (B-2C)	77	391	45	0.14	28	252	29	0.14	18	
Boiler #4 (B-2D)	77	461	53	0.14	32	404	47	0.14	29	
Udex Stripper Htr (H-1)	63	438	50	0.067	15	459	53	0.067	16	0.067 lb/MM BTU - 1994
Born Heater (H-9)	62	355	41	0.04	7	368	42	0.04	7	0.049 lb/MM BTU - 12/94 0.04 lb/MM BTU - 11/00
Platformer Interm. Htr. (H-2)	58	310	35	0.077	12	279	32	0.077	11	0.077 lb/MM BTU - 11/00
#4 Topper Htr (H-6)	50	299	34	0.056	8	398	47	0.056	12	0.056 lb/ MM BTU - 11/99
Platformer Htr. (H-3)	50	441	50	0.099	22	397	46	0.099	20	0.099 lb./ MM BTU - 1/94
Subtotal (>40 & < 100 MM BTU/hr)	591	3522	403	0.10	182	3485	403	0.10	177	
GAS FIRED RECIPROCATING COMPRESSORS										
FCC GasCon - M7 (E-5)		24	3	5.88	77	29	3.5	5.88	90	Stack Test (04/2000) - Avg
FCC GasCon - M8 (E-4)		54	6	4.42	116	47	5.6	4.42	108	Stack Test (04/2000) - Avg
FCC GasCon - M9 (E-3)		54	7	3.38	103	47	5.6	3.38	83	Stack Test (04/2000) - Avg
FCC GasCon - M13 (E-6)		56	7	2.48	76	47	5.6	2.48	61	Stack Test (04/2000) - Avg
Subtotal		188	23		373	172	20		342	
HEATER/BOILER TOTALS (Applied towards the Sigma Equation)										
Totals (> 40 MM BTU/hr)	970	6328	733		726	5994	697		671	
PROCESS HEATERS/BOILERS (< 40 MM BTU/HR)										
FCCU Superheater (B-1)	35	270	31	0.10	14	270	31	0.10	14	AP-42 - 100 lbs/MM scf fuel
TDU Salt Heater (P-70)	4	27	3	0.10	1	0 0	0.0	0.10	0.0	AP-42 - 100 lbs/MM scf fuel
FCCU Air Preheat (H-94)	55	0	0	0.10	0.0	4	0.4	0.10	0.2	AP-42 - 100 lbs/MM scf fuel
M14 Compres-Plat (E-1) - gas fired		33	4	3.13	55	55	7	3.13	90	Stack Test (01/1994) - Avg
M15 Compres-Plat (E-2) - gas fired		32	4	3.45	60	52	6	3.45	94	Stack Test (01/1994) - Avg
Subtotal	94	362	42		130	381	44		198	

APPENDIX D

PARAGRAPHS 12 AND 14 DESIGN AND OPERATING CRITERIA FOR NOx REDUCING SYSTEMS, WET GAS SCRUBBERS, AND DRY GAS SCRUBBERS

All air pollution control equipment designed pursuant to this appendix will be designed and built in accordance with regulatory requirements that may apply.

I. Selective Non-Catalytic Reduction

A. Design Considerations

1. Reductant Addition

a. Reductant Type (e.g. Anhydrous Ammonia, Aqueous Ammonia, or Urea) and Addition Rate

b. Enhanced Reductant Type (e.g. Hydrogen) and Addition Rates

c. Diluent Type and Rate

d. Flow Distribution Manifold

e. Injection Grid / Nozzles

i. Number
ii. Size
iii. Location
iv. Controls

f. Ammonia Slip

2. Flue Gas Characteristics

a. Pre-SNCR/Post-SNCR NOx Concentration

b. Flue Gas Volumetric Flow

c. Temperature Profile

d. SO_2/SO3 Concentrations

e. CO/H2O/O2 Concentrations

f. Particulate Matter Loading and Characteristics

3. Efficiency

a. Designed NOx Concentration in Flue Gas

b. Designed Removal Efficiency

B. Operating Considerations

1. Reductant Addition

a. Reductant Addition Rates

b. Ammonia Slip

2. Flue Gas Characteristics

a. Outlet NOx Concentration

b. Flue Gas Volumetric Flow

c. Temperature Profile

d. SO_2 Concentrations

e. CO/H2O/O2 Concentrations

f. Particulate Loading and Characteristics

3. Efficiency

a. Actual Outlet NOx Concentration

b. Actual Removal Efficiency

II. O3 System

A. Design Considerations

1. Ozone Addition

a. Addition Rates

b. Flow Distribution Manifold

c. Injection Grid/Nozzles

i. Number
ii. Size
iii. Location
iv. Controls

d. Ozone Slip

2. Flue Gas Characteristics

a. Inlet/Outlet NOx Concentration

b. Flue Gas Volumetric Flow

c. Temperature Range

d. SO_2/SO3 Concentrations

e. CO/H2O/O2 Concentrations

f. Particulate/~~Ash~~ Loading and Characteristics

3. Efficiency

a. Designed to Outlet NOx Concentration

b. Designed to Removal Efficiency

B. Operating Considerations

1. Ozone Addition

a. Addition Rates

b. Ozone Slip

2. Flue Gas Characteristics

a. NOx Concentration

b. Flue Gas Volumetric Flow

c. Temperature Range

d. SO_2/SO3 Concentrations

e. CO/H2O/O2 Concentrations

f. Particulate Loading and Characteristics

3. Efficiency

a. Actual Outlet NOx Concentration

b. Actual Removal Efficiency

III. Dry Gas Scrubber

A. Design Considerations

1. Absorber Vessel

a. Volume

b. Dimensions

c. Pressure Drop

d. Internal Configuration

e. Location in Process Train

2. Absorbent

    a. Type (Lime or other)

    b. Addition Rate

3. Flue Gas Characteristics

    a. Inlet/Outlet SO_2/SO3 Concentrations

    b. Flue Gas Volumetric Flow

    c. Inlet/Outlet Temperature Range

    d. Inlet/Outlet Particulate Loading and Characteristics

4. Efficiency

    a. Designed to Outlet SO_2/SO3 Concentration

    b. Designed to Removal Efficiency

5. Safety Considerations

B. Operating Considerations

1. Absorbent

    a. Type (Lime or other)

    b. Addition Rate

2. Flue Gas Characteristics

    a. Outlet SO_2

    b. Flue Gas Volumetric Flow

    c. Inlet/Outlet Temperature Range

    d. Inlet/Outlet Particulate Loading and Characteristics

e. Effect on downstream baghouse

f. Pressure drop across the absorbent bed.

3. Efficiency

a. Outlet SO_2 Concentration

b. Actual Removal Efficiency

APPENDIX E

PARAMETRIC EMISSIONS MONITORING SYSTEMS FOR HEATERS AND BOILERS WITH CAPACITIES BETWEEN 150 AND 100 mmBTU/HR

MAP shall continuously monitor NOx and CO emissions from-heaters and boilers with capacities of less than 150 mmBTU/hr (HHV) but greater than 100 mmBTU/hr (HHV) in accordance with this Appendix to demonstrate compliance with the NOx requirements established for Controlled Heaters and Boilers pursuant to Paragraph 13., to establish the Baseline for any PAL for NOx and CO, and to demonstrate compliance with the CAP. MAP shall continuously monitor by either (1) installing and operating a NOx or CO CEMS or (2) installing a Parametric Emission Monitoring System (PEMS) for NOx or CO. A CEMS directly measures the gas concentration of NOx or CO in a stack. A PEMS is a mathematical model that predicts the gas concentration of NOx or CO in the stack based on a set of operating data. Consistent with the CEMS data frequency requirements of 40 CFR Part 60, the PEMS shall calculate a pound per million BTU value at least once every 15 minutes, and all of the data produced in a calendar hour shall be averaged to produce a calendar hourly average value in pounds per million BTU. The 24 calendar hour averages in a given calendar day shall be averaged and used as the calendar daily average concentration in Appendix P.

The types of information needed for a PEMS are described below. The list of instruments and data sources shown below represent an ideal case. However at a minimum, each PEMS shall include continuous monitoring for at least items 3-5 below. MAP will identify and use existing instruments and refinery data sources to provide sufficient data for the development and implementation of the PEMs parametric software.

Basis Instrumentation:

1. Absolute Humidity reading (one instrument per refinery, if available)
2. Fuel Density, Composition and/or specific gravity - On line readings (it may be possible if the fuel gas does not vary widely, that a grab sample and analysis may be substituted)
3. Fuel flow rate
4. Firebox temperature
5. Stack excess oxygen reading
6. Airflow to the firebox (if known or possibly estimated)
7. Process variable data - steam flow rate, temperature and pressure - process stream flow rate, temperature & pressure, etc.

Computers & Software:

1. Windows NT computer or Honeywell Node - Windows NT is preferred so "PC Anywhere" software can be used to monitor the PEMs setup.
2. "Software CEM" to calculate the "predicted" NOx or CO emissions
3. Data management software to write the compliance monitoring reports

Calibration and Setup:

1. Data will be collected for a period of 3 to 7 days of all the data that is to be used to construct the mathematical model. The data will be collected over an operating range that represents 80% to 100% of typical heater/boiler operation
2. Collect data for "End of Run" and "Start of Run", if appropriate

3. A"Sensor Validation" analysis shall be conducted to make sure the system is collecting data properly

4. Stack Testing (by subcontractor) to develop the actual emissions data for comparison to the collected parameter data

5. Development of the mathematical models and installation of the model into the computer.

MAP is proposing to install these PEMS in the States of Louisiana, Kentucky, Illinois, Ohio, Minnesota and Michigan. If these States have enacted requirements that are directly applicable to these PEMS then the perfomance specifications shall be referenced as part of their installation and operation.

The heaters/boilers that are being considered for installation of PEMS are listed in the table below. The table shows the refinery and the specific heater/boiler and its' rated capacity. MAP has twenty six sources that are possible candidates for PEMS installation.

Table 1 - List of MAP Candidate Heaters/Boilers

	Capacity
Candidate Heaters/Boilers for PEMs	mmBTU/hr
CANTON REFINERY (1)	
Number 11 Boiler (4-16-B-11)	130
CATLETTSBURG REFINERY (9)	
FCC Charge Heater (2-1-B-8)	145
Number 3 Crude Charge Heater (2-23-B-3)	145
Number 3 Crude Charge Heater (2-23-B-4)	145
Number 4 Vaccum Heater (2-26-B-2)	145
Number 11 Boiler (1-39-B-1)	114
VGO Reactor Charge Heater (2-104-B-1)	103

VGO Reactor Charge Heater (2-104-B-2)	103
No. 2 Distillate Desulfurizer Stripper Reboiler (2-121-B-3)	100
DETROIT REFINERY (2)	
SR PLATFORMER CHARGE HEATERs	130
FCCU PREHEATER (11-H-1)	102
GARYVILLE REFINERY (4)	
Crude Vacuum Heater (10-1403)	138
Crude Vacuum Heater (10-1404)	138
Old Boiler # 1 (36-1601)	100
Old Boiler # 2 (36-1602)	100
ROBINSON REFINERY (7)	
HF Alky Isostripper Reboiler (7-F-1)	140
Crude Vacuum Heater (1-F-2)	130
Regular Coker Heater (90-F-1)	122
Ultraformer Reactor Preheater (3-F-3)	120
Ultrafiner Stripper Heater (2-F-2)	119
Ultraformer Reactor Preheater (3-F-4)	100
FCC Preheater (82-F-2)	100
ST PAUL REFINERY (3)	
#4 & #6 Boiler (Share a common Stack)	105
No. 1 Crude Charge Heater (5-1-B-7)	102
ALKYLATION & FCCU HEATER (5-8 & 28-B-1)	100
TEXAS CITY REFINERY (0)	
NONE	

The monitoring protocol for the PEMS to be installed on the heaters shall be based on EPA's "Alternative Monitoring Protocol" for an Industrial Furnace.

The elements of a protocol for a PEMS shall include:

1. Applicability

   a. Identify source name, location, and emission unit number(s)

   b. Identify the type of industry;

   c. Identify the process of interest;

d. Identify the regulations that apply (e.g.; NSPS, NESHAP, SIP, and/or Consent Decree);

e. Identify the pollutant(s) subject to monitoring (information on major/area source determination).

f. Provide expected dates of monitor compliance demonstration testing

2. Source Description

a. Provide a simplified block flow diagram with parameter monitoring points and emission sampling points identified (e.g.; sampling ports in the stack);

b. Provide a discussion of process or equipment operations that are known to significantly affect emissions or monitoring procedures (e.g., batch operations, plant schedules, product changes).

3. Control Equipment Description

a. Provide a simplified block flow diagram with parameter monitoring points and emission sampling points identified (e.g.; sampling ports in the stack);

b. List monitored operating parameters and normal operating ranges;

c. Provide a discussion of operating procedures that are known to significantly affect emissions (e.g., catalytic bed replacement schedules, ESP rapping cycles, fabric filter cleaning cycles).

4. Monitoring System Design

a. Install, calibrate, operate, and maintain a continuous PEMS;

b. Provide a general description of the software and hardware components of the PEMS including manufacturer, type of computer, name(s) of software product(s), monitoring

technique (e.g., method of emission correlation). Manufacturer literature and other similar information shall also be submitted, as appropriate;

c. List all elements used in the PEMS to be measured (e.g., pollutant(s), other exhaust constituent(s) such as O_2 for correction purposes, process parameter(s), and/or emission control device parameter(s));

d. List all measurement or sampling locations (e.g., vent or stack location, process parameter measurement location, fuel sampling location, work stations);

e. Provide a simplified block flow diagram of the monitoring system overlaying process or control device diagram (could be included in Source Description and Control Equipment Description);

f. Provide a description of sensors and analytical devices (e.g., thermocouple for temperature, pressure diaphragm for flow rate);

g. Provide a description of the data acquisition and handling system operation including sample calculations (e.g., parameters to be recorded, frequency of measurement, data averaging time, reporting units, recording process);

h. Provide checklists, data sheets, and report format as necessary for compliance determination (e.g., forms for record keeping).

5. Support Testing and Data for Protocol Design

a. Provide a description of field and/or laboratory testing conducted in developing the correlation (e.g., measurement interference check, parameter/emission correlation test plan, instrument range calibrations):

b. Provide graphs showing the correlation, and supporting data (e.g., correlation test

results, predicted versus measured plots, sensitivity plots, computer modeling development data).

6. Initial Verification Test Procedures

a. Perform an initial relative accuracy test (RA test) to verify the performance of the PEMS over the permitted operating range. The PEMS must meet the relative accuracy requirement of the applicable Performance Specification in 40 CFR Part 60, Appendix B. The test shall utilize the test methods of 40 CFR Part 60, Appendix A.

b. Identify the most significant independently modifiable parameter affecting the emissions. Within the limits of safe unit operation, and typical of the anticipated range of operation, test the selected parameter for three RA test data sets at the low range, three at the normal operating range and three at the high operating range of that parameter, for a total of nine RA test data sets. Each RA test data set should be between 21 and 60 minutes in duration:

c. Maintain a log or sampling report for each required stack test listing the emission rate in accordance with the applicable emission limitations:

d. Demonstrate the ability of the PEMS to detect excessive sensor failure modes that would adversely affect PEMS emission determination. These failure modes include gross sensor failure or sensor drift.

e The owner or operator shall demonstrate the ability to detect sensor failures that would cause the PEMS emissions determination to drift significantly from the original PEMS value.

f. The owner or operator may use calculated sensor values based upon the

mathematical relationships established with the other sensors used in the PEMS. The owner or operator shall establish and demonstrate the number and combination of calculated sensor values which would cause PEMS emission determination to drift significantly from the original PEMS value.

7. Quality Assurance Plan

   a. Provide a list of the input parameters to the PEMS (e.g., transducers, sensors, gas chromatograph, periodic laboratory analysis), and a description of the sensor validation procedure (e.g., manual or automatic check):

   b. Provide a description of routine control checks to be performed during operating periods (e.g., preventive maintenance schedule, daily manual or automatic sensor drift determinations, periodic instrument calibrations)

   c. Provide minimum data availability requirements and procedures for supplying missing data (including specifications for equipment outages for QA/QC checks):

   d. List corrective action triggers [e.g., response time deterioration limit on pressure sensor, use of statistical process control (SPC) determinations of problems, sensor validation alarms]:

   e. List trouble-shooting procedures and potential corrective actions:

   f. Provide an inventory of replacement and repair supplies for the sensors:

   g. Specify, for each input parameter to the PEMS, the drift criteria for excessive error (e.g.: the drift limit of each input sensor that would cause the PEMS to exceed relative accuracy requirements):

   h. Conduct a quarterly electronic data accuracy assessment tests of the PEMS.

i. Conduct semiannual RA tests of the PEMS. Annual RA tests may be conducted if the most recent RA test result is less than or equal to 7.5%. Identify the most significant independently modifiable parameter affecting the emissions. Within the limits of safe unit operation and typical of the anticipated range of operation, test the selected parameter for three RA test data pairs at the low range, three at the normal operating range, and three at the high operating range of that parameter for a total of nine RA test data sets. Each RA test data set should be between 21 and 60 minutes in duration.

8. PEMS Tuning

a. Perform tuning of the PEMS provided that the fundamental mathematical relationships in the PEMS model are not changed.

b. Perform tuning of the PEMS in case of sensor recalibration or sensor replacement provided that the fundamental mathematical relationships in the PEMS model are not changed.

APPENDIX F

NOX AND CO SOURCE TESTING AND PORTABLE ANALYZER REQUIREMENTS FOR HEATERS AND BOILERS < 100 mmBTU/HR

For heaters and boilers < 100 mmBTU/hr and > 40 mmBTU/hr that are controlled for NOx pursuant to Paragraph 13., and for all heaters and boilers < 100 mmBTU/hr that are included in any NOx or CO PAL, MAP shall use this appendix to monitor and demonstrate compliance.

I. NOx Monitoring for Controlled Heaters and Boilers < 100 mmBTU/hr

MAP shall either follow one of Methods 7-7E for NOx, or use a portable analyzer and follow the requirements of Conditional Test Method - 022 ("CTM-022"), in conjunction with 40 CFR Part 60 Appendix A, Method 19 to determine pounds per million BTU, to conduct 3 one-hour test runs to demonstrate compliance with the NOx emission limits in pounds per million BTU established pursuant to Paragraph 13. The test shall be conducted within 90 days of establishing the emission limit in the permit as required by Paragraph 13.

II. NOx and CO Monitoring for Establishing the Baseline and Demonstrating Compliance with the Cap for PALs for Heaters and Boilers < 100 mmBTU/hr

MAP shall follow one of Methods 7-7E for NOx and one of Methods 10-10B for CO, in conjunction with 40 CFR Part 60 Appendix A, Method 19 to determine pounds per million BTU, to establish the baseline and demonstrate compliance with the NOx and CO Caps established pursuant to Paragraph 26. The initial tests shall be conducted prior to submitting the application for the PAL pursuant to Paragraph 26. Thereafter, by March 31 of each calendar year, MAP shall conduct the annual test to establish the revised actual concentration to ensure continued

compliance with the Cap and by June 30 of each calendar year, MAP shall begin to use the revised actual concentration as the calendar daily average concentration in Appendix P.

III. **NOx and CO Monitoring for Establishing the Baseline and Demonstrating Compliance with the Cap for PALs for Heaters and Boilers < 40 mmBTU/hr**

MAP shall either follow one of Methods 7-7E for NOx and one of Methods 10-10B for CO, or use a portable analyzer and follow the requirements of Conditional Test Method - 022 ("CTM-022") for NOx and use the same procedures in CTM-022 for CO, in conjunction with 40 CFR Part 60 Appendix A, Method 19 to determine pounds per million BTU, to conduct 3 one-hour test runs to establish the baseline and demonstrate compliance with the NOx and CO Caps established pursuant to Paragraph 26. The initial tests shall be conducted prior to submitting the application for the PAL pursuant to Paragraph 26. Thereafter, by March 31 of each calendar year, MAP shall conduct the annual test to ensure continued compliance with the Cap and by June 30 of each calendar year, MAP shall begin to use the revised actual concentration as the calendar daily average concentration in Appendix P.

APPENDIX G

FUEL OIL PHASE-OUT

Heater/Boiler Des.	Baseline Amount (bbls/yr)	Proposed Amount (bbls/yr)	Date of Reduction
CANTON			
Number 11 Boiler (4-16-B-11)	67,146	0	04/30/2003
HDS Charge Heater (4-32-B-1)	8,852	0	04/30/2003
Number 1 Boiler (4-16-B-1)	1,887	0	04/30/2003
Number 2 Boiler (4-16-B-2)	2,968	0	04/30/2003
Subtotal	80,853	0	
CATLETTSBURG			
# 5 Crude Charge Heater (1-41-B-1)	56,961	0	01/31/2004
#2 Crude Charge Heater (1-2-B-3)	43,189	0	01/31/2004
#2 Vacuum Charge Heater (1-2-B-1)	435	0	01/31/2004
# 3 Crude Charge Heater (2-23-B-3)	6	0	01/31/2004
# 3 Crude Charge Heater (2-23-B-4)	5,597	0	01/31/2004
Subtotal	106,188	0	

Heater/Boiler Des.	Baseline Amount (bbls/yr)	Proposed Amount (bbls/yr)	Date of Reduction
DETROIT[1/]			
CO Boiler (27-BR-6)	120,761	0	12/31/2003
Alkylation Reboiler (9-H-2)	0	60,335	12/31/2003
Subtotal	120,761	60,335	
ROBINSON			
Boilers #3, #4, #5, & #6 [59-F-3, 4, 5, & 6]	9,708	0	04/01/2003
Crude Vacuum Heater (1-F-2)	3,875	0	04/01/2003
Subtotal	13,583	0	
ST. PAUL PARK[2/]			
# 2 Crude Charge Heater (2-B-3)	15,000	7,500	04/01/2004
HDH Charge Heater (32-B-1)	42,516	21,258	04/01/2004
#1 Crude Fractionator (1-B-70)	29,500	14,750	04/01/2004
#2 Crude Vacuum Heater (5-B-10)	7,811	3,906	04/01/2004

1/ MAP shall limit the sulfur content of oil fired at Detroit to 1.0 weight percent sulfur.

2/ MAP shall limit the sulfur content of oil fired at St. Paul Park to 1.4 weight percent sulfur.

Heater/Boiler Des.	Baseline Amount (bbls/yr)	Proposed Amount (bbls/yr)	Date of Reduction
Dehexanizer Reboiler (10-B-1)	21,654	10,827	04/01/2004
#4 Boiler (16-B-4)	4,450	2,225	04/01/2004
# 6 Boiler (16-B-6)	5,500	2,750	04/01/2004
Hot Oil Heater (34-B-2)	25,574	12,787	04/01/2004
Iso-Stripper Reboiler (28-B-1)	10,281	5,141	04/01/2004
Subtotal	162,286	81,143	
REFINERY-WIDE TOTALS	**483,671**	**141,478**	

APPENDIX H

NSPS SUBPART J COMPLIANCE SCHEDULE FOR HEATERS AND BOILERS

Source	Date of Compliance	Method of Compliance
Canton		
CCR Charge Heaters [4-33-B-1 thru 4]	09/01/01	Submit AMP /Lock Hopper Gas from CCR
Catlettsburg		
HRU Boilers	09/01/01	Submit AMP/Caustic Oxidizer off-gas
HPCCR Charge Heaters [2-102-B-1A, 1B, 1C]	09/01/01	Submit AMP/ Lock Hopper Gas from CCR
LPCCR Charge Heaters [I-44-B-1&2]	09/01/01	Submit AMP/Lock Hopper Gas from CCR
Saturates Gas Heater [2-30-B-1]	09/01/01	Submit AMP/Disfilde Gas from Merox Unit
Detroit		
FCC Charge Heater [11-H-1]	09/01/01	Submit AMP/Disulfide Gas from Merox Unit
Garyville		
FCC Charge Heater [84-78]	09/07/00	Submitted AMP/Disulfide Gas from LPG Merox
Saturates Gas Heater [92-80]	09/07/00	Submitted AMP/Disulfide Gas from C3/C3 Merox
SRS Hot Oil Heater [124-91]	09/07/00	Submitted AMP/ Codenser Off-gas

Source	Date of Compliance	Method of Compliance
Platformer Charge Heater [8-74]	09/07/00	Submitted AMP/ Lock hopper gas from CCR
Robinson[1]		
Ultrafiner Heaters [2-F-1 & 2]	12/31/03	Install H2S CEM on hydrogen fuel gas drum
Crude Heater [1-F-1]	12/31/03	CEM on stack/ Amine treated Vacuum off-Gas
Platformer Heaters [16F-3A, B, C]	09/01/01	Submit AMP/ Lock Hopper Gas from CCR
Alkylation Reboiler [7F-1]	09/01/01	Submit AMP/ Disulfide Gas from LPG Merox
All Heaters and Boilers	12/31/02	Reroute/Monitor off-gas from high pressure separator (2c-3), vessel 3-k-10, and vessel 3-c-10
St. Paul Park		
No Sources with extensions required		

[1] (Robinson currently injects three process streams downstream of its central fuel gas knock out drum. The refinery will either submit an AMP or reroute these three streams by 12/31/2002.).

Source	Date of Compliance	Method of Compliance
Texas City[2/]		
FCC Steam Generator [B-1]	07/19/00	Submit AMP/Disulfide Gas
	06/30/2007	Build SRU/Amine- Eliminate Valero Outages
UDEX Stripper Heater [H-1]	07/19/00	Submitted AMP/UDEX Hot Well Vent
	06/30/2007	Build SRU/Amine - Eliminate Valero Outages
Alkylation Heater	12/31/07	Build new SRU/SWS (Valero outages)
Boilers 1- 4 [27-B-1 thru 4]	12/31//07	Build SRU/Amine - Eliminate Valero Outages
Udex Borne Heater [02H6]	12/31/07	Build SRU/Amine - Eliminate Valero Outages
Platformer Interheaters [09H2]	12/31/07	Build SRU/Amine - Eliminate Valero Outages
Platformer Charge Heater [09H1]	12/31/07	Build SRU/Amine - Eliminate Valero Outages

[2/] (Texas City currently sends spent (sour amine) to Valero for processing at the #3 Sulfur Plant. On periodic basis, Valero shutsdown the #3 Sulfur Plant which results in Texas City burning a fuel above the 160 ppm H2S limit. The refinery will burn natural gas in its existing NSPS heaters but will burn the higher sulfur content gas in those heaters noted above. The refinery will build a new sulfur plant, sour water stripper, and amine treating facilities by June 30, 2007 to remedy this problem.)

APPENDIX I

SCHEDULE FOR COMPLYING WITH THE FCCU NEW SOURCE PERFORMANCE STANDARDS (NSPS)

[SEE NEXT PAGE]

SCHEDULE FOR COMPLYING WITH THE FCCU NEW SOURCE PERFORMANCE STANDARDS (NSPS)

Refinery	Sulfur Dioxide		Particulate Matter		Carbon Monoxide	
	NSPS Limit (see below)	CEM Installation	NSPS Limit (1 lb/1000 lb coke burn)	CEM Installation (Opacity or equivalent)	NSPS Limit (500 ppm CO)	CEM Installation
Canton	05/30/2004 (Note 1a)	12/31/2001	12/31/2005 (Note 4)	Date of Lodging	12/31/2001	12/31/2001
Catlettsburg						
RCC	6/30/2004 (Note 1b & 2)	Date of Lodging	6/30/2004 (Note 2)	Date of Lodging	Date of Lodging	Date of Lodging
FCC	6/30/2004 (Note 1b & 2)	Date of Lodging	6/30/2004 (Note 2)	Date of Lodging	6/30/2004 (Note 2)	Date of Lodging
Detroit	05/30/2004 (Note 1a)	12/31/2001	12/31/2005 (Note 4)	Date of Lodging	6/30/2003 (Note 5)	6/30/2002
Garyville	12/31/2001 (Note 1b)	12/31/2001	Date of Lodging	Approved PEMs	Date of Lodging	Date of Lodging
Robinson	Date of Lodging (Note 1b)	Date of Lodging	Date of Lodging	Approved PEMs	Date of Lodging	Date of Lodging
St. Paul Park	12/30/2004 (Note 1a)	5/30/2002	12/31/2005 (Note 4)	Date of Lodging	12/31/2002	5/30/2002
Texas City	6/30/2003 (note 1b & 3)	11/30/2002	6/30/2003 (note 3)	Submit PEMs (06/30/2003)	6/30/2003 (note 3)	11/30/2002

Notes

(1a) These three refineries may comply with the NSPS limit of 9.8 lbs SO2 per 1000 lbs of coke burn rate. The compliance dates reflect the date at which the refinery much obtain an enforceable permit limit after peforming the 6 month test period, the 12-month Optimization Study, and 6 months to submit study, finalize short term and long term limit, and obtain permit

(1b) Refinery has agreed to take NSPS limit of 50 ppm - 7day average. During Hydrotreater outages, Catlettsburg may comply with NSPS limit of 9.8 lb/1000 lb coke burn

(2) Catlettsburg will complete the reconfiguration of the two FCCUs by June 30, 2004 at which point both will meet the NSPS limit; the FCCU may be shutdown in meeting this limit.

(3) Texas City may need up to 6 months to correct any operating problems with the wet gas scrubber and certify comliance with the NSPS limit

(4) Date corresponds to the installation of the electro-static precipatators (ESPs)

(5) Detroit plans to shutdown existing CO Boiler and build new dedicated FCCU Stack by 06/30/2003.

APPENDIX J

NSPS SUBPART J COMPLIANCE SCHEDULE FOR FLARES

Source	Date of Compliance	Method of Compliance
CANTON		
North Flare	12/31/2001	Submit AMP, Reroute FW vent
South Flare	12/31/2001	Submit AMP
CATLETTSBURG		
Lube/Petrochem Flare (1-14-FS-2)	06/01/2004	AMP, Scrubber
South Area Flare (2-11-FS-1)	06/01/2004	AMP, reroute FW vapors
HF Alkylation Flare (2-11-FS-3)	06/01/2004	Submit AMP
New North Area Flare	06/01/2004	Reroute foul water vents, submit AMP
Air Assisted Flare (2-11-FS-5)	06/01/2004	Shutdown or reroute streams
Pitch Flare (1-14-FS-3)	06/01/2004	Reroute streams, submit AMP
RCCS Flare (2-11-FS-4)	06/01/2004	Reroute streams, submit AMP
Vapor Destruction Unit [1-7-B-1]	09/01/2001	Submit AMP
DETROIT		
Unifiner Flare	03/01/2003	Reroute naphtha skimmer, AMP
Alkylation Flare	03/01/2003	Submit AMP

Crude Flare	01/30/2005	Reroute miscellaneous streams; AMP
CP Cracking Plant Flare	01/30/2005	Reroute miscellaneous streams; AMP
GARYVILLE		
South Flare [69-73]	12/31/2001	Unit 19 SW surge drum/Submit AMP
North Flare [83-78]	12/31/2001	Unit 33 SW surge drum/Submit AMP
Refrigerated Butane Storage Flare	12/31/2001	Submit AMP
Marine Vapor Recovery [107-90]	09/07/2000	Submitted AMP
ROBINSON		
Flare System [#1 - #6]	12/31/2005	Reroute several streams
Wastewater Flare [2-F-1 & 2]	12/31/2005	Reroute several streams
ST. PAUL PARK		
Main Flare	12/31/2003	Reroute several streams
Loading Rack Flare (Temporary when condenser out)	03/30/2002	Submit AMP
TEXAS CITY		
Marine Vapor Combustor	07/19/2000	Submitted AMP
Alklation Flare	07/19/2000	Submitted AMP
Wastewater Treatment Flare	07/19/2000	Submitted AMP

APPENDIX K

STUDY OF BREAKTHROUGH IN DUAL CARBON CANISTERS

1. MAP shall conduct a study of dual carbon canisters designed to determine the concentration of VOCs or benzene that may be emitted from the primary (lead) carbon canister in a dual series before VOCs above background or benzene above 1 ppm is emitted from the secondary (tail) carbon canister.

2. MAP shall select a total of ten dual carbon canisters from its Catlettsburg, Garyville, and Texas City Refineries. In making the selection, MAP shall review the frequency with which each primary carbon canister historically has been changed out, and shall include in the study, to the extent possible, dual canister systems in which the life expectancy of the primary canisters vary. MAP shall include, if possible, at least five dual carbon canisters where the life expectancy of the primary canister is approximately one month or less. MAP may include two 150 gallon-size carbon canisters and eight 55 gallon-size carbon canisters.

3. By no later than thirty (30) days after the Date of Lodging of the Consent Decree, MAP shall submit to EPA a proposal that identifies the location and size of each of the selected dual carbon canisters and the historical life expectancy of the primary canister in each series. If EPA comments upon MAP's proposal, the parties shall endeavor to come to agreement informally. Unless, within thirty (30) days after receipt of MAP's proposal, EPA provides comments, MAP shall commence the study ("Commencement of the Study"), and shall notify EPA of the date of the Commencement of the Study.

4. By no later than seven days after the Commencement of the Study, MAP shall monitor each of the selected dual carbon canister systems for breakthrough between the primary and

secondary carbon canisters and for emissions from the secondary canister. Thereafter, MAP shall monitor for breakthrough between the primary and secondary canisters in accordance with the frequency specified in 40 C.F.R. § 61.354(d).

5. On the first monitoring occasion in which breakthrough between the primary and secondary canister reaches 50 ppm or greater of VOCs, MAP shall monitor, on that same day, emissions from the secondary canister. On a daily basis thereafter, MAP shall monitor emissions from both the primary and secondary canister.

6. At such time as emissions from the secondary canister reach either a VOC concentration above background or a benzene concentration of 1 ppm, MAP shall replace the primary canister with the secondary canister. The provisions of this Appendix K, and not Subparagraph 18.E.iii, shall apply to the timing of the replacement of any primary canister that is a subject of this study, for so long as the carbon canister is monitored for purposes of the study. After the carbon canister no longer is monitored for purposes of this Study, the provisions of Subparagraph 18.E.iii. shall govern the timing of the replacement of the primary canisters, unless and until EPA redefines the meaning of "breakthrough" pursuant to Subparagraph 18.E.i.

7. Contemporaneously with each monitoring event undertaken pursuant to this Appendix K, MAP shall maintain a written record of the time, date, and monitoring results.

8. For each dual carbon canister in which the primary canister has a life expectancy of one month or less, MAP shall conduct the monitoring specified in Paragraph 5 for one year. For each dual carbon canister in which the primary canister has a life expectancy of greater than one month, MAP shall conduct the monitoring specified in Paragraph 5 for the greater of: (i) one year; or (ii) three cycles of the subject carbon canister system, not to exceed two years.

9. For each dual carbon canister in which the primary canister has a life expectancy of one month or less, by no later than one year and three months after the date of the Commencement of the Study, MAP shall submit a report to EPA that includes, but is not limited to, the monitoring data, the replacement dates of the primary carbon canisters, and MAP's recommendations regarding the concentration of VOCs or benzene that may be emitted from the primary canister in a dual series before VOCs above background or benzene above 1 ppm is emitted from the secondary canister. By no later than sixty (60) days after receipt of the report, EPA and MAP jointly shall evaluate the breakthrough limits set forth in Subparagraph 18.E.i, to determine if any revisions to that Subparagraph are necessary with respect to carbon canisters in which the primary canister has a life expectancy of one month or less.

10. For each dual carbon canister in which the primary canister has a life expectancy of greater than one month, MAP shall submit a report that contains the same information set forth in Paragraph 9 by no later than ninety (90) days after completing all required monitoring. By no later than sixty (60) days after receipt of the report, EPA and MAP jointly shall evaluate the breakthrough limits set forth in Subparagraph 18.E.i, to determine if any revisions to that Subparagraph are necessary with respect to carbon canisters in which the primary canister has a life expectancy of greater than one month.

APPENDIX L

REPORTS, PLANS AND CERTIFICATIONS UNDER THE BENZENE WASTE NESHAP ENHANCED PROGRAM PROVISIONS OF PARAGRAPH 18 OF THE CONSENT DECREE IN UNITED STATES V. MARATHON ASHLAND PETROLEUM LLC

Name or Summary of the Report, Plan, or Certification	CD Sub-Para No.	Applicable Refinery(ies) C=Canton; Ct= Cattlesburg; D=Detroit; G=Garyville; R=Robinson; SP=St. Paul; TC=Texas City	Rqd. ("R") v. Cont-ingent ("C")	One-Time ("1") v. Quar-terly ("Q")	Due Date
BWN Compliance Review and Verification Report	C.ii.	All but D & R	R	1	270 D after Lodging
Amended BWN Compliance Review and Verification Report	C.iii	All but D & R	C	1	90 D after completing additional sampling requested by EPA
Amended TAB Report	D.i	All but D & R	C	1	60 D after completing BWN Compliance Review and Verification Report
Plan for SP to comply w/ 6 BQ if SP's TAB equals or is greater than 10	D.ii.	SP	C	1	180 D after completing BWN Compliance Review and Verification Report
Plan for C, Ct, G, and/or TC to come into compliance if BWN Compliance Review and Verification Report shows non-compliance	D.iii	C; Ct; G; TC	C	1	60 D after completing BWN Compliance Review and Verification Report
Compliance Certification	D.v	C; Ct; G; TC	C	1	30 D after completing all actions necessary to come into compliance

Report certifying installation of dual canisters	E.i.	All but SP	R	1	300 D after Lodging
Waste/Slop/Off-Spec Oil Schematics	J.i.	All	R	1	90 D after Lodging
Revised Waste/Slop/Off-Spec Oil Schematics	J.i.	All	C	1	Mutually-agreed upon time between MAP and EPA
Schedule to complete installation of controls on waste management units handling organic benzene waste	J.ii.	All but SP	C	1	Mutually-agreed upon time between MAP and EPA, not to exceed 2 years
Plan to quantify uncontrolled waste/slop/off-spec oil movements	J.iv.	All	R	1	90 D after EPA has approved schematics
EOL Sampling Plan	K.i; L.i; M.ii	All	R	1	C, Ct, G, TC — 4 Mos. after Lodging; R – 5/1/03; D – 11/1/03; SP – 30 D after EPA and MAP meet at SP
EOL Revised Sampling Plan	K.ii; L.i; M.ii	All	C	As need-ed	If and when MAP becomes aware of factors indicating original plan no longer accurately reflects EOL benzene quantity
Plan to ensure that uncontrolled benzene does not equal or exceed, as applicable, 2, 6, or 10 Mg/yr, or that it is minimized	K.-vii; L.i; M.v	All	C	1	30 D after the end of the Q in which the projected calendar year benzene quantity is equal to or greater than 2, 6, or 10 Mg.

Proposal for Third-Party TAB Study and Compliance Review	K.-viii; L.i; M.vi	All	C	1	C, Ct, D, G, R, TC – Last day of 4th Q as set forth in ¶ K.viii. SP – As agreed bet. EPA and MAP
Third-Party TAB Study and Compliance Review	K-viii; L.i; M.vi	All	C	1	30 D after receipt of the Third-Party Study and Compliance Review
Plan to implement the results of the Third-Party TAB Study and Compliance Review	K-viii; L.i;	All but SP	C	1	90 D after MAP receives the Third-Party TAB Study and Compliance Review
Plan for SP to comply w/ 6 BQ if Third-Party TAB Study and Compliance Review so warrants	M.vi	SP	C	1	120 D after MAP receives the Third-Party TAB Study and Compliance Review
Report on installation of closed loop sampling devices	O.i.	All	R	1	180 D after Entry
Results of study of "breakthrough" in carbon canisters	O.ii.	N/A	R	1	90 D after completion of study
Lab audits done from 1 yr. prior to Lodging through 1st Q in which the 1st quarterly report is due	G.i; P.ii-a.(1)	N/A	R	Q	C,Ct,G, TC – 1st Section 61.357 Report due after Entry; D,R,SP – 1st Qtrly Report due under Decree

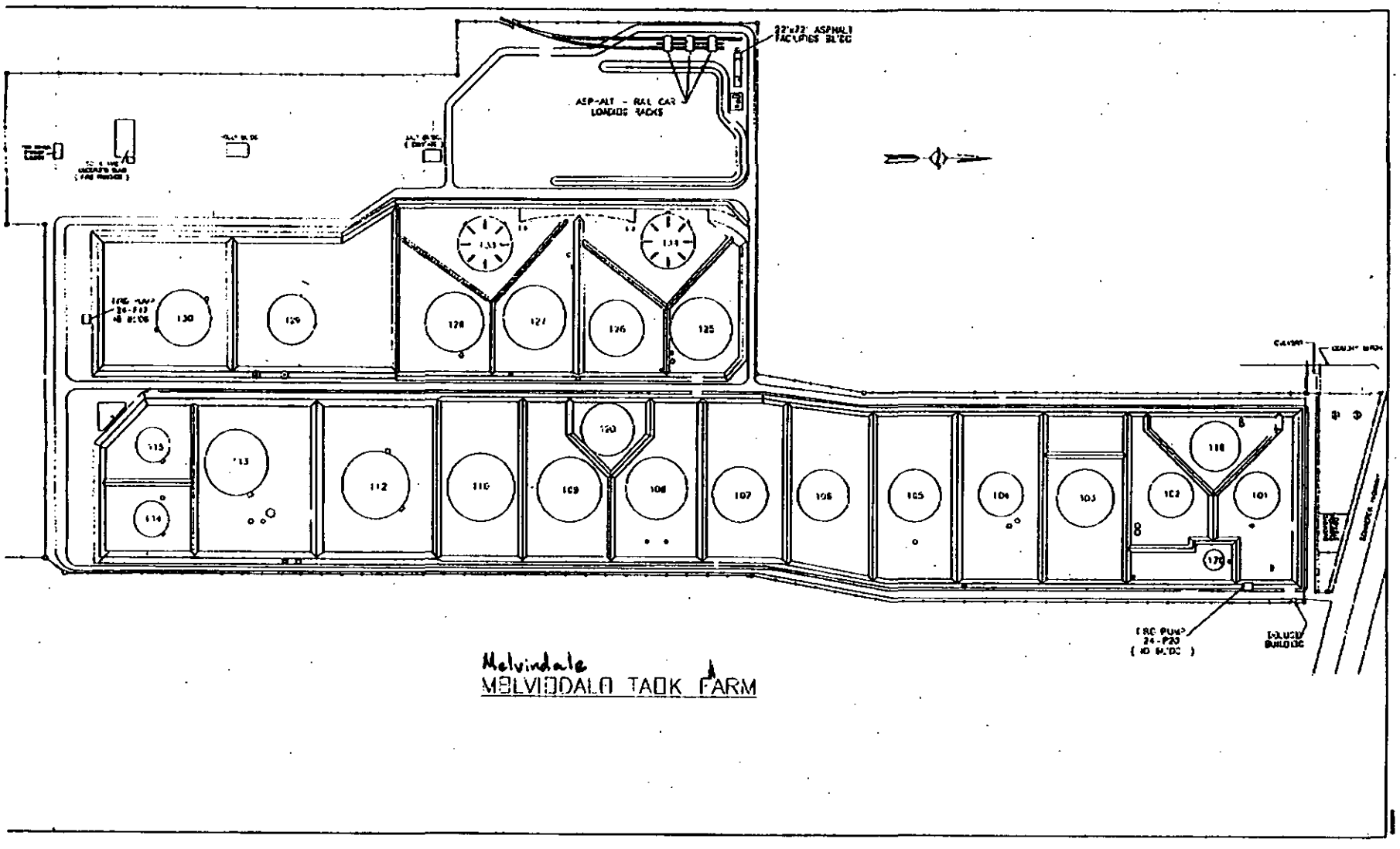
Continuing lab audits	G.i; G.ii; P.ii-c.(1)	N/A	R	Q	C,Ct,G,TC – Each Section 61.357 Report D,R–Each Qtrly Report due under the Decree, until D and/or R are able to, and do, opt to include this info in Section 61.357 Reports SP–Each Qtrly Report due under the Decree
Report on training done between Lodging and the 1st Q in which report is due	I.i; I.ii; P.ii-a.(2)	All	R	Q	C,Ct,G, TC – 1st Section 61.357 Report due after Entry; D,R,SP – 1st Qtrly Report due under Decree
Report on training done in that Q	I.i; I.ii; I.iii; I.iv; P.ii-c(2)	All	R	Q	C,Ct,G,TC – Each Section 61.357 Report D,R–Each Qtrly Report due under the Decree, until D and/or R are able to, and do, opt to include this info in Section 61.357 Reports SP–Each Qtrly Report due under the Decree
Results of Qtrly Sampling at G of 10 ppm-exempted streams of >0.1 Mg/yr benzene for the period between Lodging and the 1st Q in which report is due	L.ii; P.ii-a(3)	G	R	Q	1st Section 61.357 Report due after Entry
Results of Qtrly Sampling at G of 10 ppm-exempted streams of >0.1 Mg/yr benzene for the quarter	L.ii; P.ii-c(4)	G	R	Q	In each Section 61.357 Report

Results of annual sampling at SP of >0.05 Mg/yr benzene streams	M.i; P.ii-b.	SP	R	Q	In the first Qtrly Report for the first calendar Q of each year
Results of 3 Months of Monthly EOL Results	K.iii L.i; P.ii-c(3)	All but SP	R	Q	C,Ct,G,TC – Each Section 61.357 Report D,R–Each Qtrly Report due under the Decree, until D and/or R are able to, and do, opt to include this info in Section 61.357 Reports
Results of Sampling of > 0.05 Streams	K.iv K.v; L.i; P.ii-c(3)	All but SP	C	Q	C,Ct,G,TC – Each Section 61.357 Report D,R–Each Qtrly Report due under the Decree, until D and/or R are able to, and do, opt to include this info in Section 61.357 Reports
Results of Sampling of > 0.03 Streams	K.vi L.i; P.ii-c(3)	All but SP	C	Q	C,Ct,G,TC – Each Section 61.357 Report D,R–Each Qtrly Report due under the Decree, until D and/or R are able to, and do, opt to include this info in Section 61.357 Reports
Results of Quarterly EOL Sampling at SP	M.iii P.ii-c(3)	SP	R	Q	In each Qtrly report

APPENDIX M

DIAGRAM OF THE MELVINDALE AND CRUDE TANK FARMS AT THE DETROIT REFINERY

[SEE NEXT PAGE]



Melvindale
MELVINDALE TANK FARM

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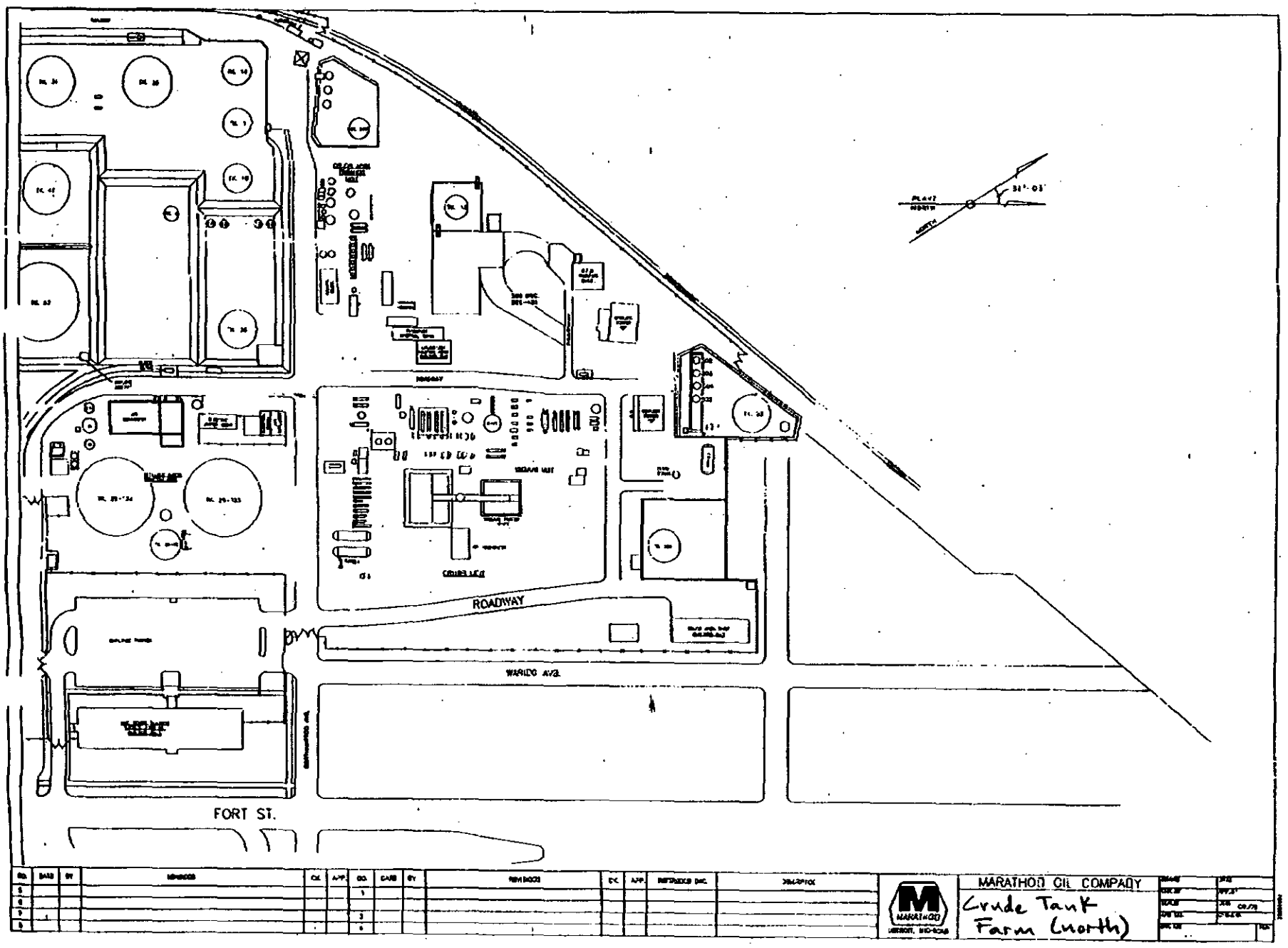

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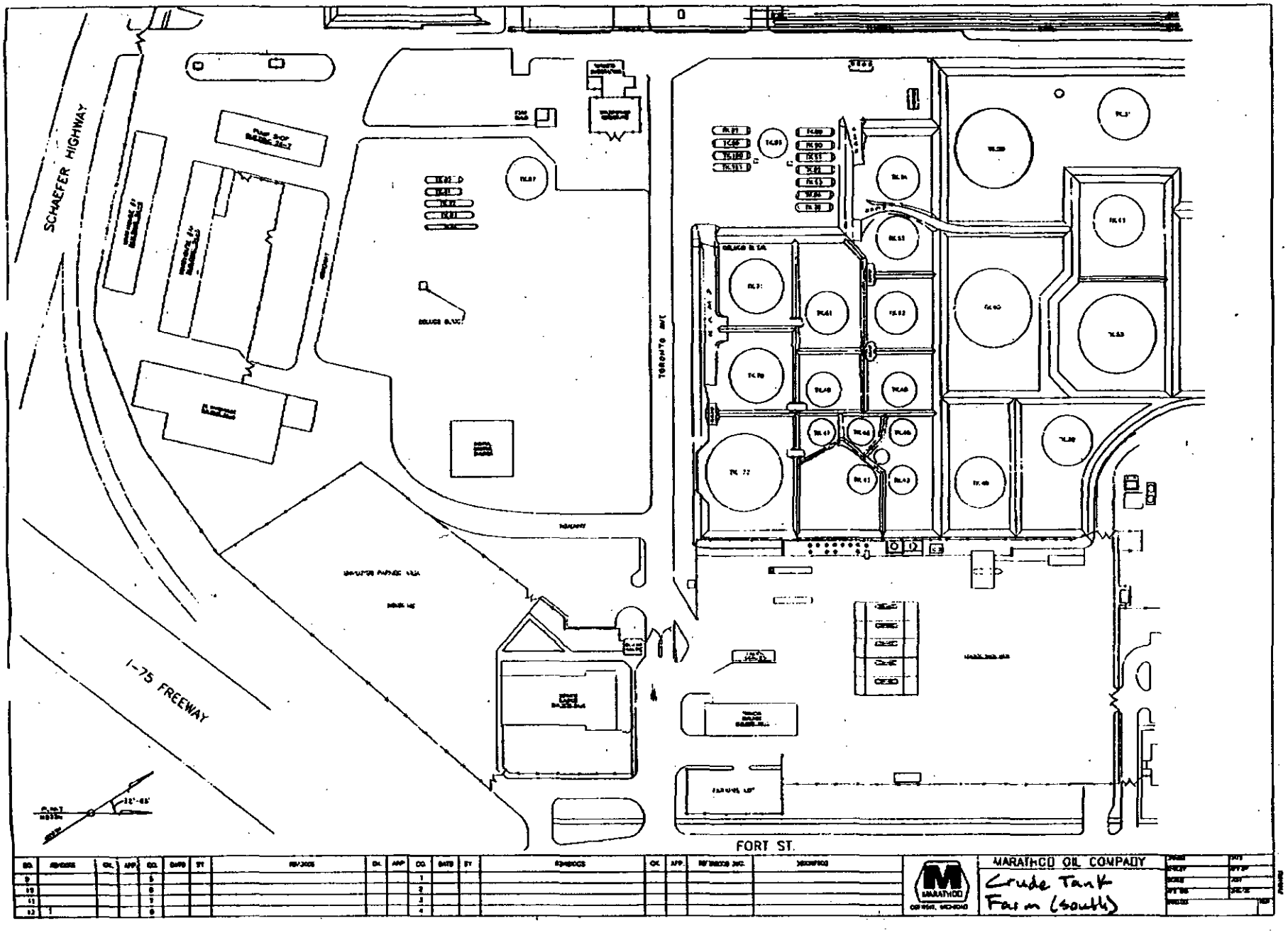

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APPENDIX N

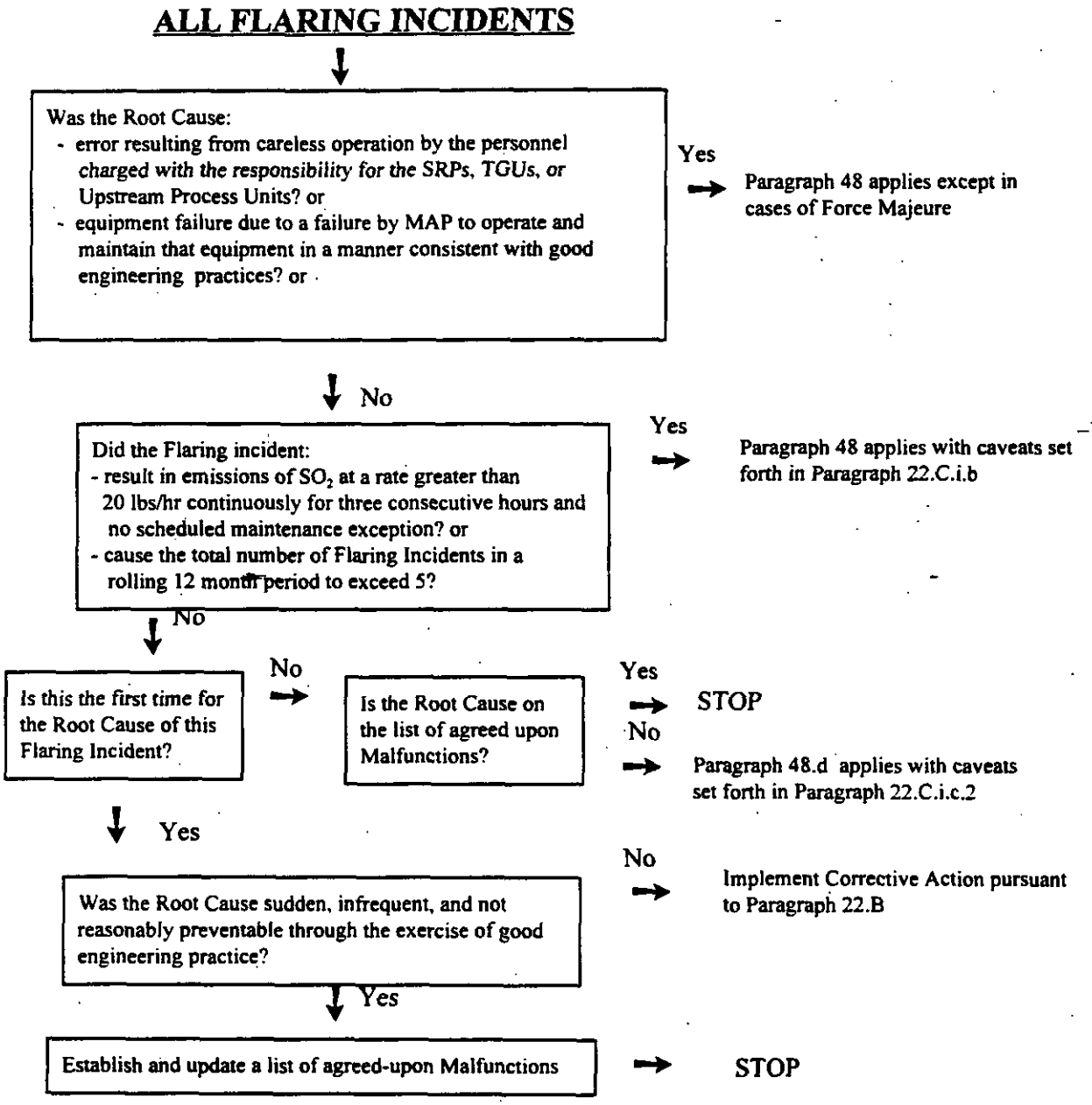
REPORTS, PLANS AND CERTIFICATIONS UNDER THE LDAR ENHANCED PROGRAM PROVISIONS OF PARAGRAPH 20 OF THE CONSENT DECREE IN UNITED STATES V. MARATHON ASHLAND PETROLEUM LLC

Name or Summary of the Report, Plan, or Certification	CD Sub-Para Nos.	Applicable Refinery(ies) "All" means all seven of MAP's Refineries	Rqd. ("R") v. Cont-ingent ("C")	One-Time ("1") v. Quar-terly or w/ §63.654 Reports (">1")	Due Date
Written Refinery-Wide LDAR Program	A; O.i.a	All	R	1	150 D after Lodging
Updated Refinery-Wide LDAR Program	A	All	C	1	As needed
Report on training for new LDAR personnel	B.i; O.ii-c(1)	All	R	>1	In each Section 63.654 Report
Report on annual training for LDAR personnel	B.ii; O.ii-c(1)	All	R	>1	In each Section 63.654 Report
Report on LDAR training for refinery and operations personnel who hold positions relevant to LDAR	B.iii O.ii-c(1)	All	R	>1	In each Section 63.654 Report

LDAR audit reports and records of corrective actions	D; O.ii-b.	All	R	>1	In the Qtrly Report for the 1st calendar Q of each year
Certification of implementation of the first attempt at repair program	G; O.ii-a(1)	All	R	1	In the first Qtrly report due under the CD or the first Qtrly report in which the rqmt. becomes due
Operational specifications for the dataloggers for LDAR monitoring	I.ii.	All	R	1	In time to ensure electronic LDAR datalogging use at all Refineries by no later than 2 years after the Date of Lodging
Certification of implementation of electronic LDAR monitoring	I.ii; O.i.b	All	R	1	2 years and 30 days after Lodging
Certification of implementation of QA/QC procedures for review of data generated by LDAR monitoring technicians	J; O.ii-a(2)	All	R	1	In the first Qtrly report due under the CD or the first Qtrly report in which the rqmt. becomes due
Identification of each Refinery's LDAR "point" person	K; O.ii-a(3)	All	R	1	In the first Qtrly report due under the CD or the first Qtrly report in which the rqmt. becomes due
Certification of the development of a tracking program for new valves and pumps	L; O.ii-a(4)	All	R	1	In the first Qtrly report due under the CD or the first Qtrly report in which the rqmt. becomes due
Certification of implementation of calibration drift assessment procedures	M; O.ii-a(5)	All	R	1	In the first Qtrly report due under the CD or the first Qtrly report in which the rqmt. becomes due

Certification of implementation of the "delay of repair" procedures	N; O.ii-a(6)	All	R	1	In the first Qtrly report due under the CD or the first Qtrly report in which the rqmt. becomes due
Quarterly monitoring reports	O.ii-c(2)	All	R	>1	In each Section 63.654 Report

APPENDIX O
(LOGIC DIAGRAM FOR PARAGRAPH 22)



APPENDIX P

BASELINE AND CAP DETERMINATION FOR THE PAL(S)

I. Determining the Baseline - MAP shall establish baseline emissions for emission units within any PAL established pursuant to Paragraph 26 using this Appendix separately for each pollutant. MAP shall include the following emissions units within each PAL: all FCCUs, all SRUs (excluding flares, thermal oxidizers), all heaters (>5 mmBTU/hr), and all boilers (>5 mmBTU/hr). The foregoing sentence shall not apply to incinerators except those associated with SRUs. MAP may propose, for EPA approval, to include additional emissions units within a PAL. EPA will consider MAP's proposal based on availability, accuracy and reliability of baseline data, adequacy of monitoring, relative contribution to the Cap, and any other relevant and available information. In addition, MAP may propose for EPA approval alternate methods to calculate baseline emissions and emission rates used to determine compliance with the PAL.

A. Determining Baseline Concentrations for NOx, SO_2, CO and PM for Calendar years 2000-2002. The baseline concentration shall be in lb/mmBTU separately for each fuel fired for heaters and boilers for all pollutants, in ppmvd @ 0% O2 for all other emissions units for NOx, SO_2, and CO, in lb/1000 lb coke for PM emissions from FCCUs, in lb/dscf for PM emissions from all other units, and shall be determined as follows:

1. For calendar years 2000-2002, for emissions units that have CEMS installed the baseline concentration shall be established using the average concentration in that time period, or if CEMS were not installed in that time period, at least 3-months of CEMS data from another representative time period, with adjustment for variability of operating parameters during this period as compared to the operating parameters for calendars years 2000-2002, and excluding periods of operation that result in emissions above allowable levels.

2. For calendar year 2002, for emissions units that have CEMS installed by December 31, 2001, the baseline concentration shall be established using the average concentration from January 1, 2002 through December 31, 2002, and excluding periods of operation that result in emissions above allowable levels.

3. For emissions units that do not have CEMS installed the baseline concentration shall be established as follows:

   a. For heaters and boilers > 40 mmBTU/hr conduct a series of source tests and parametric analysis as provided in Appendix E or provide 30 consecutive days of CEMS data (from temporary CEMS);

b. For heaters and boilers < 40 mmBTU/hr either conduct a series of source tests and parametric analysis as provided in Appendix E, or conduct tests measuring concentration using a portable analyzer as provided in Appendix F; and

c. For all other emissions units, submit a proposal for EPA approval for the concentration with supporting information as part of the PAL application required by Paragraph 26.

B. Determining Baseline Utilization for Calendar Years 2000-2002. The baseline utilization for each calendar year for each emissions unit shall be the average utilization of that emissions unit as follows:

1. For FCCUs utilization shall be in terms of an annual average pounds of coke burn per hour with an annual average weight percent hydrogen on coke and annual average CO Boiler auxiliary fuel firing rate in mmBTU/hr for each fuel at annual average combustion O2 by volume percent, combustion temperature in degrees Fahrenheit, and air pre-heat temperature in degrees Fahrenheit;

2. For sulfur recovery units shall be in terms of long tons of sulfur produced per day, at an annual average acid gas feed rate in scfd, NH3 gas feed rate in scfd, air feed rate to reactor furnace (RF) in scfd, annual average acid and NH3 gas concentration in percent by volume, and annual average natural gas feed rate in mol/hr;

3. For heaters and boilers utilization shall be in terms of annual average fuel firing rate for each fuel fired in mmBTU/hr for each fuel at annual average combustion O2 by volume percent, combustion temperature in degrees Fahrenheit, and air pre-heat temperature in degrees Fahrenheit.

C. Determining Baseline Emissions. MAP shall determine baseline emissions for an emissions unit to be included in the PAL as follows:

1. For FCCUs, baseline emissions in tons per year for a particular calendar year shall be calculated as follows:

$$BE_{FCCU} = BC_{FCCU} \times [BRF_{FCCU} + BCOBF_{FCCU}] \times 379 \times MW \times [8760/2000]$$

$$BRF_{FCCU} = [(3.64 \times wt\ \%\ H_B) + (1.53 \times \{100\text{-}wt\ \%\ H_B\})]$$

x [BCBR]

$BCOBF_{FCCU}$ = $[(BUO_{COB}) \times (9190) + (BUFG_{COB}) \times (BF_{d\text{-}fg}) + BUNG_{COB}) \times (8710)]$

where:

BC_{FCCU} = baseline concentration in ppmvd @ 0 % O2 for that calendar year

MW = molecular weight of the pollutant in pounds per pound-mole

wt % H_B = annual average weight percent hydrogen on coke for that calendar year as determined by either continuous measurement or daily measurements of CO2 and moisture in the FCCU flue gas.

BCBR = annual average FCCU regenerator coke burn rate in pounds of coke per hour for that calendar year as determined continuously or on a daily basis by heat balance and flue gas constituents.

BUO_{COB} = baseline utilization rate of CO boiler on oil in mmBTU/hr for that calendar year

$BUFG_{COB}$ = baseline utilization rate of CO boiler on fuel gas in mmBTU/hr for that calendar year

$BUNG_{COB}$ = baseline utilization rate of CO boiler on natural gas in mmBTU/hr for that calendar year

$BF_{d\text{-}fg}$ = the baseline flow factor on a dry basis for fuel gas and shall be calculated for that calendar year for each application using the equation in section 3.2. of Method 19 in 40 CFR Part 60 Appendix A.

2. For SRUs, baseline emissions in tons per year for a particular calendar year shall be calculated as follows:

BE_{SRU} = $BC_{SRU} \times [BFRI] \times MW \times [8760/2000]$

BFRI = BWG + [(BNG + BTA)/1-B%EA] - BSP

Where:

BFRI = baseline incinerator flue gas flow rate in lb-moles per hour;

BC_{SRU} = baseline SRU flue gas baseline concentration in ppmvd at 0 % O2;

BWG = baseline waste gas flow in lb-moles per hour;

BNG = baseline natural gas flow in lb-moles per hour;

BTA = baseline theoretical air in lb-moles per hour;

B%EA = baseline percent excess air; and

BSP = baseline sulfur product loss in lb-moles per hour calculated based on an annual average of sulfur recovered in long tons per day for that calendar year.

3. For heaters and boilers, baseline emissions in tons per year for a particular calendar year shall be calculated as follows:

$$BE_{H\&B}\ (tpy) = [(BCO_{H\&B} \times BUO_{H\&B}) + (BCFG_{H\&B} \times BUFG_{H\&B}) + (BCNG_{H\&B} \times BUNG_{H\&B})] \times [8760/2000]$$

Where:

$BUO_{H\&B}$ = baseline utilization rate of the heater or boiler on oil in mmBTU/hr;

$BUFG_{H\&B}$ = baseline utilization rate of the heater or boiler on fuel gas in mmBTU/hr;

$BUNG_{H\&B}$ = baseline utilization rate of the heater or boiler on natural gas in mmBTU/hr;

$BCO_{H\&B}$ = baseline concentration for emissions of a pollutant from the heater or boiler firing oil in lb/mmBTU;

$BCFG_{H\&B}$ = baseline concentration for emissions of a pollutant from the heater or boiler firing fuel gas in lb/mmBTU;

$BCNG_{H\&B}$ = baseline concentration for emissions of a pollutant from the heater or boiler firing natural gas in lb/mmBTU.

To determine the contribution of SO2 emissions from oil firing, the baseline emissions for SO2 only for all heaters and boilers collectively firing oil shall be calculated by the following alternative method in place of $BCO_{H\&B}$ x $BUO_{H\&B}$ in the equation above:

BROE = $BOFR_{H\&B}$ x 42 x DO x wt%S x 64/32 x (1/2000)

Where:

BROE = Baseline refinery-wide SO2 emissions from oil firing in tons per year;

$BOFR_{H\&B}$ = Baseline oil firing rate in barrels per year;

DO = Baseline density of oil in pounds per gallon; and

wt%S = Baseline sulfur content of oil in weight percent sulfur.

4. For other units included within a PAL, MAP shall propose for EPA approval a calculation method consistent with the above methods in its application for the PAL.

II. Establishing the Cap. MAP shall establish the Initial Cap and each annual revision to that Cap used in any PAL submitted for approval by EPA pursuant to this Consent Decree in accordance with procedures of this Appendix.

A. Each initial Cap shall be calculated in accordance with the following equation separately for each pollutant:

$$\text{Initial Cap} = \sum_{a=1}^{o} (BE_{FCCU})_a + \sum_{b=1}^{p} (BE_{SRU})_b + \sum_{c=1}^{q} (BE_{H\&B})_c + X$$

X = for all other units MAP shall propose for EPA approval a calculation method consistent with the above methods in its application for the PAL

Where:

$(BE_{FCCU})_a$ = baseline emissions in tons per year for FCCU a within the PAL

o = the number of FCCUs within the PAL;

$(BE_{SRU})_b$ = baseline emissions in tons per year for SRU b within the PAL

p = the number of SRUs within the PAL;

$(BE_{H\&B})_c$ = baseline emissions in tons per year for heater or boiler c within the PAL; and

q = the number of heaters and boilers within the PAL.

B. Except as provided below, each Cap shall be revised annually as required by Paragraph 26.D. Each annual revision to the Cap shall be in tons per year and calculated in accordance with the equation below separately for SO2, NOx, and PM. For CO, the Initial Cap shall remain in effect for the full duration of the PAL and shall not be revised to lower it as CO limits become effective.

$$\text{Revised Cap} = \text{Prior Cap} - \Big[\sum_{d=1}^{r} (BE_{FCCU} - PE_{FCCU})_d + \sum_{e=1}^{s} (BE_{SRU} - PE_{SRU})_e + \sum_{f=1}^{t} (BE_{H\&B} - PE_{H\&B})_f + (BROE - PROE) \Big] + Y;$$

$(PE_{FCCU})_d$	=	$[BE_{FCCU}]_d \times [PC_{FCCU}]_d / [BC_{FCCU})]_d$;
$(PE_{SRU})_e$	=	$[BE_{SRU}]_e \times [PC_{SRU}]_e / [BC_{FSRU})]_e$;
$(PE_{H\&B})_f$	=	$[PC_{H\&B}]_f \times ([BUO_{H\&B}]_f + [BUFG_{H\&B}]_f + [BUNG_{H\&B}]_f) \times [8760/2000]$;
PROE	=	$POFR_{H\&B} \times 42 \times DO \times wt\%S \times 64/32 \times (1/2000)$
Y	=	for all other units MAP shall propose for EPA approval a calcualtion method consistent with the above methods in its application for the PAL;

Where:

Prior Cap	=	the prior cap for the PAL for the preceding year in tons per year;
r	=	the number of FCCUs within the PAL for which 365-day rolling average emissions limits were established pursuant to the consent decree in the preceding calendar year;
$(PC_{FCCU})_d$	=	the 365-day rolling average emission limit established pursuant to this consent decree in ppmvd at 0% O2 for FCCU d;
s	=	the number of SRUs within the PAL for which 365-day rolling average emissions limits were established pursuant to the consent decree in the preceding calendar year;
$(PC_{SRU})_e$	=	the 365-day rolling average emission limit established pursuant to this consent decree in ppmvd at 0% O2 for SRU e;
t	=	the number of heaters and boilers within the PAL for which 365-day rolling average emissions limits were established pursuant to the consent decree in the preceding calendar year;
$(PC_{H\&B})_f$	=	the 365-day rolling average emission limit established pursuant to this consent decree in ppmvd at 0% O2 for heater or boiler f;

$POFR_{H\&B}$ = Permitted oil firing rate established pursuant to this consent decree for all heaters and boilers at the refinery in barrels per year;

DO = Maximum or permitted density of oil in pounds per gallon; and

wt%S = Maximum or permitted sulfur content of oil in weight percent sulfur.

If the permitted emission rate (PE) is higher than the baseline emission (BE) rate for particular emission unit, the term BE-PE shall be considered zero for that emissions unit for the purposes of the above summation. For the Revised SO2 Caps at the Robinson, Texas City, Detroit, Canton and St. Paul Park refineries only, the Revised Cap value produced by the equation above shall be multiplied by 1.15 to arrive at the final value of the Revised Cap, provided, however, that the Revised Cap shall never be more than the Cap for the prior year. For purposes of determining the permitted emission rate for the Catlettsburg FCCU if it is shut down as a compliance option pursuant to Paragraphs 12.D.ii. and 14.D.i., PC_{FCCU} for NOx shall be deemed equal to 20 ppmvd and PC_{FCCU} for SO2 shall be deemed equal to 25 ppmvd.

III. Determining Compliance with the Cap.

A. Each day MAP shall calculate the daily emission rate using the following equations for each emissions unit in a PAL:

1. For FCCUs, daily emissions in tons per day for a particular calendar day shall be calculated as follows:

$$DE_{FCCU} = DC_{FCCU} \times [DRF_{FCCU} + DCOBF_{FCCU}] \times 379 \times MW \times [24/2000]$$

$$DRF_{FCCU} = [(3.64 \times wt\ \%\ H_D) + (1.53 \times \{100\text{-}wt\ \%\ H_D\})] \times [DCBR]$$

$$DCOBF_{FCCU} = [(DUO_{COB}) \times (9190) + (DUFG_{COB}) \times (DF_{d\text{-}fg}) + DUNG_{COB}) \times (8710)]$$

where:

DC_{FCCU} = calendar daily average concentration in ppmvd at 0 % O2;

MW = molecular weight of the pollutant in pounds per pound-mole;

wt % H_D = calendar daily average weight percent hydrogen on coke as determined by either continuous measurement or daily measurements of CO2 and moisture in the FCCU flue gas;

DCBR = calendar daily average FCCU regenerator coke burn rate in pounds of coke per hour as determined continuously or on a daily basis by heat balance and flue gas constituents;

DUO_{COB} = calendar daily average utilization rate of CO boiler on oil in mmBTU/hr;

$DUFG_{COB}$ = calendar daily average utilization rate of CO boiler on fuel gas in mmBTU/hr for that calendar day;

$DUNG_{COB}$ = calendar daily average utilization rate of CO boiler on natural gas in mmBTU/hr for that calendar day

$DF_{d\text{-}fg}$ = the calendar daily average flow factor on a dry basis for fuel gas and shall be calculated for that calendar day for each application using the equation in section 3.2. of Method 19 in 40 CFR Part 60 Appendix A.

2. For SRUs, calendar daily average emissions in tons per day for a particular calendar day shall be calculated as follows:

DE_{SRU} = DC_{SRU} x [DFRI] x MW x [24/2000]

DFRI = DWG + [(DNG + DTA)/1-D%EA] - DSP

where:

DFRI = calendar daily average incinerator flue gas flow rate in lb-moles per hour;

DC_{SRU} = calendar daily average SRU flue gas concentration in ppmvd at 0 % O2;

DWG = calendar daily average waste gas flow in lb-moles per hour;

DNG = calendar daily average natural gas flow in lb-moles per hour;

DTA = calendar daily average theoretical air in lb-moles per hour;

D%EA = calendar daily average percent excess air; and

DSP = calendar daily average sulfur product loss in lb-moles per hour calculated based on an calendar daily average of sulfur recovered in long tons per day for that calendar day.

3. For heaters and boilers, calendar daily average emissions in tons per day for a particular calendar day shall be calculated as follows:

$$DE_{H\&B}\ (tpy) = [(DCO_{H\&B} \times DUO_{H\&B}) + (DCFG_{H\&B} \times DUFG_{H\&B}) + (DCNG_{H\&B} \times DUNG_{H\&B})] \times [24/2000]$$

Where:

$DUO_{H\&B}$ = calendar daily average utilization rate of the heater or boiler on oil in mmBTU/hr;

$DUFG_{H\&B}$ = calendar daily average utilization rate of the heater or boiler on fuel gas in mmBTU/hr;

$DUNG_{H\&B}$ = calendar daily average utilization rate of the heater or boiler on natural gas in mmBTU/hr;

$DCO_{H\&B}$ = calendar daily average concentration for emissions of a pollutant from the heater or boiler firing oil in lb/mmBTU;

$DCFG_{H\&B}$ = calendar daily average concentration for emissions of a pollutant from the heater or boiler firing fuel gas in lb/mmBTU;

$DCNG_{H\&B}$ = calendar daily average concentration for emissions of a pollutant from the heater or boiler firing natural gas in lb/mmBTU.

To determine the contribution of SO2 emissions from oil firing, the daily emissions for SO2 only for all heaters and boilers collectively firing oil shall be calculated by the following alternative method in place of $DCO_{H\&B}$ x $DUO_{H\&B}$ in the equation above:

DROE = $DOFR_{H\&B}$ x 42 x DO x wt%S x 64/32 x (1/2000)

Where:

DROE = Daily refinery-wide SO2 emissions from oil firing in tons per day;

$DOFR_{H\&B}$ = Daily oil firing rate in barrels per day;

DO = Daily density of oil in pounds per gallon; and

wt%S = Daily sulfur content of oil in weight percent sulfur.

4. For other units included within a PAL, MAP shall propose for EPA approval a calculation method consistent with the above methods in its application for the PAL.

C. Calculating the total daily emissions for units within the PAL. Each day, MAP shall calculate the total daily emission rate in tons per day as follows:

$$DE_{Cap} = \sum_{g=1}^{u} (DE_{FCCU})_g + \sum_{h=1}^{v} (DE_{SRU})_h + \sum_{j=1}^{w} (DE_{H\&B})_j + DROE + Z$$

Z = for all other units MAP shall propose for EPA approval a calculation method consistent with the above methods in its application for the PAL