IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OHIO
WESTERN DIVISION

UNITED STATES OF AMERICA,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Civil Action No. 3:17-cv-01320
	)	
LIMA REFINING COMPANY,	)	
	)	
Defendant	)	
	)	

CONSENT DECREE

TABLE OF CONTENTS

APPENDICES

The following Appendices are attached to and part of this Consent Decree:

Appendix A: Enhanced LDAR Program

Appendix B: Emission Reductions from Flares and Control of Flaring Events

Appendix C: Control Technology Demonstration Requirements

CONSENT DECREE

WHEREAS Plaintiff the United States of America ("United States"), on behalf of the United States Environmental Protection Agency ("EPA"), has filed a complaint ("Complaint") against Defendant Lima Refining Company ("LRC" or "Defendant"), concurrently with the lodging of this Consent Decree, for alleged environmental violations at LRC's petroleum refinery located in Lima, Ohio ("Refinery" or "Lima Refinery");

WHEREAS the United States, the State of Ohio, and LRC are among the parties to a Consent Decree Addendum entered by the United States District Court for the Western District of Texas in Civ. No. SA-07-CA-0683-RF on November 20, 2007 (the "2007 Addendum"), which covers three refineries, including the Lima Refinery;

WHEREAS on March 20, 2009, EPA issued a Finding of Violation to LRC asserting that the Lima Refinery was in violation of the National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries at 40 C.F.R. Part 63, Subparts CC and A, and its Title V permit by improperly operating one of its refinery flares;

WHEREAS on December 17, 2013, EPA issued a Notice and Finding of Violation to LRC asserting the Lima Refinery's alleged non-compliance with various requirements of the following: (i) Permit-to-Install issued by Ohio Environmental Protection Agency ("Ohio EPA"); (ii) the Ohio State Implementation Plan; (iii) the Lima Refinery Title V permit;

WHEREAS on March 28, 2016, November 29, 2016, February 17, 2017, and February 22, 2017, the Ohio Environmental Protection Agency issued Notices of Violation asserting the Lima Refinery's noncompliance with its Title V permit;

WHEREAS on May 20, 2014, the Lima Refinery received Permit Numbers P0116161 and P0116163, which raised the NOx emission limits for certain heaters and lowered the NOx

emission limits for other heaters, for an overall reduction in the allowable NOx emissions from heaters and boilers at the Lima Refinery;

WHEREAS the United States alleges that LRC owes stipulated penalties for various violations of the 2007 Addendum, and LRC denies that allegation;

WHEREAS, pursuant to Section XXV of the 2007 Addendum, LRC complied with and completed the 2007 Addendum with respect to Lima Refinery obligations except for certain limited obligations that were not yet completed but are being incorporated herein;

WHEREAS EPA reviewed information and data submitted by LRC regarding its compliance with the Lima Refinery obligations in the 2007 Addendum and determined that, except for the limited obligations that are incorporated herein, once it has paid the stipulated penalties required to be paid pursuant to Paragraph 72 of this Consent Decree, LRC will have satisfactorily completed the requirements for termination set forth in Section XXV of the 2007 Addendum;

WHEREAS, because this Consent Decree incorporates all remaining obligations of the 2007 Addendum that pertain to the Lima Refinery (in addition to a resolution of the matters alleged in the Complaint), the United States, Ohio, and LRC have lodged on this day in the Western District of Texas a Second Amendment to the 2007 Addendum that will terminate all obligations of the 2007 Addendum that apply to the Lima Refinery and will otherwise amend the 2007 Addendum as needed to reflect the termination of the provisions applicable to the Lima Refinery;

WHEREAS LRC has significantly reduced its emissions of SO_2, NOx, and PM since 2007; decreasing emissions by at least 2,470 tons per year of SO_2 (a 93% reduction), 1,320 tons per year of NOx (a 72% reduction), and 134 tons per year of PM (a 36% reduction);

WHEREAS, simultaneous with the lodging of this Consent Decree, the United States has filed a motion to terminate the obligations of the 2007 Consent Decree with respect to the Lima Refinery which termination shall become effective only after LRC submits payment of stipulated penalties for alleged past violations of the 2007 Addendum pursuant to Paragraph 72 of this Consent Decree;

WHEREAS, under this Consent Decree, LRC will pay civil penalties and stipulated penalties totaling $1,000,000, perform a Supplemental Environmental Project at a cost of no less than $1,750,000, and perform a mitigation project at an estimated cost of $10 million;

WHEREAS LRC estimates that, including expenditures it already has made, it will spend a total of approximately $150 million to comply with the injunctive relief requirements of this Consent Decree;

WHEREAS the United States anticipates that the affirmative relief in Section V of this Consent Decree (Compliance Requirements) will reduce emissions of the following pollutants by the following approximate amounts, in tons per year ("tpy"):

Sulfur Dioxide ("SO_2")	98
Volatile Organic Compounds ("VOCs")	28
Nitrogen Oxide ("NOx")	68
Particulate Matter ("PM")	30

The United States also anticipates reductions of carbon monoxide and hazardous air pollutants ("HAPs");

WHEREAS LRC currently operates a Sulfur Recovery Plant ("SRP"), designed to handle 110 long tons per day ("LTPD") of sulfur;

WHEREAS LRC has received a permit to install a third Sulfur Recovery Unit ("SRU") and a second Tail Gas Treating Unit ("TGTU"), to increase the flexibility to process crude oil with higher sulfur and acid contents (heavy crude or bitumen);

WHEREAS discussions between the United States and LRC ("the Parties") have resulted in the settlement embodied in the Consent Decree;

WHEREAS LRC has waived any applicable federal or state requirements of statutory notice of the alleged violations;

WHEREAS LRC is settling solely to avoid the cost and uncertainty of litigation and does not admit any liability to the United States arising from the transactions or occurrences alleged in the Complaint, the Notices of Violation, or otherwise;

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

NOW, THEREFORE, before the taking of any testimony, without the adjudication or admission of any issue of fact or law except as provided in Section I, and with the consent of the Parties, it is hereby ORDERED, ADJUDGED, AND DECREED as follows:

I. JURISDICTION AND VENUE

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331, 1345, and 1355; Sections 113(b) and 167 of the Clean Air Act ("CAA"), 42 U.S.C. §§ 7413(b) and 7477; and over the Parties. Venue lies in this District pursuant to Section 113(b) of the CAA, 42 U.S.C. § 7413(b); and 28 U.S.C. §§ 1391(b) and (c) and 1395(a), because LRC is located in this judicial district and the violations alleged in the Complaint are alleged to have occurred in this judicial district. For purposes of this Consent Decree, or any action to enforce this Consent Decree, LRC consents to this Court's jurisdiction over this

Consent Decree, over any action to enforce this Consent Decree, and over LRC. LRC also consents to venue in this judicial district.

2. For purposes of this Consent Decree, LRC does not contest that the Complaint states claims upon which relief may be granted.

3. The State of Ohio has actual notice of the commencement of this action in accordance with the requirements of CAA Sections 113(a)(1) and 113(b)(3), 42 U.S.C. §§ 7413(a)(1) and 7413(b)(3).

II. APPLICABILITY AND BINDING EFFECT

4. The obligations of this Consent Decree apply to and are binding upon the United States and upon LRC and any successors, assigns, and other entities or persons otherwise bound by law.

5. Effective from the Date of Lodging of this Consent Decree, LRC shall give written notice, and shall provide a copy of, this Consent Decree to any successors in interest at least sixty days prior to the transfer of ownership or operation of any portion of the Lima Refinery. LRC shall notify the United States in accordance with the notice provisions set forth in Section XVII (Notices), of any successor in interest at least thirty days prior to any such transfer.

6. LRC shall condition any transfer, in whole or in part, of ownership of, operation of, or other interest in (exclusive of any non-controlling, non-operational shareholder interest) the Lima Refinery upon the transferee's written agreement to execute a modification to the Consent Decree that shall make the terms and conditions of the Consent Decree applicable to the transferee.

7. As soon as possible prior to the transfer: (i) LRC shall notify the United States of the proposed transfer and of the specific Consent Decree provisions that LRC proposes the transferee assume; (ii) LRC shall certify that the transferee is contractually bound to assume the obligations and liabilities of this Consent Decree; and (iii) the transferee shall submit to the United States a certification that the transferee has the financial and technical ability to assume the obligations and liabilities of this Consent Decree and a certification that the transferee is contractually bound to assume the obligations and liabilities of this Consent Decree.

8. No earlier than thirty (30) Days after giving notice of a successor in interest pursuant to Paragraph 7 above, LRC may file a motion to modify this Consent Decree in accordance with Section XX below with the Court to make the terms and conditions of this Consent Decree applicable to the transferee. LRC shall be released from the obligations and liabilities of this Consent Decree unless the United States opposes the motion and the Court finds that the transferee does not have the financial and technical ability to assume the obligations and liabilities under this Consent Decree.

9. Except as provided in Paragraphs 5 – 8 and Section XII (Force Majeure), LRC shall be solely responsible for ensuring that performance of the work required under this Consent Decree is undertaken in accordance with the deadlines and requirements contained in this Consent Decree (including Appendices). LRC shall provide an electronic or hard copy of this Consent Decree to its officers, the Lima Refinery plant manager, the Lima Refinery Manager of Health, Safety, Security, and Environmental Protection, and all personnel in the Lima Refinery Environmental Department. In addition, LRC shall ensure that its employees, agents, and contractors whose duties include compliance with any provision of this Consent Decree are made aware of this Consent Decree and aware of the specific requirements of this Consent Decree that

fall within such person's duties. LRC shall condition any contract for work required under this Consent Decree upon performance of the work in conformity with the terms of this Consent Decree. Copies of the applicable portions of this Consent Decree do not need to be supplied to firms who are retained solely to supply materials or equipment to satisfy requirements of this Consent Decree.

10. In any action to enforce this Consent Decree, LRC shall not raise as a defense the failure by any of its officers, directors, employees, agents, or contractors to take any actions necessary to comply with the provisions of this Consent Decree.

III. OBJECTIVES

11. It is the purpose of the Parties to this Consent Decree to further the objectives of the Clean Air Act, the Ohio SIP promulgated pursuant to Section 110 of the Clean Air Act, 42 U.S.C. § 7410, and the rules and regulations promulgated under the Clean Air Act.

IV. DEFINITIONS

12. Unless otherwise defined herein, terms used in this Consent Decree shall have the meaning given to those terms in the Clean Air Act and the implementing regulations promulgated thereunder. The following terms used in this Consent Decree shall be defined for purposes of this Consent Decree and the reports and documents submitted pursuant thereto as follows:

a. "2007 Addendum" shall mean the civil consent decree entered in *United States, et al. v. The Premcor Refining Group, Inc., et al.*, Civil No. SA-07-CA-0683RF (W.D. Tex.) on November 20, 2007.

b. "30-day rolling average" shall mean the average daily emission rate or concentration during the preceding 30 days. For purposes of clarity, the first day used in a 30-

day rolling average compliance period is the first day on which the emission limit is effective, and the first complete 30-day average compliance period is 30 days later (*e.g.*, for a limit effective on January 1, the first day in the period is January 1 and the first complete 30-day period is January 1 through January 30).

c. "365-day rolling average" shall mean the average daily emission rate or concentration during the preceding 365 days. For purposes of clarity, the first day used in a 365-day rolling average compliance period is the first day on which the emission limit is effective, and the first complete 365-day average compliance period is 365 days later (*e.g.*, for a limit effective on January 1, the first day in the period is January 1 and the first complete 365-day period is January 1 through December 31).

d. "Calendar Quarter" shall mean any one of the three month periods ending on March 31st, June 30th, September 30th, and December 31st.

e. "CEMS" or "Continuous Emissions Monitoring System" shall mean, the total equipment, required under this Consent Decree or an applicable regulation or permit, used to sample and condition (if applicable), to analyze, and to record emissions or process parameters.

f. "CEMS Downtime Root Cause Analysis" shall mean an assessment conducted through a process of investigation to determine the primary cause and any material contributing cause(s) of CEMS downtime. When determining whether a CEMS Downtime Root Cause Analysis is required pursuant to Paragraph 23, CEMS downtime shall not include periods for which a redundant CEMS provides data in place of data from the primary CEMS.

g. "CO" shall mean carbon monoxide.

h. "COF Project" shall mean the crude oil flexibility project authorized to be constructed and operated at the Lima Refinery pursuant to Permit-to-Install No. P0114527 issued by Ohio EPA on December 23, 2013, as modified by Permit-to-Install Nos. P0119111 issued by Ohio EPA on September 18, 2015, and P0119208 issued by Ohio EPA on October 30, 2015.

i. "Consent Decree" or "Decree" shall mean this Consent Decree, including any and all appendices attached to this Consent Decree, and any amendments thereto.

j. "Date of Entry" or "DOE" shall mean the Effective Date of this Consent Decree.

k. "Date of Lodging" shall mean the date this Consent Decree is filed for lodging with the Clerk of the Court for the United States District Court for the Northern District of Ohio.

l. "Day" shall mean a calendar day. In computing any period of time as a deadline for submission under this Consent Decree, where the last day would fall on a Saturday, Sunday, or federal holiday, the period shall run until the close of business of the next Day.

m. "Effective Date" shall have the definition set forth in Section XVIII of this Consent Decree.

n. "EPA" shall mean the United States Environmental Protection Agency and any of its successor departments or agencies.

o. "Existing CEMS" shall mean the following CEMS which exist at the Lima Refinery as of the Date of Lodging:

Source	Pollutant
Aromatics Fuel Gas	H_2S
FCC/East Side Fuel Gas	H_2S
LIU Fuel Gas	H_2S
CE Boiler	NOx/O_2
Nebraska Boiler	NOx/O_2

B&W Boiler	NOx/O_2
HDS Furnace	NOx/O_2
Reformer SCR	NOx/O_2
LIU Flare Header	H_2S
Aromatics Flare Header	H_2S/TRS
FCC Flare Header	H_2S
Acid Gas Flare Header	H_2S
Isocracker SCR	NOx/O_2
Crude Furnace	NOx/O_2
SRU	SO_2/O_2
FCC Regenerator	$CO/CO_2/O_2/NOx/SO_2$
FCC ESP Stack	SO_2/O_2

To the extent that, after the Date of Lodging of this Consent Decree, it is determined that additional CEMS existed as of the Date of Lodging but were not set forth on this list, then those additional CEMS shall be included in the definition of "Existing CEMS" for purposes of this Consent Decree.

p. "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."

q. "MMBtu" shall mean million British thermal units.

r. "NOx" shall mean nitrogen oxides.

s. "Paragraph" shall mean a portion of this Consent Decree identified by an Arabic numeral.

t. "Parties" shall mean the United States and LRC.

u. "Redundant CEMS" shall mean redundant analyzers installed to minimize or prevent periods of missing data during primary analyzer down time. The following CEMS

that exist at the Lima Refinery as of the Date of Lodging each have a backup CEMS. Each such backup is a "Redundant CEMS":

Source	Pollutant
Aromatics Fuel Gas (installed, not in service)	H_2S
FCC/East Side Fuel Gas	H_2S
LIU Flare Header	H_2S
Aromatics Flare Header	H_2S/TRS
LIU Fuel Gas	H_2S
B&W Boiler	NOx/O_2
CE Boiler	NOx/O_2
Nebraska Boiler	NOx/O_2
HDS Furnace	NOx/O_2
Reformer SCR	NOx/O_2
Acid Gas Flare Header	H_2S
FCC Flare Header	H_2S
Isocracker SCR	NOx/O_2

If any additional redundant analyzer exists as of the Date of Lodging of this Consent Decree and is not identified in the table of Redundant CEMS above, such additional CEMS shall be a "Redundant CEMS" for purposes of this Consent Decree.

v. "Refinery" or "Lima Refinery" shall mean the refinery owned and operated by LRC in Lima, Ohio, which is subject to the requirements of this Consent Decree.

w. "Reportable Flaring Incident" shall mean (i) any time the SO_2 emissions from a flare exceed 500 lb in any 24–hour period; or (ii) any discharge to the flare in excess of 500,000 standard cubic feet (scf) above the baseline, determined in 40 C.F.R. 60.103a(a)(4), in any 24–hour period.

x. "Reportable Tail Gas Incidents" shall mean any time the SO_2 emissions from a Sulfur Recovery Plant exceed 500 lb greater than the amount that would have been

emitted if the SO_2 or reduced sulfur concentration was equal to 250 ppmvd during one or more consecutive periods of excess emissions or any 24-hour period, whichever is shorter.

y. "Section" shall mean a portion of this Consent Decree that has a heading identified by an upper case Roman numeral.

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

aa. "SO_2" shall mean sulfur dioxide.

bb. "SRP" or "Claus Sulfur Recovery Plant" shall mean a process unit that recovers sulfur from hydrogen sulfide by a vapor phase catalytic reaction of sulfur dioxide with hydrogen sulfide.

cc. "Startup" shall mean the setting in operation for any purpose.

dd. "United States" shall mean the United States of America, acting on behalf of EPA;

ee. "Upstream Process Units" shall mean all amine contactors, amine scrubbers, and sour water strippers at the refinery, as well as all process units at the refinery that produce gaseous or aqueous waste streams that are processed at amine contactors, amine scrubbers, or sour water strippers.

ff. "VOC" or "Volatile Organic Compounds" shall have the definition set forth in 40 C.F.R. § 51.100(s).

V. COMPLIANCE REQUIREMENTS

A. Leak Detection and Repair Program Enhancements

14. NSPS Applicability. Upon the Date of Entry, each "process unit" (as defined by 40 C.F.R. § 60.590a(e)) at the Lima Refinery shall be an "affected facility" for purposes of 40 C.F.R. Part 60, Subpart GGGa, and shall be subject to and comply with the requirements of

Subpart GGGa no later than one (1) year from the Date of Entry except as specifically provided in this Paragraph.

a. The requirements of 40 C.F.R. Part 60, Subpart GGGa, shall not apply to compressors at the Lima Refinery based solely on the applicability provisions set forth in this Paragraph.

b. Process units on which construction commenced prior to January 4, 1983, shall not be subject to the requirements in 40 C.F.R. § 60.482-7a(h)(2)(ii) regarding difficult-to-monitor valves.

c. Entry of this Consent Decree satisfies the following notification and testing requirements that are triggered by initial applicability of 40 C.F.R. Part 60, Subparts A and GGGa: 40 C.F.R 60.7, 60.8, 60.18 (but only with respect to the following flares: P006 – FCC Flare and P007 – LIU Flare), 60.482-1a(a) and 60.487a(e).

d. For any process unit at the Lima Refinery, any two consecutive months of monitoring that LRC conducts in compliance with the monitoring requirements of 40 C.F.R. Part 60, Subpart GGGa before the Date of Entry shall satisfy the requirement to conduct monitoring of those components for two consecutive months following the initial applicability of 40 C.F.R. Part 60, Subpart GGGa.

15. Enhanced Leak Detection and Repair. LRC shall implement and comply with the requirements of the Enhanced Leak Detection and Repair Program ("ELP") set forth in Appendix A to this Consent Decree by the dates specified therein. The requirements of Appendix A are in addition to any applicable requirements under 40 C.F.R. Part 60, Subpart GGGa; Part 61, Subparts J and V; and Part 63, Subpart CC. The terms "in light liquid

service" and "in gas/vapor service" shall have the definitions set forth in the applicable provisions of 40 C.F.R. Part 60, Subpart GGGa; and Part 63, Subpart CC.

16. Nothing in Subsection V.A or in Appendix A to this Consent Decree shall relieve LRC of its independent obligation to comply with any other requirements of NSPS Subpart GGGa that may be applicable, or with any other federal, state or local Leak Detection and Repair ("LDAR") regulation that may apply to "Equipment" (as that term is defined in applicable LDAR regulations) at the Lima Refinery.

B. CEMS Operation and Maintenance Plan and CEMS Downtime Root Cause Analyses and Corrective Action

17. CEMS Operation and Maintenance Plan. By no later than one (1) year after the Date of Entry of this Consent Decree, LRC shall develop and submit to EPA for review a comprehensive CEMS Operation and Maintenance Plan ("CEMS O&M Plan" or "Plan") for the Lima Refinery that is designed to enhance the performance of CEMS, improve CEMS accuracy and stability, and minimize periods of CEMS downtime. The CEMS O&M Plan shall include, at a minimum, each element identified in Paragraphs 18 – 21. EPA's review of LRC's CEMS O&M Plan shall be undertaken pursuant to Paragraph 22. LRC shall implement and comply with the terms of the CEMS O&M Plan upon submission of the plan, except as provided for in Paragraph 22.

18. CEMS Operations and Maintenance Training. By no later than the date of submission of the CEMS O&M Plan, LRC shall provide annual training to all individuals (LRC employees and contractors) involved in CEMS operations and maintenance in order to ensure and maintain necessary levels of competence in maintaining and operating CEMS. All newly-hired individuals (LRC employees and contractors) involved in CEMS operations and maintenance shall receive CEMS training, which shall include a review of the CEMS O&M

Plan, prior to undertaking any CEMS-related responsibilities. All individuals involved in CEMS operations and maintenance shall have access to and be familiar with the CEMS O&M Plan. The CEMS O&M Plan need not address training requirements for authorized representatives of CEMS vendors and suppliers at Lima Refinery.

19. CEMS Testing and Calibration. The CEMS O&M Plan shall require that LRC certify, calibrate, maintain, and operate all CEMS in accordance with the CEMS provisions of 40 C.F.R. §§ 60.13 and 60.7(f) (excluding those provisions applicable only to Continuous Opacity Monitoring Systems), Part 60, Appendices A and F, and the applicable performance specifications of 40 C.F.R. Part 60, Appendix B, or as specified by an approved Alternative Monitoring Plan. Nothing in the Consent Decree shall relieve LRC of its obligation to comply with existing applicable CEMS requirements.

20. CEMS Operation. Commencing on the Date of Entry for Existing and Redundant CEMS and on the date required by this Consent Decree for CEMS that will be installed pursuant to this Consent Decree, LRC shall operate either an Existing or Redundant CEMS.

21. Preventive Maintenance, Quality Assurance/Quality Control ("QA/QC"), and Repair. By no later than the date of submission of the CEMS O&M Plan, LRC shall develop and implement the programs set forth in Subparagraphs 21.a–21.c.

a. CEMS Routine Preventive Maintenance Program. The CEMS Routine Preventive Maintenance Program shall identify and require implementation of a regularly-scheduled set of activities designed to minimize problems that cause CEMS downtime. Such activities and procedures may be based initially on the CEMS vendor's recommendations. Routine preventive maintenance procedures may include regular (*e.g.,* daily, weekly, monthly) internal (and, as needed, external) operation and maintenance ("O&M") checks designed to

minimize CEMS downtime. Internal O&M checks may include CEMS inspections, routine cleaning of components, and any other routine maintenance. External O&M checks include, but are not limited to, independent third party CEMS audits or other assessments to ensure continuous CEMS operation.

b. CEMS QA/QC Program. The CEMS QA/QC Program shall identify and require implementation of activities to assess and maintain the quality of continuous emissions monitoring data, including regular (e.g., daily, weekly monthly) internal (and, as needed, external) QA/QC and operation checks designed to maintain or improve data quality. Internal QA/QC and operation checks may include periodic calibrations, drift tests, relative accuracy tests, and any other sampling and analyses to assess the quality of CEMS data (i.e., accuracy and precision). External QA/QC and operation checks may include independent third party CEMS audits, third party sampling and analysis for accuracy and precision, or other assessments to ensure accurate CEMS operations.

c. CEMS Repair Program. The CEMS Repair Program shall identify and require the implementation of procedures designed to ensure the prompt repair of CEMS to address both routine and non-routine maintenance and repair. As part of its CEMS Repair Program, LRC shall: (i) maintain a spare parts inventory adequate to support normal operating and CEMS preventive maintenance requirements; and (ii) establish written procedures for the acquisition of parts on an emergency basis (*e.g.,* vendor availability on a next-day basis). LRC shall ensure that an individual has been designated with the responsibility for maintaining the adequacy of the spare parts inventory. The on-site spare parts inventory may be based initially on CEMS vendor recommendations.

d. Review and Update of Programs. Beginning 12 months after the date LRC implements its CEMS O&M Plan, LRC shall review and update, as needed, its CEMS Routine Preventive Maintenance Program, its CEMS QA/QC Program, and its CEMS Repair Program, at least one time per 12-month period. In this review, LRC shall incorporate necessary or appropriate modifications based on operating experience with each CEMS and, as needed, the results of each CEMS Downtime Root Cause Analysis and Corrective Action Report written pursuant to Paragraph 23 within the preceding 12 month period.

22. EPA Review and Comment on CEMS Operation and Maintenance Plan. EPA may provide written comments on LRC's CEMS O&M Plan or EPA may decline to comment. The procedures of this Paragraph shall apply.

a. Upon submission of the Plan, LRC shall implement the proposed CEMS O&M Plan. If EPA provides written comments within 90 days of receipt of LRC's CEMS O&M Plan, then within 45 days of receipt of such comments, LRC shall either: (i) modify and implement the CEMS O&M Plan consistent with EPA's written comments; or (ii) submit the matter for dispute resolution under Section XIII of this Consent Decree. If EPA provides written comments after 90 days of receipt of LRC's CEMS O&M Plan, then within 60 days of receipt of such comments, LRC shall either (i) implement all of the actions required by the comments; or (ii) notify EPA that LRC has determined that implementation of one or more of those actions (which LRC shall specifically identify) would be either unduly burdensome given the degree to which LRC has proceeded with implementing the CEMS O&M Plan or would be otherwise unreasonable. If LRC notifies EPA that it will not implement all of the actions required by the comments, then within 60 days of receipt of LRC's notification, EPA may either accept LRC's position or invoke dispute resolution pursuant to Section XIII of this Consent Decree.

b. During the pendency of any dispute resolution proceeding pursuant to this Paragraph 22, LRC shall implement all parts of the CEMS O&M Plan that are not the subject of the dispute and shall also implement the disputed parts consistent with LRC's proposal. After completion of the dispute resolution proceeding, LRC shall implement the disputed parts of the CEMS O&M Plan consistent with the results of the dispute resolution proceeding.

23. CEMS Downtime Root Cause Analysis and Corrective Action.

a. CEMS Downtime Triggering Event. At any time that a CEMS at the Lima Refinery has downtime greater than 5% of the time in each such calendar quarter, LRC shall conduct a CEMS Downtime Root Cause Analysis. For purposes of calculating whether a CEMS is in continuous operation for at least 95% of the total operating time of the process unit(s) being monitored, the periods of time associated with: (i) QA/QC daily zero and span checks required by 40 C.F.R. § 60.13(d)(1), (ii) an initial certification or re-certification seven day calibration drift test (as described in applicable performance specifications in 40 C.F.R. Part 60, Appendix B, including, but not limited to, Performance Specification 2, § 8.3) conducted following a component change on a CEMS, and (iii) quarterly cylinder gas audits shall not be counted as downtime and shall not be included in the calculation. The 5% downtime calculation shall mean the period of time during the operation of the emission unit being monitored in which any of the required CEMS data either are not recorded or are invalid for any reason (*e.g.*, monitor malfunctions, data system failures, preventive maintenance, unknown causes, *etc.*). Any period of time when required data on an Existing CEMS either are not recorded or are invalid for any reason, but associated Redundant CEMS is recording valid CEMS data, shall not be included in the 5% downtime calculation. CEMS data that meet the requirements of 40 C.F.R. § 60.13 shall be considered "valid" for purposes of determining downtime.

b. CEMS Downtime Root Cause Analysis and Corrective Action Report. By no later than 60 days after an event that triggers a CEMS Downtime Root Cause Analysis, LRC shall prepare a CEMS Downtime Root Cause Analysis and Corrective Action Report that shall, at a minimum, include the following elements:

i. An identification and detailed analysis setting forth the root cause and any material contributing cause(s) of the CEMS downtime event;

ii. The steps, if any, taken to limit the duration of the CEMS downtime;

iii. An analysis of the measures reasonably available to prevent the root cause and any material contributing cause(s) of the CEMS downtime event from recurring. This analysis shall include an evaluation of possible design, operational, and maintenance measures; and

iv. The corrective actions taken or to be taken consistent with the requirements of Paragraph 23.c.

c. CEMS Downtime Corrective Action. LRC shall undertake as expeditiously as reasonably possible such reasonably available corrective actions as are necessary to correct the root cause of the CEMS downtime and to prevent a recurrence of the root and any material contributing cause(s) identified in the CEMS Downtime Root Cause Analysis and Corrective Action Report. In the report required under this Paragraph, LRC shall include a description of any corrective actions already completed or a schedule for the implementation of corrective actions that are not yet completed.

d. CEMS Downtime Third Party Evaluation. For any specific CEMS for which a CEMS Downtime Root Cause Analysis and Corrective Action Report is required twice within thirty-six (36) consecutive calendar months, LRC shall retain an independent third party to evaluate LRC's assessment of the CEMS downtime cause(s). By no later than 120 days after

LRC's submittal of the second CEMS Downtime Root Cause Analysis and Corrective Action Report, the independent third party shall prepare a written report ("CEMS Downtime Third Party Report") describing its evaluation and findings, which may include recommendations for additional corrective actions and/or modifications to LRC's CEMS O&M Plan.

e. CEMS Downtime Root Cause Analyses and CEMS Downtime Third Party Evaluations: Reports to EPA. In each Semi-Annual Report Required by Section IX of this Consent Decree, LRC shall provide a list identifying each Root Cause Failure Analysis that was completed since the previous report. If any Root Cause Failure Analysis has changed since its initial submittal to EPA and Ohio EPA, LRC shall include the analysis and resulting corrective action plan, including a schedule for implementation, in a written report included with the first Semi-Annual Report required by Section IX of the Consent Decree following the changes to the Root Cause Failure Analysis. Following completion of each independent third party evaluation, the evaluation and resulting recommendations and a schedule for implementation shall be submitted to EPA and Ohio EPA in the first Semi-Annual Report required by Section IX of the Consent Decree following completion of the independent third party evaluation.

f. EPA Review and Comment on CEMS Downtime Corrective Actions; LRC Response; Dispute Resolution.

i. EPA Review. After a review of a CEMS Downtime Root Cause Analysis and Corrective Action Report, EPA may notify LRC in writing of: *(1)* any deficiencies in the corrective actions identified; and/or *(2)* any objections to the schedules of implementation of the corrective actions. In the notification, EPA will provide an explanation of the basis for its objections.

ii. LRC Response.

(1) If LRC has not yet commenced implementation of the corrective action, LRC will implement an alternative or revised

corrective action or implementation schedule based on EPA's comments.

(2) If a corrective action that EPA has identified as deficient has already commenced or is already completed, then LRC is not obligated to implement any alternative or additional corrective action identified by EPA. However, LRC shall be on notice that EPA considers such corrective action deficient and will likely not be acceptable for remedying any subsequent, similar root cause(s) of any future CEMS monitor downtime.

iii. If EPA and LRC cannot agree on the appropriate corrective action(s) or implementation schedule(s), if any, to be taken in response to a CEMS Downtime Root Cause Analysis and Corrective Action Report, either party may invoke the dispute resolution provisions of Section XIII of the Consent Decree.

g. Redundant CEMS. Nothing in this Consent Decree shall obligate LRC to install any additional redundant CEMS.

C. Flaring Emission Reductions and Controls

24. Emission Reductions from Flares and Control of Flaring Events. LRC shall implement and comply with the Emissions Reductions from Flares and Control of Flaring Events set forth in Appendix B to this Consent Decree by the dates specified therein to control and minimize emissions from the flaring devices at the Lima Refinery.

D. Sulfur Recovery Plant and Sulfur Pits

25. Sulfur Recovery Plant and NSPS Applicability.

a. Existing SRP. The Lima Refinery owns and operates a SRP (P040) which currently consists of two Sulfur Pits, two Claus Sulfur Recovery Units, Claus I and II, respectively, that operate in a parallel configuration, with a joint Tail Gas Treating Unit ("Existing TGTU") serving as a control device ("Existing SRP"). The Existing SRP has a total design capacity of 110 LTPD. By no later than the Date of Entry, the Existing SRP shall be an "affected facility" as that term is used in 40 C.F.R. Part 60, Subparts A and Ja, for all pollutants applicable

to SRP, and shall be subject to and comply with all applicable requirements of 40 C.F.R. Part 60, Subparts A and Ja.

b. New SRP. By no later than December 31, 2018, or the completion date of the COF Project, whichever is later, but in no event later than December 31, 2019, LRC must install a third SRU, Claus III, with a total design capacity of 130 LTPD and a second TGTU ("New TGTU") with a capacity of 195 LTPD, to be able to handle the maximum throughput of Claus III, including oxygen enrichment. The new SRP ("New SRP") will consist of three parallel SRUs (Claus I, II, and III), two parallel TGTUs (Existing TGTU and New TGTU), and the Sulfur Pits. The New SRP must allow acid gas from the refinery to be redirected to either of the other Claus units, if one Claus unit goes down.

c. The New SRP shall achieve and thereafter maintain compliance with the emission limit in 40 C.F.R. § 60.102a(f)(1)(i) and the monitoring requirements in 40 C.F.R. § 60.106a(a)(1) in accordance with the monitoring procedure specified in the SRP O&M Plan by no later than 60 days after achieving the maximum production rate at which the unit will be operated, or 180 days after initial startup, whichever comes first.

d. Nothing in this Consent Decree shall be interpreted to limit LRC's opportunity to submit for EPA approval alternative monitoring procedures or requirements pursuant to 40 C.F.R. Part 60, Subpart A, for emissions from the Existing and New SRPs.

e. LRC shall operate and maintain, to the extent practicable, the Existing and New SRPs, including the TGTUs, its sulfur pits, and any supplemental control devices on the SRPs, in accordance with its obligation to minimize emissions through implementation of good air pollution control practices as required by 40 C.F.R. § 60.11(d), at all times, including, but not limited to, periods of Startup, Shutdown, Malfunction and maintenance.

26. SRP Turndown Rate Engineering Project.

a. By no later than December 31, 2018, or the completion date of the COF Project, whichever is later, but in no event later than December 31, 2019, LRC shall complete a project to reduce the minimum acid gas feed rates at each SRP (the "SRP Turndown Rate Engineering Project"). Claus I and II are currently designed to have minimum acid gas feed rates of 12 LTPD each and Claus III is currently designed to have a minimum acid gas feed rate of 26 LTPD. Upon completion of the SRP Turndown Rate Engineering Project, Claus I and II shall each have minimum acid gas feed rates of 2 LTPD and Claus III shall have a minimum acid gas feed rate of 3 LTPD. The SRP Turndown Rate Engineering Project shall consist of installation of (i) the following equipment at each Claus unit (A) a low-range flow meter calibrated to detect the low-end range of acid gas flow rates (*e.g.*, if the standard flow meter on Claus I is calibrated to detect acid gas flow rates over 12 LTPD, the low-range flow meter will be calibrated to detect flow rates from 2 – 12 LTPD); (B) a switching valve; (C) a low-range flow meter and flow control valves for combustion air; and (D) a nitrogen connection to the combustion air line upstream of each SRU burner, or (ii) any other equipment necessary to achieve the required minimum acid gas feed rate.

b. On and after January 1, 2019, during shutdowns of the SRU(s), LRC shall not flare acid gas due to a low acid gas feed rate until the total acid gas feed rate to the New SRP is less than 2 LTPD. On and after January 1, 2019, during startups of the SRU(s), LRC shall not flare acid gas due to a low acid gas feed rate once the total acid gas feed rate to the New SRP is 2 LTPD or greater.

27. SRP Optimization Study

a. By no later than 180 days after the implementation of the SRP Turndown Project, LRC shall commence a third party study designed to optimize performance of the New SRP ("SRP Optimization Study"), in light of the actual characteristics of the feeds to the train. This study shall have at least the following components:

i. A detailed evaluation of each Claus train's design and capacity, the operating parameters, and the conversion and recovery efficiencies across the reaction furnace, waste heat boiler and each catalytic converter, including assessment of catalytic activity and determinations of material balances;

ii. An analysis of the composition and variability of the Acid Gas and Sour Water Stripper Gas resulting from the processing of the heavy sour crude slate;

iii. 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 SRPs from achieving optimal sulfur recovery efficiency;

iv. Establishment of baseline data through testing and measurement of key parameters throughout the SRP;

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

vi. Identification of key parameters that affect optimization of the SRP;

vii. For any key parameters identified in the third party study 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;

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

ix. Establishment of new operating procedures for long term efficient operation.

b. No later than 60 days prior to the commencement of the SRP Optimization Study, LRC shall submit to EPA a plan outlining the study protocol for EPA approval.

c. No later than 90 days following commencement of the SRP Optimization Study, LRC shall submit a report to EPA detailing the results of the study. It shall include, at a minimum, a description of study procedures, test data, investigative findings, recommendations made for optimization, if any, quantification of the increase in sulfur recovery efficiency accomplished at SRP feed gas conditions, if any, identification of the operating and maintenance procedures to be utilized for maintaining the New SRP at optimal performance, and a timeline for implementation of each recommendation, as expeditiously as practicable. LRC shall implement the recommendations, if any, for optimization, in accordance with the timeline and shall implement the identified operating procedures for maintaining the New SRP at optimal performance; and

d. No later than 90 days following completion of the implementation of the recommendations, if any, for optimization, LRC shall so notify EPA.

28. SRP Operation and Maintenance.

a. By no later than the Date of Entry, LRC shall comply with its plan for operating and maintaining the Existing SRP, including, but not limited to, Claus I and II, the Existing TGTU, Sulfur Pits I and II, as well as Upstream Process Units, in accordance with good air pollution control practices for minimizing emissions ("SRP O&M Plan").

b. By no later than 90 days after achieving the maximum production rate at which the New SRP will be operated, or 180 days after initial startup, whichever comes first, LRC shall submit to EPA an updated plan ("SRP O&M Plan") for operating and maintaining the New SRP, including, but not limited to, Claus I, II, and III, Existing TGTU, New TGTU, Sulfur

Pit I, II, and III, as well as Upstream Process Units, in accordance with good air pollution control practices for minimizing emissions. The updated SRP O&M Plan shall have as its goal the elimination of Reportable Flaring Incidents and Reportable Tail Gas Incidents and the continuous operation of the SRP, between scheduled maintenance turnarounds, with a minimization of emissions. The updated SRP O&M Plan shall incorporate operating procedures and maintenance from the SRP Turndown Rate Engineering Project and SRP Optimization Project. The updated SRP O&M Plan shall include procedures for:

i. Startup and shutdown;

ii. Hot standby;

iii. Emergencies and schedules to coordinate maintenance turnarounds of the SRP Claus trains and associated TGTUs to coincide, if necessary to minimize emissions, with scheduled turnarounds of major Upstream Process Units;

iv. Reducing sulfur streams ("sulfur shedding"), such that process units upstream of the SRP are brought down to reduce production of sulfur streams in the event that LRC is not able to operate one of its SRPs or TGTUs;

v. Use of oxygen enrichment;

vi. Operation of the Sulfur Pits, including their control and monitoring equipment; and

vii. Operation of equipment necessary to achieve the minimum acid gas feed rates required by the SRP Turndown Rate Engineering Project.

c. LRC shall comply with the most recently submitted SRP O&M Plan at all times, including, but not limited to, periods of Startup, Shutdown, and Malfunction of the SRP. LRC may make reasonable modifications to the SRP O&M Plan submitted under this Paragraph, provided that LRC provides EPA with a copy of the modification in its next semi-annual report submitted pursuant to Section IX of the Consent Decree.

d. EPA does not, by its review of a SRP O&M Plan and/or by its failure to comment on a SRP O&M Plan, warrant or aver in any manner that any of the actions that LRC may take pursuant to such SRP O&M Plan will result in compliance with the provisions of the CAA or any other applicable federal, state, or local law or regulation. Notwithstanding the review by EPA or any state agency of a SRP O&M Plan, LRC shall remain solely responsible for compliance with the CAA and such other laws and regulations.

29. Sulfur Pits

a. Sulfur Pit Emissions. By no later than the Date of Entry for Sulfur Pits I and II, and by no later than the later of December 31, 2018, or 60 days after startup of SRU III, for Sulfur Pit III, LRC shall comply with the requirements of 40 C.F.R. § 60.102a(f) and install, operate, and maintain the following control and monitoring equipment:

i. Pit sweep system for Sulfur Pit I, II, and III; and

ii. Airflow indicators, with alarms, located at each eductor inlet at Sulfur Pit I, II, and III.

b. Upon Date of Entry, LRC must route emissions from Sulfur Pits I and II to the front of the Claus SRU, during normal operations. If Claus I or Claus II is down, emissions from the sulfur pit associated with the inoperable Claus SRU may be routed to the Existing TGTU incinerator.

c. Upon installation of SRU III, LRC must route emissions from Sulfur Pit III to the front of any Claus SRU. If all three Claus SRUs are down, emissions from the sulfur pits may be routed to the incinerator associated with either the Existing or the New TGTU.

30. Root Cause Analysis. Within 45 days of a Reportable Flaring Incident, LRC shall submit the root cause analysis and corrective action analysis, as required pursuant to 40 C.F.R. § 60.103a.

31. Corrective Action Implementation.

a. In response to a Reportable Flaring Incident or Reportable Tail Gas Incident, LRC shall take, as expeditiously as practicable, such interim and/or long-term corrective actions, if any, as are consistent with good engineering practices to minimize the likelihood of a recurrence of the Root Cause, including any other contributing causes, of that Reportable Flaring Incident or Reportable Tail Gas Incident.

b. EPA does not, by its agreement to the entry of this Consent Decree or by its failure to object to any corrective action that LRC may take in the future, warrant or aver in any manner that any of LRC's corrective actions in the future will result in compliance with the provisions of the CAA or its implementing regulations. Notwithstanding EPA's review of any plans, reports, corrective actions, or procedures under Subsection V.D, LRC shall remain solely responsible for non-compliance with the CAA and its implementing regulations. Nothing in this Paragraph shall be construed as a waiver of EPA's rights under the CAA and its regulations for future violations of the Act or its regulations.

c. After a review of any report required by Paragraph 30 that is submitted to EPA, EPA shall notify LRC in writing of: (i) any deficiencies in the corrective actions listed in the findings; and/or (ii) any objections to the schedules of implementation of the corrective actions and explain the basis for EPA's objections. If LRC has not commenced a corrective action that EPA has identified as deficient, LRC will implement an alternative or revised corrective action or implementation schedule based on EPA's comments. If a corrective action that EPA has identified as deficient has already commenced or is already completed, then LRC is not obligated to implement the corrective action identified by EPA for that Reportable Flaring Incident provided that LRC completes the corrective action that it has identified and commenced.

However, LRC will be put on notice that such corrective action is deficient and is likely not acceptable for remedying any subsequent, similar Root Cause(s) of any Reportable Flaring Incident. If EPA and LRC cannot agree on the appropriate corrective action(s) or implementation schedule(s), if any, to be taken in response to a Root Cause, either party may invoke the Dispute Resolution provisions of Part XIII of the Consent Decree.

d. For purposes of Paragraph 31.c, "commenced" means LRC has: (i) commenced actual physical construction on the corrective action; or (ii) completed the engineering design for the corrective action and has purchased or entered into a binding contractual obligation (with adverse consequences from its breach) to purchase equipment necessary to implement the corrective action.

e. Nothing in Subsection V.D shall be construed to limit the right of LRC to take such corrective actions as it deems necessary and appropriate immediately following a Reportable Flaring Incident or in the period during preparation and review of any reports required under this Paragraph.

E. Emission Reductions from Fluid Catalytic Cracking Unit ("FCCU")

32. By December 31, 2018, or the completion date of the COF Project, whichever is later, but in no event later than December 31, 2019, LRC shall install selective catalytic reduction ("SCR") and an alkaline wet gas scrubber ("scrubber") on the FCCU.

33. LRC shall operate the FCCU SCR and scrubber according to the manufacturer's specifications and good engineering practices.

34. NOx Emission Reductions from the FCCU.

a. Interim NOx Emission Limits. Beginning no later than the Date of Entry, LRC shall comply with the following interim emission limits at the FCCU: (i) a short-term FCCU NOx emission limit of 140 ppmvd NOx at 0% O_2 (7-day rolling average) ("Interim Short-

Term FCCU NOx Emission Limit"); and (ii) a long-term FCCU NOx emission limit of 70 ppmvd NOx at 0% O_2 (365-day rolling average) ("Interim Long-Term FCCU NOx Emission Limit"). For the Interim Long-Term FCCU NOx Emission Limit, the first complete 365-day rolling average shall be calculated on the Date of Entry, based on monitoring data (obtained from CEMS certified as compliant with EPA CEMS monitoring requirements) from the Date of Entry, and the 364 Days prior to the Date of Entry.

b. Final NOx Emission Limits. Final NOx emission limits shall be set in accordance with Appendix C.

c. Startup, Shutdown, and Malfunction. NOx emissions during periods of Startup, Shutdown, or Malfunction of the LRC FCCU, or Malfunction of the SCR, shall not be used in determining compliance with the Short-Term LRC FCCU NOx Limit established in Paragraph 34.a - b above provided that during such periods LRC, to the extent practicable, maintains and operates the FCCU, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions. The Long-Term FCCU NOx Limit established in Paragraph 34.a - b above shall apply at all times.

d. Demonstrating Compliance with FCCU NOx Emission Limits. By no later than the Date of Entry, LRC shall use NOx and O_2 CEMS to monitor performance of the LRC FCCU and to report compliance with the terms and conditions of this Consent Decree. CEMS shall be used to demonstrate compliance with the Short-Term and Long-Term FCCU NOx Emission Limits established pursuant to Paragraph 34.a - b above. LRC shall install, certify, calibrate, maintain, and operate all CEMS at the FCCU required by this Paragraph in accordance with the provisions of 40 C.F.R. § 60.13 that are applicable to CEMS (excluding

those provisions applicable only to COMS) and Part 60 Appendices A and F, and the applicable performance specification test of 40 C.F.R. Part 60 Appendix B.

35. SO_2 Emission Reductions from the FCCU. By December 31, 2018 or the completion date of the COF Project, whichever is later, but in no event later than December 31, 2019, LRC shall install an alkaline wet gas scrubber on the FCCU.

a. Interim SO_2 Emission Limits at the FCCU. By no later than the Date of Entry, LRC shall comply with the following SO_2 limits at the LRC FCCU: (i) 50 ppmvd SO_2 at 0% O_2 (7-day rolling average) ("Short-Term FCCU SO_2 Emission Limit"); and (ii) 25 ppmvd SO_2 at 0% O_2 (365-day rolling average) ("Long-Term FCCU SO_2 Emission Limit"). For the Long-Term FCCU SO_2 Limit, the first complete 365-day rolling average shall be calculated on the Date of Entry, based on monitoring data from the Date of Entry, and the 364 Days prior to the Date of Entry.

b. Final SO_2 Emission Limits at the FCCU. Final SO_2 emission limits shall be set in accordance with Appendix C.

c. Startup, Shutdown, or Malfunction. SO_2 emissions during periods of Startup, Shutdown, or Malfunction of the FCCU, or Malfunction of the scrubber, shall not be used in determining compliance with the Short-Term FCCU SO_2 Emission Limit established in Paragraph 35.a - b above, provided that during such periods LRC, to the extent practicable, maintains and operates the FCCU, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions. The Long-Term FCCU SO_2 Emission Limit established in Paragraph 35.a - b, above, shall apply at all times.

d. Demonstrating Compliance with FCCU SO_2 Emission Limits. By no later than the Date of Entry, LRC shall use an SO_2 and O_2 CEMS to monitor the performance of the FCCU and to report compliance with the terms and conditions of this Consent Decree. LRC shall install, certify, calibrate, maintain, and operate all CEMS at the FCCU required by this Paragraph in accordance with the provisions of 40 C.F.R. § 60.13 that are applicable to CEMS (excluding those provisions applicable only to COMS) and Part 60 Appendices A and F, and the applicable performance specification test of 40 C.F.R. Part 60 Appendix B.

36. CO Emission Limits at the FCCU.

a. CO Emission Limit at the FCCU. By no later than Date of Entry, LRC shall comply with the following CO limit at the FCCU: 500 ppmvd CO at 0% O_2 (one-hour block average)

b. Demonstrating Compliance with FCCU CO Emission Limit. By no later than the Date of Entry, LRC shall use a CO and O_2 CEMS to monitor the performance of the FCCU and to report compliance with the terms and conditions of this Consent Decree. LRC shall install, certify, calibrate, maintain, and operate all CEMS at the FCCU required by this Paragraph in accordance with the provisions of 40 C.F.R. § 60.13 that are applicable to CEMS (excluding those provisions applicable only to COMS) and Part 60 Appendices A and F, and the applicable performance specification test of 40 C.F.R. Part 60 Appendix B.

37. NSPS Applicability to the FCCU

a. The FCCU is an "affected facility" as that term is used in 40 C.F.R. Part 60, Subparts A and J for NOx. On and after the Date of Entry, through December 31, 2018, the FCCU shall continue to be subject to and shall comply with 40 C.F.R. Part 60, Subparts A and J for NOx.

b. Beginning on the Date of Entry, the FCCU shall become an "affected facility" as that term is used in 40 C.F.R. Part 60, Subpart Ja for SO_2, PM, and CO.

c. Beginning on January 1, 2019, the FCCU shall become an "affected facility" as that term is used in 40 C.F.R. Part 60, Subpart Ja for NOx in lieu of Subpart J. On and after January 1, 2019, LRC shall comply with all applicable requirements in 40 C.F.R. Part 60, Subpart Ja at the FCCU.

d. Entry of this Consent Decree and compliance with the relevant monitoring requirements of this Consent Decree for the FCCU shall satisfy the notice requirements of 40 C.F.R. § 60.7(a) and the initial performance test requirement of 40 C.F.R. § 60.8(a).

F. Incorporation of Consent Decree Requirements into Federally Enforceable Permits

38. Permits Needed for Termination of the 2007 Addendum. By no later than April 30, 2017, LRC shall submit to permitting authorities in the State of Ohio complete applications, amendments and/or supplements to incorporate as "applicable requirements" the following requirements into non-Title V, federally enforceable permits that will survive termination of this Consent Decree and into the Title V permit:

a. For all Covered Heaters and Boilers included in the NOx Final Demonstration of Compliance per Paragraph 27 of the 2007 Addendum, continuously monitor and record NOx emissions in units of lb NOx/million BTU of actual heat input, per Paragraph 30 of the 2007 Addendum;

b. For boilers B026 and B032, install, certify, calibrate, maintain and operate all NOx CEMS in accordance with the provisions of 40 C.F.R. § 60.13 that are applicable to CEMS (excluding those provisions applicable only to continuous opacity monitoring systems)

and 40 C.F.R. Part 60, Appendices A and F, and the applicable performance specification of 40 C.F.R. Part 60, Appendix B, per Paragraph 30 of the 2007 Addendum; and

c. For the FCCU (P010), comply with all applicable requirements of 40 C.F.R. Part 60, Subparts A and J, per Paragraphs 97, 98, and 107 of the 2007 Addendum.

39. Permits Needed to Meet Compliance Obligations. If any compliance obligation under this Section V (Compliance Requirements) requires LRC to obtain a federal, state, or local permit or approval, LRC shall submit timely and complete applications and take all other actions necessary to obtain all such permits or approvals. LRC may seek relief under the provisions of Section XII of this Decree (Force Majeure) for any delay in the performance of any such obligation resulting from a failure to obtain, or a delay in obtaining, any permit or approval required to fulfill such obligation, if LRC has submitted timely and complete applications and has taken all other actions necessary to obtain all such permits or approvals.

40. Permits to Ensure Survival of Consent Decree Limits and Standards after Termination of Consent Decree. Prior to termination of this Consent Decree, LRC shall submit to permitting authorities in the State of Ohio complete applications, amendments and/or supplements to incorporate as "applicable requirements" the following limits and standards into non-Title V, federally enforceable permits that will survive termination of this Consent Decree:

a. Leak Detection and Repair. All of the applicable requirements set forth in Paragraphs 14 and Appendix A.

b. CEMS Operation and Maintenance. All of the requirements set forth in Paragraph 19, and a requirement to have and comply with a CEMS O&M Plan with the minimum elements specified in Paragraphs 18-21.

c. Flaring Emission Reductions and Controls. All of the requirements and limits set forth in Appendix B, Paragraphs 19-21.

d. Sulfur Recovery Plan and Sulfur Pits. All of the requirements set forth in Paragraph 25, the requirement to have and comply with a SRP O&M Plan with the minimum elements specified in Paragraph 28.b, and the requirements set forth in Paragraph 29.

e. Emission Reductions from FCCUs. All of the requirements, including the NOx, SO2, and CO final emission limits set forth in Paragraphs 32-38 and Appendix C.

f. All of Section VI (Emission Credit Generation); provided however, that LRC is not required to incorporate into a federally enforceable permit the prohibitions/other language of Section VI on the use of any CD Emissions Reductions or 2007 Addendum Emissions Reductions (as defined in Section VI) that LRC, upon seeking termination of this Consent Decree, demonstrate no longer are capable of being used in a manner prohibited by Section VI.

g. Requirements in Paragraphs 62-64 regarding operation of oxygen enrichment.

41. Modifications to Title V Operating Permits. Prior to the termination of this Consent Decree, LRC shall submit complete applications to permitting authorities in the State of Ohio to modify, amend, or revise the Title V permit of the Lima Refinery to incorporate the limits and standards identified in the preceding Paragraph into the Title V permit. The Parties agree that the incorporation of these emission limits and standards into Title V permits shall be done in accordance with applicable state or local Title V rules. The Parties agree that the incorporation may be by "amendment" under 40 C.F.R. § 70.7(d) and analogous state Title V rules, where allowed by state law.

VI. EMISSION CREDIT GENERATION

42. Definitions.

a. "CD Emissions Reductions" shall mean any emissions reductions that result from any projects, controls, or any other actions used to comply with this Consent Decree.

b. "2007 Addendum Emissions Reductions" shall mean any emissions reductions that result from any projects, controls, or any other actions used to comply with the 2007 Addendum.

43. Prohibitions. LRC shall neither generate nor use any CD Emissions Reductions nor any 2007 Addendum Emissions Reductions: (i) as netting reductions; (ii) as emissions offsets; or (iii) to apply for, obtain, trade, or sell any emission reduction credits in any permit application initiated after February 21, 2017. Baseline actual emissions for each unit during any 24-month period selected by LRC shall be adjusted downward to exclude any portion of the baseline emissions that would have been eliminated as CD Emissions Reductions or 2007 Addendum Emissions Reductions had LRC been complying with this Consent Decree and the 2007 Addendum during that 24-month period.

44. Outside the Scope of the Prohibitions. Nothing in this Section is intended to prohibit LRC from seeking to, nor OEPA from denying LRC's request to:

a. Use or generate emission reductions from emissions units that are covered by this Consent Decree to the extent that the proposed emissions reductions represent the difference between CD Emissions Reductions and more stringent control requirements that LRC may elect to accept for those emissions units in a permitting process, except as provided in Paragraph 43;

b. Use or generate emissions reductions from emissions units that are not subject to an emission limitation or control requirement pursuant to this Consent Decree and were not subject to an emission limitation or control requirement pursuant to the 2007 Addendum; or

c. Use CD Emissions Reductions or 2007 Addendum Emissions Reductions for compliance with any rules or regulations designed to address regional haze or the non-attainment status of any area (excluding Prevention of Significant Deterioration and non-attainment New Source Review rules, but including, for example, Reasonably Achievable Control Technology ("RACT") rules that apply to the Lima Refinery); provided, however, that LRC shall not be allowed to trade or sell any CD Emissions Reductions or 2007 Addendum Emissions Reductions.

45. Additional Prohibition. Even if the Waste Gas minimization requirements of Paragraphs 13-16 of Appendix B result in emissions lower than the allowable level under the flaring limitation in Paragraph B19 of Appendix B, such reductions shall be considered CD Emissions Reductions and shall be subject to the general prohibition set forth in Paragraph 43.

VII. SUPPLEMENTAL ENVIRONMENTAL PROJECTS

46. LRC shall implement a supplemental environmental project ("SEP") in accordance with the requirements of this Consent Decree. The SEP involves protecting families by abating lead-based paint hazards in "child-occupied facilities" as defined at 40 C.F.R. § 745.83, including residential properties, located in the geographic areas set forth in Paragraph 47. This SEP may include, but is not limited to, the following: window replacement, using energy efficient windows that meet EPA Energy Star criteria; the removal of lead-based paint and dust; the permanent enclosure or encapsulation of lead-based paint; and the replacement of lead-based

painted surfaces or fixtures. The SEP will be lead-based paint abatement in owner-occupied, low-income residences and other child-occupied facilities whose owners are unable to afford such lead-based paint abatement work, with priority given to families where children age six and under or pregnant women reside or regularly visit.

47. LRC shall implement this SEP in residences and child-occupied facilities within a 50 mile radius of the Lima Refinery.

48. In implementing this SEP, LRC shall prioritize residences and child-occupied facilities that are located in census tracts with a higher incidence of childhood lead poisoning.

49. Nothing in this Consent Decree shall prevent LRC from using nonprofit organizations, contractors, or consultants in planning and implementing this SEP.

50. In implementing this SEP, LRC shall ensure that the individuals or entity performing the work have experience in conducting lead-based paint abatement work. LRC also shall ensure that all work performed for the SEP is conducted in accordance with all applicable federal and state work practice and notification requirements including, but not limited to, the United States Department of Housing and Urban Development's ("HUD's") Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing and the State of Ohio. "Eligible costs" shall include all, but only those costs of conducting lead-based paint abatement work in compliance with the HUD Guidelines, such as family relocation costs, lead inspections/risk assessments, remediation and clearance, purchase of materials, and costs allowed by the HUD Guidelines, except that up to ten percent of total costs billed by any contractor retained by LRCs may be overhead costs yet still be considered "eligible costs."

51. LRC must fully fund an escrow account to pay for the SEP not later than 30 days after the Date of Entry of this Consent Decree. LRC must spend at least $1,750,000 for the SEP.

52. LRC shall complete the SEP by 24 months from the Effective Date, provided that this date may be extended by mutual agreement of the LRC and EPA in writing.

53. With regard to the SEP, LRC certifies the truth and accuracy of each of the following:

a. that all cost information provided to EPA in connection with EPA's approval of the SEP is complete and accurate and that LRC in good faith estimates that the cost to implement the SEP is $1,750,000;

b. that, as of the date of executing this Consent Decree, LRC is not required to perform or develop the SEP by any federal, state, or local law or regulation and is not required to perform or develop the SEP by agreement, grant, or as injunctive relief awarded in any other action in any forum;

c. that the SEP is not a project that LRC was planning or intending to construct, perform, or implement other than in settlement of the claims resolved in this Consent Decree;

d. that LRC has not received and will not receive credit for the SEP in any other enforcement action;

e. that LRC will not receive any reimbursement for any portion of the SEP from any other person; and

f. that (i) LRC is not a party to any open federal financial assistance transaction that is funding or could fund the same activity as the SEP described in Paragraph 46; and (ii) LRC has inquired of the SEP recipient and/or SEP implementer whether either is a party

to an open federal financial assistance transaction that is funding or could fund the same activity as the SEP and has been informed by the recipient and/or the implementer that neither is a party to such a transaction. For purposes of these certifications, the term "open federal financial assistance transaction" refers to a grant, cooperative agreement, loan, federally-guaranteed loan guarantee, or other mechanism for providing federal financial assistance whose performance period has not yet expired.

54. SEP Completion Report. By no later than 30 days after the date set for completion of the SEP set forth in Paragraph 46, LRC shall submit a SEP Completion Report to the United States, in accordance with Section XVII (Notices). The SEP Completion Report shall contain the following information:

a. a detailed description of the SEP as implemented;

b. a description of any problems encountered in completing the SEP and the solutions thereto;

c. an itemized list of all eligible SEP costs expended;

d. certification that the SEP has been fully implemented pursuant to the provisions of this Consent Decree; and

e. a description of the environmental and public health benefits resulting from implementation of the SEP (with a quantification of the benefits and pollutant reductions, if feasible).

55. EPA may, in its sole discretion, require information in addition to that described in the preceding Paragraph, in order to evaluate LRC's SEP Completion Report.

56. After receiving LRC's SEP Completion Report, the United States shall notify LRC whether or not LRC has satisfactorily completed the SEP. If LRC has not completed the SEP in accordance with this Consent Decree, stipulated penalties may be assessed under Section XI (Stipulated Penalties).

57. Disputes concerning the satisfactory performance of the SEP and the amount of eligible SEP costs may be resolved under Section XIII (Dispute Resolution). No other disputes arising under this Section shall be subject to Dispute Resolution.

58. Each submission required under this Section shall be signed by an official with knowledge of the SEP and shall bear the certification language set forth in Paragraph 69.

59. Any public statement, oral or written, in print, film, or other media, made by LRC making reference to the SEP under this Consent Decree shall include the following language: "This project was undertaken in connection with the settlement of an enforcement action, *United States v. Lima Refining Company*, taken on behalf of the U.S. Environmental Protection Agency under the Clean Air Act."

60. For federal income tax purposes, LRC agrees that it will neither capitalize into inventory or basis nor deduct any costs or expenditures incurred in performing the SEP.

VIII. ENVIRONMENTAL MITIGATION

61. By no later than December 31, 2018, or the date of completion of the COF Project, whichever is later, but in any event no later than December 31, 2019, LRC shall complete installation and commence implementation of the Environmental Mitigation Project described in Paragraph 62 for the purpose of reducing emissions of SO_2.

62. LRC shall retrofit SRU Claus II with oxygen enrichment technology and install oxygen enrichment technology on SRU Claus III that will increase the percentage of oxygen in

the air supplied to both SRUs for combustion of H_2S in order to temporarily increase the SRU capacity during an unplanned or planned SRU Claus shutdown or process upset. Oxygen enrichment at SRU Claus II will increase the throughput capacity on a short-term basis to 80 long tons per day. Oxygen enrichment at SRU Claus III will increase the throughput capacity on a short-term basis to 195 long tons per day. This increase in short-term capacity is solely to be used to mitigate the effects of a planned or unplanned SRU Claus shutdown or process upset by allowing one of the other Claus units to handle the flow diverted from the shutdown Claus unit.

63. During a shutdown of SRU Claus I, II, or III that causes or may cause acid gas to be routed to the flare, LRC shall utilize the oxygen enrichment technology to minimize the flaring of acid gas. LRC shall not use the oxygen enrichment technology unless SRU Claus I, II, or III is shut down or in the process of shutting down. During such events, LRC shall concurrently implement sulfur shedding procedures in accordance with its PMO plan.

64. During the use of oxygen enrichment at either SRU Claus II or SRU Claus III, LRC shall comply with an emission limit of 250 parts per million SO_2, on a 12-hour average basis.

65. In each Semi-Annual Report due under Section IX, LRC shall submit a summary of each use of oxygen enrichment during the reporting period. The summary shall:

a. Identify the start and end date and time of the use of oxygen enrichment;

b. Identify the start date and time of the shutdown of the Claus Unit which necessitated the use of oxygen enrichment;

c. Identify the start date and time of the restart of the Claus Unit after its shutdown;

d. Identify which Claus Unit shut down and which used oxygen enrichment;

e. Identify whether the shutdown was planned or unplanned;

f. For the Claus Unit that used oxygen enrichment, provide each 12-hour average SO_2 emission rate (in ppm) during the period of time when oxygen enrichment was in use; and

g. Identify the reduction of SO_2 emissions attributable to the use of oxygen enrichment, including the supporting calculation.

IX. REPORTING AND RECORDKEEPING

66. Semi-Annual Compliance Status Reports. On the dates and for the time periods set forth in Paragraph 68, LRC shall submit to EPA in the manner set forth in Section XVII (Notices) the following information relevant to the semi-annual period for each report:

a. A progress report on the implementation of the requirements of Section V of this Consent Decree (Compliance Requirements);

b. Copies of quarterly excess emissions report submitted to Ohio EPA, per OAC rule 3745-77-07, which include: total downtime of each CEMS, expressed as a percentage of operating time for the calendar quarter; cause of CEMS downtime; total duration of excess emissions at each CEMS as a percentage of operating time for the calendar quarter; the actual emissions of that averaging period (in the units of the limit); cause of excess emissions; and corrective action taken.

c. A list of any CEMS that should be removed from the list of Existing or Redundant CEMS because an underlying legal requirement (*e.g.*, this Consent Decree, a federal or state statute or regulation, or a permit) no longer requires the operation of the CEMS, since the submittal of the previous Semi-Annual Compliance Report. Include a description of the legal requirement that formerly required the CEMS operation and the date that the legal requirement no longer was applicable;

d. A copy of the summary page and relevant operating information for each FCCU PM performance test conducted during the reporting period;

e. A description of each time LRC did not comply with the SRP O&M Plan submitted pursuant to this Consent Decree;

f. For the SRP Pit air flow, identification of all times during the reporting period that the sulfur pit flow was below the minimum set point and a description of the corrective action(s) taken to address the incident; A description of any problems anticipated with respect to meeting the requirements of Section V, Appendix A, and/or Appendix B at the Lima Refinery;

g. A description of the status of the SEPs in Section VII of this Consent Decree;

h. A description of the status of the Mitigation Project in Section VIII of this Consent Decree;

i. Any additional matters required by any other Paragraph or Appendix of this Consent Decree to be submitted in the semi-annual report; and

j. Any additional matters that LRC believes should be brought to the attention of EPA.

67. Emissions Data. In the semi-annual report required to be submitted on August 30 of each year, LRC will provide a summary of annual emissions data for the prior calendar year to include:

a. SO_2 emissions in tons per year from the Sulfur Recovery Plant;

b. Emissions from Covered Flares as specified in Paragraph B21 of Appendix B; and

c. NOx, PM, SO_2, and CO emissions in tons per year from the FCCU;

d. The basis for the emissions estimate or calculation for each of the estimates in Subparagraphs a–c (*i.e.*, stack tests, CEMS, emission factor, *etc*.).

To the extent that the required emissions summary data is available in other reports generated by LRC, such other reports can be attached, or the appropriate information can be extracted from such other reports and attached to the August 30 semi-annual report to satisfy the requirement.

68. Due Dates. The first compliance status report shall be due two months after the first full half-year after the Effective Date of this Consent Decree (*i.e.,* either: (i) February 28 of the year after the Effective Date, if the Effective Date is between January 1 and June 30 of the preceding year; or (ii) August 30 of the year after the Effective Date, if the Effective Date is between July 1 and December 31). The initial report shall cover the period between the Effective Date and the first full half-year after the Effective Date (a "half-year" runs between January 1 and June 30 and between July 1 and December 31). Until termination of this Decree, each subsequent report will be due on February 28 and August 30 and shall cover the prior half-year (*i.e.*, January 1 to June 30 or July 1 to December 31).

69. Each report submitted under this Consent Decree shall be signed by the plant manager (or his/her designee) or the person responsible for environmental management and compliance and shall include the following certification:

> I certify under penalty of law that this document and all attachments were 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 inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

This certification requirement does not apply to emergency or similar notifications where compliance would be impractical.

70. The reporting requirements of this Consent Decree do not relieve LRC of any reporting obligations required by the Clean Air Act or implementing regulations, or by any other federal, state, or local law, regulation, permit, or other requirement.

71. Any information provided pursuant to this Consent Decree may be used by the United States in any proceeding to enforce the provisions of this Consent Decree and as otherwise permitted by law.

X. CIVIL PENALTY

72. LRC shall pay civil penalties and stipulated penalties in the amount of $1,000,000 as set forth below:

a. By no later than 30 days after the Date of Entry of this Consent Decree, LRC shall pay the sum of $706,982 as a civil penalty. LRC shall pay the penalty by FedWire Electronic Funds Transfer ("EFT") to the U.S. Department of Justice in accordance with written instructions to be provided to LRC following entry of the Consent Decree, by the Financial Litigation Unit of the U.S. Attorney's Office for the Northern District of Ohio, 801 West Superior Avenue, Suite 400, Cleveland, Ohio. At the time of payment, LRC shall send a copy of the EFT authorization form, the EFT transaction record, and a transmittal letter: (i) to the United States in accordance with Section XVII of this Decree (Notices); (ii) by email to acctsreceivable.CINWD@epa.gov; and (iii) by mail to:

EPA Cincinnati Finance Office
26 Martin Luther King Drive
Cincinnati, Ohio 45268

The transmittal letter shall state that the payment is for the civil penalty owed pursuant to the Consent Decree in *United States v. Lima Refining Company*, and shall reference the civil action number and DOJ case number 90-5-2-1-06811/3.

b. By no later than 30 days after the Date of Entry of this Consent Decree, LRC shall pay a total sum of $293,018 in stipulated penalties in resolution of violations of the 2007 Addendum at the Lima Refinery. These stipulated penalties shall be split 50% to the United States and 50% to the State of Ohio, as a Plaintiff-Intervener in the 2007 Addendum.

i. Payment to the United States in the amount of $146,509 shall be made in accordance with the instructions in Paragraph 72.a.

ii. Payment to the State of Ohio in the amount of $146,509 shall be made by check made payable to the "Treasurer, State of Ohio" and delivered to

Scott Hainer, Paralegal, or his successor
Office of the Attorney General of Ohio
Environmental Enforcement Section
30 East Broad Street, 25th Floor
Columbus, OH 43215

73. If any portion of the civil penalty due to the United States is not paid when due, LRC shall pay interest on the amount past due, accruing from the Effective Date through the date of payment, at the rate specified in 28 U.S.C. § 1961. Interest payment under this Paragraph shall be in addition to any stipulated penalty due.

74. LRC shall not deduct any penalties paid under this Decree pursuant to this Section or Section XI (Stipulated Penalties) in calculating its federal income tax.

XI. STIPULATED PENALTIES

75. Failure to Pay Civil Penalty. If LRC fails to pay any portion of the civil penalty required to be paid under Section X of this Consent Decree (Civil Penalty) when due, LRC shall pay a stipulated penalty of $2,000 per day for each day that the payment is late. Late payment of the civil penalty and any accrued stipulated penalties shall be made in accordance with Paragraph 84.

76. Failure to Meet all Other Consent Decree Obligations. LRC shall be liable for stipulated penalties to the United States for violations of this Consent Decree as specified in Paragraphs 77 - 79 unless excused under Section XII of this Decree (Force Majeure).

77. Failure to Meet Obligations in Sections V–IX of this Consent Decree

STIPULATED PENALTY TABLE 1a.

Violation	Stipulated Penalty
77.a. Violation of Paragraph 17. For failure to develop or submit a CEMS O&M Plan in accordance with the requirements of Paragraphs 17 or for failure to include the CEMS Testing and Calibration requirements in the CEMS O&M Plan as required by Paragraph 19.	$200 per day, for up to 30 days $1,000 per day, from 31 to 60 days $2,000 per day, for more than 60 days late
77.b. Violation of Paragraph 19. For failure to install, certify, calibrate, maintain, and operate a CEMS in accordance with the requirements of Paragraph 19, incorporated into the CEMS O&M Plan.	$200 per day, for up to 30 days $1,000 per day, from 31 to 60 days $2,000 per day, for more than 60 days late
77.c. Violation of Paragraph 18. For failure to develop or implement the CEMS Training requirements in accordance with Paragraph 18.	For failing to develop: $5,000 per month or partial month For failing to implement: $2,000 per month late
77.d. Violation of Paragraph 21. Failure to develop or implement a preventive	$500 per day, for up to 30 days

maintenance program, a QA/QC program or a repair program in accordance with the requirements of Paragraph 21.	$1,000 per day, for 31 to 60 days $2,000 per day, for 61 days and thereafter
77.e. Violation of Paragraph 23.b. Failure to prepare a CEMS Root Cause Analysis and Corrective Action Report in accordance with the requirements of Subparagraph 23.b.	$5,000 per month or partial month, per Report
77.f. Violation of Paragraph 23.c. Failure to undertake and complete CEMS corrective action(s) in accordance with the requirements of Subparagraph 23.c.	$1,250 per day, for up to 30 days $3,000 per day, for 31 to 60 days $5,000 per day, for 61 days and thereafter
77.g. Violation of Paragraph 23.d. Failure to retain a third party, have the third party prepare a report, or implement any recommendations made by the third party in accordance with the requirements of Subparagraph 23.d.	$10,000 per month or partial month
77.h. Violation of Paragraph 32. Failure to install SCR and wet gas scrubber on the FCCU as required by Paragraph 32.	$10,000 per day
77.i. Failure to operate SCR and wet gas scrubber as required by Paragraph 33.	$500 per day, for up to 30 days $1,000 per day, for 31 to 60 days $2,000 per day, for 61 days and thereafter
77.j. Violation of Paragraph 34. Failure to comply with the 7-day or 365-day rolling average FCCU NOx emission limit.	$1,000 per day, for 1 to 7 days $2,500 per day, for 8 days and thereafter
77.k. Violation of Paragraph 35. Failure to comply with 7-day or 365-day rolling average FCCU SO_2 emission limit.	$1,000 per day, for 1 to 7 days $2,500 per day, for 8 days and thereafter

77.l. Violation of Paragraph36. Failure to comply with 7-day or 365-day rolling average FCCU CO emission limit.	$1,000 per day, for 1 to 7 days $2,500 per day, for 8 days and thereafter
77.m. Violation of Paragraph 37. Failure to comply with NSPS J and Ja requirements for FCCU generators.	$1,000 per day, for 1 to 7 days $2,500 per day, for 8 days and thereafter
77.n. Violation of Paragraph 25. Failure to comply with the NSPS Subpart Ja requirements for SRPs.	$1,000 per day up to 30 days $1,500 per day for 31 to 60 days $2,000 per day after 60 days
77.o. Violation of Paragraph 25.e. Failure to operate the SRPs, TGTUs, sulfur pits, and supplemental control devices on the SRPs in accordance with 40 C.F.R. § 60.11(d), at all times.	$500 per day for up to 30 days $1,500 per day for 31 to 60 days $2,000 per day after 60 days
77.p. Violation of Paragraph 26. Failure to implement SRP Turndown Rate Engineering project, in accordance with Paragraph 26.	$10,000 per day
77.q. Violation of Paragraph **Error! Reference source not found.** Failure to retain a third party, have the third party prepare a report, or implement any recommendations made by the third party for the SRP Optimization Study.	$10,000 per month or partial month
77.r. Violation of Paragraph 28. Failure to develop or implement the SRP operation and maintenance plan.	$500 per day for up to 30 days $1,500 per day for 31 to 60 days $2,000 per day after 60 days
77.s, Violation of Paragraph 29. Failure to comply with the requirements of 40 C.F.R. § 60.102a(f), install, operate, and maintain monitoring equipment, and route sulfur pit emission in accordance with Paragraph 29.	$1,000 per day for up to 30 days $1,750 per day for 31 to 60 days $4,000 per day after 60 days

77.t. Violation of Paragraph 40 and 41. Failure to submit permit applications in accordance with the requirements of Paragraphs 40 and 41.	$800 per day for up to 30 days $1,500 per day for 31 to 60 days $3,000 per day after 60 days
77.u. Violation of Paragraphs 50 or 51. Failure to complete the SEP in accordance with the requirements of Paragraphs 50 and 51.	$4,000 per day for up to 30 days $8,000 per day, for more than 30 days late
77.v. Violation of Paragraphs 62 or 63. Failure to install oxygen enrichment as required by Paragraph 62 and 63.	$10,000 per day
77.w. Violation of Paragraph 64. Failure to operate oxygen enrichment as required by Paragraph 64.	$1,000 per day, for up to 30 days $1,500 per day, for 31 to 60 days $2,000 per day, for 61 days and thereafter
77.x. Violation of Section VII. Failure to submit reports timely or in accordance with the requirements of this Consent Decree.	$300 per day, for period of delay up to 30 days $1,000 per day, for period of delay from 31 to 60 days $5,000 per day, for more than 60 days late

STIPULATED PENALTY TABLE 1b.

Tons Emitted in Reportable Flaring Incident or Tail Gas Incident ("Incident")	Length of Time from Commencement of Flaring/Excess Emissions within the Incident to Termination of Flaring or Excess Emissions within	Length of Time from Commencement of Flaring/Excess Emissions within the Incident to Termination of Flaring/Excess Emissions within	Length of Time from Commencement of Flaring/Excess Emissions within the Incident to Termination of Flaring/Excess Emissions within

	the Incident is 3 hours or less	the Incident is greater than 3 hours but less than or equal to 24 hours	the Incident is greater than 24 hours
5 Tons or Less	$500 per ton	$750 per ton	$1000 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

78. Failure to Meet Obligations in Appendix A of this Consent Decree.

STIPULATED PENALTY TABLE 2

Violation	**Stipulated Penalty**	
79.a. Violation of Paragraph A3. Failure to timely develop and complete the Facility-Wide LDAR Program document required in Paragraph B3 and to update it on an annual basis if needed pursuant to Paragraph A3.	Period of noncompliance 1 - 15 days 16 - 30 days 31 days or more	Penalty per day late $ 300 $ 400 $ 500
79.b. Violation of Paragraph A4. Each failure to perform monitoring at the frequencies set forth in Paragraph A4	$100 per component per missed monitoring event, not to exceed $25,000 per month	

<table>
<tr>
<td>79.c. Violation of Paragraph A6. Each failure to comply with Method 21 (or the AWP, as applicable) in performing LDAR monitoring, as indicated by the leak percentage ratio calculated under Paragraph A28, but only if the auditor identified a leak rate of at least 0.5% per component type in the process unit.</td>
<td>Comparative Monitoring Leak Ratio calculated Paragraph B28

≥ 3.0 < 4.0
≥ 4.0 < 5.0
≥ 5.0 < 6.0
≥ 6.0</td>
<td>Penalty per Covered Process Unit

$15,000
$30,000
$45,000
$60,000</td>
</tr>
<tr>
<td>79.d. Violation of Paragraph A6. Failure to comply with the requirements of Paragraph A6.</td>
<td colspan="2">$100 per failure to record data per piece of Covered Equipment, but no greater than $2,500 per Covered Process Unit per month

$150 per day for each failure to transfer monitoring data to an electronic database for each day that the transfer is late</td>
</tr>
<tr>
<td>79.f. Violation of Paragraph A7. Each failure to conduct and record the calibrations and calibration drift assessments in accordance with the requirements of Paragraph A7.</td>
<td colspan="2">$100 per missed event</td>
</tr>
<tr>
<td>79.g. Violation of Paragraph A10. Each failure to undertake a repair attempt under the circumstances identified in Paragraph A10.</td>
<td colspan="2">$150 per day for each day up to the day the repair is made, not to exceed $1500 per leak (at which time, if the repair still is not made, the penalties in Subparagraph 79.i apply)</td>
</tr>
<tr>
<td>79.h. Violation of Paragraph A11. Each failure to timely perform a first attempt at repair as required by Paragraph A11. For purposes of these stipulated penalties, the term “repair” includes the required remonitoring in Paragraph A12 after the repair attempt; the stipulated penalties in Subparagraph 79.j do not apply.</td>
<td colspan="2">$ 150 per day for each late day, not to exceed $1,500 per leak</td>
</tr>
</table>

<table>
<tr>
<td>79.i. Violation of Paragraph A12. Each failure to timely perform a final attempt at repair as required by Paragraph A12. For purposes of these stipulated penalties, the term “repair” includes the required remonitoring in Paragraph A12 after the repair attempt; the stipulated penalties in Subparagraph 79.j do not apply.</td>
<td>
<table>
<tr><th>Equipment type</th><th>Penalty per Component per day late</th><th>Not to Exceed</th></tr>
<tr><td>Valves, connectors</td><td>$ 300</td><td>$ 18,750</td></tr>
<tr><td>Pumps, agitators</td><td>$1,200</td><td>$ 75,000</td></tr>
</table>
</td>
</tr>
<tr>
<td>79.j. Violation of Paragraph A13. Each failure to timely perform Repair Verification Monitoring as required by Paragraph A13 in circumstances where the first attempt to adjust, or otherwise alter, the piece of equipment to eliminate the leak was made within 5 days and the final attempt to adjust, or otherwise alter, the piece of equipment to eliminate the leak was made within 15 days.</td>
<td>
<table>
<tr><th>Equipment type</th><th>Penalty per Component per day late</th><th>Not to Exceed</th></tr>
<tr><td>Valves, connectors</td><td>$ 150</td><td>$ 9,375</td></tr>
<tr><td>Pumps, agitators</td><td>$ 600</td><td>$ 37,500</td></tr>
</table>
</td>
</tr>
<tr>
<td>79.k. Violation of Paragraph A14. Each failure to undertake the drill-and-tap method in accordance with the requirements of Paragraph A14.</td>
<td>
<table>
<tr><th>Period of noncompliance</th><th>Penalty per component per day late</th></tr>
<tr><td>Between 1 and 15 days</td><td>$ 200</td></tr>
<tr><td>Between 16 and 30 days</td><td>$ 350</td></tr>
<tr><td>Over 30 days</td><td>$ 500 per day for each day over 30, not to exceed $37,500</td></tr>
</table>
</td>
</tr>
<tr>
<td>79.l. Violation of Paragraph A15. Each failure to record the information required by Paragraph A15.</td>
<td>$ 100 per component per item of missed information</td>
</tr>
<tr>
<td>79.m. Violation of Paragraph A16. Each improper placement of a piece of Covered Equipment on the DOR list in violation of the requirements of Paragraph A16.</td>
<td>
<table>
<tr><th>Equipment Type</th><th>Penalty per component per day on list</th><th>Not to exceed</th></tr>
<tr><td>Valve, connectors</td><td>$ 300</td><td>$ 37,500</td></tr>
<tr><td>Pumps, Agitators</td><td>$ 1200</td><td>$ 150,000</td></tr>
</table>
</td>
</tr>
<tr>
<td>79.n. Violation of Subparagraph A17.a. Each failure to comply with the requirement in Subparagraph A16.a that a relevant unit supervisor or person of similar authority sign off on placing a piece of Covered Equipment on the DOR list.</td>
<td>$250 per piece of Covered Equipment</td>
</tr>
</table>

79.o. Violation of Subparagraph A17.c. Each failure to comply with the 0.10% limit on valves that may be placed on the DOR list in violation of the requirements of Subparagraph A17.c.	$5,000 per valve
79.p. Violation of Paragraph A18. Each failure to install a Low-E Valve or a valve fitted with Low-E Packing when required to do so pursuant to Paragraph A18.	$1,000 per valve required by Subparagraph A19.b or A19.c; $10,000 per valve required by Subparagraph A19.d
79.q. Violation of Paragraph A23. Each failure to add a piece of Covered Equipment to the LDAR program in accordance with the requirements of Paragraph A23.	$300 per piece of Covered Equipment (plus an amount, if any due under Subparagraph 79.b for any missed monitoring for a component that should have been added to the LDAR program)
79.r. Violation of Paragraph A23. Each failure to remove a piece of Covered Equipment from the LDAR program in violation of Paragraph A23.	$150 per piece of Covered Equipment
79.s. Violation of Paragraph A24. Each failure to develop a training protocol in accordance with the requirements of Paragraph A24.	$50 per day of noncompliance
79.t. Violation of Paragraph A24. Each failure to perform initial, refresher, or new personnel training as required by the training program identified in Paragraph A24.	$1,000 per person per month late
79.u. Violation of Paragraph A25. Each failure of a monitoring technician or LDAR database coordinator to complete the certification required in Paragraph A25.	$100 per failure per technician or database coordinator
79.v. Violation of Paragraph A26. Each failure to perform any of the requirements relating to QA/QC in Paragraph A26.	$750 per missed requirement per quarter
79.w. Violation of Paragraph A27. Each failure to conduct an LDAR audit in accordance with the schedule set forth in Paragraph A27.	Period of noncompliance — Penalty per day 1 – 15 days — $300 16 – 30 days — $400 31 days or more — $500, not to exceed $ 50,000 per audit
79.x. Violation of Paragraph A27. Each failure to use a third-party auditor or each use of a third-party auditor that is not experienced in LDAR audits, in violation of Paragraph A27.	$25,000 per audit

79.y. Violation of Paragraph A28. Except for the requirement to undertake Comparative Monitoring, each failure to substantially comply with the LDAR audit requirements in Paragraph A28.	$10,000 per missed requirement, not to exceed $100,000 per audit
79.z. Violation of Subparagraphs A29.a–A29.c. Each failure to substantially comply with the Comparative Monitoring requirements of Subparagraphs A29.a–A29.c.	$50,000 per audit
79.aa. Violation of Paragraph A31.b. Each failure to timely submit a Final Corrective Action Plan that substantially conforms to the requirements of Paragraph A31.b.	Period of noncompliance — Penalty per day per violation 1 - 15 days — $ 100 16 - 30 days — $ 250 31 days or more — $ 500 Not to exceed $50,000 per audit
79.bb. Violation of Paragraph A31. Each failure to implement a corrective action within 90 days after the LDAR Audit Completion Date or pursuant to the schedule that LRC must propose pursuant to Subparagraph A31.a if the corrective action cannot be completed in 90 days.	Period of noncompliance — Penalty per day per violation 1 - 15 days — $ 500 16 - 30 days — $ 750 31 days or more — $1,000 Not to exceed $100,000 per audit

79.cc. Violation of Paragraph A32. Each failure to timely submit a Certification of Compliance that substantially conforms to the requirements of Paragraph A32.	Period of noncompliance 1 - 15 days 16 - 30 days 31 days or more Not to exceed $50,000	Penalty per day per violation $ 100 $ 250 $ 500

79. Failure to Meet Obligations in Appendix B of this Consent Decree.

STIPULATED PENALTY TABLE 3

Violation	**Stipulated Penalty**	
78.a. Violation of Paragraph B2. Failure to timely submit a report (¶ B2) that conforms to the requirements of that Paragraph.	Period of delay or noncompliance Days 1–30 Days 31–60 Days 61 and later	Penalty per day $ 300 $ 400 $ 500
78.b. Violation of Paragraph B14. Failure to timely submit a plan (¶ B14) that conforms to the requirements of that Paragraph.	Period of delay or noncompliance Days 1–30 Days 31–60 Days 61 and later	Penalty per day $ 500 $ 750 $ 1000
78.c. Violation of Paragraph BA3, B4, B5, B6, B7, B8.a, B8.b, the Column labeled "Minimum accuracy requirements" in Table 13 of 40 C.F.R. Part 63, Subpart CC, or B9. Failure to timely install the equipment and monitoring systems required by Paragraphs B3–B7 in accordance with the respective, applicable technical specifications in: *(1)* those Paragraphs or *(2)* Paragraph B8.a, B8.b, or *(3)* the Column labeled "Minimum accuracy requirements" in Table 13 of 40 C.F.R. Part 63, Subpart CC; or *(4)* Paragraph B9.	Period of delay or noncompliance, per monitoring system Days 1–30 Days 31–60 Days 61 and later	Penalty per day per monitoring system $ 750 $ 1250 $ 2,000
78.d. Violation of the QA/QC requirements in Table 13 of 40 C.F.R. Part 63, Subpart CC. Failure to comply with the requirements that have a	Violation of a: Daily requirement Weekly requirement	Penalty $ 100 $ 125 per day late

periodic compliance basis (*e.g.*, "daily," "weekly,") in the column labeled "Calibration requirements" in Table 13 of 40 C.F.R. Part 63, Subpart CC.	Quarterly requirement Annual requirement Biennial requirement	$ 200 per day late $ 500 per day late $1,000 per day late
78.e. Violation of Subparagraph B8.a, B8.b or of any requirement of Table 13 of 40 C.F.R. Part 63, Subpart CC not covered by Subparagraphs 78.c. or 78.d. Failure to comply with the requirements of Subparagraph B8.a, B8.b, or of any requirement of Table 13 of 40 C.F.R. Part 63, Subpart CC, not covered by Subparagraph 78.c. or 78.d.	Period of Delay or Noncompliance Days 1–30 Days 31–60 Days 61 and later	Penalty per Day per Requirement $ 250 $ 500 $1,000
78.f. Violation of Paragraph B10. Failure to comply with a requirement of Paragraph B10.	Per monitoring system, number of hours per calendar quarter in violation 0.25–50.0 50.25–100.0 Over 100.0	Penalty per hour per monitoring system $ 250 $ 500 $ 1,000

78.g. Violation of Certain Subparagraph B18.b.i and ii Requirements. Each failure to comply with the following requirements in Subparagraph B18.b.i or Subparagraph B18.b.ii: *(1)* Subparagraph B18.b.i requirement to have the Primary Compressor in the LIU FGRS Available for Operation and/or in operation 90% of the time; *(2)* Subparagraph B18.b.i requirement to have the Secondary Compressor in the LIU FGRS Available for Operation and/or in operation 98% of the time that the Primary Compressor is not in operation; *(3)* Subparagraph B.18.b.ii requirement to have one Compressor in the FCC FGRS Available for Operation and/or in operation 98% of the time; and *(4)* Subparagraph B18.b.ii requirement to have two Compressors in the FCC FGRS Available for Operation and/or in operation 90% of the time.	Per FGRS, the number of hours or fraction thereof–over the allowed percentage—in a rolling 8760-hour period that a Compressor required to be Available for Operation is not: $750; provided however, that stipulated penalties shall not apply for any hour or fraction thereof in which a Compressor's unavailability did not result in flaring.
78.h. Violation of Subparagraph B19.a. Failure to comply with the refinery-wide 365-day rolling average limit on VOC Emissions.	Pollutant — Penalty per Day per ton VOC — $ 2,500 The amount of excess emissions during the event(s) which precipitate(s) the exceedance(s) of the 365-day rolling average VOC Limit is not the sole basis for calculating the stipulated penalty due. Instead, each day on which the 365-day rolling average limit is violated—which violations most likely continue even though the precipitating event and the excess emissions do not—counts as a separate day. LRC shall comply with Appendix B1.3 to calculate the stipulated penalties resulting from violating the flaring limitation in Subparagraph B19.a.

78.i. Violation of Paragraph B20.g. For each Covered Flare or Portable Flare, if any, failure to comply with the Net Heating Value in the Combustion Zone Gas ("NHV_{cz}") standard in Paragraph B20.g.	On a per Flare basis, hours per calendar quarter in noncompliance	Penalty per hour, or fraction thereof per flare
	Hours 0.25–50.0	$ 25
	Hours 50.25–100.0	$ 75
	Hours over 100.0	$ 150
	For purposes of calculating the number of hours of noncompliance with the NHV_{cz} standard, all 15-minute periods of violation shall be added together to determine the total.	
78.j. Violation of Paragraph B21. Failure to record any information required to be recorded pursuant to Paragraph B21.	$100 per day	
78.k. Violation of Paragraph B22. Failure to comply with the H_2S emission limit at a Covered Flare after that Covered Flare is required to comply with 40 C.F.R. Part 60, Subpart J, or 40 C.F.R. Part 60, Subpart Ja.	On a per Covered Flare basis, hours (on a three-hour rolling average basis) per calendar quarter in noncompliance	Penalty per hour per Covered Flare
	Hours 1–50.0	$ 50
	Hours 51–100.0	$ 100
	Hours over 100.0	$ 200
	For purposes of calculating the number of hours of noncompliance with the H_2S limit, all one-hour periods of violation shall be added together to determine the total. The averaging period for this standard is a three-hour rolling average.	
78.l. Violation of Paragraph B23. Failure to comply with a requirement of 40 C.F.R. §§ 63.670 and 63.671 to the extent that the failure is not already subject to a stipulated penalty in Subparagraphs 78.a – 78.n.	Period of Delay or Noncompliance	Penalty per Day per Requirement per Flare
	Days 1–30	$ 250
	Days 31–60	$ 500
	Days 61 and later	$1,000

80. Waiver of Payment. The United States may, in its unreviewable discretion, reduce or waive payment of stipulated penalties otherwise due to it under this Consent Decree.

81. Demand for Stipulated Penalties. A written demand by the United States for the payment of stipulated penalties will identify the particular violation(s) to which the stipulated

penalty relates, the stipulated penalty amount that the United States 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. Prior to issuing a written demand for stipulated penalties, the United States may, in its unreviewable discretion, contact LRC for informal discussion of matters that the United States believes may merit stipulated penalties.

82. Stipulated Penalties Accrual. Stipulated penalties under this Section shall begin to accrue on the Day after performance is due or on the Day a violation occurs, whichever is applicable, and shall continue to accrue until performance is satisfactorily completed or until the violation ceases. Stipulated penalties shall accrue simultaneously for separate violations of this Consent Decree.

83. Stipulated Penalties Payment Due Date. Stipulated penalties shall be paid no later than thirty (30) days after receipt of a written demand by the United States unless the demand is disputed through compliance with the requirements of the dispute resolution provisions of this Consent Decree.

84. Manner of Payment of Stipulated Penalties. Stipulated penalties owing to the United States of under $10,000 shall be paid by check and made payable to the "U.S. Department of Justice," referencing DOJ Number 90-5-2-1-06811/3 and delivered to the U.S. Attorney's Office in the Northern District of Ohio, 801 West Superior Ave, Suite 400, Cleveland, Ohio. Stipulated penalties owing to the United States of $10,000 or more shall be paid in the manner set forth in Section X of this Decree (Civil Penalty). All transmittal correspondence shall state that the payment is for stipulated penalties, shall identify the violations to which the payment relates, and shall include the same identifying information

required by Paragraph 71, except that the transmittal letter shall state that the payment is for stipulated penalties and shall state for which violation(s) the penalties are being paid.

85. Stipulated Penalties Dispute. Stipulated penalties shall continue to accrue as provided in Paragraph 82, during any dispute resolution, but need not be paid until the following:

a. If the dispute is resolved by agreement or by a decision of EPA that is not appealed to the Court, LRC shall pay accrued penalties determined to owed, together with interest, to the United States within 30 days of the effective date of the agreement or the receipt of EPA's decision or order.

b. If the dispute is appealed to the Court and the United States prevails in whole or in part, LRC shall pay all accrued penalties determined by the Court to be owed, together with interest, within 60 days of receiving the Court's decision or order, except as provided in Subparagraph c, below.

c. If any Party appeals the Court's decision, LRC shall pay all accrued penalties determined to be owed, together with interest, within 15 days of receiving the final appellate court decision.

86. Nothing in this Consent Decree prevents LRC from early compliance with the deadlines in the Consent Decree.

87. If LRC fails to pay stipulated penalties according to the terms of this Consent Decree, LRC shall be liable for interest on such penalties, as provided for in 28 U.S.C. § 1961, accruing as of the date payment became due. Nothing in this Paragraph shall be construed to limit the United States from seeking any remedy otherwise provided by law for LRC's failure to pay any stipulated penalties.

88. Subject to the provisions of Section XV (Effect of Settlement/Reservation of Rights), the stipulated penalties provided for in this Consent Decree shall be in addition to any other rights, remedies, or sanctions available to the United States for LRC's violation of this Consent Decree or applicable law. In addition to injunctive relief or stipulated penalties, the United States may seek mitigating emissions reductions equal to or greater than the excess amounts emitted if the violations result in excess emissions. LRC reserves the right to oppose the United States' request for mitigating emission reductions, including without limitation the authority of the United States to compel mitigation. LRC shall be allowed a credit, for any stipulated penalties paid, against any statutory penalties imposed for such violation.

XII. FORCE MAJEURE

89. "Force majeure," for purposes of this Consent Decree, is defined as any event arising from causes beyond the control of LRC, of any entity controlled by LRC, or of LRC's contractors, which delays or prevents the performance of any obligation under this Consent Decree despite LRC's best efforts to fulfill the obligation. The requirement that LRC exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure event and best efforts to address the effects of any such event (a) as it is occurring and (b) after it has occurred, to prevent or minimize any resulting delay to the greatest extent possible. "Force Majeure" does not include LRC's financial inability to perform any obligation under this Consent Decree. The failure of a Permitting Authority to issue a necessary construction or operating permit in a timely fashion is a force majeure event where the Settling Defendant submitted a timely and complete permit application and the failure of the Permitting Authority to issue the relevant permit is beyond the control of LRC.

90. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree, whether or not caused by a force majeure event, LRC shall notify EPA in writing not later than fifteen calendar days after the time that LRC first knew that the event might cause a delay. In the written notice, LRC shall specifically reference this Paragraph 90 and shall provide an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; LRC's rationale for attributing such delay to a force majeure event if it intends to assert such a claim; and a statement as to whether, in the opinion of LRC, such event may cause or contribute to an endangerment to public health, welfare or the environment. LRC shall be deemed to know of any circumstance of which LRC, any entity controlled by LRC, or LRC's contractors knew or should have known. LRC shall include with any notice all available documentation supporting the claim that the delay was attributable to a force majeure. The written notice required by this Paragraph shall be effective upon the mailing of the same by overnight mail or by certified mail, return receipt requested, to EPA in the manner set forth in Section XVII of this Decree (Notices).

91. Failure by LRC to comply with the requirements of Paragraph 90 shall preclude LRC from asserting any claim of force majeure for that event for the period of time of such failure to comply, and for any additional delay caused by such failure.

92. If EPA agrees that the delay or anticipated delay is attributable to a force majeure event, the time for performance of the obligations under this Consent Decree that are affected by the force majeure event will be extended by EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the force

majeure event shall not, of itself, extend the time for performance of any other obligation. EPA will notify LRC in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure event.

93. If EPA does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, or if the EPA and LRC fail to agree on the length of the delay attributable to the force majeure event, EPA will notify LRC in writing of its decision.

94. If LRC elects to invoke the dispute resolution procedures set forth in Section XIII (Dispute Resolution), it shall do so no later than 45 days after receipt of EPA's notice. In any such proceeding, LRC shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure event, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Defendant complied with the requirements of Paragraphs 89 and 90. If LRC carries this burden, the delay at issue shall be deemed not to be a violation by Defendant of the affected obligation of this Consent Decree identified to EPA and the Court.

XIII. DISPUTE RESOLUTION

95. Unless otherwise expressly provided for in this Consent Decree, the dispute resolution procedures of this Section shall be the exclusive mechanism to resolve disputes arising under or with respect to this Consent Decree.

96. Informal Dispute Resolution. Any dispute subject to Dispute Resolution under this Consent Decree shall first be the subject of informal negotiations. The dispute shall be considered to have arisen when one Party sends the other Party a written Notice of Dispute.

Such Notice of Dispute shall state clearly the matter in dispute. The period of informal negotiations shall not exceed 60 days from the date the dispute arises, unless that period is modified by written agreement. If the Parties cannot resolve a dispute by informal negotiations, then the position advanced by the United States shall be considered binding unless, within 30 days after the United States has notified LRC of the conclusion of the informal negotiation period, LRC invokes formal dispute resolution procedures set forth below.

97. Formal Dispute Resolution. LRC shall invoke formal dispute resolution procedures, within the time period provided in the preceding Paragraph, by serving on the United States a written Statement of Position regarding the matter in dispute. The Statement of Position shall include, but need not be limited to, any factual data, analysis, or opinion supporting LRC's position and any supporting documentation relied upon by LRC.

98. The United States shall serve its Statement of Position within 45 days of receipt of LRC's Statement of Position. The United States' Statement of Position shall include, but need not be limited to, any factual data, analysis, or opinion supporting that position and any supporting documentation relied upon by the United States. The United States' Statement of Position shall be binding on LRC unless LRC files a motion for judicial resolution of the dispute in accordance with the following Paragraph.

99. LRC may seek judicial review of the dispute by filing with the Court and serving on the United States, in accordance with Section XVII of this Consent Decree (Notices), a motion requesting judicial resolution of the dispute. The motion must be filed within 45 days of receipt of the United States' Statement of Position pursuant to the preceding Paragraph. The motion shall comply with the Local Rules of the Court.

100. The United States shall respond to LRC's motion within the time period allowed by the Local Rules of this Court. LRC may file a reply memorandum, to the extent permitted by the Local Rules.

101. Standard of Review. In all disputes arising under the Consent Decree, LRC shall bear the burden of demonstrating that its position complies with this Consent Decree and the CAA and that LRC is entitled to relief under applicable principles of law.

102. The invocation of dispute resolution procedures under this Section shall not, by itself, extend, postpone, or affect in any way any obligation of LRC under this Consent Decree unless and until final resolution of the dispute so provides. Stipulated penalties with respect to the disputed matter shall continue to accrue from the first Day of noncompliance, but payment shall be stayed pending resolution of the dispute as provided in Paragraph 85. If LRC does not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section XI (Stipulated Penalties). As part of the resolution of any dispute under this Section, the Parties, by agreement, or the 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 work that occurred as a result of the dispute resolution process. LRC shall be liable for stipulated penalties for its failure thereafter to complete the work in accordance with the extension or modified schedule.

XIV. INFORMATION COLLECTION AND RETENTION

103. The United States and its representatives, including attorneys, contractors, and consultants, shall have the right of entry into the Lima Refinery, at all reasonable times, upon presentation of credentials, to:

a. monitor the progress of activities required under this Consent Decree;

b. verify any data or information submitted to the United States in accordance with the terms of this Consent Decree;

c. obtain documentary evidence, including photographs and similar data; and

d. assess LRC's compliance with this Consent Decree.

104. Until one year after the termination of this Consent Decree, LRC shall retain all non-identical copies of all documents, records, or other information (including documents, records, or other information in electronic form) in its possession or control that directly relate to LRC's performance of its obligations under this Consent Decree. Until one year after termination of this Consent Decree, LRC shall instruct its contractors and agents to preserve all documents, records, or other information, regardless of storage medium (*e.g.*, paper or electronic) in its contractors' or agents' possession or control, or that come into its or its contractors' or agents' possession or control, that demonstrate or document LRC's compliance or non-compliance with the obligations of this Consent Decree. This information-retention requirement shall apply regardless of any contrary corporate or institutional policies or procedures. At any time during this information-retention period, upon request by the United States, LRC shall provide copies of any documents, records, or other information required to be maintained under this Paragraph.

105. Except for emissions data, LRC may also assert that information required to be provided under this Section is protected as Confidential Business Information ("CBI") under 40 C.F.R. Part 2. As to any information that LRC seeks to protect as CBI, LRC shall follow the procedures set forth in 40 C.F.R. Part 2.

106. This Consent Decree in no way limits or affects any right of entry and inspection, or any right to obtain information, held by the United States pursuant to applicable federal laws, regulations, or permits, nor does it limit or affect any duty or obligation of LRC to maintain documents, records, or other information imposed by applicable federal or state laws, regulations, or permits.

XV. EFFECT OF SETTLEMENT/RESERVATION OF RIGHTS

107. Definitions. For purposes of this Part XV, the following definitions apply:

a. "Hazardous Air Pollutants" or "HAPs" shall have the meaning set forth in 42 U.S.C. § 7412(b).

b. Applicable NSR/PSD Requirements shall mean the Prevention of Significant Deterioration ("PSD") and New Source Review ("NSR") requirements at Part C of Subchapter I of the Act, 42 U.S.C. § 7470, et. seq., and the regulations promulgated thereunder at 40 C.F.R. §§ 52.21 and 51.166; the portions of the applicable SIPs and related rules adopted as required by 40 C.F.R. §§ 51.165 and 51.166; "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), 40 C.F.R. Part 51, Appendix S, and 40 C.F.R. § 52.24; Title V regulations or permit provisions that implement, adopt or incorporate the specific regulatory requirements identified above; and state or local regulations or permits that implement, adopt, or incorporate the specific federal regulatory requirements identified above.

108. This Consent Decree resolves the civil claims of the Unites States for the violations alleged in the Complaint filed in this action through the Date of Lodging.

109. Entry of this Consent Decree shall resolve the civil claims of the United States for the violations that occurred through the Date of Lodging of the Consent Decree as alleged in the

Notice and Finding of Violation ("NOV/FOV") issued to LRC by EPA dated December 18, 2013 (EPA-5-14-OH-02) and the Finding of Violation ("FOV") issued to LRC by EPA dated March 20, 2009.

110. Entry of this Consent Decree shall resolve the civil claims of the United States for the violations that occurred through the Date of Lodging of the Consent Decree as alleged in the Notices of Violation ("NOVs") issued to LRC by Ohio Environmental Protection Agency dated March 28, 2016, November 29, 2016, February 17, 2017, and February 22, 2017.

111. Resolution of Pre-Lodging Claims under Listed Regulations at the Covered Flares and other Specified Process Units. With respect to emissions of the following pollutants from the following flares and process units, entry of this Consent Decree shall resolve the civil claims of the United States against LRC for violations of the following regulations (and any applicable state regulations that implement, adopt, or incorporate any of the following regulations) that occurred from the date of accrual through the Date of Lodging:

Flare(s)/ Process Unit(s)	**Pollutant(s)**	**Regulation(s)**
Covered Flares	VOCs and HAPs	40 C.F.R. § 60.11(d); 40 C.F.R. §§ 60.18(c)(1)-(2), (c)(3)(ii), (c)(4), (d), (e) and (f); 40 C.F.R. § 63.6(e)(1)(i); 40 C.F.R. §§ 63.11(b)(1), (3)-(5), (6)(ii), and (7); 40 C.F.R. §§ 60.482-10(d), 60.482-10a(d), but only to the extent that these provisions require compliance with 40 C.F.R. §§ 60.18(c)(3)(ii) and (d); 40 C.F.R. §§ 60.482-10(e), 60.482-10a(e), but only to the extent that these provisions relate to flares; 40 C.F.R. §§ 60.592(a), 60.592a(a), but only to the extent that these provisions: (a) relate to flares, and (b) require compliance with 40 C.F.R. §§ 60.18(c)(3)(ii) and (d); 40 C.F.R. § 63.643(a)(1), but only to the extent that this provision: (a) relates to flares, and (b) requires compliance with 40 C.F.R. §§ 63.11(b)(1) and (b)(6)(ii); 40 C.F.R. § 63.648(a), but only to the extent that this provision: (a) relates to flares, and (b) requires compliance with 40 C.F.R. §§ 60.18(c)(3)(ii) and (d); Table 6 of 40 C.F.R. Part 63, Subpart CC, but only to the extent that Table 6 requires compliance with 40 C.F.R. § 63.6(e)(1)(i); 40 C.F.R. § 63.1566(a)(1)(i) and Table 15 of Part 63, Subpart UUU, but only to the extent that Table 15: (a) relates to flares, and (b) requires compliance with 40 C.F.R. §§ 63.11(b)(1) and (b)(6)(ii); 40 C.F.R. § 63.1566(a)(1)(i) and Table 44 of Part 63, Subpart UUU, but only to the extent that Table 44 requires compliance with 40 C.F.R. § 63.6(e)(1).
Covered Flares	SO_2, and H_2S	40 C.F.R. Part 60, Subparts A, J, and Ja

112. Resolution of Claims Continuing Post-Lodging for Failure to Comply with Requirements Related to Monitoring, Operation, and Maintenance According to Flare Design at the Covered Flares. With respect to emissions of VOCs and HAPs at the following flares, entry of this Consent Decree shall resolve the civil claims of the United States against LRC for violations of the listed regulations from the Date of Lodging through the following dates, but only to the extent that these claims are based upon LRC's use of too much steam in relation to vent gas flow:

Flares	**Date**	**Regulation(s)**
LIU	December 31, 2017	40 C.F.R. § 60.18(d);
FCC	December 31, 2018	40 C.F.R. § 63.11(b)(1);
AG	January 30, 2019	40 C.F.R. §§ 60.482-10(d) and 60.482-10a(d), but only to the extent that these provisions require compliance with 40 C.F.R. § 60.18(d); 40 C.F.R. §§ 60.482-10(e) and 60.482-10a(e), but only to the extent that these provisions relate to flares; 40 C.F.R. §§ 60.592(a) and 60.592a(a), but only to the extent that these provisions: (a) relate to flares; and (b) require compliance with 40 C.F.R. § 60.18(d); 40 C.F.R. § 63.643(a)(1), but only to the extent that this provision requires compliance with 40 C.F.R. § 63.11(b)(1); 40 C.F.R. § 63.648(a), but only to the extent that this provision: (a) relates to flares, and (b) requires compliance with 40 C.F.R. § 60.18(d) 40 C.F.R. § 63.1566(a)(1)(i) and Table 15 of Part 63, Subpart UUU, but only to the extent that these provisions: (a) relate to flares, and (b) require compliance with 40 C.F.R. § 63.11(b)(1).

113. Resolution of FCCU Violations. Entry of the Consent Decree shall resolve the civil claims of the United States claims for violations of NOx and SO_2 emissions limits from date of accrual through the Date of Lodging, as set forth below:

a. If after monitoring and setting emission limits for NOx in accordance with Appendix C, the NOx limits are equal to or less than 50 ppmvd at 0% excess air on a 365-day rolling average, and 80 ppmvd at 0% excess air on a 7-day rolling average, then this Consent Decree shall resolve the civil claims of the United States for violations at the FCCU of 40 C.F.R § 60.102a(b)(2);

b. If after monitoring and setting emission limits for NOx in accordance with Appendix C, the NOx limits are equal to or less than 10 ppmvd at 0% excess air on a 365-day rolling average and 20 ppmvd at 0% excess air on a 7-day rolling average, then this Consent Decree shall resolve the civil claims of the United States for violations at the FCCU of the PSD/NNSR requirements with respect to emissions of NOx;

c. If after monitoring and setting emission limits for SO_2 in accordance with Appendix C, the SO_2 limits are equal to or less than 20 ppmvd at 0% excess air on a 365-day rolling average, and 40 ppmvd at 0% excess air on a 7-day rolling average, then this Consent Decree shall resolve the civil claims of the United States for violations at the FCCU of 40 C.F.R § 60.102a(b)(3);

d. If after monitoring and setting emission limits for SO_2 in accordance with Appendix C, the SO_2 limits are equal to or less than 10 ppmvd at 0% excess air on a 365-day rolling average and 18 ppmvd at 0% excess air on a 7-day rolling average, then this Consent Decree shall resolve the civil claims of the United States for violations at the FCCU of the PSD/NNSR requirements with respect to emissions of SO_2.

114. Resolution of LDAR Violations. Entry of this Consent Decree shall resolve the civil claims of the United States against LRC for violations of: (1) 40 C.F.R. Part 60, Subparts GGG and GGGa; (2) 40 C.F.R. Part 61, Subparts J and V; (3) the Equipment Leak Standards of 40 C.F.R. Part 63, Subpart CC; and (4) any applicable, federally enforceable state or local regulation that implements, adopts, or incorporates the federal provisions cited in this Paragraph that occurred from the date of accrual through the Date of Lodging of this Consent Decree at each process unit (as defined as 40 C.F.R. § 60.590a(e)) at the Lima Refinery.

115. Resolution of Consent Decree Violations. Entry of this Consent Decree shall resolve the civil and stipulated penalty claims of the United States against LRC for the following alleged violations of the Consent Decree Addendum entered by the United States District Court for the Western District of Texas in Civ. No. SA-07-CA-0683-RF on November 20, 2007:

a. Violations of Paragraph 94 for excess emissions of CO from the FCCU;

b. Violations of Paragraphs 250 - 252 for acid gas flaring and tail gas incidents;

c. Violations of Paragraph 242 for failure to submit reports for acid gas flaring and hydrocarbon flaring;

d. Violations of Paragraphs 89 and 118 for excessive CEMS downtime;

e. Violations of Paragraphs 199, 201, 203, 209-211, and 213 for failure to comply with the LDAR Program enhancements; and

f. Violations of Paragraph 221 for excess SO_2 from the SRU/TGTU/BB Treater

116. The United States reserves all legal and equitable remedies available to enforce the provisions of this Consent Decree. This Consent Decree shall not be construed to limit the

rights of the United States to obtain penalties or injunctive relief under the CAA or implementing regulations, or under other federal or state laws, regulations, or permit conditions, except as expressly specified in Paragraphs 108-115. The United States further reserves all legal and equitable remedies to address any imminent and substantial endangerment to the public health or welfare or the environment arising at, or posed by, the Lima Refinery, whether related to the violations addressed in this Consent Decree or otherwise.

117. In any subsequent administrative or judicial proceeding initiated by the United States for injunctive relief, civil penalties, or other appropriate relief relating to the Lima Refinery or LRC's CAA violations, LRC shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by the United States in the subsequent proceeding were or should have been brought in the instant case, except with respect to claims that have been specifically resolved pursuant to Paragraphs 108-115.

118. This Consent Decree is not a permit, or a modification of any permit, under any federal, state, or local laws or regulations. LRC is responsible for achieving and maintaining complete compliance with all applicable federal, State, and local laws, regulations, and permits; and LRC's compliance with this Consent Decree shall be no defense to any action commenced pursuant to any such laws, regulations, or permits, except as set forth herein. The United States does not, by its consent to the entry of this Consent Decree, warrant or aver in any manner that LRC's compliance with any aspect of this Consent Decree will result in compliance with provisions of the Act, 42 U.S.C. § 7401 *et seq.*, or with any other provisions of federal, state, or local laws, regulations, or permits.

119. This Consent Decree does not limit or affect the rights of LRC or of the United States against any third parties, not party to this Consent Decree, nor does it limit the rights of third parties, not party to this Consent Decree, against LRC, except as otherwise provided by law.

120. This Consent Decree shall not be construed to create rights in, or grant any cause of action to, any third party not party to this Consent Decree.

XVI. COSTS

121. The Parties shall bear their own costs of this action, including attorneys' fees, except that the United States shall be entitled to collect the costs (including attorneys' fees) incurred in any action necessary to collect any portion of the civil penalty or any stipulated penalties due but not paid by LRC.

XVII. NOTICES

122. Unless otherwise specified herein, whenever notifications, submissions, or communications are required by this Consent Decree, they shall be made in writing and addressed as follows:

As to the United States:

Required only where the "United States" (and not "EPA") is a recipient:

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
Reference Case No. 90-5-2-1-06811/3

As to EPA (Headquarters):

Required where either the "United States" or "EPA" is a recipient.
For EPA Headquarters, only electronic submissions are required. Those shall be addressed to:

refinerycd@erg.com

If the submission cannot be sent by email, it shall be sent to:

Eastern Research Group, Inc.
14555 Avion Parkway, Suite 200
Chantilly, VA 20151

As to EPA (Region 5):

Required where either the "United States" or "EPA" is a recipient.
Electronic submissions are required.

Electronic submissions shall be addressed to:

R5airenforcement@epa.gov

As to LRC:

Jerry Miller
Vice President, Lima Refining Company
1150 South Metcalf St.
Lima, Ohio 45804

Paul Logsdon
Director, EHS
1150 South Metcalf St.
Lima, Ohio 45804

Gary Vonderembse
1150 South Metcalf St.
Lima, Ohio 45804

Dan Syphard
Legal Counsel, US Operations
Blazer Pkwy
Suite 200
Columbus, Ohio 43017

Electronic submissions shall be addressed to:

jerry.miller@huskyenergy.com
paul.logsdon@huskyenergy.com
Gary.Vonderembse@huskyenergy.com
Dan.syphard@huskyenergy.com

123. Date of Submission and Date of Receipt. Unless otherwise provided herein, notifications to or communications between the Parties shall be deemed submitted on the date they are postmarked and sent by U.S. Mail or overnight mail, postage prepaid, or, if the communication is required to be submitted solely to EPA, then on the date sent by electronic mail; provided however, that notices under Section XII (Force Majeure) and Section XIII (Dispute Resolution) shall be sent by overnight mail or by certified or registered mail, return receipt requested. Notifications to or communications mailed to LRC shall be deemed to be received on the earlier of: (i) actual receipt by LRC; or (ii) receipt of an electronic version sent to the addressees set forth in this Paragraph. If the date for submission of a report, study, notification, or other communication falls on a Saturday, Sunday or federal holiday, the report, study, notification, or other communication will be deemed timely if it is submitted the next business day.

124. Any Party may change either the notice recipient or the address for providing notices to it by serving the other Party with a notice setting forth such new notice recipient or address.

XVIII. EFFECTIVE DATE

125. The Effective Date of this Consent Decree shall be the date upon which this Consent Decree is entered by the Court or a motion to enter the Consent Decree is granted, whichever occurs first, as recorded on the Court's docket; provided however, that LRC hereby

agrees that it shall be bound to perform duties scheduled to occur prior to the Effective Date. In the event the United States withdraws or withholds consent to this Consent Decree before entry, or the Court declines to enter the Consent Decree, then the preceding requirement to perform duties scheduled to occur before the Effective Date shall terminate.

XIX. RETENTION OF JURISDICTION

126. The Court shall retain jurisdiction over this case until termination of this Consent Decree, for the purpose of resolving disputes arising under this Consent Decree or entering orders modifying this Consent Decree, or effectuating or enforcing compliance with the terms of this Consent Decree.

XX. MODIFICATION

127. The terms of this Consent Decree, including the attached Appendices, may be modified only by a subsequent written agreement signed by the United States and LRC. Where the modification constitutes a material change to this Decree, it shall be effective only upon approval by the Court.

128. The nature and frequency of reports required by this Consent Decree may be modified by mutual agreement of the Parties. The agreement of the United States to such modification must be in the form of a written notification from EPA, but need not be filed with the Court to be effective.

129. Any disputes concerning modification of this Consent Decree shall be resolved pursuant to Section XIII (Dispute Resolution), provided, however, that, instead of the burden of proof provided by Paragraph 101, the Party seeking the modification bears the burden of demonstrating that it is entitled to the requested modification in accordance with Federal Rule of Civil Procedure 60(b).

XXI. TERMINATION

130. Termination: Conditions Precedent. Prior to termination, LRC must have completed all of the following requirements of this Consent Decree:

a. Payment of all civil penalties, stipulated penalties and other monetary obligations;

b. Satisfactory compliance with relevant provisions of Section V (Compliance Requirements), Appendix A (Enhanced LDAR Program), and Appendix B (Emission Reductions from Flares and Control of Flaring Events), Section VII (Supplemental Environmental Project), and Section VIII (Environmental Mitigation);

c. Operation for at least one year in satisfactory compliance with the limitations and standards set forth in Paragraphs 17-23 (CEMS);

d. Application for and receipt of all non-Title V air permits necessary to ensure survival of the Consent Decree limits and standards after termination of this Consent Decree (the Paragraph 40 requirement); and

e. Application for a modification or amendment to the Title V permit to incorporate the limits and standards in Paragraph 39 into the Title V permit of the LRC Refinery.

131. Termination: Procedure.

a. At such time as LRC believes that it has satisfied the conditions for termination set forth in Paragraph 130, LRC may submit a request for termination to the United States by certifying such compliance in accordance with the certification language in Paragraph 69. In the Request for Termination, LRC must demonstrate that it has satisfied the conditions for termination set forth in Paragraph 130. The Request for Termination shall include all necessary supporting documentation.

b. Following receipt by the United States of LRC's Request for Termination, the Parties shall confer informally concerning the Request. If the United States agrees that the Decree may be terminated, the Parties shall submit a joint motion to terminate this Consent Decree.

c. If the United States does not agree that the Consent Decree may be terminated, or if LRC does not receive a written response from the United States within 60 days of LRC's submission of the Request for Termination, LRC may invoke dispute resolution under Section XIII of this Consent Decree (Dispute Resolution).

132. Partial Termination. Upon satisfying the provisions of any individual Section or Sections of this Consent Decree, LRC may request two partial terminations after demonstrating completion of the requirements in paragraph 130 above for any such Sections of this Consent Decree. After submitting two partial terminations, LRC may submit one final termination request once all provisions of this Consent Decree have been completed.

XXII. PUBLIC PARTICIPATION

133. This Consent Decree shall be lodged with the Court for a period of not less than 30 Days for public notice and comment in accordance with 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its consent if the comments regarding the Consent Decree disclose facts or considerations indicating that the Consent Decree is inappropriate, improper, or inadequate. LRC consents to entry of this Consent Decree without further notice and agrees not to withdraw from or oppose entry of this Consent Decree by the Court or to challenge any provision of the Consent Decree, unless the United States has notified LRC in writing that it no longer supports entry of the Consent Decree.

XXIII. SIGNATORIES/SERVICE

134. Each undersigned representative of LRC and the Assistant Attorney General for the Environment and Natural Resources Division of the Department of Justice certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind the Party he or she represents to this document.

135. This Consent Decree may be signed in counterparts, and its validity shall not be challenged on that basis. LRC agrees to accept service of process by mail with respect to all matters arising under or relating to this Consent Decree and to waive the formal service requirements set forth in Rules 4 and 5 of the Federal Rules of Civil Procedure and any applicable Local Rules of this Court including, but not limited to, service of a summons.

XXIV. INTEGRATION

136. This Consent Decree and its Appendices constitute the final, complete, and exclusive agreement and understanding among the Parties with respect to the settlement embodied in the Consent Decree and its Appendices and supersede all prior agreements and understandings, whether oral or written, concerning the settlement embodied herein. No other document, nor any representation, inducement, agreement, understanding, or promise, constitutes any part of this Consent Decree or the settlement it represents, nor shall it be used in construing the terms of this Consent Decree.

XXV. FINAL JUDGMENT

137. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment of the Court as to the United States and LRC. The Court finds that there is no just reason for delay and therefore enters this judgment as a final judgment under Fed. R. Civ. P. 54 and 58.

Dated this _____ day of _____, 2017.

_____
UNITED STATES DISTRICT JUDGE

Subject to the notice and comment provisions of 28 C.F.R. § 50.7, THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of *United States v. Lima Refining Company* (N.D. Ohio).

FOR PLAINTIFF THE UNITED STATES OF AMERICA:

NATHANIEL DOUGLAS
Deputy Section Chief
Environmental Enforcement Section
Environment and Natural Resources Division
United States Department of Justice

SUSAN M. AKERS
Assistant Section Chief
Environmental Enforcement Section
Environment and Natural Resources Division
P.O. Box 7611
Washington, D.C. 20044-7611
(202) 514-4831
susan.akers@usdoj.gov

Subject to the notice and comment provisions of 28 C.F.R. § 50.7, THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. Lima Refining Company (N.D. Ohio).

DAVID A. SIERLEJA
Acting United States Attorney
Northern District of Ohio

GUILLERMO J. ROJAS
Assistant United States Attorney
Toledo Branch Office
Four Seagate, Third Floor
Toledo, OH 43604

Subject to the notice and comment provisions of 28 C.F.R. § 50.7, THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of *United States v. Lima Refining Company* (N.D. Ohio).

FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION 5:

Robert A. Kaplan
Acting Regional Administrator
Region 5
United States Environmental Protection Agency
77 W. Jackson Blvd.
Chicago, IL 60604

We hereby consent to the entry of the Consent Decree in the matter of *United States v. Lima Refining Company* (N.D. Ohio).

FOR DEFENDANT LIMA REFINING COMPANY:

Justin A. Savage
Hogan Lovells US LLP
555 Thirteenth Street, N.W.
Washington, DC 20004
Telephone: (202) 637-5600
Fax: (202) 637-5910
justin.savage@hoganlovells.com

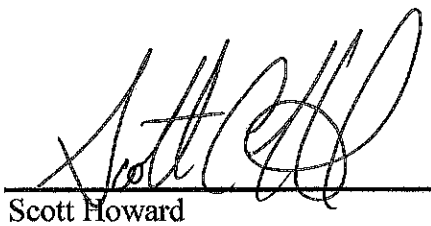
We hereby consent to the entry of the Consent Decree in the matter of *United States v. Lima Refining Company* (N.D. Ohio).

FOR DEFENDANT LIMA REFINING COMPANY:

Jerry Miller
Vice President, Lima Refining Company
1150 South Metcalf St.
Lima, Ohio 45804

We hereby consent to the entry of the Consent Decree in the matter of *United States v. Lima Refining Company* (N.D. Ohio).

FOR DEFENDANT LIMA REFINING COMPANY:



Scott Howard
Vice President, Lima Refining Company
1150 South Metcalf St.
Lima, Ohio 45804

APPENDIX A

ENHANCED LDAR PROGRAM

Definitions:

1. The definitions set forth in the Consent Decree shall apply for purposes of this Appendix A. For purposes of this Appendix A to the Consent Decree, the following definitions shall also apply:

a. "Certified Low-Leaking Valves" shall mean valves for which a manufacturer has issued either: (i) a written guarantee that the valve will not leak above 100 parts per million (ppm) for five years; or (ii) a written guarantee, certification or equivalent documentation that that model of valve has been tested pursuant to generally-accepted good engineering practices and has been found to be leaking at no greater than 100 ppm.

b. "Certified Low-Leaking Valve Packing Technology" shall mean valve packing technology for which a manufacturer has issued either: (i) a written guarantee that the valve packing technology will not leak above 100 ppm for five years; or (ii) a written guarantee, certification or equivalent documentation that the valve packing technology has been tested pursuant to generally-accepted good engineering practices and has been found to be leaking at no greater than 100 ppm.

c. "Covered Equipment" shall mean all pumps and valves in light liquid, heavy liquid, or gas/vapor service in all Covered Process Units.

d. "Covered Process Units" shall mean any process unit that is, or under the terms of this Consent Decree becomes, subject to the equipment leak provisions of 40 C.F.R. Part 60, Subpart GGGa.

e. "DOR" shall mean Delay of Repair.

f. "ELP" shall mean the Enhanced Leak Detection and Repair Program specified in this Appendix A.

g. "Equipment" shall mean any equipment as defined in 40 C.F.R. § 60.591a.

h. "LDAR" or "Leak Detection and Repair" shall mean the leak detection and repair activities required by any "equipment leak" provisions of 40 CFR Part 60, 61 or 63. LDAR also shall mean any state or local equipment leak provisions that require the use of Method 21 to monitor for equipment leaks and also require the repair of leaks discovered through such monitoring.

i. "LDAR Audit Commencement Date" or "Commencement of an LDAR Audit" shall mean the first Day of the on-site inspection that accompanies an LDAR audit.

j. "LDAR Audit Completion Date" or "Completion of an LDAR Audit" shall mean one hundred twenty (120) Days after the LDAR Audit Commencement Date.

k. "Maintenance Shutdown" shall mean a shutdown of a Covered Process Unit that lasts longer than thirty (30) Days.

l. "Method 21" shall mean the test method found at 40 C.F.R. Part 60, Appendix A, Method 21.

m. "Repair Verification Monitoring" shall mean the utilization of monitoring (or another method that indicates the relative size of the leak) by no later than the end of the next calendar Day of each attempt at repair of a leaking piece of Covered Equipment in order to verify that the leak is below the applicable leak definition in this ELP.

n. "Screening Value" shall mean the highest emission level that is recorded at each piece of Covered Equipment as it is monitored in compliance with Method 21.

Part A: General

2. The requirements of the ELP shall apply to all Covered Equipment. In addition, the requirements of Paragraphs 3, 23, 26.a., 26.b., 27-28, 31 (except the non-federally enforceable provisions of Paragraph 31.c), and 32 of this Appendix shall also apply to all Equipment at the Lima Refinery that is regulated under any federal, state, or local LDAR program. The requirements of this ELP are in addition to, and not in lieu of, the requirements of any federal, state or local LDAR regulation that may be applicable to a piece of Covered Equipment. If there is a conflict between a federal, state or local LDAR regulation and this ELP, LRC shall follow whichever regulation is more stringent.

3. By no later than one hundred eighty (180) Days after the Date of Entry, LRC shall develop a written facility-wide LDAR Program that describes: (i) its facility-wide LDAR program (*e.g.*, applicability of regulations to process units and/or specific Equipment; leak definitions; monitoring frequencies); (ii) a tracking program (*e.g.*, Management of Change) that ensures that new pieces of Equipment added to the Lima Refinery for any reason are integrated into the LDAR program and that pieces of Equipment that are taken out of service are removed from the LDAR program; (iii) the roles and responsibilities of all employee and contractor personnel assigned to LDAR functions at the Lima Refinery; (iv) how the number of personnel dedicated to LDAR functions is sufficient to satisfy the requirements of the LDAR program; and (v) how the Lima Refinery plans to implement this ELP. LRC shall review this document on an annual basis and update it as needed by no later than December 31 of each year, beginning one year after the Date of Entry.

Part B: Monitoring Frequency

4. By no later than the Date of Entry, for all Covered Equipment, LRC shall comply with the monitoring frequency for valves as required by 40 C.F.R. § 60.482-7a, 40 C.F.R. § 60.482-4a, 40 C.F.R. § 60.482-8a, and 40 C.F.R. § 60.482-10a, except as provided in 40 C.F.R. § 60.482-1a, and for pumps as required by 40 C.F.R. § 60.482-2a and 40 C.F.R. § 60.482-8a.

5. Alternative Standards for Valves – Skip Period Leak Detection and Repair. LRC may elect to comply with the skip period monitoring requirements set forth in 40 C.F.R. § 60.483-2a, if applicable.

Part C: Monitoring Methods and Equipment

6. Method 21 and Alternative Work Practice Monitoring.

a. Except as provided in Subparagraph 6.b, by no later than the Date of Entry, for all Covered Equipment, LRC shall comply with Method 21 in performing LDAR monitoring, using a Toxic Vapor Analyzer 1000B Flame Ionization Detector (FID) attached to a data logger, or equivalent equipment, which directly electronically records the Screening Value detected at each piece of Covered Equipment, the date and time that each Screening Value is taken, and the identification numbers of the monitoring instrument and technician. LRC or its contractor shall transfer this monitoring data to an electronic database on at least a weekly basis for recordkeeping purposes. Notwithstanding the foregoing, LRC may use paper logs where necessary or more feasible (*e.g.*, small rounds, re-monitoring, or when data loggers are not available or broken). Any manually recorded monitoring data shall be transferred to the electronic database within 7 Days of monitoring.

b. Alternative Work Practice.

(i) From the Date of Entry, LRC may utilize the Alternative Work Practice as defined at 40 C.F.R. 60.18(g) ("the AWP") for monitoring Equipment that meets the "difficult to monitor" criteria set out at 40 C.F.R. § 60.482-7a(h)(1).

(ii) No sooner than three (3) years from the Date of Entry, LRC may submit a request for review and approval of an AWP for LDAR monitoring of all Covered Equipment. Such request shall include a protocol that, at a minimum, addresses the following operational criteria:

(A) calibration procedures;

(B) startup (*i.e.*, warming-up the Optical Gas Imaging (OGI) Instrument)/shutdown procedures;

(C) video recording and storage;

(D) site-specific impact of weather conditions (*e.g.*, wind speed, temperature, and visibility);

(E) maintenance of the OGI Instrument;

(F) certification of personnel to use the OGI instrument;

(G) minimum number of hours of field use by certified personnel prior to certified personnel performing compliance monitoring; and

(H) identification of process unit(s) where certified personnel may monitor with an OGI instrument.

If such request is approved by EPA, LRC may utilize the AWP for monitoring all Covered Equipment.

7. LRC shall conduct all calibrations of LDAR monitoring equipment as required by Subpart GGGa in accordance with 40 C.F.R. Part 60, EPA Reference Test Method 21, prior to each time LDAR monitoring equipment is placed into service before each monitoring shift or is restarted during a monitoring shift, except as provided below. LRC shall conduct calibration drift assessment rechecks of the LDAR monitoring equipment at the end of each monitoring shift and prior to each time LDAR monitoring equipment is turned off during each monitoring shift, except when LDAR monitoring equipment is unable to function such that the calibration drift assessment recheck cannot be performed before the LDAR monitoring equipment turns off. LRC is not required to conduct a calibration drift assessment re-check during the same monitoring shift in the event of a "flame-out" of the instrument if the instrument can be immediately re-ignited. The calibration drift assessment shall be conducted using calibration gas as provided in 40 C.F.R. § 60.485a(b)(1) with a concentration approximately equal to the applicable internal leak definition. If any calibration drift assessment after the initial calibration shows a negative drift of more than 10% from the previous calibration, LRC shall re-monitor all components that had a reading greater than 250 ppm. LRC shall retain all calibration records for at least one year, or as otherwise required by any federal, state or local law, whichever provides the longest retention requirement.

Part D: Leak Detection and Repair Action Levels

8. To the extent required by 40 C.F.R. Part 60, Subpart GGGa, LRC shall identify leaks through Method 21 monitoring (or the AWP pursuant to Paragraph 6.b.), and audio, visual, and olfactory sensing inspections.

9. Leak Definitions and Repairs for Valves and Pumps.

   a. By no later than the Date of Entry, for each leak detected at or above the leak definition for valves defined at 40 C.F.R. § 60.482-7a(b), LRC shall perform repairs in accordance with Paragraphs 11 - 16 of this Appendix.

   b. By no later than the Date of Entry, for each leak detected at or above the leak definition for pumps defined at 40 C.F.R. §60.482-2a(b)(1)(ii), LRC shall perform repairs in accordance with Paragraphs 12 - 16 of this Appendix.

10. By no later than the Date of Entry, for all Covered Equipment, at any time, including outside of periodic monitoring, that a leak is detected through audio, visual, or olfactory sensing, LRC must monitor and/or repair the piece of Covered Equipment in accordance with 40 C.F.R. Part 60, Subpart GGGa, and with Paragraphs 12 - 16 of this Appendix.

Part E: Leak Repairs

11. LRC shall make an "initial attempt" at repair on any valve that has a reading greater than 200 ppm of volatile organic compounds ("VOCs"), excluding control valves and other valves that LDAR personnel are not authorized to repair.

12. For each leak subject to Paragraph 9 of this Appendix, by no later than five (5) Days after detecting a leak, LRC shall perform a first attempt at repair. By no later than fifteen (15) Days

after detection, LRC shall perform a final attempt at repair or may place the valve or pump covered by Paragraph 9 on the Delay of Repair list provided that LRC has complied with 40 C.F.R. Part 60, Subpart GGGa and with the requirements of Paragraphs 13 – 15 and 17 of this Appendix.

13. For each attempt at repair as set forth in Paragraphs 11 and 12 of this Appendix, LRC shall perform Repair Verification Monitoring.

14. Drill-and-Tap Repairs.

a. Except as provided in Subparagraph 14.b, for leaking valves (other than control valves), when other repair attempts have failed to reduce emissions below the applicable leak definition, LRC shall attempt at least one drill-and-tap repair (with a second injection of sealant if the first injection is unsuccessful at repairing the leak) before placing the valve on the DOR list.

b. Drill-and-tap is not required when there is a major safety, mechanical, product quality, or environmental issue with repairing the valve using the drill-and-tap method, in which case LRC shall document the reason(s) why any drill-and-tap attempt was not performed prior to placing any valve on the DOR list.

15. For each leak, LRC shall record the following information: the date of all repair attempts; the repair methods used during each repair attempt; the date, time and Screening Values for all re-monitoring events; and, if relevant, the information required under Paragraph 14 and 17 of this Appendix for Covered Equipment placed on the DOR list.

16. Nothing in Paragraphs 12 - 15 of this Appendix is intended to prevent LRC from taking a leaking piece of Covered Equipment out of service; provided however, that prior to placing the leaking piece of Covered Equipment back in service, LRC must either repair the leak or comply with the requirements of Part F of this Appendix (Delay of Repair) to place the piece of Covered Equipment on the DOR list.

Part F: Delay of Repair

17. By no later than the Date of Entry, for all Covered Equipment placed on the DOR list, LRC shall require the following:

a. Sign-off from the refinery manager, a LRC official responsible for environmental management and compliance at the refinery, an official responsible for plant engineering, an operations manager, or an area superintendent or unit supervisor that the piece of Covered Equipment is technically infeasible to repair without a process unit shutdown;

b. Periodic monitoring, at the frequency required for other pieces of Covered Equipment of that type in the process unit, of the Covered Equipment placed on the DOR list;

c. No more than 0.10% of all valves may be on the DOR list at any one time. If a valve is (i) isolated and taken out of VOC and/or hazardous air pollutant (“HAP”)

service at the same time it is placed on the DOR list and is later repacked with Certified Low-Leaking Valve Packing Technology, or is replaced with Certified Low-Leaking Valves before it is placed back into VOC and/or HAP service; or (ii) repacked with Certified Low-Leaking Valve Packing Technology or replaced with Certified Low-Leaking Valves at the next Maintenance Shutdown, such valve shall not be included in computing the applicable percentage limitation of valves that may be on the DOR list at any one time; and

d. Covered Equipment may be removed from the DOR list if it is monitored at the frequency required for other pieces of Covered Equipment of that type in the process unit for two successive monitoring periods without detecting a leak greater than the Leak Definition as set forth in 40 C.F.R. Part 60, Subpart GGGa for that type of Covered Equipment.

Part G: Valve Replacement/Improvement Program

18. Commencing no later than the Date of Entry, and continuing until termination, LRC shall implement the program set forth in Paragraphs 19 through 22 of this Appendix to replace and/or improve the emissions performance of the valves in each Covered Process Unit.

19. Valves.

a. By no later than 15 Days after the Date of Entry:

(i) LRC shall implement modified purchasing procedures that evaluate the availability of valves and valve packing that meet the requirements for a Certified Low-Leaking Valve or Certified Low-Leaking Valve Packing Technology at the time that the valves and/or valve packing is acquired.

(ii) Except as provided in Paragraph 20, LRC shall install valve packing material that meets the requirements for Certified Low-Leaking Valve Packing Technology whenever repacking any valve in gas/vapor or light liquid VOC service in a Covered Process Unit.

b. By no later than the dates specified below (except as provided in Paragraph 20), LRC shall ensure that each new valve in gas/vapor or light liquid VOC service that it installs in any Covered Process Unit either is a Certified Low-Leaking Valve or is fitted with Certified Low-Leaking Valve Packing Technology:

(i) For all Process Units other than those in (ii) below, by no later than 12 months after Date of Entry; and;

(ii) For the following process units affected by the Crude Oil Flexibility project as specified in PTIs P0114527 and P0119111 (B001 – Vacuum II Furnace; B004 – Crude II Furnace; J011 – DO Rail Loading Rack, P005 – Delayed Coking Unit, P037 – LIU Cooling Tower, P040 – Claus I & II, TGTU 1, P049 – Claus III, TGTU 2, and P050 – Acid Gas Flare), by no later than December 31, 2018, or the

date of completion of the COF Project, whichever is later, but in no event later than December 31, 2019.

c. By no later than twelve (12) months after the Date of Entry, LRC shall perform a warehouse inventory review to identify and remove all valves that are not Certified Low-Leaking Valve or all packing that is not Certified Low-Leaking Valve Packing Technology if there is an available Certified Low-Leaking Valve or Valve Packing Technology that can replace the valve or packing. In the Compliance Status Report due following the warehouse inventory review, LRC shall certify that the warehouse inventory review is complete and identify each valve identified and removed during the warehouse inventory review process.

d. Replacing or Repacking Existing Valves that have Screening Values at or above 2,500 ppm. By no later than the Date of Entry, except as provided in Paragraph 20, for each Existing Valve (excluding control valves) in each Covered Process Unit that has a Screening Value at or above 2,500 ppm during any two monitoring events (excluding repair verification monitoring) within the sixty (60) months following the date the initial 2,500 ppm Screening Value is detected, LRC shall either replace or repack the Existing Valve with a Certified Low-Leaking Valve or with Certified Low-Leaking Valve Packing Technology. LRC shall undertake this replacement, or repacking by no later than thirty (30) Days after the monitoring event that triggers the replacement or repacking requirement, unless the replacement or repacking requires a process unit shutdown. If the replacement or repacking requires a process unit shutdown, LRC shall undertake the replacement or repacking during the first Maintenance Shutdown that follows the monitoring event that triggers the requirement to replace or repack the valve. If LRC completes the replacement or repacking within thirty (30) Days of detecting the leak, LRC shall not be required to comply with Part E of this Appendix. If LRC does not complete the replacement or repacking within thirty (30) Days, or if, at the time of the leak detection, LRC reasonably can anticipate that it might not be able to complete the replacement or repacking within thirty (30) Days, LRC shall comply with all applicable requirements of Part E of this Appendix in addition to the requirements of this Subparagraph 19.d.

20. Commercial Unavailability of a Certified Low-Leaking Valve or Certified Low-Leaking Valve Packing Technology.

a. LRC shall not be required to utilize a Certified Low-Leaking Valve or Certified Low-Leaking Valve Packing Technology to replace or repack a valve if a Certified Low-Leaking Valve or Certified Low-Leaking Valve Packing Technology is commercially unavailable in accordance with the provisions in Part N of this Appendix. Prior to claiming this commercial unavailability exemption, LRC must contact a reasonable number of vendors of valves and obtain a written representation or equivalent documentation from each vendor that the particular valve that LRC needs is commercially unavailable either as a Certified Low-

Leaking Valve or with Certified Low-Leaking Valve Packing Technology. In the Compliance Status Reports due under Part N of this Appendix, LRC shall:

(i) identify each valve for which it could not comply with the requirement to replace or repack the valve with a Certified Low-Leaking Valve or Certified Low-Leaking Valve Packing Technology

(ii) identify the vendors it contacted to determine the unavailability of such a Valve or Packing Technology; and

(iii) include the written representations or documentation that LRC secured from each vendor regarding the unavailability.

b. Ongoing Assessment of Availability. LRC may use a prior determination of Commercial Unavailability of a valve or valve packing pursuant to this Paragraph and Part N of this Appendix for a subsequent Commercial Unavailability claim for the same valve or valve packing (or valve or valve packing in the same or similar service), provided that the previous determination was completed within the preceding twelve- (12)-month period. After one year, LRC must in order to claim Commercial Unavailability conduct a new assessment of the availability of a valve or valve packing meeting Certified Low-Leaking Valve or Certified Low-Leaking Valve Packing Technology requirements.

21. Records of Certified Low-Leaking Valves and Certified Low-Leaking Valve Packing Technology. Upon acquisition of any Certified Low-Leaking Valves or Certified Low-Leaking Valve Packing Technology, LRC shall secure documentation from each manufacturer that demonstrates that the proposed valve or packing technology meets the definition of "Certified Low-Leaking Valve" and/or "Certified Low-Leaking Valve Packing Technology." LRC shall retain that documentation for the duration of this Consent Decree and make it available upon request.

22. Valve Replacement/Improvement Report. In each Compliance Status Report due under Part N of this Appendix, LRC shall include a separate section in the Report that describes the actions it took to comply with this Part G, including all valve and packing purchasing records.

Part H: Management of Change

23. Management of Change: For each Management of Change ("MOC") process or analysis, LRC shall ensure that each piece of Equipment added to the Lima Refinery or removed from the Lima Refinery for any reason is evaluated to determine if it is or was subject to LDAR requirements and that such pieces of Equipment are integrated into or removed from the LDAR program.

Part I: Training

24. By no later than the Date of Entry, LRC shall have ensured that all personnel (whether employed by the Operator of the Lima Refinery or contractors) responsible for LDAR

monitoring, maintenance of LDAR monitoring equipment, LDAR repairs, and/or any other duties generated by the LDAR program have completed training on all aspects of LDAR that are relevant to the person's duties. By that same time, LRC shall develop a training protocol to ensure that refresher training is performed once per calendar year and that new personnel are sufficiently trained prior to any involvement in the LDAR program.

Part J: Quality Assurance ("QA")/Quality Control ("QC")

25. Daily Certification by Monitoring Technicians. Commencing no later than the Date of Entry, on each Day that monitoring occurs, at the end of such monitoring Day to the extent practical but in no case later than the next work Day for the monitoring technician, LRC shall ensure that each monitoring technician certifies that the data collected represents the monitoring performed for that Day by requiring the monitoring technician to sign a form that includes the following certification:

> On [insert date], I reviewed the monitoring data that I collected on [insert date] and, to the best of my knowledge and belief, the data accurately represents the monitoring I performed on that date.

In lieu of a form for each technician for each Day of monitoring, a log sheet may be created that includes the certification that the monitoring technicians would date and sign each Day that the technician collects data.

26. Commencing by no later than the first full calendar quarter after the Effective Date, LRC shall undertake the following:

a. Maintain their MOC processes to continue to require the following:

   i. For each MOC that involves the addition of a component or components subject to LDAR requirements, an action item will be generated for the LDAR coordinator to instruct an LDAR technician to tag each component affected by the MOC and enter it into the electronic LDAR database (registry); and

   ii. The action item required pursuant to (i) may not be closed with respect to a particular MOC until an LDAR technician has confirmed and reported to the LDAR Coordinator that the component or components have been tagged and entered into the LDAR database (registry).

b. An LDAR-trained employee or contractor of LRC, who does not serve as an LDAR monitoring technician on a routine basis, shall conduct process unit walk-throughs, at unannounced times, to assure that all Covered Process Units are reviewed at least once per year, and in the course of those walk-throughs conduct spot checks of Equipment to verify that the Equipment checked is included in the LDAR database and is properly tagged;

c. On a quarterly basis, review the LDAR database's electronic records to:

(i) verify that Covered Equipment was monitored at the appropriate frequency;

(ii) verify that proper documentation and sign-offs have been recorded for all Covered Equipment placed on the shutdown or DOR list;

(iii) verify that repairs have been performed within the required timeframe;

(iv) review monitoring data and Covered Equipment counts (*e.g.*, number of pieces of Covered Equipment monitored per Day) for feasibility and unusual trends; and

(v) verify that proper calibration records and monitoring instrument maintenance information are stored and maintained.

d. On a quarterly basis, at unannounced times, conduct spot checks of LDAR program records to verify that those records are maintained as required; and

e. On a quarterly basis, at unannounced times, observe each LDAR monitoring technician in the field to ensure monitoring is being conducted as required.

LRC shall correct any deficiencies detected or observed as soon as practicable. LRC shall maintain a log that: (i) records the date and time that the reviews, verifications, and observations required by this Paragraph were undertaken; and (ii) describes the nature and timing of any corrective actions taken.

Part K: LDAR Audits and Corrective Action

27. LRC shall conduct LDAR audits pursuant to the schedule in Paragraph 28 and the requirements of Paragraph 29 of this Appendix. LRC shall retain a third-party with experience in conducting LDAR audits to conduct no less than the initial audit and follow-up audits every two (2) years until termination of the Consent Decree. To perform the third-party audit, LRC shall select a different company than its regular LDAR contractor.

28. Until termination of this Consent Decree, LRC shall ensure that an LDAR audit at the Lima Refinery is conducted by an independent contractor with expertise in LDAR program requirements to perform a third party audit for all regulatory LDAR requirements and this ELP every twenty-four (24) months in accordance with the following schedule: for the first LDAR audit at the Lima Refinery, the LDAR Audit Commencement Date shall be no later than the second calendar quarter after the Date of Entry. For each subsequent LDAR audit, the LDAR Audit Completion Date shall occur within the same calendar quarter that the first LDAR Audit Completion Date occurred.

29. Each LDAR audit shall include, but not be limited to, reviewing compliance with all applicable regulations, reviewing and/or verifying the same items that are required to be reviewed and/or verified in Paragraph 26 of this Appendix, and performing the following activities for Covered Equipment:

a. Calculating a Comparative Monitoring Audit Leak Percentage. Covered Equipment, excluding pumps and valves in heavy liquid service, shall be

monitored to calculate a leak percentage for each Covered Process Unit that is covered in the audit, broken down by Covered Equipment type (*i.e.*, valves and pumps). The monitoring that takes place during the audit shall be called "comparative monitoring" and the leak percentages derived from the comparative monitoring shall be called the "Comparative Monitoring Audit Leak Percentage." Until termination of this Consent Decree, LRC shall conduct a comparative monitoring audit pursuant to this Paragraph during each LDAR audit. Each Covered Process Unit at the Lima Refinery that is not the subject of the current audit shall have a comparative monitoring audit at least once before a previously-audited Covered Process Unit is audited again.

b. Calculating the Historic, Average Leak Percentage from Prior Periodic Monitoring Events. For the Covered Process Unit that is audited, the historic average leak percentage from prior monitoring events, broken down by Covered Equipment type (*i.e.*, valves and pumps) shall be calculated. The following number of complete monitoring periods immediately preceding the comparative monitoring audit shall be used for this purpose: valves – four (4) periods; and pumps – twelve (12) periods.

c. Calculating the Comparative Monitoring Leak Ratio. For the Covered Process Unit that is audited, the ratio of the comparative monitoring audit leak percentage from Paragraph 29.a to the historic average leak percentage from Paragraph 29.b shall be calculated. If a calculated ratio yields an infinite result, LRC shall assume one leaking piece of Covered Equipment was found in the process unit through its routine monitoring during the twelve-(12)-month period before the audit, and the ratio shall be recalculated.

In addition to these items, LDAR audits after the first audit shall include reviewing the Lima Refinery's compliance with this ELP.

30. When More Frequent Periodic Monitoring is Required. If a comparative monitoring audit leak percentage calculated pursuant to Paragraph 29.a triggers a more frequent monitoring schedule under any applicable federal, state, or local law or regulation than the frequencies listed in Paragraphs 4, 5, or 6 of Part B of this Appendix for the equipment type in that Covered Process Unit, LRC shall monitor the affected type of Covered Equipment at the greater frequency unless and until less frequent monitoring is again allowed under the specific federal, state, or local law or regulation. At no time may LRC monitor at intervals less frequently than those in the applicable Paragraph in Part B of this Appendix.

31. Corrective Action Plan ("CAP").

a. Requirements of a CAP. By no later than thirty (30) Days after each LDAR Audit Completion Date, LRC shall develop a preliminary CAP if the results of an LDAR audit identify any deficiencies or if the Comparative Monitoring Leak Ratio calculated pursuant to Subparagraph 29.c is 3.0 or higher, and a Comparative Monitoring Audit Leak Percentage calculated pursuant to Paragraph

29.a is 0.5% or higher. The CAP shall describe the actions that LRC shall take to correct the deficiencies and/or the systemic causes of a Comparative Monitoring Leak Ratio that is 3.0 or higher and a Comparative Monitoring Audit Leak Percentage of 0.5% or higher. The CAP also shall include a schedule by which those actions shall be undertaken. LRC shall complete each corrective action as expeditiously as possible with the goal of completing each action within ninety (90) Days after the LDAR Audit Completion Date. If any action is not completed or is not expected to be completed within ninety (90) Days after the LDAR Audit Completion Date, LRC shall explain the reasons in the final CAP to be submitted under Subparagraph 31.b, together with a proposed schedule for completion of the action(s) as expeditiously as practicable.

b. Submissions of the CAP to EPA. By no later than one hundred twenty (120) Days after the LDAR Audit Completion Date, LRC shall submit the final CAP to EPA, together with a certification of the completion of corrective action(s). For any corrective actions requiring more than ninety (90) Days to complete, LRC shall include an explanation together with a proposed schedule for completion as expeditiously as practicable.

c. Approval/Disapproval of All or Parts of a CAP.

(i) Unless within sixty (60) Days after receipt of the CAP, EPA disapproves all or part of a CAP's proposed actions and/or schedules, the CAP shall be deemed approved.

(ii) By no later than sixty (60) Days after receipt of LRC's CAP, EPA may disapprove any or all aspects of the CAP. Each item that is not specifically disapproved shall be deemed approved. Except for good cause, EPA may not disapprove any action within the CAP that already has been completed. Within 45 Days of receipt of any disapproval from EPA, LRC shall submit a revised CAP that addresses the deficiencies that EPA identified. LRC shall implement the revised CAP either pursuant to the schedule that EPA proposed, or, if EPA did not specify a schedule, as expeditiously as practicable.

(iii) A dispute arising with respect to any aspect of a CAP shall be resolved in accordance with the Dispute Resolution provisions in Section XIII of this Consent Decree.

Part L: Certification of Compliance

32. Within one hundred eighty (180) Days after the initial LDAR Audit Completion Date, LRC shall submit a certification to EPA and OEPA that, to the best of the certifier's knowledge and belief after reasonable inquiry: (i) the Lima Refinery is in compliance with all applicable LDAR regulations, except for any corrective actions not yet completed, as described in part (ii) of this Paragraph; (ii) LRC has completed all corrective actions, if applicable, or is in the process of completing all corrective actions pursuant to a CAP; and (iii) all Equipment at the Lima

Refinery that is regulated under any federal, state, or local leak detection program has been identified and included in the Lima Refinery's LDAR program.

33. Reserved

Part M: Reporting

34. Compliance Status Reports. On the dates and for the time periods set forth in Paragraph 35 of this Appendix, LRC shall submit, in the manner set forth in Section IX (Reporting and Recordkeeping) of the Consent Decree, a Compliance Status Report regarding compliance with this ELP. The Compliance Status Report shall include the following information with respect to the relevant reporting period:

a. How the number of personnel dedicated to LDAR functions is sufficient to satisfy the requirements of the LDAR program;

b. An identification and description of any non-compliance with the requirements of this Appendix;

c. An identification of any problems encountered in complying with the requirements of this Appendix;

d. The information required in Paragraphs 20 and 22 of this Appendix;

e. Identification of any LDAR training conducted in accordance with Part I of this Appendix;

f. Any deviations identified in the QA/QC performed under Part J of this Appendix A, as well as any corrective actions taken under that Part;

g. A summary of LDAR audit results for audits that were completed during the reporting period, including specifically identifying all deficiencies; and

h. The status of all actions under any CAP that was submitted pursuant to Part K of this Appendix during the reporting period.

35. Due Dates. The first Compliance Status Report shall be due thirty-one (31) Days after the first full half-year after the Date of Entry (*i.e.*, either: (i) January 31 of the year after the Date of Entry, if the Date of Entry is between January 1 and June 30 of the preceding year; or (ii) July 31 of the year after the Date of Entry, if the Date of Entry is between July 1 and December 31). The initial report shall cover the period between the Date of Entry and the first full half year after the Date of Entry (a "half year" runs between January 1 and June 30 and between July 1 and December 31). Until termination of this Consent Decree, each subsequent report will be due on the same date in the following year and shall cover the prior year (*i.e.*, either January 1 to December 31 or July 1 to June 30).

36. Each Compliance Status Report submitted under this Part shall be signed by the refinery manager, a LRC official responsible for environmental management and compliance at the refinery, or a LRC official responsible for plant engineering management, and shall include the following certification:

I certify under penalty of law that I have examined and am familiar with the information in the enclosed document(s), including all attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are, to the best of my knowledge and belief, true and complete. I am aware that there are significant penalties for knowingly submitting false statements and information, including the possibility of fines or imprisonment pursuant to Section 113(c)(3) of the Clean Air Act and 18 U.S.C. Sections 1001 and 1341.

Part N: Process and Factors for "Commercial Unavailability" of Low-Leaking Valve or Packing Technology

Summary: This Part outlines a process to be followed and factors to be taken into consideration to establish that a Certified Low-Leaking Valve or Certified Low-Leaking Valve Packing Technology is not "commercially available" pursuant to Paragraph 20 of this Appendix. Factors and procedures other than those identified in this Part may also be utilized to establish that a Certified Low-Leaking Valve or Certified Low-Leaking Valve Packing Technology is not commercially available.

37. Factors. The following factors shall be taken in to account for determining the availability of safe and suitable Certified Low-Leaking Valve or Certified Low-Leaking Valve Packing Technologies:

(1) Valve type;

(2) Valve service and operating conditions;

(3) Type of refinery process equipment in which the valve is used;

(4) Seal performance;

(5) Service life;

(6) Packing friction;

(7) Temperature and pressure limitations; and

(8) Retrofit applications (*e.g.*, re-piping or space limitations).

(9) The following factors may also be relevant for consideration, depending on the process unit or equipment in use at the refinery:

(a) Valve or valve packing specifications identified by the licensor of the process unit or equipment in use at the refinery (including components that are part of a design package by a specialty-equipment provider as part of a larger process unit); or

(b) Valve or valve packing vendor or manufacturer recommendations for the relevant refinery unit and/or process unit components.

38. Process. The following procedure shall be followed for determining the availability of a Certified Low-Leaking Valve or Certified Valve Packing Technology:

a. LRC must contact a reasonable number of vendors of valves and valve packing technologies, taking into account the relevant factors identified above, prior to asserting a claim that Certified Low-Leaking Valve or Certified Low-Leaking Valve Packing Technology is not commercially available.

(i) For purposes of this Consent Decree, a reasonable number of vendors shall mean at least three (3) vendors of valves and three (3) vendors of valve packing technologies;

(ii) If fewer than three (3) vendors of valve or valve packing technologies are contacted, the determination of whether such fewer number is reasonable for purposes of this Consent Decree shall be based on Factors (9)(a) and/or (9)(b) above, or on a demonstration that fewer than three vendors offer valves or valve packing technologies for the service and operating conditions of the valve to be replaced, in consideration of Factors (1) through (8) above, as applicable.

b. LRC shall obtain a written representation from each vendor contacted or equivalent documentation that the valve or valve packing does not meet the specifications for a Certified Low-Leaking Valve or Certified Low-Leaking Valve Packing Technology.

c. LRC shall prepare a written report fully explaining the basis for each claim that a valve or valve packing is not commercially available, to include all relevant documentation and other information supporting the claim. Such report shall also identify the commercially available valve or packing technology that comes closest to meeting the requirements for a Certified Low-Leaking Valve or Certified Low-Leaking Valve Packing Technology that is selected and installed by LRC pursuant to Paragraph 19 of this Appendix. Such report shall be included in the Semi-Annual Report required by Section VIII of the Consent Decree, for the period in which the valve or valve packing is replaced.

39. EPA Review of Claim of Commercial Unavailability. Upon review by EPA of any claim of commercial unavailability, if EPA disagrees that a valve or valve-packing technology is commercially unavailable, EPA shall notify LRC in writing, specifying the valve or valve packing EPA believes to be commercially available and the basis for its availability for the service and operating conditions of the valve. Following receipt by LRC of EPA's notice, the following shall apply:

a. LRC is not required to retrofit any valves or valve packing for which the unavailability claim was asserted (unless otherwise required to do so pursuant to some other provision of this Consent Decree).

b. EPA's notification shall serve as notice to LRC of EPA's intent that a future claim of commercial unavailability will not be accepted for: (a) the valve or valve packing that was the subject of the unavailability claim, or (b) for a valve or valve packing in the same or similar service, taking into account the factors identified in this Appendix. If LRC disagrees with EPA's notification, LRC and EPA may informally discuss the basis for the claim of commercial unavailability. EPA may thereafter revise its notification, if necessary.

c. If LRC makes a subsequent commercial unavailability claim for the same valve or valve packing (or valve or valve packing in the same or similar service) that was the subject of a prior unavailability claim which was not accepted by EPA, and such subsequent claim is also denied by EPA on the same basis as provided in EPA's prior notification, LRC shall retrofit the valve or valve packing with the commercially available valve or valve packing technology at the next Maintenance Shutdown.

d. Any disputes concerning EPA's notification to LRC of the commercial availability of a valve or valve packing technology in a particular application pursuant to Paragraph 39.c of this Appendix shall be addressed under the Dispute Resolution provisions in Section XIII of this Consent Decree.

APPENDIX B

EMISSION REDUCTIONS FROM FLARES AND CONTROL OF FLARING EVENTS

Part A: Definitions

B1. The definitions set forth in the Consent Decree shall apply for purposes of this Appendix B. For purposes of this Appendix B to the Consent Decree, the following definitions shall also apply:

a. "Ambient Air" shall mean that portion of the atmosphere, external to buildings, to which persons have access.

b. "Assist Air" shall have the same meaning as defined in 40 C.F.R. § 63.641 as published in the Federal Register on December 1, 2015.

c. "Assist Steam" shall have the same meaning as defined in 40 C.F.R. § 63.641 as published in the Federal Register on December 1, 2015.

d. "Available for Operation" shall mean, with respect to a Compressor within a Flare Gas Recovery System, that the Compressor is capable of commencing the recovery of Potentially Recoverable Gas as soon as practicable but not more than one hour after the Need for the Compressor to Operate arises. The period of time, not to exceed one hour, allowed by this definition for the startup of a Compressor shall be included in the amount of time that a compressor is Available for Operation.

e. "Barrels per day" or "bpd" shall mean barrels per calendar day.

f. "Baseload Waste Gas Flow Rate" shall mean the daily average flow rate, in scfd, to the Flare, excluding all flows during periods of Startup, Shutdown, and Malfunction. The flow rate data period that shall be used to determine Baseload Waste Gas Flow Rate is set forth in Subparagraph B14.b.ii.

g. "BTU/scf" shall mean British Thermal Unit per standard cubic foot.

h. "FCC Flare Gas Recovery System" or "FCC FGRS" shall mean the Flare Gas Recovery System associated with the FCC Flare.

i. "Capable of Receiving Sweep, Supplemental, and/or Waste Gas" shall mean, for a Flare, that the flow of Flare Sweep, Flare Supplemental, and/or Waste Gas is/are not prevented from being directed to the Flare by means of closed valves and/or blinds.

j. "Center Steam" shall have the same meaning as defined in 40 C.F.R. § 63.641 as published in the Federal Register on December 1, 2015.

k. "Combustion Zone" shall have the same meaning as defined in 40 C.F.R. § 63.641 as published in the Federal Register on December 1, 2015.

l. "Combustion Zone Gas" shall mean all gases and vapors found after the Flare tip. This gas includes all Vent Gas, Pilot Gas, Total Steam, and Premix Air.

m. "Compressor" shall mean, with respect to a Flare Gas Recovery System, a mechanical device designed and installed to recover gas from a flare header. Types of Flare Gas Recovery System compressors include but are not limited to reciprocating compressors, centrifugal compressors, liquid ring compressors and liquid jet ejectors.

n. "Covered Flare" shall mean each of the following Flares:

(1) FCC Flare, Emission Unit P006.

(2) LIU Flare, Emission Unit P007.

(3) Acid Gas (AG) Flare, Emission Unit P050.

o. "Duplicate Spare Compressor" shall mean, with respect to a Flare Gas Recovery System, an installed compressor, designed to be identical or functionally equivalent to the other compressor(s) of the FGRS. In order to qualify as a "Duplicate Spare Compressor," the compressor must be functionally interchangeable with the other FGRS compressor(s) such that the Operating Design Capacity of the FGRS is Available for Operation while any one compressor of the FGRS is out of service. The capacity of a Duplicate Spare Compressor depends upon the number of compressors installed to meet the Operating Design Capacity of the FGRS. For example, if one compressor is installed to provide an Operating Design Capacity of 270 kscfh, the Duplicate Spare Compressor shall have a capacity of 270 kscfh; if, instead, three, 90 kscfh compressors are installed, the Duplicate Spare Compressor shall have a capacity of 90 kscfh.

p. "Elevated Flare" shall mean a Flare that supports combustion at a tip that is situated at the upper end of a vertical conveyance (*e.g.*, pipe, duct); the combustion zone is elevated in order to separate the heat generated by combustion from people, equipment, or structures at grade level.

q. "External Utility Loss" shall mean a loss in the supply of electrical power or other third-party utility to the Lima Refinery that is caused by events occurring outside the boundaries of the Lima Refinery, excluding utility losses due to an interruptible utility service agreement.

r. "Flare" shall have the same meaning as defined in 40 C.F.R. § 63.641 as published in the Federal Register on December 1, 2015.

s. "Flare Gas Recovery System" or "FGRS" shall mean a system of one or more compressors, piping, and associated water seal, rupture disk, or similar device used to divert gas from a Flare and direct the gas to a fuel gas system, to a combustion device other than the Flare, or to a product, co-product, by-product, or raw material recovery system.

t. "Flare Purge Gas" shall have the same meaning as defined in 40 C.F.R. § 63.641 as published in the Federal Register on December 1, 2015.

u. "Flare Supplemental Gas" shall have the same meaning as defined in 40 C.F.R. § 63.641 as published in the Federal Register on December 1, 2015.

v. "Flare Sweep Gas" shall have the same meaning as defined in 40 C.F.R. § 63.641 as published in the Federal Register on December 1, 2015.

w. "Flare Vent Gas" shall have the same meaning as defined in 40 C.F.R. § 63.641 as published in the Federal Register on December 1, 2015.

x. "In Operation" or "Being In Operation" or "Operating," with respect to a Flare, shall mean any and all times that Sweep, Supplemental, and/or Waste Gas is or may be vented to a Flare. A Flare that is In Operation is Capable of Receiving Sweep, Supplemental, and/or Waste Gas unless all Sweep, Supplemental, and Waste Gas flow is prevented by means of closed valves and/or blinds.

y. "KSCFH" or "kscfh" shall mean thousand standard cubic feet per hour.

z. "Lower Steam" shall have the same meaning as defined in 40 C.F.R. § 63.641 as published in the Federal Register on December 1, 2015. Diagrams illustrating the meaning and location of Center, Lower, and Upper Steam are set forth in Appendix B1.1 to this Consent Decree.

aa. "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." In any dispute under this Appendix B involving this definition, LRC shall have the burden of proving all of the following:

(1) The excess emissions were caused by a sudden, unavoidable breakdown of technology, beyond the control of the owner or operator;

(2) The excess emissions (a) did not stem from any activity or event that could have been foreseen and avoided, or planned for, and (b) could not have been avoided by better operation and maintenance practices;

(3) To the maximum extent practicable the air pollution control equipment or processes were maintained and operated in a manner consistent with good practice for minimizing emissions;

(4) Repairs were made in an expeditious fashion when the operator knew or should have known that applicable emission limitations were being exceeded. Off-shift labor and overtime must have

been utilized, to the extent practicable, to ensure that such repairs were made as expeditiously as practicable;

(5) The amount and duration of the excess emissions (including any bypass) were minimized to the maximum extent practicable during periods of such emissions;

(6) All possible steps were taken to minimize the impact of the excess emissions on Ambient Air quality;

(7) All emission monitoring systems were kept in operation if at all possible;

(8) The owner or operator's actions during the period of excess emissions were documented by properly signed, contemporaneous operating logs, or other relevant evidence;

(9) The excess emissions were not part of a recurring pattern indicative of inadequate design, operation, or maintenance; and

(10) The owner or operator properly and promptly notified the appropriate regulatory authority.

bb. "Monitoring System Malfunction" shall mean any sudden, infrequent, and not reasonably preventable failure of instrumentation or a monitoring system to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not Monitoring System Malfunctions. In any dispute under this Consent Decree involving this definition, LRC shall have the burden of proving all of the following:

(1) The instrument or monitoring system downtime was caused by a sudden, unavoidable breakdown of technology, beyond the control of the owner or operator;

(2) The instrument or monitoring system downtime (a) did not stem from any activity or event that could have been foreseen and avoided, or planned for, and (b) could not have been avoided by better operation and maintenance practices;

(3) To the maximum extent practicable the air pollution control equipment or processes were maintained and operated in a manner consistent with good practice for minimizing emissions;

(4) Repairs were made in an expeditious fashion when the operator knew or should have known that applicable emission limitations were being exceeded. Off-shift labor and overtime must have been utilized, to the extent practicable, to ensure that such repairs were made as expeditiously as practicable;

(5) The amount and duration of the instrument or monitoring system downtime was minimized to the maximum extent practicable;

(6) The owner or operator's actions during the period of instrument or monitoring system downtime were documented by properly signed, contemporaneous operating logs, or other relevant evidence; and

(7) The instrument or monitoring system downtime was not part of a recurring pattern indicative of inadequate design, operation, or maintenance.

cc. "Need for a Compressor to Operate" shall mean:

(1) For a situation in which no Compressor within the FGRS is recovering gas: When a Potentially Recoverable Gas flow rate (determined on a fifteen-minute block average) to the Covered Flare(s) serviced by the Flare Gas Recovery System exists; or

(2) For a situation in which one or more Compressors within the FGRS already are recovering gas: When the Potentially Recoverable Gas flow rate (determined on a fifteen-minute block average) exceeds the capacity of the operating Compressor(s).

dd. "Net Heating Value Analyzer" or "NHV Analyzer" shall mean an instrument capable of measuring the Net Heating Value of Vent Gas in BTU/scf. The sample extraction point of a Net Heating Value Analyzer may be located upstream of the introduction of Flare Supplemental and/or Flare Sweep and/or Flare Purge Gas if the composition and flow rate of any such Flare Supplemental and/or Flare Sweep and/or Flare Purge Gas is a known constant and if this constant then is used in the calculation of the Net Heating Value of the Vent Gas.

ee. "Net Heating Value of Combustion Zone Gas" or "NHV_{cz}" shall mean the Net Heating Value, in BTU/scf, of the Combustion Zone Gas in a Flare. NHV_{cz} shall be calculated in accordance with 40 C.F.R. § 63.670(m).

ff. "Net Heating Value of Vent Gas" or "NHV_{vg}" shall mean the Net Heating Value, in BTU/scf, of the Vent Gas directed to a Flare. NHV_{vg} shall be calculated in accordance with 40 C.F.R. § 63.670(l).

gg. "Operating Design Capacity" shall mean:

(1) With respect to the FCC Flare Gas Recovery System: The design capacity, in kscfh, of one of the flare gas recovery

Compressors, excluding the capacity of the other Duplicate Spare Compressor.

(2) With respect to the LIU Flare Gas Recovery System: The design capacity, in kscfh, of the LIU Primary Compressor, excluding the design capacity of the LIU Secondary Compressor.

hh. "Perimeter Assist Air" shall have the same meaning as defined in 40 C.F.R. § 63.641 as published in the Federal Register on December 1, 2015.

ii. "Pilot Gas" shall have the same meaning as defined in 40 C.F.R. § 63.641 as published in the Federal Register on December 1, 2015.

jj. "Portable Flare" shall mean a Flare that is not permanently installed that receives Waste Gas that has been redirected to it from a Covered Flare.

kk. "Potentially Recoverable Gas" shall mean the Sweep Gas, Supplemental Gas introduced prior to a Covered Flare's water seal, and/or Waste Gas (including hydrogen, nitrogen, oxygen, carbon dioxide, carbon monoxide, and/or water) directed to a Covered Flare's or group of Covered Flares' FGRS. Purge Gas and Supplemental Gas introduced between a Covered Flare's water seal and a Covered Flare's tip is not Potentially Recoverable Gas. Hydrogen venting from a steam methane reformer (hydrogen plant) is not Potentially Recoverable Gas. Recycled hydrogen that bypasses the FGRS to reestablish hydrogen balance in the event that hydrogen demand declines or stops rapidly is also not Potentially Recoverable Gas. Excess Fuel Gas and excess gases generated during Shutdown, in turnaround, and during Startup, caused by a gas imbalance that cannot be consumed by Fuel Gas consumers in the refinery, because there is not sufficient demand for the gas, is not Potentially Recoverable Gas provided that when the excess gas is routed around the FGRS, no natural gas is being supplied to the Fuel Gas mix drum. Nitrogen purges of process units that are being Shutdown, in turnaround and during Startup, or the nitrogen purging of operating process units during a partial refinery turnaround scenario, that cause the NHV of the Fuel Gas at the exit of the mix drum to fall below 800 BTU/scf, shall not be considered Potentially Recoverable Gas, and may be routed around the FGRS. Waste gas routed to the LIU flare through the sweet gas header shall not be considered Potentially Recoverable Gas.

ll. "Premix Assist Air" shall have the same meaning as defined in 40 C.F.R. § 63.641 as published in the Federal Register on December 1, 2015.

mm. "Prevention Measure" shall mean an instrument, device, piece of equipment, system, process change, physical change to process equipment, procedure, or program to minimize or eliminate flaring.

nn. "SCFD" or "scfd" shall mean standard cubic feet per day.

oo. "SCFH" or "scfh" shall mean standard cubic feet per hour.

pp. "SCFM" or "scfm" shall mean standard cubic feet per minute.

qq. "Smoke Emissions" shall have the definition set forth in Section 3.5 of Method 22 of 40 C.F.R. Part 60, Appendix A.

rr. "LIU Flare Gas Recovery System" or "LIU FGRS" shall mean the Flare Gas Recovery System associated with the LIU Flare.

ss. "Standard Conditions" shall mean a temperature of 68 degrees Fahrenheit and a pressure of 1 atmosphere (29.92 inches Hg). Unless otherwise expressly set forth in this Appendix, Standard Conditions shall apply.

tt. "Steam-Assisted Flare" shall mean a Flare that utilizes steam piped to a Flare tip to assist in combustion.

uu. "Total Capacity" shall mean:

(1) With respect to the FCC Flare Gas Recovery System: The sum of the capacities, in kscfh, of the installed flare gas recovery Compressors, including the capacity of the one installed Duplicate Spare Compressor.

(2) With respect to the LIU Flare Gas Recovery System: The sum of the capacities, in kscfh, of the installed flare gas recovery Compressors, including the capacity of the one installed Duplicate Spare Compressor.

vv. "Total Steam" shall mean the total of all steam that is supplied to a Flare and includes, but is not limited to, Lower Steam, Center Steam, and Upper Steam.

ww. "Upper Steam" shall mean the portion of Assist Steam introduced via nozzles located on the exterior perimeter of the upper end of a Flare tip. Diagrams illustrating the meaning and location of Center, Lower, and Upper Steam are set forth in Appendix B1.1 to this Consent Decree.

xx. "Visible Emissions" shall mean five minutes or more of Smoke Emissions during any two consecutive hours.

yy. "Volatile Organic Compound", or "VOC" shall have the same definition as presented in 40 C.F.R. § 51.100(s).

zz. "Waste Gas" shall mean the mixture of all gases from facility operations that is directed to a Flare for the purpose of disposing of the gas. "Waste Gas" does not include gas introduced to a Flare exclusively to make it operate safely and as intended; therefore, "Waste Gas" does not include Pilot Gas, Total Steam, Assist Air, or the minimum amount of Sweep Gas and Purge Gas that is necessary to perform the functions of Sweep Gas and Purge Gas. "Waste Gas" also does not include the minimum amount of gas introduced to a Flare to ensure compliance with regulatory and/or enforceable

permit requirements regarding the combustible characteristics of Combustion Zone Gas; therefore, "Waste Gas" does not include Flare Supplemental Gas. Depending upon the instrumentation that monitors Waste Gas, certain compounds (hydrogen, nitrogen, oxygen, carbon dioxide, carbon monoxide, and/or water (steam)) that are directed to a Flare for the purpose of disposing of these compounds may be excluded from calculations relating to Waste Gas flow. The circumstances in which such exclusions are permitted are specifically identified in the applicable provisions of this Appendix. Appendix B1.7 to this Consent Decree depicts the meaning of "Waste Gas," together with its relation to other gases associated with Flares.

aaa. "Waste Gas Minimization Plan" or "WGMP" shall mean the document submitted pursuant to Paragraph B14.

Part B: Instrumentation and Monitoring Systems

B2. Flare Data and Monitoring Systems and Protocol Report ("Flare Data and Monitoring Systems and Protocol Report"). For the Covered Flares, by no later than the dates set forth in Column B of Appendix B2.1, LRC shall submit a report, consistent with the requirements in Appendix B1.8, to EPA that includes the following:

a. The information, diagrams, and drawings specified in Paragraphs 1–7 of Appendix B1.8;

b. A detailed description of each instrument and piece of monitoring equipment, including the specific model and manufacturer, that LRC has installed or will install in compliance with Paragraphs B4, B5, and B7 of this Appendix (Paragraphs 8–9 of Appendix B1.8); and

c. A narrative description of the monitoring methods and calculations that LRC shall use to comply with the requirements of Paragraph B20.f (Paragraph 10 of Appendix B1.8).

For any H_2S CEMS required pursuant to 40 C.F.R. Part 60, Subpart J or Subpart Ja, this report shall satisfy the notification requirements of 40 C.F.R. § 60.7(a)(5).

B3. Installation and Operation of Monitoring Systems. By no later than the dates set forth in Column C of Appendix B2.1, for each Covered Flare, LRC shall have completed the installation and commenced the operation of the instrumentation, controls, and monitoring systems set forth in Paragraphs B4–B7.

B4. Vent Gas and Assist Steam Monitoring Systems. LRC shall install, operate, calibrate, and maintain a monitoring system capable of continuously measuring, calculating, and recording the volumetric flow rate of Vent Gas (which includes Waste, Sweep, Purge, and any Supplemental Gas used) in the header or headers that feed the Covered Flare. Different flow monitoring methods may be used to measure different gaseous streams that make up the Vent Gas provided that the flow rates of all gas streams that contribute to the Vent Gas are determined and that that all monitoring systems meet the requirements of 40 C.F.R. § 63.670(i).

B5. Steam Control Equipment. This equipment, including, as necessary, main and trim control valves and piping, shall enable LRC to control Assist Steam flow in a manner sufficient to ensure compliance with this Decree, and including 40 C.F.R. Part 63, Subpart CC, Table 13.

B6. Video Camera. This instrument shall record, in digital format, the flame of and any Smoke Emissions from, the Covered Flares.

B7. Vent Gas Compositional Monitoring or Direct Monitoring of Net Heating Value of Vent Gas. For each Covered Flare, LRC shall determine the concentration of individual components in the Vent Gas or shall directly monitor the Net Heating Value of the Vent Gas (NHV_{vg}) in compliance with 40 C.F.R. § 63.670(j)(1).

B8. Instrumentation and Monitoring Systems: Specifications, Calibration, Quality Control and Maintenance.

a. The instrumentation and monitoring systems identified in Paragraphs B4 and B7 shall comply with all applicable requirements of 40 C.F.R. § 63.671.

b. Any Mass Spectrometer utilized to meet the requirements of Paragraph B7 must also adhere to all operating practices recommended by the manufacturer and installer, and developed internally.

B9. Instrumentation and Monitoring Systems: Recording and Averaging Times. The instrumentation and monitoring systems identified in Paragraphs B4, B6, and B7 shall be able to produce and record data measurements and calculations for each parameter at the following time intervals.

Instrumentation and Monitoring System	Recording and Averaging Times
Vent Gas (including Waste, Flare Sweep, Flare Purge, and Flare Supplemental) and Assist Steam Flow Monitoring Systems	Measure continuously and record 15-minute block averages
Vent Gas Compositional Monitoring (if using the methodology in 40 C.F.R. § 63.670(j)(1)	Measure no less than once every 15 minutes and record that value
Vent Gas Net Heating Value Analyzer	Measure continuously and record 15 minute block averages
Video Camera	Record at a rate of no less than 4 frames per minute

Nothing in this Paragraph is intended to prohibit LRC from setting up process control logic that uses different averaging times from those in this table provided that the recording and

averaging times in this table are available and used for determining compliance with this Consent Decree.

B10. Instrumentation and Monitoring Systems: Operation. Except for periods of Monitoring System Malfunctions, repairs associated with Monitoring System Malfunctions, and required monitoring system quality assurance or quality control activities (including, as applicable, calibration checks and required zero and span adjustments), LRC shall operate each of the instruments and monitoring systems required in Paragraphs B4, B6, and B7 and collect data on a continuous basis at all times when the Covered Flare that the instrument and/or monitoring system is associated with is Capable of Receiving Sweep, Supplemental, and/or Waste Gas.

B11. Portable Flares. If LRC uses a Portable Flare during the pendency of this Consent Decree, then by no later than the date of installation, LRC shall comply with the requirements of Paragraphs B4–B10 for the Portable Flare.

Part C: Determining Whether a Covered Flare that has a Water Seal is Not Receiving Potentially Recoverable Gas Flow

B12. For a Covered Flare that has a water seal, if all of the following conditions are met, then the Covered Flare is not receiving Potentially Recoverable Gas flow:

a. For the water seal associated with the respective Covered Flare, the pressure difference between the inlet pressure and the outlet pressure is less than the water seal pressure as set by the static head of water between the opening of the dip tube and the level of the water in the water seal; and

b. Downstream of the water seal, there is no flow of Flare Supplemental Gas directed to the Covered Flare.

Part D: Waste Gas Minimization

B13. Applicability. The provisions of this Part D apply to all Covered Flares.

B14. Waste Gas Minimization Plan ("WGMP"). By no later than the dates set forth in Column D of Appendix B2.1, for the Covered Flares, LRC shall submit to EPA a Waste Gas Minimization Plan that discusses and evaluates flaring Prevention Measures both Facility-wide and on a Flare-specific basis. The WGMP shall include but not be limited to:

a. Updates. LRC shall submit updates, if and as necessary, to the information, diagrams, and drawings provided in the Flare Data and Monitoring Systems and Protocol Report required under Paragraph B2.

b. Waste Gas Characterization and Mapping. LRC shall undertake to characterize the Waste Gas being disposed of at the Covered Flares and determine its source as follows:

i. Volumetric (in scfm) and mass (in pounds) flow rate. LRC shall identify the volumetric flow of Waste Gas, in scfm on a 30-day rolling average, and the mass flow rate, in pounds per hour on a 30-day rolling average, vented to the Covered Flares for the one-year period of time prior to 90 days before the submission of the WGMP. To the extent that, for either Flare, LRC has instrumentation capable of measuring and/or calculating the volumetric and mass flow rate of hydrogen, nitrogen, oxygen, carbon monoxide, carbon dioxide, and/or water (steam) in the Waste Gas, LRC may break down the volumetric and mass flow as between: (i) All Waste Gas flows excluding hydrogen, nitrogen, oxygen, carbon monoxide, carbon dioxide, and/or water (steam); and (ii) hydrogen, nitrogen, oxygen, carbon monoxide, carbon dioxide, and/or water (steam) flows in the Waste Gas. LRC may use an engineering evaluation, monitoring data, or a combination to determine flow rate. In determining flow rate, flows during all periods (including but not limited to normal operations and periods of Startup, Shutdown, Malfunction, process upsets, relief valve leakages, utility losses due to an interruptible utility service agreement, and emergencies arising from events within the boundaries of the Lima Refinery), except those described in the next sentence, shall be included. Flows that could not be prevented through reasonable planning and are in anticipation of or caused by a natural disaster, act of war or terrorism, or External Utility Loss are the only flows that shall be excluded from the calculation of flow rate. LRC shall specifically describe the date, time, and nature of the event that results in the exclusion of any flows from the calculation.

ii. Baseload Waste Gas Flow Rates. LRC shall utilize flow rate data for the one-year period of time prior to 90 days before the submission of the WGMP to determine the Baseload Waste Gas Flow Rate, in scfd, to the Covered Flares. The Baseload Waste Gas Flow Rate shall not include flows during periods of Startup, Shutdown, and Malfunction.

iii. Identification of Constituent Gases. LRC shall use best efforts to identify the constituent gases within the Waste Gas of the Covered Flares and the percentage contribution of each such constituent during baseload conditions. LRC may use monitoring data, an engineering evaluation, or a combination of monitoring data and an engineering evaluation to determine Waste Gas constituents.

iv. Waste Gas Mapping. Using instrumentation, isotopic tracing, and/or engineering calculations, LRC shall identify and estimate the flow from each process unit header (sometimes referred to as a “subheader”) to the main header(s) servicing the Covered Flares. Using that information and all other available information, LRC shall complete an identification of each Waste Gas tie-in to the main header(s) and process unit header(s), as applicable, consistent with Appendix B1.11. Temporary connections to the main header(s) of the Covered Flares

and/or process unit header(s) are not required to be included in the mapping.

c. Reductions previously realized. LRC shall describe the equipment, processes and procedures installed or implemented since 2010 to reduce flaring at the Covered Flares. The description shall specify the date of installation or implementation and the amount of reductions realized.

d. Evaluation of possible reductions. Subsequent to the Waste Gas Characterization and Mapping in paragraph B14.b, LRC will evaluate Waste Gas reductions for all covered flares. The criteria for evaluation will include cost, feasibility and reduction of Waste Gas routed to the flare.

e. Planned reductions. LRC shall describe the equipment, processes, or procedures that LRC plans to install or implement to eliminate or reduce flaring, provided that such actions are technically and economically feasible, based on Subparagraph B14.d above. The description shall specify a schedule for expeditious installation and commencement of operation and a projection of the amount of reductions to be realized. Subsequent to the submission of the WGMP, LRC may revise the installation and operation dates provided that LRC does so in writing to EPA within a reasonable time of determining that such a revision(s) is(are) necessary and provides a reasonable explanation for the revised date(s).

f. Prevention Measures. LRC shall describe and evaluate all Prevention Measures, including a schedule for the expeditious implementation and commencement of operation of all Prevention Measures, to address the following:

   i. Flaring that has occurred or may reasonably be expected to occur during planned maintenance activities, including Startup and Shutdown. The evaluation shall include a review of flaring that has occurred during these activities since January 2010 and shall consider the feasibility of performing these activities without flaring.

   ii. Flaring that may reasonably be expected to occur due to issues of gas quantity and quality. The evaluation shall include a general audit of the existing flare gas recovery capacity of the Covered Flares, the storage capacity available for excess Waste Gases, and the scrubbing capacity available for Waste Gases including any limitations associated with scrubbing Waste Gases for use as fuel.

g. Flaring caused by the recurrent failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. The evaluation shall consider the adequacy of existing maintenance schedules and protocols for such equipment. A failure is “recurrent” if it occurs more than twice during any five-year period as a result of the same cause.

B15. Waste Gas Minimization Plan: Implementation. By no later than the dates specified in the WGMP, LRC shall implement the actions described therein. If (i) no implementation date and/or (ii) no completion date for actions that do not require ongoing implementation (such as the installation of a piece of equipment) is (are) set forth in the WGMP, the implementation and/or completion date shall be deemed the date of the submission of the WGMP.

B16. Enforceability of the WGMP. The terms of the WGMP are enforceable under this Consent Decree.

Part E: Flare Gas Recovery Systems

B17. Flare Gas Recovery Systems: Capacity and Start-Up Dates. By no later than the following dates for the following Covered Flares, LRC shall complete installation and commence operation of the following Flare Gas Recovery Systems:

FGRS ID	Covered Flares	FGRS Operating Design Capacity (kscfh) (at suction)	Total No. of Compressors	Capacity of each Compressor (kscfh) (at suction)	FGRS Total Capacity (kscfh) (at suction)	Date
LIU	LIU Flare	154	2	77	154	DOE
FCC	FCC Flare	154	2	77	154	DOE

B18. Flare Gas Recovery Systems: Operation.

a. General. LRC shall operate each FGRS in a manner to minimize Waste Gas to the respective Covered Flares while ensuring safe refinery operations. LRC also shall operate each FGRS consistent with good engineering and maintenance practices and in accordance with its design and the manufacturer's specifications.

b. Requirements Related to Compressors Being Available for Operation and/or in Operation. By no later than the Date of Entry for the FCC FGRS, and by no later than December 31, 2018 for the LIU FGRS, LRC shall comply with the following requirements when Potentially Recoverable Gas is being generated:

i. LIU Flare Gas Recovery System. For the LIU Flare Gas Recovery System, LRC shall have one Compressor Available for Operation and/or in operation 98% of the time and two Compressors Available for Operation and/or in operation 90% of the time. Periods of maintenance and subsequent restart on the Compressors within the LIU Flare FGRS may be included in the amount of time that the Compressors are

Available for Operation when determining compliance with the requirement to have two Compressors Available for Operation and/or in operation 90% of the time, provided that these periods shall not exceed 1344 hours per Compressor in a five-year rolling sum period, rolled hourly.

ii. FCC Flare Gas Recovery System. For the FCC Flare Gas Recovery System, LRC shall have one Compressor Available for Operation and/or in operation 98% of the time and two Compressors Available for Operation and/or in operation 90% of the time. Periods of maintenance and subsequent restart on the Compressors within the FCC Flare FGRS may be included in the amount of time that the Compressors are Available for Operation when determining compliance with the requirement to have two Compressors Available for Operation and/or in operation 90% of the time, provided that these periods shall not exceed 1344 hours per Compressor in a five-year rolling sum period, rolled hourly.

iii. Period to be Used for Computing Percentage of Time. For purposes of calculating compliance with the 90% and the 98% of time that a Compressor or group of Compressors must be Available for Operation and/or in operation, as required by Subparagraphs B18.b.i and B18.b.ii, the period to be used shall be an 8760-hour rolling sum, rolled hourly, using only hours when Potentially Recoverable Gas was generated during all or part of the hour but excluding hours for flows that could not have been prevented through reasonable planning and were in anticipation of or caused by a natural disaster, act of war or terrorism, or External Utility Loss. When no Potentially Recoverable Gas was generated during an entire hour, then that hour shall not be used in computing the 8760-hour rolling sum. The rolling sum shall include only the prior 8760 1-hour periods when Potentially Recoverable Gas was generated during all or part of the hour, provided that the Potentially Recoverable Gas was not generated by flows that could not have been prevented through reasonable planning and were in anticipation of or caused by a natural disaster, act of war or terrorism, or External Utility Loss.

Part F: VOC Emissions Limitation from Flaring

B19. LRC shall comply with the following flaring requirements from all Covered Flares and Portable Flares (if any):

a. VOC Limit. LRC shall comply with a limit of 100 tons of VOC emissions on a 365-day rolling average basis, rolled hourly. The first complete 365-day average compliance period shall end on December 31, 2019. The rolling average period shall include only the prior 365 days when any Covered Flare or Portable Flare was/were In Operation. VOC emissions shall be calculated in accordance with Appendix B2.5 to determine compliance with this VOC Limit.

LRC contends that Appendix B2.5 may result in calculated VOC emissions that appear artificially higher than actual VOC emissions.

b. Exceedances. Each exceedance of the 365-day rolling average limit shall constitute one day of violation. An exceedance of the limit shall not prohibit ongoing refinery operations.

c. Instrumentation and monitoring. Instrumentation used to determine compliance with this Paragraph shall meet the requirements of 40 C.F.R. § 63.670(i) and 40 C.F.R. § 63.670(j)(1) as well as the applicable requirement of 40 C.F.R. § 63.671 and 40 C.F.R. Part 63 Subpart CC Tables 12 and 13. Compounds to be detected and quantified are the VOCs presented in Table 12 of 40 C.F.R. Part 63 Subpart CC.

Part G: Flare Operation and Recordkeeping

B20. Operational Requirements Applicable to Covered Flares and Portable Flares (if any). For each Covered Flare and Portable Flare (if any), by no later than the dates set forth in Column F of Appendix B2.1, LRC shall comply with the requirements set forth in this Paragraph at all times when a Covered Flare or Portable Flare (if any) is In Operation.

a. Operation during Vent Gas Venting. LRC shall operate each Covered Flare or Portable Flare (if any) at all times when Vent Gas may be vented to it.

b. Pilot Flame Presence. LRC shall comply with the requirements of 40 C.F.R. § 63.670(b).

c. No Visible Emissions. LRC shall comply with the requirements of 40 C.F.R. § 63.670(c).

d. Flare Tip Velocity. LRC shall comply with the requirements of 40 C.F.R. § 63.670(d).

e. Monitoring According to Applicable Provisions. LRC shall comply with all applicable Subparts of 40 C.F.R. Parts 60, 61, and 63 that state how a particular Covered Flare or Portable Flare (if any) must be monitored.

f. Good Air Pollution Control Practices. At all times, including during periods of Startup, Shutdown, and/or Malfunction, LRC shall implement good air pollution control practices to minimize emissions from each Covered Flare or Portable Flare (if any); provided however, that LRC shall not be in violation of this requirement for any practice that this Consent Decree requires LRC to implement after the Date of Lodging for the period between the Date of Lodging and the implementation date or compliance date (whichever is applicable) for the particular practice.

g. Combustion Zone Net Heating Value Standard. By no later than the date in Column G of Appendix B2.1, at any time that Supplemental, Sweep, and/or

Waste Gas is routed to Covered Flare or a Portable Flare (if any), LRC shall operate the such Flare or Portable Flare (if any) in compliance with 40 C.F.R. §§ 63.670 and 63.671.

B21. Recordkeeping: Timing and Substance. LRC shall comply with the following recordkeeping requirements:

a. By no later than three months after the dates set forth in Column C of Appendix B2.1, LRC shall calculate and record each of the following parameters when the flare is in operation:

i. Volumetric flow rates of all gas streams that contribute to the Vent Gas volumetric flow rate (in scfm) (in 15-minute block averages and in accordance with any calculation requirements of Paragraph B4 and 40 C.F.R. § 63.670(i));

ii. Assist Steam volumetric flow rate (in scfm) (in 15-minute block averages and in accordance with any calculation requirements of Paragraph B4 and 40 C.F.R. § 63.670(i));

iii. NHV_{vg} (in BTU/scf) (in 15-minute block averages in accordance with 40 C.F.R. § 63.670(l));

iv. NHV_{cz} (in BTU/scf) (in 15-minute block averages in accordance with 40 C.F.R. § 63.670(m));

v. Combustion Efficiency (as a fraction) for the Covered Flares for each 15 minute period according to the calculations in Appendix B2.5; and

vi. VOC Emissions (by tons) from the Covered Flares on a 365-day average, rolled hourly.

b. By no later than the dates required in Column G of Appendix B2.1 for compliance with the standards in Paragraph B20, and by no later than the dates required in Column F of Appendix B2.1 for compliance with the standard in Paragraph B19, at any time that LRC deviates from those standards, LRC shall record the duration of the deviation, an explanation of the cause(s) of the deviation, and a description of the corrective action(s) taken by LRC.

Part H: 40 C.F.R. Part 60, Subpart A, J, and Ja Applicability; 40 C.F.R. Part 63, Subpart CC Applicability

B22. 40 C.F.R. Part 60, Subparts A and Ja. As of the Date of Lodging, the FCC, LIU, and AG Flares shall each be an "affected facility" within the meaning of Subparts A and Ja of 40 C.F.R. Part 60, and shall comply with all of the requirements of Subparts A and Ja.

B23. 40 C.F.R. Part 63, Subpart CC. By no later than the dates in Column H of Appendix B2.1, the FCC, LIU, and AG Flares shall be subject to and comply with the requirements of 40 C.F.R. §§ 63.670 and 63.671.

B24. 40 C.F.R. Part 63, Subpart CC, Revisions. The Consent Decree requires the refinery to implement requirements that were published in the Federal Register on December 1, 2015, prior to one or more of the formal effective dates of these requirements. If any referenced provision is stayed, vacated, or withdrawn, the refinery shall continue to comply with the referenced provisions as adopted on December 1, 2015, as conditions of complying with this Consent Decree. To the extent that, from the Date of Lodging of this Consent Decree until its termination, final, effective revisions to the referenced provisions are adopted that are different from the terms and conditions as published in the Federal Register on December 1, 2015, the refinery shall comply with the final, effective regulations no later than the relevant effective date. Additionally, should EPA provide publicly available guidance clarifying how a particular provision of a referenced requirement should be implemented or will be enforced, the refinery may rely on that guidance in complying with this Consent Decree.

Part I: Recordkeeping

B25. LRC shall keep all records to document compliance with the requirements of this Appendix in accordance with Section XIV (Information Collection and Retention) of this Consent Decree. All records will be retained for five years, except for data recorded by any video camera required pursuant to Paragraph B6, which will be retained for one year from the date of recording. Upon request by EPA, LRC shall make all such documents available to EPA.

Part J: Reporting

B26. Compliance Status Reports. In the reports due under Section IX (Reporting and Recordkeeping), LRC shall submit the following information relating to this Appendix:

a. A progress report on the implementation of the requirements in this Appendix;

b. A description of any problems anticipated with respect to meeting the requirements of this Appendix;

c. Monitoring equipment/instrument downtime; exceedances of emission standards; and compliance with compressor availability requirements; as described in Paragraph B27;

d. For the semi-annual report due on August 30 of each year, annual emissions data, as described in Paragraph B28;

e. Any additional matters LRC believes should be brought to the attention of EPA; and

f. Any additional matters required by any other Paragraph of this Appendix to be submitted in the semi-annual report.

B27. Monitoring Instrument/Equipment Downtime and Failure to Meet Standard. On and after the date of applicability of any standard, LRC shall provide a summary of the following, per Covered Flare or per Portable Flare (if applicable) per calendar quarter (hours shall be rounded to the nearest tenth):

a. Monitoring Instrument/Equipment Downtime. The total number of hours of downtime of each monitoring instrument/equipment required pursuant to Paragraphs B4, B6, and B7 expressed as both an absolute number and a percentage of time the Covered Flare or Portable Flare (if any) that the instrument/equipment monitors is In Operation and Capable of Receiving Sweep, Supplemental, and/or Waste Gas;

b. Monitoring Instrument/Equipment Downtime. An identification of the periods of downtime by date, time, cause (including Monitoring System Malfunction or maintenance), and, if the cause is asserted to be a Monitoring System Malfunction and the corrective action taken.

c. Inapplicability of Emissions Standard. The total number of hours, expressed as both an absolute number of hours and a percentage of time during a calendar quarter in which the requirement of Subparagraph B20.f was not applicable because Flare Supplemental, Flare Sweep, and/or Waste Gas was/were not being vented to the FCC, LIU, or AG Flare or Portable Flare (if any) for at least 15 minutes; for purposes of Subparagraph B27.d, all remaining hours shall be termed “Hours of Applicability”;

d. Failure to Meet Emissions Standard. During the Hours of Applicability, the total number of hours, expressed as both an absolute number of hours and a percentage of time the FCC, LIU, or AG Flare or Portable Flare (if any) was receiving Flare Supplemental, Flare Sweep, and/or Waste Gas for at least 15 minutes, of a failure to meet the emission standard in Subparagraph B20.f; a specific identification of each block period that failed to meet that standard, by time and date; the cause of the failure, and if the cause is asserted to be a Malfunction, an explanation and any corrective actions taken.

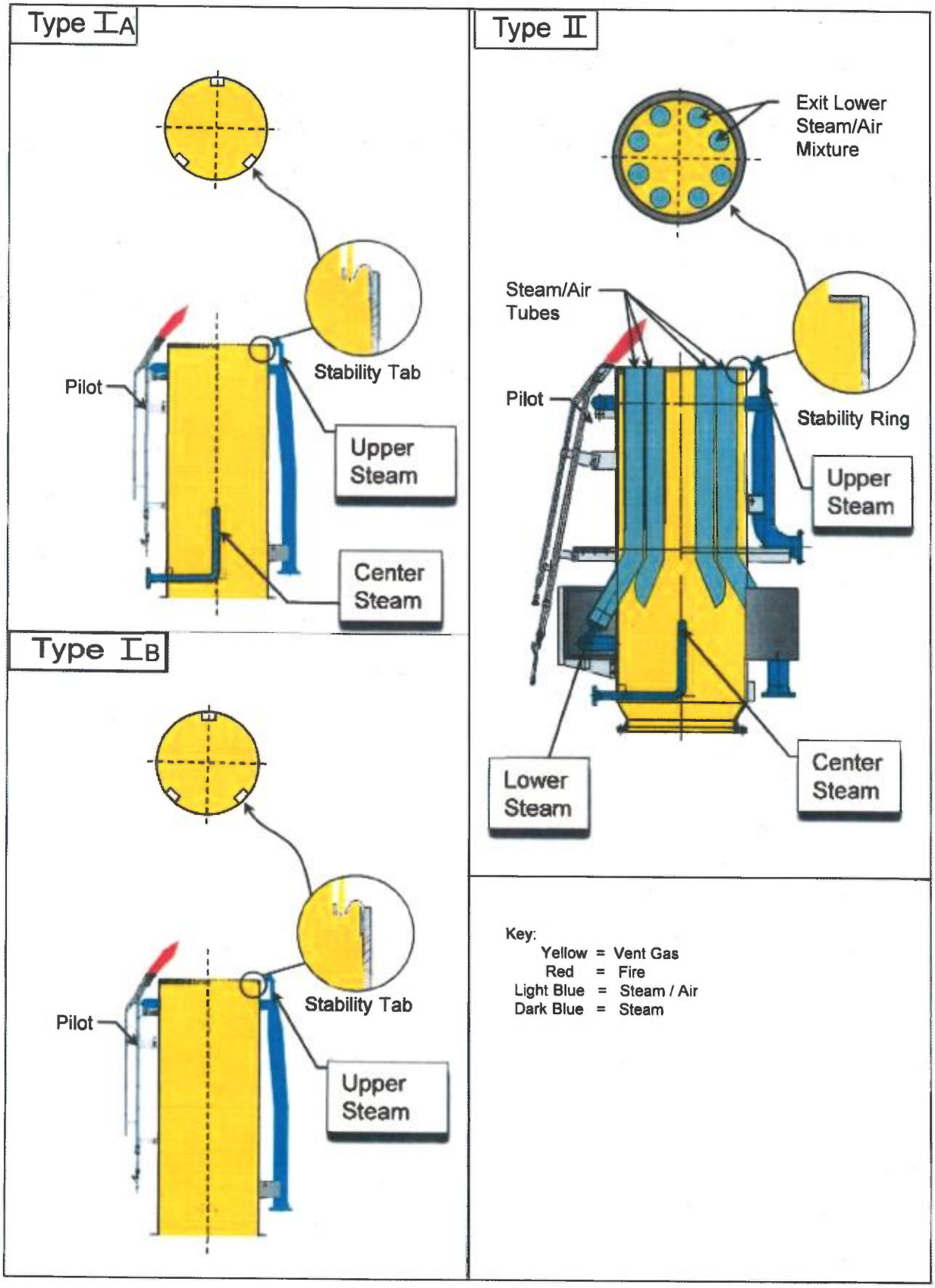
e. Compliance with Compressor Availability Requirements. In each semi-annual report starting on and after the Date of Entry, LRC shall provide sufficient information to document compliance with the Compressor availability requirements of Subparagraph B18.b.i for the LIU Flare. In each semi-annual report starting on and after December 31, 2018, LRC shall provide sufficient information to document compliance with the Compressor availability requirements of Subparagraph B18.b.ii for the FCC Flare. For any period of non-compliance, LRC shall identify the date, cause, and corrective action taken.

B28. Emissions Data. In the semi-annual report that is submitted on August 30 of each year, LRC shall provide, for each Covered Flare and Portable Flare (if applicable), for the prior calendar year, the calculated amount of emissions of the following compounds (in tons per year): VOCs, SO_2, H_2S, CO_2, methane, and ethane.

Flaring Appendices
Lima Refining Company Consent Decree
Lima, Ohio

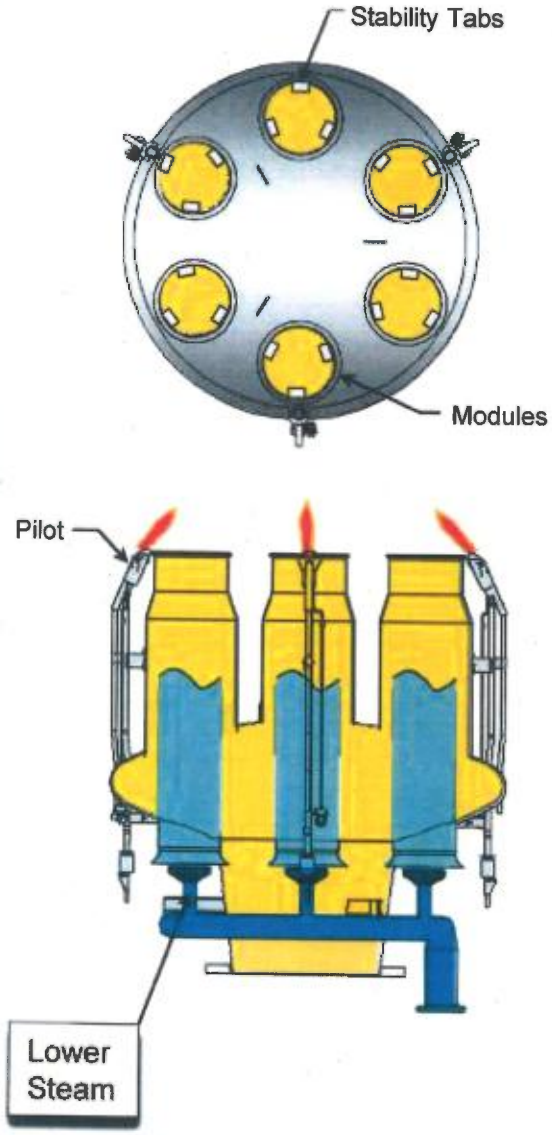
Number	Abbreviation	Description
B1.1	S-Drwgs	Drawings Illustrating Lower, Center, and Upper Steam Injection in Various Types of Flare Tips
B1.2	N/A	Intentionally Left Blank
B1.3	NHV_{cz}	Calculating NHV_{cz} for Steam-Assisted Flares
B1.4	N/A	Intentionally Left Blank
B1.5	N/A	Intentionally Left Blank
B1.6	N/A	Intentionally Left Blank
B1.7	G-Drwg	Depiction of Gases Associated with Steam-Assisted Flares
B1.8	Flr-Data-Rpt	Outline of Requirements for the Flare Data and Initial Monitoring Systems Report
B1.9	N/A	Intentionally Left Blank
B1.10	N/A	Intentionally Left Blank
B1.11	WG-Map	Waste Gas Mapping: Level of Detail Needed to Show Main Headers and Process Unit Headers
B1.12	N/A	Intentionally Left Blank
B1.13	N/A	Intentionally Left Blank
B1.14	N/A	Intentionally Left Blank
B2.1	Cmplnc-Sch	Covered Flares and Applicability Dates for Certain Consent Decree Requirements
B2.2	N/A	Intentionally Left Blank
B2.3	N/A	Intentionally Left Blank
B2.4	N/A	Intentionally Left Blank
B2.5	FLR-VOC-Limit-Calc	Methodology for Calculating Refinery VOC Flaring Limitation

Appendix B1.1

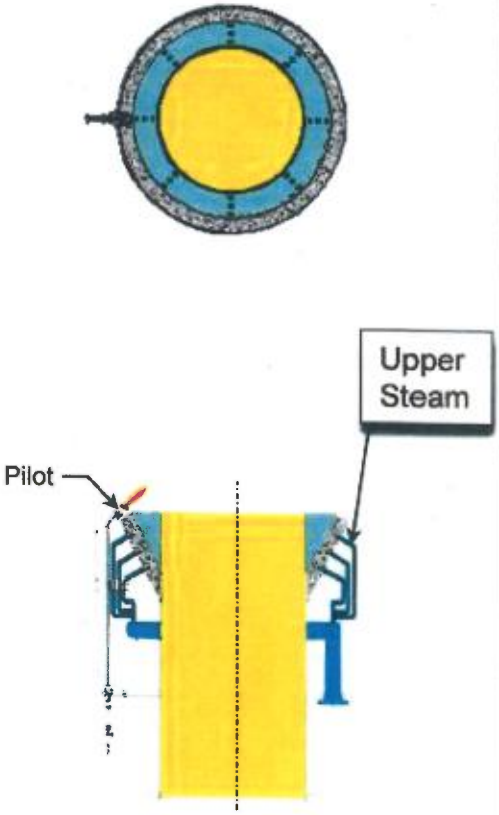


Appendix B1.1

Type III



Type IV



Key:

Yellow	=	Vent Gas
Red	=	Fire
Light Blue	=	Steam / Air
Dark Blue	=	Steam

APPENDIX B1.3

CALCULATING $NHV_{cz\text{-}limit}$ AND NHV_{cz} FOR STEAM-ASSISTED FLARES

All abbreviations, constants, and variables are defined in the Key on Page 6 of this Appendix.

Steps in the Calculations

Step 1: Determine the Lower Flammability Limit ("LFL") of Each Individual Vent Gas Compound

Take the LFL values of each individual Vent Gas compound from Table 1 in this Appendix.

Step 2: Calculate the LFL of the vent gas mixture

The average lower flammability limit of the vent gas is calculated by Le Chatelier's equation shown below as Equation 1. This calculation uses the weighted average of the LFLs of the individual compounds weighted by their volume fraction of the vent gas. All inerts, including nitrogen, are assumed to have an infinite lower flammability limit (e.g. $LFL_{N2} = \infty$).

$$LFL_{vg} = \frac{1}{\sum_{i=1}^{n}\left(\frac{x_i}{LFL_i}\right)} \qquad \textit{Equation 1}$$

Step 3: Determine the Net Heating Value of the Vent Gas (NHV_{vg})

If a Gas Chromatograph is used: The net heating value of the vent gas is calculated and reported from the GC at the conclusion of each analytical cycle (~10-15 minutes). Equation 2 is used by the GC to calculate the vent gas net heating value from each individual compound net heating value. Individual compound volume fractions, except for water, are measured directly by the GC. A company is not required to measure water in Vent Gas. If a company chooses to measure water, then: (i) if the water measurement is taken upstream of a knock-out drum, then water does not have to be included in the calculation of NHV_{vg}; (ii) if no knock-out drum exists or if the water measurement is taken after the knock-out drum, then the company must include water in the calculation of NHV_{vg} and adjust the concentration of the compounds measured by the GC to a wet basis. Individual compound net heating values, including water, are listed in Table 1 of this Appendix.

$$NHV_{vg} = \sum_{i=1}^{n}(x_i \cdot NHV_i) \qquad \textit{Equation 2}$$

If a Net Heating Value Analyzer/Calculator is used: Use the measured value.

NOTE: Table 1 includes two alternative values for the Net Heating Value of hydrogen: the actual NHV of hydrogen (274 BTU/scf) and an "adjusted" NHV of hydrogen (1212 BTU/scf).

APPENDIX B1.3

Companies have the option of using either in calculating NHV_{vg}; however, whichever option is selected also must be used in calculating NHV_{cz}.

Step 4: Calculate the NHV_{vg} at its LFL ($NHV_{vg\text{-}LFL}$)

Using LFL_{vg} from Equation 1 and NHV_{vg} from Equation 2, the $NHV_{vg\text{-}LFL}$ is calculated by Equation 3.

$$NHV_{vg-LFL} = NHV_{vg} \cdot LFL_{vg} \qquad \textit{Equation 3}$$

Step 5: Multiply $NHV_{vg\text{-}LFL}$ by the Combustion Efficiency Multipliers to calculate the $NHV_{cz\text{-}limit}$

The Net Heating Value of the Gases in the Combustion Zone (NHV_{cz}) of a Flare that is needed to ensure an acceptable Combustion Efficiency is determined by multiplying $NHV_{vg\text{-}LFL}$ by Combustion Efficiency Multipliers appropriate to the flare category and the volume percent of hydrogen in the Vent Gas as defined in Table 2.

The Net Heating Value of Combustion Zone Gas Limit is calculated as follows:

$$NHV_{cz-limit} = (A + B \cdot x_{propylene}) \cdot NHV_{vg-LFL} \qquad \textit{Equation 4}$$

Step 6: Calculate the Net Heating Value of the Combustion Zone Gas (NHV_{cz})

The NHV in the combustion zone (NHV_{cz}) combines the NHVs of the Vent Gas, pilot gas, and steam and is calculated by Equation 5a (based on mass flow measurement) or 5b (based on volumetric flow measurement). These two equations are equivalent for combustion zone conditions, as shown in Addendum A to this Appendix. The NHV of steam is assumed to be zero. Vent Gas flow rate ($\dot{m}_{vg}$ or Q_{vg}) and steam flow rate ($\dot{m}_s$ or Q_s) are measured by on-line flow meters. The pilot gas flow rate ($\dot{m}_{pg}$ or Q_{pg}) is constant for each flare and set by an orifice.

$$NHV_{cz} = \frac{\left(\frac{\dot{m}_{vg} \cdot NHV_{vg}}{MW_{vg}}\right) + \left(\frac{\dot{m}_{pg} \cdot NHV_{pg}}{MW_{pg}}\right)}{\left(\frac{\dot{m}_{vg}}{MW_{vg}}\right) + \left(\frac{\dot{m}_{pg}}{MW_{pg}}\right) + \left(\frac{\dot{m}_{s}}{MW_{H_2O}}\right) + \left(\frac{\dot{m}_{air}}{MW_{air}}\right)} \qquad \textit{Equation 5a}$$

OR

$$NHV_{cz} = \frac{(Q_{vg} * NHV_{vg}) + (Q_{pg} * NHV_{pg})}{Q_{vg} + Q_{pg} + Q_s + Q_{air}} \qquad \textit{Equation 5b}$$

APPENDIX B1.3

The values for $\dot{m}_s$, $\dot{m}_{air}$, Q_s and Q_{air} are determined as follows based on the type of flare:

Steam-Assisted Flare without a Minimum Steam Reduction System ("MSRS")

$\dot{m}_s \text{ or } Q_s = measured\ value$

$\dot{m}_{air} \text{ or } Q_{air} = 0$

Steam-Assisted Flare with MSRS

$\dot{m}_s \text{ or } Q_s = measured\ value$

$\dot{m}_{air} \text{ or } Q_{air} = result\ from\ Equation\ 13\ in\ Step\ 6a$

OR

$\dot{m}_{air} \text{ or } Q_{air} = 0$ *with vendor certification that the MSRS equipment installed on the flare is not capable (even at minimum vent gas flow) of inspirating more than twice the stoichiometric volume of air into the vent gas.*

The molecular weight of the vent gas (MW_{vg}) is calculated by the GC using Equation 6. An on-line ultrasonic flow meter may also be used to calculate MW_{vg}. Individual compound molecular weights are listed in Table 1 of this Appendix.

$$MW_{vg} = \sum_{i=1}^{n} (x_i \cdot MW_i) \qquad \textit{Equation 6}$$

The NHV of the pilot gas (NHV_{pg}) and MW of the pilot gas (MW_{pg}) are calculated using Equations 7 and 8, respectively. These calculations are similar to the vent gas calculations, except the individual compound volume fractions are that of the pilot gas and not the vent gas. Individual compound volume fractions are measured by laboratory analysis of a pilot gas sample, or may be taken from the natural gas supplier's laboratory certificate of analysis.

$$NHV_{pg} = \sum_{i=1}^{n} (pg_i \cdot NHV_i) \qquad \textit{Equation 7}$$

$$MW_{pg} = \sum_{i=1}^{n} (pg_i \cdot MW_i) \qquad \textit{Equation 8}$$

APPENDIX B1.3

Step 6a: Calculation of air mass flow rate for flares equipped with MSRS.

The complete combustion of an organic compound comprised of a combination of carbon and hydrogen atoms is shown in Equation 9:

$$C_xH_y + \left(x + \frac{y}{4}\right) O_2 \rightarrow xCO_2 + \left(\frac{y}{2}\right) H_2O \qquad \textit{Equation 9}$$

Note: *x* and *y* values for each compound are found in Table 1 of this Appendix.

Therefore, the stoichiometric oxygen molar flow rate (moles/hr) for any given combustible compound flow is defined by Equation 10a (mass basis) or Equation 10b (volumetric basis):

$$\dot{n}_{O2-stoich} = x_j \left(\frac{\dot{m}_{vg}}{MW_{vg}}\right)\left(x + \frac{y}{4}\right) \qquad \textit{Equation 10a}$$

OR

$$\dot{n}_{O2-stoich} = x_j \left(\frac{Q_{vg}}{385.5}\right)\left(x + \frac{y}{4}\right) \qquad \textit{Equation 10b}$$

The stoichiometric oxygen mass flow rate for the vent gas (lb/hr) or stoichiometric oxygen volumetric flow rate for the vent gas (scfh) is given by Equation 11a (mass basis) or 11b (volumetric basis).

$$\dot{m}_{O2-stoich-vg} = MW_{O_2} * \sum_{j=1}^{n} \dot{n}_{O2-stoich_j} \qquad \textit{Equation 11a}$$

OR

$$Q_{O2-stoich-vg} = 385.5 * \sum_{j=1}^{n} \dot{n}_{O2-stoich_j} \qquad \textit{Equation 11b}$$

The stoichiometric air mass flow rate (lb/hr) or stoichiometric air volumetric flow rate (scfh) for the vent gas is given by Equation 12a (mass basis) or Equation 12b (volumetric basis).

$$\dot{m}_{air-stoich-vg} = \frac{MW_{air}}{0.21 \cdot MW_{O_2}} * \dot{m}_{O2-stoich-vg} \qquad \textit{Equation 12a}$$

OR

$$Q_{air-stoich-vg} = \frac{Q_{O2-stoich-vg}}{0.21} \qquad \textit{Equation 12b}$$

APPENDIX B1.3

The air mass flow (lb/hour) or air volumetric flow (scfh) used in Equation 5a or 5b is given by subtracting two times the stoichiometric air from the total air provided by the MSRS. This is shown in Equation 13a and 13.b.

$$\dot{m}_{air} = \dot{m}_{air-MSRS} - (2 * \dot{m}_{air-stoich-vg}) \qquad \textit{Equation 13a}$$

OR

$$Q_{air} = Q_{air-MSRS} - (2 * Q_{air-stoich-vg}) \qquad \textit{Equation 13b}$$

The equation for $\dot{m}_{air-MSRS}$ or $Q_{air-MSRS}$ is specific to the MSRS installed and must be provided by the MSRS vendor. The factor of 2 used in Equation 13 is based on the best information available as of the Date of Lodging. If new information becomes available thereafter, the parties may modify that factor; any such modification does not constitute a material modification to the Consent Decree.

If $\dot{m}_{air} < 0$ then $\dot{m}_{air} = 0$
OR
If $Q_{air} < 0$ *then* $Q_{air} = 0$

Step 7: Ensure that during flare operation, $NHV_{cz} \geq NHV_{cz\text{-}limit}$

The flare must be operated to ensure that NHV_{cz} is equal to or above $NHV_{cz\text{-}limit}$ to ensure acceptable combustion efficiency. Equation 14 shows this relationship.

$$NHV_{cz} \geq NHV_{cz-limit} \qquad \textit{Equation 14}$$

APPENDIX B1.3

Key to the Abbreviations:

$0.21 = mole\ fraction\ of\ oxygen\ in\ air (0.21\ lb-mol\ O_2/lb-mol\ air)$
$385.5 = conversion\ from\ pound\ moles\ to\ standard\ cubic\ feet\ (385.5\ scf/lb\text{-}mol)$
$A = overall\ combustion\ efficiency\ multiplier\ for\ NHV_{vg-LFL}\ (unitless)$
$B = propylene\ combustion\ efficiency\ multiplier\ for\ NHV_{vg-LFL}\ (unitless)$
$C_{vg} = concentration\ of\ VOC\ in\ the\ vent\ gas\ (vol\ \%)$
$i = individual\ numbered\ compound\ from\ column\ i\ in\ Table\ 1\ (unitless)$
$j = individual\ numbered\ compound\ from\ column\ j\ in\ Table\ 1\ (unitless)$
$k = individual\ gaseous\ component\ of\ the\ combustion\ zone\ (unitless)$
$LFL_i = lower\ flammability\ limit\ of\ individual\ compound\ (vol\ \%)$
$LFL_{vg} = lower\ flammability\ limit\ of\ vent\ gas\ (vol\ \%)$
$\dot{m}_{air} = mass\ flow\ rate\ of\ air\ (lb/hr)$
$\dot{m}_{air-MSRS} = total\ mass\ flow\ rate\ of\ air\ introduced\ by\ an\ MSRS\ (lb/hr)$
$\dot{m}_{air-stoich-vg} = stoichiometric\ air\ mass\ flow\ for\ the\ vent\ gas (lb/hr)$
$\dot{m}_k = mass\ flow\ rate\ of\ individual\ combustion\ zone\ gas\ component\ (lb/hr)$
$\dot{m}_{O2-stoich-vg} = stoichiometric\ oxygen\ mass\ flow\ for\ the\ vent\ gas\ (lb/hr)$
$\dot{m}_{pg} = mass\ flow\ rate\ of\ pilot\ gas\ (lb/hr)$
$\dot{m}_s = mass\ flow\ rate\ of\ total\ steam\ (lb/hr)$
$\dot{m}_{vg} = mass\ flow\ rate\ of\ vent\ gas\ (lb/hr)$
$\dot{n}_{O2-stoich} = stoichiometric\ oxygen\ molar\ flow\ for\ an\ individual\ compound\ (mol/hr)$
$MW_{H_2O} = molecular\ weight\ of\ water\ (18.02\ lb/lb-mol)$
$MW_i = molecular\ weight\ of\ individual\ compound\ (lb/lb-mol)$
$MW_k = molecular\ weight\ of\ individual\ combustion\ zone\ gas\ component (lb/lb-mol)$
$MW_{O_2} = molecular\ weight\ of\ oxygen\ (32.0\ lb/lb-mol)$
$MW_{air} = molecular\ weight\ of\ air\ (28.9\ lb/lb-mol)$
$MW_{pg} = molecular\ weight\ of\ pilot\ gas\ (lb/lb-mol)$
$MW_{vg} = molecular\ weight\ of\ vent\ gas\ (lb/lb-mol)$
$n = list\ of\ individual\ compounds\ from\ Table\ 1\ (unitless)$
$NHV_{cz} = net\ heating\ value\ of\ the\ combustion\ zone\ (BTU/scf)$
$NHV_i = net\ heating\ value\ of\ individual\ compound\ (BTU/scf)$
$NHV_{vg-LFL} = net\ heating\ value\ vent\ gas\ at\ lower\ flammability\ limit\ (BTU/scf)$
$NHV_{cz-limit} = limit\ net\ heating\ value\ of\ the\ combustion\ zone\ (BTU/scf)$
$NHV_{pg} = net\ heating\ value\ of\ pilot\ gas\ (BTU/scf)$
$NHV_{vg} = net\ heating\ value\ of\ vent\ gas\ (BTU/scf)$
$P_{cz} = pressure\ of\ combustion\ zone\ gas\ (psia)$
$P_{std} = ambent\ pressure\ at\ standard\ condtions\ (14.696\ psi)$
$pg_i = individual\ compound\ volume\ fraction\ in\ pilot\ gas\ (vol\ fraction)$
$Q_{air-MSRS} = total\ volumetric\ flow\ rate\ of\ air\ introduced\ by\ an\ MSRS\ (scfh)$
$Q_{air-stoich-vg} = stoichiometric\ air\ volumetric\ flow\ for\ the\ vent\ gas\ (scfh)$
$Q_k = individual\ vent\ gas\ component\ volumetric\ flow\ rate\ (scfh)$
$Q_{k,acf} = individual\ vent\ gas\ component\ volumetric\ flow\ rate\ (ft^3/hr)$
$Q_{O2-stoich-vg} = stoichiometric\ oxygen\ volumetric\ flow\ for\ the\ vent\ gas\ (scfh)$
$Q_{vg} = vent\ gas\ volumetric\ flow\ rate\ (scfh)$
$Q_{pg} = pilot\ gas\ volumetric\ flow\ rate\ (scfh)$
$Q_s = steam\ volumetric\ flow\ rate\ (scfh)$
$Q_{air} = air\ volumetric\ flow\ rate\ (scfh)$
$R = gas\ constant\ (10.73\ ft^3 \cdot psi/lb-mol \cdot R)$
$T_{cz} = absolute\ temperature\ of\ combustion\ zone\ gas\ (°R)$
$T_{std} = absolute\ temperature\ at\ standard\ conditions (528°R)$
$x = moles\ of\ carbon\ per\ mole\ of\ C_xH_y\ (mol/mol)$
$x_i = individual\ compound\ volume\ fraction\ in\ the\ vent\ gas\ (vol\ fraction)$
$x_j = individual\ combustible\ compound\ volume\ fraction\ in\ the\ vent\ gas\ (vol\ fraction)$
$x_{propylene} = volume\ fraction\ of\ propylene\ in\ the\ vent\ gas\ (vol\ fraction)$
$y = moles\ of\ hydrogen\ per\ mole\ of\ C_xH_y\ (mol/mol)$

APPENDIX B1.3

Table 1
Individual Compound Properties

$i^{(1)}$	j	Compound	NHV_i (Btu/scf)	MW_i (lb/lbmol)	LFL_i (vol fraction)	C_x	H_y
1	1	Hydrogen	274 or 1212[2]	2.02	0.040	0	2
2	-	Oxygen	0	32.00	∞	n/a	n/a
3	-	Nitrogen	0	28.01	∞	n/a	n/a
4	-	CO_2	0	44.01	∞	n/a	n/a
5	-	CO	316	28.01	0.125	n/a	n/a
6	2	Methane	896	16.04	0.050	1	4
7	3	Ethane	1595	30.07	0.030	2	6
8	4	Ethylene	1477	28.05	0.027	2	4
9	5	Acetylene	1404	26.04	0.025	2	2
10	6	Propane	2281	44.10	0.021	3	8
11	7	Propylene	2150	42.08	0.024	3	6
12	8	iso-Butane	2957	58.12	0.018	4	10
13	9	n-Butane	2968	58.12	0.018	4	10
14	10	iso-Butene	2928	56.11	0.018	4	8
15	11	trans-Butene	2826	56.11	0.017	4	8
16	12	cis-Butene	2830	56.11	0.016	4	8
17	13	1,3-Butadiene	2690	54.09	0.020	4	6
18	14	Pentane+ (C_5+)	3655	72.15	0.014	5	12
19	-	Water[3]	0	18.02	∞	n/a	n/a

[1] i=all compounds, j=organic compounds and hydrogen

[2] If using an H_2-adjusted NHV_{vg} and NHV_{cz}, then use 1212 BTU/scf for hydrogen.

[3] A GC does not measure water. If water is measured by means of another instrument, the properties of water listed in this row shall be used.

Note: Benzene is not required to be speciated by the Gas Chromatograph for this refinery settlement (*see* Appendix 1.9) because benzene is present in the Vent Gas only in *de minimis* quantities. Because benzene speciation is not required, it is not listed in Table 1of this Appendix. The Vent Gas composition involved in other future settlements should be evaluated on a case-by-case basis to determine if benzene speciation should be required.

APPENDIX B1.3

Table 2
Combustion Efficiency Multipliers for Steam-Assisted Flares:
Variables Based on Minimum Steam Requirements
and VOC Concentration in the Vent Gas

Minimum Steam	VOC Vent Gas Concentration	A Multiplier	B Multiplier*	
			Condition X	Condition Y
≤ 1000 lb/hr	≤ 20.0%	6.45	4.0	0.0
≤ 1000 lb/hr	> 20.0%	6.85	4.0	0.0
> 1000 lb/hr	≤ 20.0%	7.1	4.0	0.0
> 1000 lb/hr	> 20.0%	7.4	4.0	0.0

*The B Multiplier used depends on the relationship of hydrogen and propylene in the vent gas as follows:
Condition X: $3 \leq H_2\% \leq 8$ and Propylene% $\geq H_2\%$ (all percentages are volume or mole percentages)
Condition Y: Any condition not meeting the requirements for Condition X.

Note: The specifications for Condition X are based on the best information available as of the Date of Lodging. If new information becomes available thereafter, the parties may modify these conditions; any such modification does not constitute a material modification to the Consent Decree.

The "VOC Vent Gas Concentration" shall be calculated on an annual average basis as follows:

$$C_{vg} = \sum_{j=4}^{n} x_j * 100 \qquad \textit{Equation 15}$$

Note: The summation does not include methane or ethane.

APPENDIX B1.3

Addendum A
Verification of Equation 5a and Equation 5b Equivalency

In this Appendix, all gaseous flows (i.e, vent gas, steam, pilot gas, and air) may be measured on either a mass basis (lb/hr) or a volumetric basis (scfh). Depending on which measurement methodology is used, different versions of some equations must be used. These versions are designated with an "a" or "b" (e.g. Equation 5a or 5b). In all cases, these equations are equivalent. This Addendum demonstrates the equivalence of the two methods for calculating NHVcz.

Equation 5b uses volumetric flow rates for the calculation of NHV_{cz}:

$$NHV_{cz} = \frac{(Q_{vg} * NHV_{vg}) + (Q_{pg} * NHV_{pg})}{Q_{vg} + Q_{pg} + Q_s + Q_{air}} \qquad \textbf{Equation 5b}$$

The ideal gas law provides a method for determining volumetric flow rate of a specific gas, *k*, in the combustion zone at standard conditions:

$$Q_k = Q_{k,acf} * \frac{P_{cz}}{P_{std}} * \frac{T_{std}}{T_{cz}} \qquad \textbf{Equation A1}$$

$$Q_{k,acf} = \frac{\dot{m}_k R T_{cz}}{MW_k P_{cz}} \qquad \textbf{Equation A2}$$

$$Q_k = \frac{\dot{m}_k R T_{cz}}{MW_k P_{cz}} * \frac{P_{cz}}{P_{std}} * \frac{T_{std}}{T_{cz}} = \frac{\dot{m}_k R T_{std}}{MW_k P_{std}} \qquad \textbf{Equation A3}$$

$$Q_k = \frac{\dot{m}_k * 10.73 * 528}{MW_k * 14.696} = 385.5 \frac{\dot{m}_k}{MW_k} \qquad \textbf{Equation A4}$$

Substitution of this expression into Equation 5b gives NHV_{cz} in terms of mass flow:

$$NHV_{cz} = \frac{\left(385.5 \frac{\dot{m}_{vg}}{MW_{vg}} * NHV_{vg}\right) + \left(385.5 \frac{\dot{m}_{pg}}{MW_{pg}} * NHV_{pg}\right)}{385.5 \frac{\dot{m}_{vg}}{MW_{vg}} + 385.5 \frac{\dot{m}_{pg}}{MW_{pg}} + 385.5 \frac{\dot{m}_s}{MW_{H_2O}} + 385.5 \frac{\dot{m}_{air}}{MW_{air}}} \qquad \textbf{Equation A5}$$

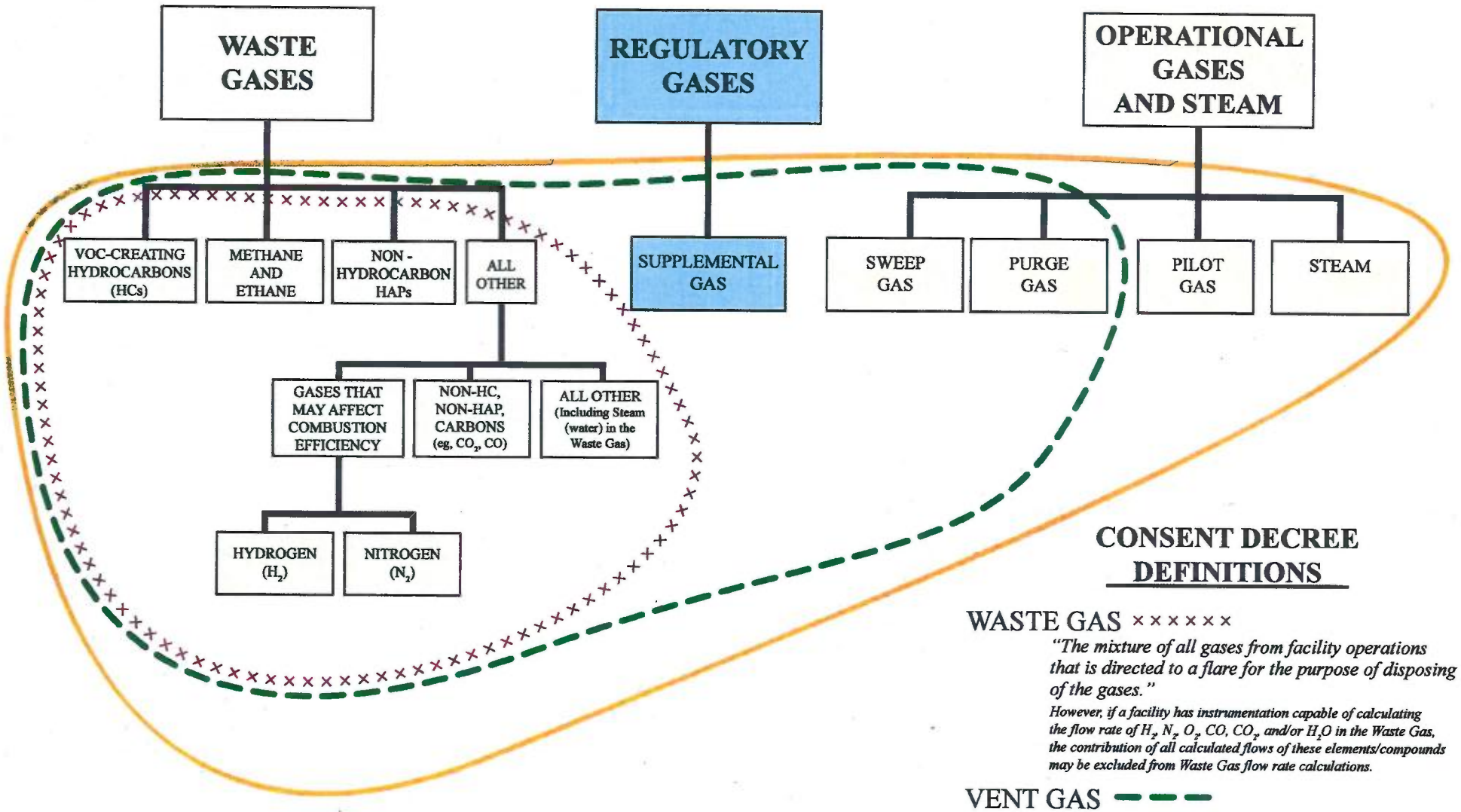
Because the combustion zone is well-mixed, each gaseous component of the combustion zone is at the same temperature and pressure. Thus, the last expression reduces to Equation 5a:

APPENDIX B1.3

$$NHV_{cz} = \frac{\left(\frac{\dot{m}_{vg} \cdot NHV_{vg}}{MW_{vg}}\right) + \left(\frac{\dot{m}_{pg} \cdot NHV_{pg}}{MW_{pg}}\right)}{\left(\frac{\dot{m}_{vg}}{MW_{vg}}\right) + \left(\frac{\dot{m}_{pg}}{MW_{pg}}\right) + \left(\frac{\dot{m}_{s}}{MW_{H_2O}}\right) + \left(\frac{\dot{m}_{air}}{MW_{air}}\right)} \qquad \textbf{\textit{Equation 5a}}$$

This demonstrates the equivalence of Equations 5a and 5b.

DEPICTION OF GASES ASSOCIATED WITH STEAM-ASSISTED FLARES



CONSENT DECREE DEFINITIONS

WASTE GAS ××××××

"The mixture of all gases from facility operations that is directed to a flare for the purpose of disposing of the gases."

However, if a facility has instrumentation capable of calculating the flow rate of H_2, N_2, O_2, CO, CO_2, and/or H_2O in the Waste Gas, the contribution of all calculated flows of these elements/compounds may be excluded from Waste Gas flow rate calculations.

VENT GAS – – –

"The mixture of all gases found prior to the flare tip. This includes all Waste Gas, Supplemental Gas, Sweep Gas, and Purge Gas."

COMBUSTION ZONE GAS ——

"The mixture of all gases and steam found just after the flare tip. This includes all Vent Gas, Pilot Gas, and Total Steam."

APPENDIX B1.7

APPENDIX B1.8

OUTLINE OF REQUIREMENTS FOR THE FLARE DATA AND INITIAL MONITORING SYSTEMS REPORT

1. Facility-Wide

    1.1 Facility plot plan showing the location of each flare in relation to the general plant layout

2. General Description of Flare

    2.1 Ground or elevated
    2.2 Type of assist system
    2.3 Simple or integrated (*e.g.*, sequential, staged)
    2.4 Date first installed
    2.5 History of any physical changes to the Flare
    2.6 Whether the Flare is a Temporary-Use Flare, and if so, the duration and time periods of use
    2.7 Flare Gas Recovery System ("FGRS"), if any, and date first installed

3. Flare Components: Complete description of each major component of the Flare, except the Flare Gas Recovery System (*see* Part 5), including but not limited to:

    3.1 Flare stack (for elevated flares)
    3.2 Flare tip
        3.1.2.1 Date installed
        3.1.2.2 Manufacturer
        3.1.2.3 Tip Size
        3.1.2.4 Tip Drawing
    3.3 Knockout or surge drum(s) or pot(s), including dimensions and design capacities
    3.4 Water seal(s), including dimensions and design parameters
    3.5 Flare header(s)
    3.6 Sweep Gas system
    3.7 Purge gas system
    3.8 Pilot gas system
    3.9 Supplemental gas system
    3.10 Assist system
    3.11 Ignition system

4. Simplified process diagram(s) showing the configuration of the components listed in Paragraph 3

APPENDIX B1.8

5. Existing Flare Gas Recovery System ("FGRS")

    5.1 Complete description of each major component, including but not limited to:
        5.1.1 Compressor(s), including design capacities
        5.1.2 Water seal(s), rupture disk, or similar device to divert the flow
    5.2 Maximum actual past flow on an scfm basis and the annual average flow in scfm for the five years preceding Date of Lodging
    5.3 Simplified schematic showing the FGRS
    5.4 Process Flow Diagram that adds the FGRS to the PDF(s) in Part 4

6. Flare Design Parameters

    6.1 Maximum Vent Gas Flow Rate and/or Mass Rate
    6.2 Maximum Sweep Gas Flow Rate and/or Mass Rate
    6.3 Maximum Purge Gas Flow and/or Mass Rate, if applicable
    6.4 Maximum Pilot Gas Flow and/or Mass Rate
    6.5 Maximum Supplemental Gas Flow Rate and/or Mass Rate
    6.6 If steam-assisted, Minimum Total Steam Rate, including all available information on how that Rate was derived

7. Gases Venting to Flare

    7.1. Sweep Gas
        7.1.1 Type of gas used
        7.1.2 Actual set operating flow rate (in scfm)
        7.1.3 Average lower heating value expected for each type of gas used
    7.2 Purge Gas, if applicable
        7.2.1 Type of gas used
        7.2.2 Actual set operating flow rate (in scfm)
        7.2.3 Average lower heating value expected for each type of gas used
    7.3 Pilot Gas
        7.3.1 Type of gas used
        7.3.2 Actual set operating flow rate (in scfm)
        7.3.3 Average lower heating value expected for each type of gas used
    7.4 Supplemental Gas
        7.4.1 Type of gas used
        7.4.2 Average lower heating value expected for each type of gas used
    7.5 Steam (if applicable)
        7.5.1 Drawing showing points of introduction of Lower, Center, Upper, and any other steam
    7.6 Simplified flow diagram that depicts the points of introduction of all gases, including Waste Gases, at the Flare (in this diagram, the detailed drawings of 7.5.1 may be simplified; in addition, detailed Waste Gas mapping is not required; a simple identification of the header(s) that carries(y) the Waste Gas to the Flare

APPENDIX B1.8

and show(s) its(their) location in relation to the location of the introduction of the other gases is all that is required)

8. Existing Monitoring Systems

8.1 A brief narrative description, including manufacturer and date of installation, of all existing monitoring systems, including but not limited to:

8.1.1 Waste Gas and/or Vent Gas flow monitoring
8.1.2 Waste Gas and/or Vent Gas heat content analyzer
81.3 Sweep Gas flow monitoring
8.1.4 Purge Gas flow monitoring
8.1.5 Supplemental Gas flow monitoring
8.1.6 Steam flow monitoring
8.1.7 Waste Gas or Vent Gas molecular weight analyzer
8.1.8 Gas Chromatograph
8.1.9 Sulfur analyzer(s)
8.1.10 Video camera
8.1.11 Thermocouple

8.2 Drawing(s) showing locations of all existing monitoring systems

9. Monitoring Equipment to be Installed to Comply with Consent Decree

10. Narrative Description of the Monitoring Methods and Calculations that will be used to comply with the NHV_{CZ} Requirements in the Consent Decree

APPENDIX B1.11

WASTE GAS MAPPING:
LEVEL OF DETAIL NEEDED TO SHOW MAIN HEADERS AND PROCESS UNIT HEADERS

Purpose:

Waste Gas Mapping is required in order to identify the source(s) of waste gas entering each Covered Flare. Waste Gas Mapping can be done using instrumentation, isotopic tracing, acoustic monitoring, and/or engineering estimates for all sources entering a flare header (e.g. pump seal purges, sample station purges, compressor seal nitrogen purges, relief valve leakage, and other sources under normal operations). This Appendix outlines what needs to be included as the Waste Gas Mapping section within the Waste Gas Minimization Plan ("WGMP")

Waste Gas Mapping Criteria:

For purposes of waste gas mapping, a main header is defined as the last pipe segment prior to the flare knock out drum. Process unit headers are defined as pipes from inside the battery limits of each process unit that connect to the main header. For process unit headers that are greater than or equal to six (6) inches in diameter, flow ("Q") must be identified and quantified if it is technically feasible to do so. In addition, all sources feeding each process unit header must be identified and listed in a table, but not necessarily individually quantified. For process unit headers that are less than six (6) inches in diameter, sources must be identified, but they do not need to be quantified.

Waste Gas Mapping Submission Requirements:

For each Covered Flare, the following shall be included within the Waste Gas Mapping section of the WGMP:

1. Simplified Schematic consistent with the example schematic included on the second page of this Appendix.

2. Table of all sources connected to each flare main header and process unit header consistent with the Table included on the third page of this Appendix.

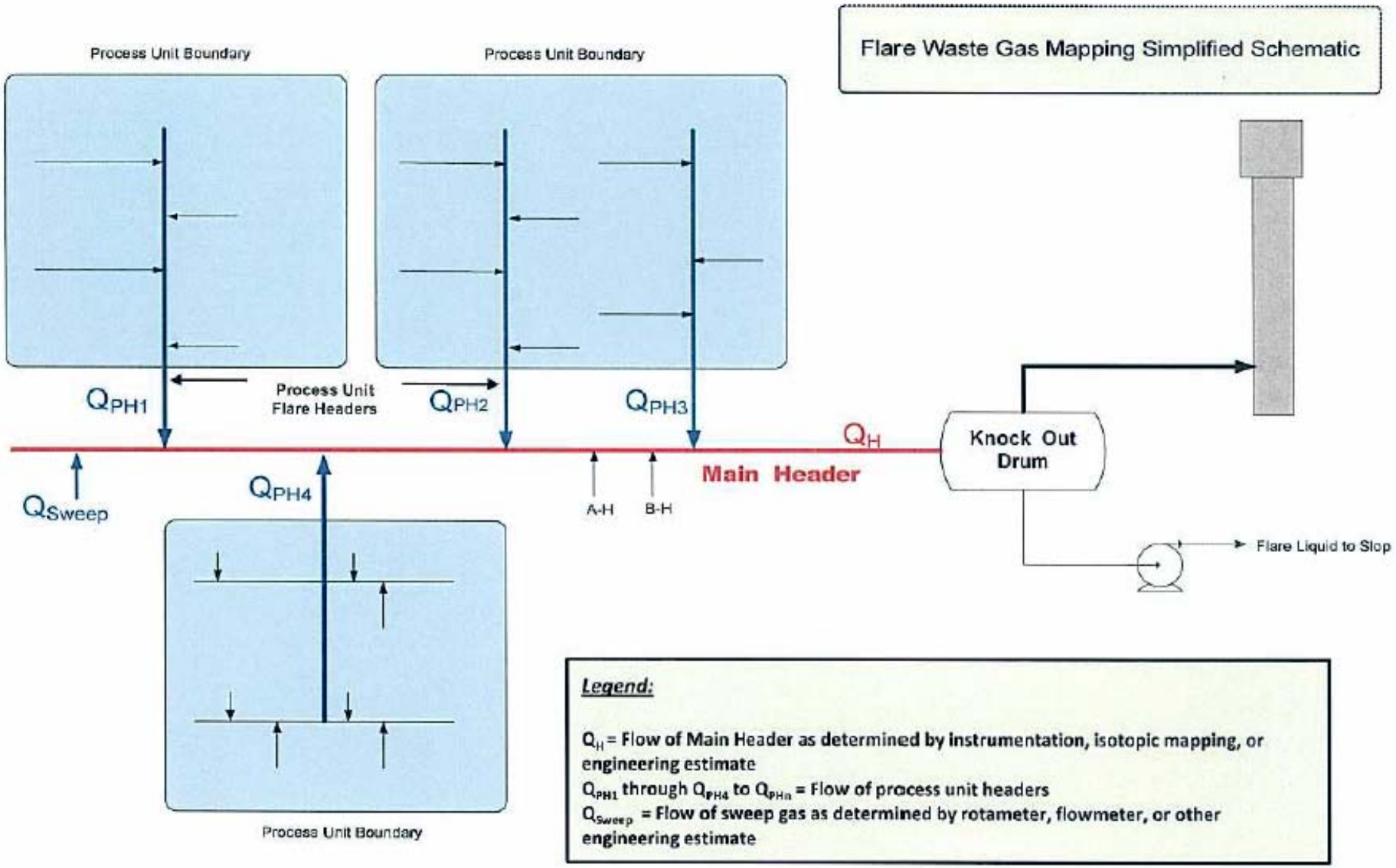

Flare Waste Gas Mapping Simplified Schematic
Process Unit Boundary
Process Unit Boundary
Process Unit Flare Headers
QPH1
QPH2
QPH3
QH
Main Header
Knock Out Drum
QSweep
QPH4
A-H
B-H
Flare Liquid to Slop
Process Unit Boundary
Legend:
QH = Flow of Main Header as determined by instrumentation, isotopic mapping, or engineering estimate
QPH1 through QPH4 to QPHn = Flow of process unit headers
QSweep = Flow of sweep gas as determined by rotameter, flowmeter, or other engineering estimate

Table 1: Example of Flare Source Description Table

Process Unit Header	Sources	Detailed Source Description
Q_{PH1} (Ex: FCCU Gas Con Unit)	3 PSVs	PSV-14 on 110-D-5 Gas Con Absorber PSV-12 on 110-D-1 Amine Scrubber PSV-7 on 110-F-1 Batch Caustic Vessel
	2 Pump Seal Purges	110-G-1 LPG Pump 110-G-2 Rich Amine Pump
	1 Sample Station	110-S-1 LPG
	1 PSV	PSV 17 on 112-D-1 Main Column
	1 Pressure Control Valve	PCV 21 – Emergency Wet Gas Compressor
	1 PSV	PSV-21 on Flush Oil Drum
	1 Pump Seal Purge	110-G-23 Slurry Oil Pump
Q_{PH2} (Ex: Gas Oil Treater)	Continue same as PH1	Continue same as PH1
Q_{PH3}	Continue same as PH1	Continue same as PH1
Q_{PH4}	Continue same as PH1	Continue same as PH1
A-H	1 PSVs	PSV-17 on 109-E-42 Slurry Heat Exchanger
B-H	2 Pump Seal Purges	110-G-3 Gas Oil Feed 110-G-4 Main Column Reflux

Appendix B2.1

Covered Flares and Applicability Dates for Certain Consent Decree Requirements for Lima Refining Company, Lima, Ohio

COVERED FLARE	FLARE DATA AND MONITORING SYSTEMS AND PROTOCOL REPORT	INSTALLATION AND OPERATION OF MONITORING SYSTEMS				WASTE GAS MINIMIZATION	FLARE GAS RECOVERY SYSTEM	GENERAL EMISSION STANDARDS FOR COVERED FLARES	FLARE OPERATION	COMPLIANCE WITH NESHAPS SUBPART CC
A	B	C				D	E	F	G	H
Referenced Paragraph of Appendix B										
B1.n	B2	B4	B5	B6	B7	B14	B17, B18	B19	B20	B23, B24
FCC (P006)	DOE + 365 days, with update due on 1/30/2020	12/31/2018	12/31/2018	12/31/2018	12/31/2018	DOE + 365 days	DOE	12/31/2018	12/31/2018	1/30/2019
LIU (P007)	NA	12/31/2017	12/31/2017	12/31/2017	12/31/2017	DOE + 365 days	DOE	12/31/2017	12/31/2017	1/30/2019
AG (P050)	NA	12/31/2017	NA	12/31/2017	12/31/2017	DOE + 365 days	NA	12/31/2017	12/31/2017	1/30/2019

Notes:

DOE – Date of Entry

NA – Not Applicable

Appendix B2.5

Calculation of Combustion Efficiency and Destruction Efficiency and VOC Emissions

Step 1: Combustion Efficiency Equation

Combustion Efficiency shall be calculated for each 15-minute period by Equation 1.

$$CE = \frac{\alpha * (\beta + NHV_{cz})}{1 + (\alpha * (\beta + NHV_{cz}))} \qquad \text{Eq. 1}$$

Where:

CE	=	Combustion Efficiency (fraction)
NHVcz	=	NHVcz values generated by the flare monitoring system for the 15-minute period (Btu/scf)
α	=	Coefficient defined by Table 1
β	=	Coefficient defined by Table 1

The values for the α and β coefficients for Equation 1 shall be as shown in Table 1 for the listed ranges of NHVcz.

Table 1: Combustion Efficiency Equation Coefficients

NHVcz (Btu/scf)	CE (fraction)
NHVcz < 95	α = 0, β = 0 (CE = 0)
95 ≤ NHVcz	α = 0.16, β = -95

Step 2: Vent Gas Flow Rate

The arithmetic mean of the vent gas flow rate (Qvg, scfh) shall be recorded every 15 minutes from the flow data generated by the flare monitoring system during each 15-minute period.

Step 3: 15-minute VOC Emissions Rate

VOC mass emissions (lb/hr) shall be calculated for each 15-minute period by Equation 2.

$$E_{voc} = \dot{m} * (1 - CE) \qquad \text{Eq. 2}$$

Where:

E_{voc}	=	VOC emissions (lb/15-minute period)
$\dot{m}$	=	Mass flow of VOC (lb/15-minute period) to the flare as calculated from the vent gas speciation and vent gas flow data from the flare monitoring system.

CE = Combustion Efficiency

Step 4: Hourly VOC Emission Rate

The hourly VOC emission rate, $E_{voc\text{-}hr}$, shall be calculated as the sum of the four 15-minute VOC emissions, E_{voc}, for each calendar hour.

Step 5: 365-Day Rolling Average VOC Emissions

Each hourly VOC emission period shall be summed by Equation 3 to determine the 365-Day Rolling Average VOC Emissions.

$$E_{VOC-yr} = \sum_{n=1}^{8760} \frac{(E_{VOC-hr})_n}{2000} \qquad \text{Eq. 3}$$

Where:

E_{voc-yr} = VOC emissions (tons per 365-day period)

n = calendar hour

Note 8,760 hours per 365 days and 2,000 lbs per ton.

Appendix C: Control Technology Demonstration Requirements

Beginning within 180 Days of the completion of the COF project, or by no later than July 1, 2019, whichever is earlier, LRC shall take the following steps to establish the following limits at the Fluid Catalytic Cracking Unit ("FCCU"): (1) a 7-Day Rolling Average NOx Emission Limit in ppmvd NOx at 0% excess air, (2) a 365-Day Rolling Average NOx Emission Limit in ppmvd NOx at 0% excess air, (3) a 7-Day Rolling Average SO_2 Emission Limit in ppmvd SO_2 at 0% excess air, and (4) a 365-Day Rolling Average SO_2 Emission Limit in ppmvd SO_2 at 0% excess air.

1. Design Report: By no later than 90 Days after the Date of Entry, LRC shall prepare and submit to EPA for approval a Design Report for the SCR and Wet Gas Scrubber at the Lima Refinery, based on the control requirements of this Consent Decree. EPA shall review and comment on the Design Report within 45 Days of receipt. LRC shall respond to any comments received within 30 Days of receipt of EPA's comments. The Design Report shall cover the following items:

    a. SCR Catalyst

        i. Type
        ii. Size/Pitch
        iii. Volume of Initial Charge
        iv. Operating Life
        v. Catalyst Module Replacement Strategy to Maintain Efficiency
        vi. Minimum Design Inlet Temperature
        vii. Disposal of Spent Catalyst Module

    b. SCR Catalyst Bed

        i. Catalyst Bed Volume
        ii. Internal Configuration
        iii. Location in Process Train
        iv. Soot Blowers
        v. Pressure Drop
        vi. Flow Orientation

    c. SCR Reductant Addition

        i. Type (Anhydrous Ammonia, Aqueous Ammonia, or Urea)
        ii. Reductant Addition Rates
        iii. Diluent Type and Rate
        iv. Flow Distribution Manifold
        v. Injection Grid/Nozzles
            1. Number
            2. Size
            3. Location
            4. Controls
        vi. Ammonia Slip

    d. Wet Gas Scrubber

i. Type (venturi, packed bed, etc.)
ii. Pressure drop
iii. Water recirculation rate
iv. Design pH
v. Liquid-to-gas ratio;
vi. Flue gas velocity;
vii. Flue gas temperature and humidity;
viii. Residence time;

2. Baseline Data Collection and Baseline Report: Starting on the Date of Entry and continuing for at least a 180-Day period prior to commencing installation of the SCR and Wet Gas Scrubber, LRC shall collect and submit to EPA baseline emissions and operational data. Such baseline emissions and operational data shall be representative of the full range of normal Lima Refinery operations, and shall include—with the exception of Inlet SO_2, NOx, and O_2 data—the parameters described in Paragraph 4.a below. Within 45 Days following completion of the baseline data collection period, LRC shall submit to EPA the baseline data collected during the baseline period in electronic format. After submittal of the Baseline Data, EPA shall have no more than 45 Days to comment.

3. Optimization Period: Within 180 Days of commencing operation of the SCR and Wet Gas Scrubber at the Lima Refinery, LRC shall undertake an optimization period for the SCR and Wet Gas Scrubber. The optimization period shall last up to 150 Days.

4. Optimization Protocol: No later than 90 Days prior to the start of the optimization period of the SCR and Wet Gas Scrubber, LRC shall submit to EPA a protocol for optimizing the SCR and Wet Gas Scrubber to minimize emissions of NOx and SO_2 to the greatest extent practicable. EPA shall review and comment on the Protocol within 45 Days of receipt. LRC shall respond to any comments submitted by EPA within 30 Days of receipt. The protocol shall describe the procedures that shall be used to evaluate the impact of different SCR and Wet Gas Scrubber operating parameters on the rate of NOx and SO_2 emissions reductions. The protocol shall contain an explanation of how any observed effects on FCCU emissions, FCCU operation, or product quality will be evaluated, and will identify LRC's proposal for modifying different operating parameters to determine the optimized operation of the control equipment. These parameters shall include, but are not limited to:

a. For general operating parameters:

i. Regenerator flue gas temperature;
ii. FCCU coke burn rate in pounds per hour;
iii. FCCU feed rate in barrels per Day;
iv. FCCU feed API gravity;
v. Estimated percentage and, where available, actual percentage of each type of FCCU feed component (i.e. atmospheric gas oil, vacuum gas oil, etc.);

vi. FCCU feed sulfur and basic nitrogen (where available) content as a weight %;
vii. FCCU conversion rate;
viii. Flue gas volumetric flow rate;
ix. Hourly and daily SO_2, NOx, CO and O_2 concentrations in ppmvd at 0% excess air at the point of CEMs measurement; and
x. Any other parameters that LRC identifies as important before the end of the demonstration period

b. For the Wet Gas Scrubber:

i. Differential pressure across the Scrubber System;
ii. Water recirculation rate;
iii. pH of the recirculation water;
iv. Inlet/Outlet SO_2 and O_2 as measured by CEMS;
v. Liquid-to-gas ratio;
vi. Flue gas velocity;
vii. Residence time;
viii. SO_2 removal efficiency;

c. For the SCR:

i. Aqueous ammonia feed rate;
ii. SCR exhaust gas temperature;
iii. Pressure drop across the catalyst beds;
iv. Operation of soot blowers;
v. Ammonia slip rate;
vi. Inlet/Outlet NOx and O_2 as measured by CEMS;
vii. NOx removal efficiency.

5. Optimization Report: Following the end of the optimization period, LRC shall have up to 60 Days to prepare and submit to EPA an Optimization Report. LRC shall include in the Optimization Report: (1) the proposed SCR and Wet Gas Scrubber operating parameters; (2) a discussion of any problems encountered during the optimization period; (3) a detailed discussion of the results of the Optimization on emissions from the FCCU; and (4) the 7-Day Rolling Average NOx and SO_2 emission rates achieved during the optimization period. After submittal of the Optimization Report, EPA shall have no more than 60 Days to comment. LRC shall respond to any comments received within 45 Days of receipt of EPA's comments.

6. Demonstration Program:

a. Within 30 Days of the final approval by EPA of the Optimization Report, LRC shall commence a Demonstration Period. During the Demonstration Period, LRC must operate the SCR and Wet Gas Scrubber consistent with the operating parameters determined during the optimization period and identified in the approved

Optimization Report. The Demonstration Period for the 7-Day Rolling Average Emission Limits shall be 140 Days. The Demonstration Period for the 365-Day Rolling Average Emission Limits shall be 730 Days.

b. If operation of the FCCU if disrupted by excessive startups and shutdowns during the Demonstration Period, LRC may request or EPA may decide to extend the Demonstration Period. In granting any such request, the amount the time that the Demonstration Period will be extended is subject to the Section XIII (Dispute Resolution) provisions of this Consent Decree.

c. During the Demonstration Period, LRC shall collect the same data required during the baseline period and identified in this Appendix C. The Demonstration Report shall include the data collected as required in this Paragraph in an electronic form in an Excel spreadsheet or a format compatible and able to be manipulated by Excel.

d. In each Semi-Annual Report submitted during the Demonstration Period, and in the first Semi-Annual Report submitted after the conclusion of the Demonstration Period, LRC shall submit the data collected during the Demonstration Period to that point, and shall include all of the information in Paragraph 4 of this Appendix C. In addition, the periodic report shall include all 7-Day and 365-Day Rolling Average Emission Rates calculated from the beginning of the Demonstration Period until the preparation of the periodic report. The report data shall be submitted electronically in an Excel spreadsheet or a format compatible and able to be manipulated by Excel.

e. Within 60 Days following completion of the Demonstration Period, LRC shall submit a Demonstration Report to EPA, based upon and including all of the data collected during the Demonstration Period, that identifies proposed 7-Day or 365-Day Rolling Average Emission Limits for NOx and SO_2, as appropriate (i.e. within 60 days of completing the 140-Day Demonstration Period for the 7-Day Rolling Average Emission Limits, LRC shall propose 7-Day Rolling Average NOx and SO_2 emission limits, and within 60 Days of completing the 730-Day Demonstration Period for the 365-Day Rolling Average Emission Limits, LRC shall propose 365-Day Rolling Average NOx and SO_2 emission limits). The proposed limits shall be based upon an analysis of CEMS data collected during the Demonstration Period, while the process and SCR and Wet Gas Scrubber parameters were optimized. LRC shall provide an explanation in the Demonstration Report for any data excluded from the analyses. In any event, LRC shall include all data required to be collected during the Demonstration Period in the Final Demonstration Report.

f. LRC shall propose Emission Limits for SO_2 and NOx in the Demonstration Report as provided in the preceding Paragraph and in accordance with the definition of that term in the Consent Decree. Each of the NOx and the SO_2 Final Rolling Average Emission Limits shall be calculated in accordance with the following formula:

$X = \mu + r\sigma$ where:

X = 7-Day or 365-Day Rolling Average Emission Limit (ppmvd at 0% excess air)
μ = arithmetic mean of all of the 7-Day or 365-Day Rolling Averages, as applicable
r = 1.65, for the 365-Day Rolling Average Emission Limit calculation, and 2.0, for the 7-Day Rolling Average Emission Limit calculation
σ = standard deviation of all of the 7-Day or 365-Day Rolling Averages, as applicable, as calculated in the following manner:

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \bar{x})^2}$$

g. EPA shall either approve the proposed Rolling Average Emission Limits or establish alternative final emission limits. If EPA approves LRC's proposed emission limits, LRC shall comply with EPA's final emission limit within 30 Days of receipt of EPA's notice.[1] If EPA establishes an alternative final emission limit that differs from LRC's proposed emission limit, LRC shall demonstrate compliance and maintain compliance with EPA's final emission limit within 60 Days of receipt of EPA's notice. If LRC invokes Dispute Resolution, it shall follow the procedures set forth in Section XIII (Dispute Resolution). During the period of Dispute Resolution, LRC shall demonstrate compliance and maintain compliance with LRC's proposed final emission limit.

[1] For a 7-Day Rolling Average Emission Limit, the first Day on which compliance with the 7-Day Rolling Average Emission Limit is assessed is the 7th Day after compliance is required. For a 365-Day Rolling Average Emission Limit, the first Day on which compliance with the 365-Day Rolling Average Emission Limit is assessed is the 365th Day after compliance is required.