

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
HOUSTON DIVISION

UNITED STATES OF AMERICA and the)	
LOUISIANA DEPARTMENT OF)	
ENVIRONMENTAL QUALITY,)	
)	Civil Action No. 4:17-cv-3302
Plaintiffs,)	
)	Judge
v.)	
)	Magistrate
EXXON MOBIL CORP. and)	
EXXONMOBIL OIL CORP.,)	
)	
Defendants.)	

CONSENT DECREE

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TABLES OF APPENDICES

Table 1:

NUMBER	ABBREVIATION	DESCRIPTION
1.1	[Reserved]	[Reserved]
1.2	NHV _{cz} , NHV _{dil} , and V _{tip}	Calculating NHV _{cz} , NHV _{dil} , and V _{tip} for Flares
1.3	Tip-Area-Eq	Calculating the Unobstructed Cross Sectional Area of Various Types of Flare Tips
1.4	G-Drwg	Depiction of Gases Associated with Steam-Assisted Flares
1.5	Flr-Data-Rpt	Outline of Requirements for the Flare Data and Initial Monitoring Systems Report
1.6	GC-Specs	Interim Specifications for Existing Gas Chromatographs at Baytown Facilities
1.7	WG-Map	Waste Gas Mapping: Level of Detail Needed to Show Main Headers and Process Unit Headers
1.8	FGRS Reqt's	Flare Gas Recovery Systems – Description and Compliance Dates

Table 2:

NUMBER	ABBREVIATION	DESCRIPTION
2.1	SEP and BEPs	SEP and BEP Protocols
2.2	Fenceline Monitoring	Fenceline Monitoring Requirements

Concurrently with the lodging of this Consent Decree, Plaintiff, the United States of America (“United States”), on behalf of the United States Environmental Protection Agency (“EPA”), has filed a complaint in this action seeking injunctive relief and civil penalties from the Defendants, Exxon Mobil Corporation and ExxonMobil Oil Corporation (collectively referred to herein as the “Defendants”), for alleged violations of the Clean Air Act (the “CAA” or “Act”), 42 U.S.C. §§ 7401 *et seq.*, with respect to emissions of volatile organic compounds (“VOCs”), hazardous air pollutants (“HAPs”), and other pollutants at the Defendants’ chemical, olefins, polymer, and plastics manufacturing facilities located in or near Baytown, Texas (the “Baytown Facilities”), Beaumont, Texas (the “Beaumont Facilities”), Baton Rouge, Louisiana (the “Baton Rouge Facilities”), and Mont Belvieu, Texas (the “Mont Belvieu Facility”);

The Louisiana Department of Environmental Quality (“LDEQ”) is a co-Plaintiff in the Complaint and is seeking injunctive relief and civil penalties from the Defendants for alleged violations of the Clean Air Act and Louisiana Environmental Quality Act (“LEQA”), La.R.S. 30:2001 *et seq.*, at the Baton Rouge Facilities;

WHEREAS, the Defendants own and operate the Baytown Facilities, Beaumont Facilities, Baton Rouge Facilities, and Mont Belvieu Facility (collectively, the “Covered Facilities”), including the Steam-Assisted and Air-Assisted Flares used at those facilities as safety devices and to control emissions of air pollutants generated by the manufacturing processes;

WHEREAS, the Complaint alleges that the Defendants violated one or more of the following federal Clean Air Act and/or Louisiana or Texas state air pollution requirements:

- a. The New Source Performance Standards (“NSPS”) promulgated at 40 C.F.R. Part 60, Subpart A, pursuant to Section 111 of the CAA, 42 U.S.C. § 7411;
- b. The National Emission Standards for Hazardous Air Pollutants (“NESHAPs”) promulgated at 40 C.F.R. Part 61, Subparts A, J, V, and FF and 40 C.F.R. Part 63, Subparts A, F, G, H, U, YY, and FFFF, pursuant to Section 112 of the CAA, 42 U.S.C. § 7412;
- c. The Title V requirements of the CAA found at 42 U.S.C. §§ 7661a(a), 7661b(c), 7661c(a); and 40 C.F.R. §§ 70.1(b), 70.5(a) and (b), 70.6(a) and (c), and 70.7(b);
- d. The portions of the Title V permits for the Baytown Facilities, Beaumont Facilities, Baton Rouge Facilities, and Mont Belvieu Facility that adopt, incorporate, or implement the provisions cited in a–b and e; and
- e. The federally enforceable Louisiana and Texas state implementation plan (SIP) provisions that incorporate, adopt, and/or implement the federal requirements listed in a–c.

WHEREAS, the Defendants have installed systems and equipment to recover Waste Gas generated by process units at their four polymer and plastics manufacturing facilities (the Mont Belvieu Plastics Plant, the Beaumont Polyethylene Plant, the Baton Rouge Plastics Plant, and the Baton Rouge Polyolefins Plant) before that Waste Gas reaches the facility’s Flare header (“In-Process Waste Gas Recovery Systems”). These systems and equipment, which are required to be operated by the four facilities’ federally enforceable CAA operating permits, include:

- A Purge Gas Purification Unit at the Baton Rouge Plastics Plant which has a nominal design capacity to recover 7.9 mscf per Day of Waste Gas;
- A Vapor Recovery Unit, an Ethylene Return Recovery Unit, and a Polypropylene Flare Gas Recovery Unit at the Baton Rouge Polyolefins Plant. These units collectively have a nominal design capacity to recover 4.3 mscf per Day of Waste Gas;

- Three Hexane Recovery Units and an Ethylene Recovery Unit at the Beaumont Polyethylene Plant which collectively have a nominal design capacity to recover 2.6 mscf per Day of Waste Gas; and
- A Low Density Polyethylene (LDPE) Recovery Unit and a flameless thermal oxidizer at the Mont Belvieu Plastics Plant. The LDPE recovery unit has a nominal design capacity to recover 1.25 mscf per Day of Waste Gas and the flameless thermal oxidizer has a nominal design capacity to combust 3.2 mscf per Day of Waste Gas at a Combustion Efficiency of at least 99.5%.

WHEREAS, the Defendants have provided a significant level of cooperation to the EPA prior to entry of this Consent Decree by undertaking studies of Flare Combustion Efficiency at an olefins manufacturing facility and a plastics manufacturing facility, implementing Flare flow reduction and Combustion Efficiency improvements at the Covered Facilities, and reducing emissions from the Covered Flares. These actions include:

- In March and April of 2015, spending over \$2.3 million dollars to undertake Passive Fourier Transform Infrared testing at the Baytown Olefins Plant and Mont Belvieu Plastics Plant;
- At the Baton Rouge Polyolefins Plant, equipping each Covered Flare with an online continuous Vent Gas BTU analyzer, operating and maintaining video monitoring for each Covered Flare, and upgrading equipment at the S-4001 Flare to improve NHV_{vg} control, Assist Steam flow control, and Pilot Gas ignition and flow reliability;
- At the Baton Rouge Plastics Plant, implementing a project to route Waste Gas during downtime of the Purge Gas Purification Unit to a recovery system at the Baton Rouge Chemical Plant to prevent flaring;
- At the Baton Rouge Chemical Plant, equipping the Covered Flares with smaller Assist Steam control valves to optimize Assist Steam injection at low Waste Gas flow rates, redirecting a Waste Gas stream with a high VOC concentration from the Flare to a waste heat boiler, improving existing FGRS operations to recover 30% more Waste Gas, implementing Flare stewardship metrics to reduce flaring, and optimizing process unit procedures and operations

to reduce flaring;

- At the Beaumont Chemical Plant, implementing a project which reduced emissions from the UDEX Flare by blocking in Sweep Gas sources in order to reduce the amount of Sweep Gas flowing to the UDEX Flare;
- At the Beaumont Polyethylene Plant, installing a vapor recovery column on two reactors and completing reactor piping modifications which improved recovery of Waste Gas;
- At the Mont Belvieu Plastics Plant, optimizing LDPE operations to reduce nitrogen purge rate, reducing the seal gas vent rate, and optimizing the reactor vent disposition to reduce flaring;
- At the Baytown Olefins Plant, installing a Compressor and integrating all Flare headers to allow for a single operating Flare for routine operations; and
- At the Baytown Chemical Plant, reordering flaring sequence to minimize usage of Assist Steam and Supplemental Gas, rerouting Waste Gas streams from Flare 24 to the Flare loop for recovery, installing Supplemental Gas injection points downstream of the FGRS water seal drum to reduce Supplemental Gas usage, operating FGRS and optimizing the water seal heights to maximize FGRS recovery, installing distributed control system-level instrumentation for continuous monitoring to prevent Compressor shutdowns, upgrading the lube oil to increase recovery performance of the Compressors, and developing an Assist Steam minimization model.

WHEREAS, Waste Gas streams routed to the Finishing Flare at the Baton Rouge Plastics Plant have limited flow rates, come from a limited set of sources at the facility, and have a consistent composition within the meaning of 40 C.F.R. § 63.670(j)(6);

WHEREAS, by entering into this Consent Decree, the Defendants commit to undertake further projects at the Covered Facilities intended to reduce emissions of air pollutants from the Covered Facilities;

WHEREAS, as more specifically described in Section V (Compliance Requirements), the

Defendants have agreed to operate monitoring equipment and control technology, as well as undertake additional measures, at the Covered Facilities that will recover and minimize Waste Gas flows to the twenty-six Flares covered by this Consent Decree (“Covered Flares”) and ensure proper Combustion Efficiency at the Covered Flares;

WHEREAS, implementing the Consent Decree’s compliance requirements are estimated to cost approximately \$300 million;

WHEREAS, between January 1, 2013 and full implementation of the Consent Decree’s compliance requirements, EPA estimates that emissions from the Covered Flares will be reduced by approximately the following amounts (in tons per year or “TPY”):

<u>Pollutant</u>	<u>Amount in TPY (2013 – through implementation)</u>
VOCs	7,061
Carbon Dioxide Equivalents (“CO ₂ e”)	158,797
HAPs	1,563
Nitrogen Oxides (“NO _x ”)	62

WHEREAS, implementing the Consent Decree’s compliance requirements will also reduce carbon monoxide (“CO”) from the Covered Flares;

WHEREAS, the Defendants estimate that the supplemental environmental project (“SEP”) and Louisiana beneficial environmental projects (“BEPs”) required to be implemented pursuant to Section VI of this Consent Decree will cost approximately \$ 2.6 million;

WHEREAS, the United States and LDEQ anticipate that the specific and comprehensive compliance measures set forth in this Consent Decree, which are subject to a reasonable

timetable for implementation, will result in the cessation of the violations alleged in the Complaint and those resolved through Section XIV (Effect of Settlement);

WHEREAS, the Defendants deny they have violated or continue to violate any of the statutory and regulatory requirements set forth in the preceding “whereas” clauses and deny any liability to the United States arising out of the occurrences alleged in the Complaint; and

WHEREAS, the Parties recognize, and the Court by entering this Consent Decree finds, that this Consent Decree has been negotiated by the Parties 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 ADJUDGED, ORDERED, 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, and Section 113(b) of the Clean Air Act, 42 U.S.C. § 7413(b). This Court has personal jurisdiction over the Parties. This Court has supplemental jurisdiction over the state law claims asserted by LDEQ pursuant to 28 U.S.C. § 1367. Venue lies in this District pursuant to Section 113(b) of the Clean Air Act, 42 U.S.C. § 7413(b), and 28 U.S.C. §§ 1391(b) and (c) and 1395(a), because the Defendants reside and are located in this judicial district, violations alleged in the Complaint are alleged to have occurred in this judicial district, and the Defendants conduct business in this judicial district. The Defendants consent to

this Court's jurisdiction over the Parties and this Consent Decree, over any action to enforce this Consent Decree, and to venue in this judicial district.

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

3. Notice of the commencement of this action has been given to LDEQ and the Texas Commission on Environmental Quality ("TCEQ") in accordance with Section 113(b) of the Clean Air Act, 42 U.S.C. § 7413(b).

II. APPLICABILITY

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

5. At least 60 Days before a transfer of the ownership or operation of any of the Covered Facilities or Covered Flares, the Defendants must provide a copy of this Consent Decree to the proposed transferee(s). At least 30 Days before any such transfer, the Defendants must provide written notice of the prospective transfer to the EPA and the United States, in accordance with Section XVI (Notices). For transfers of any of the Baton Rouge Facilities or Baton Rouge Flares, at least 30 Days before such transfer, the Defendants must also provide written notice of the prospective transfer to LDEQ in accordance with Section XVI (Notices). Any attempt to transfer ownership or operation of any of the Covered Facilities or Covered Flares without complying with this Paragraph constitutes a violation of this Decree.

6. If the Defendants intend to request that the United States or LDEQ agree to a transferee's assumption of any obligations of the Consent Decree, the Defendants must condition the transfer of the Covered Facility or Covered Flare upon the transferee's written agreement to execute a modification to the Consent Decree that makes the terms and conditions of the Consent Decree applicable to, binding upon, and enforceable against the transferee.

7. As soon as possible before the transfer, the Defendants must: (i) notify the United States and, if applicable, LDEQ of the proposed transfer and of the specific Consent Decree provisions that the Defendants propose the transferee assume; (ii) certify that the transferee is contractually bound to assume the ongoing compliance requirements and obligations of this Consent Decree; and (iii) require the transferee to submit to the United States and, if applicable, LDEQ both a certification that the transferee has the financial and technical ability to assume the ongoing compliance requirements and obligations of this Consent Decree and a certification that the transferee is contractually bound to assume the ongoing compliance requirements and obligations of this Consent Decree.

8. After submitting to the United States and, if applicable, LDEQ the notice and certification required by the previous Paragraph, either: (i) the United States shall notify the Defendants that the United States does not agree to modify the Consent Decree to make the transferee responsible for complying with the terms and conditions of the Consent Decree; or (ii) the United States, the Defendants, the transferee, and, if applicable, LDEQ shall file with the Court a joint motion requesting the Court approve a modification substituting the transferee for

the Defendants as the defendant responsible for complying with the terms and conditions of the Consent Decree that the Defendants intend the transferee to assume.

9. If the Defendants do not secure the agreement of the United States to a joint motion to modify the Consent Decree within a reasonable period of time, then the Defendants and the transferee may file, without the agreement of the United States, a motion requesting the Court to approve a modification substituting the transferee for the Defendants as the defendant responsible for complying with the terms and conditions of the Consent Decree that the transferee intends to assume. The United States and, if applicable, LDEQ may file an opposition to the motion. The motion to modify shall be granted unless the Defendants and the transferee: (i) fail to show that the transferee has the financial and technical ability to assume the ongoing compliance requirements and obligations of the Consent Decree; (ii) fail to show that the modification language effectively transfers the ongoing compliance requirements and obligations to the transferee; or (iii) the Court finds other good cause for denying the motion.

10. The Defendants must provide a copy of this Consent Decree to all officers whose duties might reasonably include compliance with any provision of this Decree. For all employees whose duties might reasonably include compliance with any provision of this Decree, as well as for any contractor retained to perform work required under this Consent Decree, the Defendants must provide a copy of the portions of this Consent Decree that are applicable to the employee's duties or to the contractor's work. The Defendants must condition any such contract upon performance of the work in conformity with the applicable terms of this Consent Decree. Copies of the applicable provisions of the Consent Decree do not need to be supplied to contractors or

vendors that are retained to supply materials or equipment to satisfy the requirements of this Consent Decree.

11. In any action to enforce this Consent Decree, the Defendants will 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. Nothing in this Paragraph is intended to prevent the Defendants from invoking Force Majeure pursuant to this Consent Decree.

III. DEFINITIONS

12. Terms used in this Consent Decree that are defined in the Clean Air Act or in federal or state regulations promulgated pursuant to the CAA will have the meanings assigned to them in the CAA or such regulations, unless otherwise provided in this Decree. Whenever the terms set forth below are used in this Consent Decree, the following definitions apply:

- a. “Assist Air” means all air that is intentionally introduced before or at a Flare tip through nozzles or other hardware conveyance for the purposes of, including, but not limited to, protecting the design of the Flare tip, promoting turbulence for mixing, or inducing air into the flame. Assist Air includes premix assist air and Perimeter Assist Air. Assist Air does not include surrounding ambient air. Flares that use Assist Air are referred to in this Consent Decree as “Air-Assisted Flares.”
- b. “Assist Steam” means all steam that is intentionally introduced before or at a Flare tip through nozzles or other hardware conveyance for the purposes of, including, but not limited to, protecting the design of the Flare tip, promoting turbulence for mixing, or inducing air into the flame. Assist Steam includes, but is not necessarily limited to, Center Steam, lower steam, and upper steam.
- c. “Available for Operation” means, with respect to a Compressor within a FGRS, 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 a Compressor to Operate arises. The period of time, not to exceed one hour,

allowed by this definition for the startup of a Compressor will be included in the amount of time that a Compressor is Available for Operation.

- d. “Baseload Waste Gas Flow Rate” means, for a Covered Flare, the daily average flow rate, in scfd, to that Flare, excluding all flows during periods of startup, shutdown, and Malfunction. The flow rate data period that must be used to determine Baseload Waste Gas Flow Rate is set forth in sub-Paragraph 29(a)(ii).
- e. “Baton Rouge Facilities” means:
- i. the Baton Rouge Chemical Plant, which is a petrochemical manufacturing facility owned and operated by the Defendants, located at 4999 Scenic Highway, Baton Rouge, Louisiana 70805-3359;
 - ii. the Baton Rouge Plastics Plant, which is a polymer manufacturing facility owned and operated by the Defendants, located at 11675 Scotlandville-Zachary Highway 19, Baton Rouge, Louisiana 70807, except that the Finishing Flare is located at 12840 Scenic Highway, Baton Rouge, Louisiana 70807; and
 - iii. the Baton Rouge Polyolefins Plant, which is a polymer manufacturing facility owned and operated by the Defendants, located at 12875 Scenic Highway, Baton Rouge, Louisiana 70807.
- f. “Baton Rouge Flares” means:
- i. the following five Steam-Assisted Flares located at the Baton Rouge Chemical Plant (“Baton Rouge Chemical Plant Flares”):
 - Flare 7;
 - Flare 10;
 - Flare 16;
 - Flare 25; and
 - Flare 26;
 - ii. the following three Flares located at the Baton Rouge Plastics Plant (“Baton Rouge Plastics Plant Flares”):
 - Flare 1 (Steam-Assisted);
 - Flare 3 (Steam-Assisted); and
 - Finishing Flare (Air-Assisted); and

iii. the following two Steam-Assisted Flares located at the Baton Rouge Polyolefins Plant (“Baton Rouge Polyolefins Plant Flares”):

- Flare S-1301; and
- Flare S-4001.

g. “Baytown Facilities” means:

i. the Baytown Chemical Plant, which is a petrochemical manufacturing facility owned and operated by the Defendants, located at 5000 Bayway Drive, Baytown, Texas, 77520; and

ii. the Baytown Olefins Plant, which is a petrochemical manufacturing facility owned and operated by the Defendants, located at 3525 Decker Drive, Baytown, Texas, 77520.

h. “Baytown Flares” means:

i. the following four Steam-Assisted Flares located at the Baytown Chemical Plant (“Baytown Chemical Plant Flares”):

- FS-9;
- FS-12;
- FS-23; and
- FS-24; and

ii. the following three Steam-Assisted Flares located at the Baytown Olefins Plant (“Baytown Olefins Plant Flares”):

- Primary Flare;
- Secondary Flare; and
- BOP-X Flare.

i. “Beaumont Facilities” means:

i. the Beaumont Chemical Plant, which is a petrochemical manufacturing facility owned and operated by the Defendants, located at 2775 Gulf States Road, Beaumont, Texas, 77701; and

- ii. the Beaumont Polyethylene Plant, which is a polymer manufacturing facility owned and operated by the Defendants, located at 11440 Highway 90, Beaumont, Texas, 77713.
- j. “Beaumont Flares” means:
- i. the following five Steam-Assisted Flares located at the Beaumont Chemical Plant (“Beaumont Chemical Plant Flares”):
 - LP East;
 - HP West;
 - UDEX;
 - Paraxylene (*a.k.a.* the “PX” flare); and
 - CS; and
 - ii. the following two Air-Assisted Flares located at the Beaumont Polyethylene Plant (“Beaumont Polyethylene Plant Flares”):
 - LP; and
 - HP.
- k. “BTU/scf” means British Thermal Unit per standard cubic foot.
- l. “Calendar Quarter” means a three-month period ending on March 31, June 30, September 30, or December 31.
- m. “Capable of Receiving Sweep, Supplemental, and/or Waste Gas” means, for a Flare, that the flow of Sweep Gas, Supplemental Gas, and/or Waste Gas is not prevented from being directed to the Flare by means of an isolation device such as closed valves, blinds, or stopples.
- n. “Center Steam” means the portion of Assist Steam introduced into the stack of a Flare to reduce burnback.
- o. “Combustion Efficiency” or “CE” means a Flare’s efficiency in converting the organic carbon compounds found in Combustion Zone Gas to carbon dioxide. Combustion Efficiency must be determined in accordance with Appendix 1.2.
- p. “Combustion Zone” means the area of the Flare flame where the Combustion Zone Gas combines for combustion.

- q. “Combustion Zone Gas” means all gases and vapors found after the Flare tip. This gas includes all Vent Gas, Pilot Gas, Total Steam, and Assist Air.
- r. “Complaint” means the complaint filed by the United States and LDEQ in this action.
- s. “Compressor” means, with respect to a FGRS, a mechanical device designed and installed to recover gas from a flare header. Types of FGRS compressors include reciprocating compressors, centrifugal compressors, liquid ring compressors, screw compressors, and liquid jet ejectors.
- t. “Consent Decree” or “Decree” means this Consent Decree, including any and all tables and attached appendices.
- u. “Covered Air-Assisted Flares” means each of the following Flares:
 - the Finishing Flare at the Baton Rouge Plastics Plant, and
 - the LP and HP Flares at the Beaumont Polyethylene Plant.

The Covered Air-Assisted Flares use only Perimeter Assist Air, and do not use pre-mix assist air.

- v. “Covered Facility” or “Covered Facilities” means:
 - each one of the Baton Rouge Facilities,
 - each one of the Baytown Facilities,
 - each one of the Beaumont Facilities, and
 - the Mont Belvieu Facility.
- w. “Covered Flare” or “Covered Flares” means each of the following Flares, as well as any Newly Installed Covered Flare or Portable Flare in use at a Covered Facility:
 - the Baton Rouge Flares,
 - the Baytown Flares,
 - the Beaumont Flares, and
 - the Mont Belvieu Flares.
- x. “Covered Steam-Assisted Flares” means all Covered Flares except for the Covered Air-Assisted Flares.

- y. “Date of Lodging” means the date this Consent Decree is filed for lodging with the Clerk of the Court for the United States District Court for the Southern District of Texas.
- z. “Day” means a calendar day unless expressly stated to be a business day. In computing any period of time for a compliance deadline under this Consent Decree (*e.g.*, a deadline for installing a FGRS or submitting a WGMP), where the last day would fall on a Saturday, Sunday, or federal or Louisiana state holiday, the period will run until the close of business of the next business day.
- aa. “Defendants” means Exxon Mobil Corporation and ExxonMobil Oil Corporation.
- bb. “Duplicate Spare Compressor” means, 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 Nominal Design Capacity of the FGRS is Available for Operation while any one compressor of the FGRS is out of service.
- cc. “Effective Date” shall have the definition provided in Section XVII.
- dd. “EPA” means the United States Environmental Protection Agency and any of its successor departments or agencies.
- ee. “External Utility Loss” means a loss in the supply of electrical power or other third-party utility to a Covered Facility that is caused by actions occurring outside the boundaries of a Covered Facility, excluding utility losses due to an interruptible utility service agreement.
- ff. “Flare” means a combustion device lacking an enclosed combustion chamber that uses an uncontrolled volume of ambient air to burn gases.
- gg. “Flare Gas Recovery System” or “FGRS” means a system of one or more Compressors, piping, and associated water seal, rupture disk, or other equipment 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.
- hh. “Flare Tip Velocity” or “Vtip” means the velocity of gases exiting the Flare tip as defined in Paragraph 40.

- ii. “In Operation,” with respect to a Flare, means all times that Sweep, Supplemental, or Waste Gas is or may be vented to a Flare. A Flare that is In Operation is Capable of Receiving Sweep, Supplemental, or Waste Gas unless all Sweep, Supplemental, and Waste Gas flow is prevented by means of an isolation device such as closed valves, blinds, and/or stopples.
- jj. “In-Process Waste Gas Recovery System” means a process-unit-specific system used to minimize hydrocarbon gas streams generated by that process unit that may otherwise be routed for combustion in a Flare from reaching the Flare header. An In-Process Waste Gas Recovery System relies on physical and/or chemical processes, including, for example, absorption, adsorption, compression, condensation, distillation, and refrigeration, to recycle or re-direct hydrocarbon gas streams back to the generating process unit for reuse, to a fuel gas system, or to a product, co-product, by-product, or raw material recovery system.
- kk. “KSCFH” or “kscfh” means thousand standard cubic feet per hour.
- ll. “LDEQ” means the Louisiana Department of Environmental Quality and any of its successor departments or agencies.
- mm. “Lower Heating Value” or “LHV” means the theoretical total quantity of heat liberated by the complete combustion of a unit volume or weight of a fuel initially at 25 degrees Centigrade and 760 mmHg, assuming that the produced water is vaporized and all combustion products remain at, or are returned to, 25 degrees Centigrade; however, the standard for determining the volume corresponding to one mole is 20 degrees Centigrade.
- nn. “Malfunction” means, as specified in 40 C.F.R. § 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 Consent Decree involving this definition, the Defendants have the burden of proving:
 - (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 used, 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 if required.
- oo. "Monitoring System Malfunction" means 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, the Defendants have the burden of proving:
- (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 instrument or monitoring system 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 used, 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.
- pp. "Mont Belvieu Plastics Plant" or "Mont Belvieu Facility" means the polymer manufacturing facility owned and operated by the Defendants, located at 13330 Hatcherville Road, Mont Belvieu, Texas, 77580.
- qq. "Mont Belvieu Flares" means the following two Steam-Assisted Flares located at the Mont Belvieu Plastics Plant:
- LDPE and
 - HDPE.
- rr. "MSCF" or "mscf" means million standard cubic feet.
- ss. "Need for a Compressor to Operate" means:

- (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 FGRS 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).
- tt. “Net Heating Value” means Lower Heating Value.
- uu. “Net Heating Value Analyzer” or “NHV Analyzer” means 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 Supplemental Gas and/or Sweep Gas and/or Purge Gas if the composition and flow rate of any such Supplemental Gas and/or Sweep Gas and/or Purge Gas is known and if this known value then is used in the calculation of the Net Heating Value of the Vent Gas.
- vv. “Net Heating Value of Combustion Zone Gas” or “NHV_{cz}” means the Lower Heating Value, in BTU/scf, of the Combustion Zone Gas in a Flare. NHV_{cz} must be calculated in accordance with Step 3 of Appendix 1.2.
- ww. “Net Heating Value of Vent Gas” or “NHV_{vg}” means the Lower Heating Value, in BTU/scf, of the Vent Gas directed to a Flare. NHV_{vg} must be calculated in accordance with Step 1 of Appendix 1.2.
- xx. “New Source Review” or “NSR” means the Prevention of Significant Deterioration (“PSD”) and Non-attainment NSR (“NNSR”) provisions in Part C and D of Subchapter I of the Clean Air Act, 42 U.S.C. §§ 7470-7492, 7501-7515, the Minor NSR provisions in §§ 7410(a), applicable federal regulations implementing such provisions of the CAA, and the corresponding provisions of the federally enforceable SIPs for the State of Louisiana and the State of Texas.
- yy. “Newly Installed Covered Flare(s)” means any Flare that is permanently installed, receives Waste Gas that has been redirected to it from an existing Covered Flare (existing as of the Effective Date), and commences operation at a Covered Facility after the Effective Date.
- zz. “Nominal Design Capacity” means, with respect to a FGRS, the sum of the capacities, in mscf per Day, of the installed flare gas recovery Compressors,

excluding the capacity of any installed Duplicate Spare Compressor or warehouse spare Compressor.

- aaa. “Paragraph” means a portion of this Decree identified by an arabic numeral.
- bbb. “Parties” means the United States, LDEQ, and the Defendants.
- ccc. “Perimeter Assist Air” means the portion of Assist Air introduced at the perimeter of the Flare tip or above the Flare tip. Perimeter Assist Air includes air intentionally entrained in lower and upper steam. Perimeter Assist Air includes all Assist Air except premix assist air.
- ddd. “Pilot Gas” means gas introduced into a Flare tip that provides a flame to ignite the Vent Gas.
- eee. “Portable Flare” means a Flare that is not permanently installed and that receives Waste Gas that has been redirected to it from a Covered Flare during an outage as described in Paragraph 46.
- fff. “Potentially Recoverable Gas” means the Sweep Gas, Supplemental Gas, 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, except that Regeneration Waste Gas Streams are not included in the definition of “Potentially Recoverable Gas.”
- ggg. “Prevention Measure” means an instrument, device, piece of equipment, system, process change, physical change to process equipment, procedure, or program to minimize or eliminate flaring.
- hhh. “Purge Gas” means the gas introduced between a Flare header’s water seal and the Flare tip to prevent oxygen infiltration (backflow) into the Flare tip. For a Flare with no water seal, the function of Purge Gas is performed by Sweep Gas, and therefore, by definition, such a Flare has no Purge Gas.
- iii. “Regeneration Waste Gas Streams” means Waste Gas streams produced during the regeneration of the dryers, reactors, and other vessels at the Covered Facilities. Regeneration Waste Gas Streams are high in nitrogen (typically approximately 90%) and have very low heating value (typically approximately 100 btu/scf), thus they are not a useful fuel.
- jjj. “Reportable Flaring Incident” means when Waste Gas equal to or greater than 500,000 scf is flared within a 24-hour period at any Covered Facility from its

Covered Flare(s). For purposes of calculating whether the triggering level of Waste Gas flow has been met, the following flows may be excluded: i) the pro-rated Baseload Waste Gas Flow Rate (pro-rated on the basis of the duration of the Reportable Flaring Incident); and ii) if a Covered Facility has instrumentation capable of calculating the volumetric flow rate of hydrogen, nitrogen, oxygen, carbon monoxide, carbon dioxide, and/or water (steam) in the Waste Gas, the contribution of all measured flows of any of these elements/compounds may be excluded. A flaring event or events that have the same root cause(s) and that last(s) more than 24 hours will be considered a single Reportable Flaring Incident. When flaring occurs at more than one Covered Flare, the volume of non-excluded Waste Gas flow at each Covered Flare must be added together unless the root cause(s) of the flaring at each Covered Flare is(are) not related to each other.

- kkk. “SCFD” or “scfd” means standard cubic feet per Day.
- lll. “SCFH” or “scfh” means standard cubic feet per hour.
- mmm. “SCFM” or “scfm” means standard cubic feet per minute.
- nnn. “Section” means a portion of this Decree identified by a roman numeral.
- ooo. “Smoke Emissions” shall have the definition set forth in Section 3.5 of Method 22 of 40 C.F.R. Part 60, Appendix A. For purposes of this Consent Decree, Smoke Emissions may be either documented by a video camera or determined by an observer knowledgeable with respect to the general procedures for determining the presence of Smoke Emissions per Method 22.
- ppp. “Standard Conditions” means a temperature of 68 degrees Fahrenheit and a pressure of 1 atmosphere. Unless otherwise expressly set forth in this Consent Decree or an Appendix, Standard Conditions apply.
- qqq. “Steam-Assisted Flare” means a Flare that uses steam piped to a Flare tip to assist in combustion.
- rrr. “Supplemental Gas” means all gas introduced to a Flare in order to improve the combustible characteristics of the Combustion Zone Gas.
- sss. “Sweep Gas” means:
 - (1) For a Flare with an FGRS: Gas intentionally introduced into a Flare header system to prevent oxygen buildup in the Flare header.

Sweep Gas in these Flares is introduced prior to and recovered by the FGRS; and

- (2) For a Flare without an FGRS: Gas intentionally introduced into a Flare header system to maintain a constant flow of gas through the flare header and out the Flare tip in order to prevent oxygen building in the Flare header and to prevent infiltration (backflow) into the Flare tip.
- ttt. “Total Steam” means 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.
- uuu. “United States” means the United States of America, acting on behalf of EPA.
- vvv. “Unobstructed Cross Sectional Area of the Flare Tip” or “ $A_{tip-unob}$ ” means the open, unobstructed area of a Flare tip through which Vent Gas and Center Steam pass. Diagrams of four common Flare types are set forth in Appendix 1.3 together with the equations for calculating the $A_{tip-unob}$ of these four types.
- www. “Vent Gas” means all gas found just before the Flare tip. This gas includes all Waste Gas, that portion of Sweep Gas that is not recovered, Purge Gas, and Supplemental Gas, but does not include Pilot Gas, Total Steam, or Assist Air.
- xxx. “Visible Emissions” means five minutes or more of Smoke Emissions during any two consecutive hours.
- yyy. “VOC” or “Volatile Organic Compounds” shall have the definition set forth in 40 C.F.R. § 51.100(s).
- zzz. “Waste Gas” means 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 comply with regulatory or enforceable permit requirements regarding the combustible characteristics of Combustion Zone Gas; therefore, “Waste Gas” does not include 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 Section V (Compliance Requirements). Appendix 1.4 to this Consent Decree depicts the meaning of “Waste Gas,” together with its relation to other gases associated with Flares.

IV. CIVIL PENALTY

13. By no later than 30 Days after the Effective Date, the Defendants must pay the following amounts as a civil penalty:

- a. \$ 2,030,000 to the United States, and
- b. \$ 470,000 to LDEQ.

14. The Defendants must pay the civil penalty due to the United States by FedWire Electronic Funds Transfer (EFT) to the U.S. Department of Justice account, in accordance with instructions provided to the Defendants by the Financial Litigation Unit (“FLU”) of the United States Attorney’s Office for the Southern District of Texas after the Effective Date. The payment instructions provided by the FLU will include a Consolidated Debt Collection System (“CDCS”) number, which the Defendants must use to identify all payments required to be made in accordance with this Consent Decree. The FLU will provide the payment instructions to:

Gindi Eckel Vincent
Exxon Mobil Corporation
Energy 2, 4B.533
22777 Springwoods Village Parkway
Spring, TX 77389
gindi.e.vincent@exxonmobil.com

on behalf of the Defendants. The Defendants may change the individual to receive payment instructions on its behalf by providing written notice of such change to the United States and EPA in accordance with Section XVI (Notices).

15. At the time of payment, the Defendants must send notice that payment has been made: (i) to the United States via email and regular mail in accordance with Section XVI and (ii) to EPA via email at cinwd_acctsreceivable@epa.gov and regular mail at: EPA Cincinnati Finance Office, 26 W. Martin Luther King Drive, Cincinnati, Ohio 45268. This notice must state that the payment is for the civil penalty owed pursuant to the Consent Decree in *United States, et al. v. Exxon Mobil Corp., et al.* and must reference the civil action number, CDCS Number, and DOJ case numbers 90-5-2-1-10128 and 90-5-2-1-10128/1.

16. The Defendants must not deduct any penalties paid under this Decree pursuant to this Section or Section X (Stipulated Penalties) in calculating their federal, state, or local income tax.

17. The Defendants must pay the civil penalty due to LDEQ by bank check made payable to the Louisiana Department of Environmental Quality and sent to: Accountant Administrator, Financial Services Division, LDEQ, P.O. Box 4303, Baton Rouge, Louisiana 70821-4303.

V. COMPLIANCE REQUIREMENTS

A. Instrumentation and Monitoring Systems

18. Flare Data and Monitoring Systems and Protocol Report. For each Covered Flare, by no later than 365 Days after the Effective Date, the Defendants must submit a report, consistent with the requirements in Appendix 1.5, to EPA that includes the following:

- a. The information, diagrams, and drawings specified in Paragraphs 1–7 of Appendix 1.5;
- b. A detailed description of each instrument and piece of monitoring equipment, including the specific model and manufacturer, that the Defendants have installed or will install in compliance with Paragraphs 20–24 of this Consent Decree (Paragraphs 8–9 of Appendix 1.5); and
- c. A narrative description of the monitoring methods and calculations that the Defendants will use to comply with the requirements of Paragraph 43 (Paragraph 10 of Appendix 1.5).

19. Installation and Operation of Monitoring and Control Systems on Covered Flares.

a. Except as provided in Paragraph 23.b., by no later than the Effective Date, the Defendants must install and commence operation of the instrumentation, controls, and monitoring systems set forth in Paragraphs 20–21 and 23 at each Covered Flare (except Newly Installed Covered Flares or Portable Flares), as specified for Steam-Assisted Flares and Air-Assisted Flares.

b. Except as provided in Paragraph 46 (Portable Flares), by no later than the date that any Newly Installed Covered Flare or Portable Flare is In Operation and Capable of Receiving Waste, Supplemental, and/or Sweep Gas at a Covered Facility, the Defendants must complete installation and commence operation of the instrumentation, controls, and monitoring systems set

forth in Paragraphs 20–23. The Defendants must operate the instrumentation, controls, and monitoring systems for each Newly Installed Covered Flare and Portable Flare in accordance with Paragraphs 20–23.

20. Vent Gas, Assist Steam, and Assist Air Monitoring Systems.

a. For each Covered Flare, the Defendants must install, operate, calibrate, and maintain a monitoring system capable of continuously measuring, calculating, and recording the volumetric flow rate of Vent Gas in the header or headers feeding that Covered Flare. This system must also be able to continuously analyze pressure and temperature at each point of Vent Gas flow measurement. 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. Flow must be calculated in scfm and pounds per hour.

b. For each Covered Steam-Assisted Flare, the Defendants must install, operate, calibrate, and maintain a monitoring system capable of continuously measuring, calculating, and recording the volumetric flow rate of Assist Steam used with each Covered Steam-Assisted Flare. This system must also be able to continuously analyze the pressure and temperature of Assist Steam at a representative point of steam flow measurement. Flow must be calculated in scfm and pounds per hour.

c. For each Covered Air-Assisted Flare, the Defendants must install, operate, calibrate, and maintain a monitoring system capable of continuously measuring, calculating, and

recording the volumetric flow rate of Assist Air used with each Covered Air-Assisted Flare. If premix assist air and Perimeter Assist Air are both used, the Defendants must install, operate, calibrate, and maintain a monitoring system capable of separately continuously measuring, calculating, and recording the volumetric flow rate of premix assist air and Perimeter Assist Air used with that Flare. Continuously monitoring fan speed or power and using fan curves is an acceptable method for continuously monitoring Assist Air flow rates.

d. Each flow rate monitoring system (whether for a Steam-Assisted or Air-Assisted Flares) must be able to correct for the temperature and pressure of the system and output parameters in Standard Conditions.

e. In lieu of a monitoring system that directly measures volumetric flow rate, the Defendants may choose from the following additional options for monitoring any gas stream:

- i. Mass flow monitors may be used for determining the volumetric flow rate of Assist Steam provided that the Defendants convert the mass flow rates to volumetric flow rates pursuant to the methodology in Step 2 of Appendix 1.2;
- ii. Mass flow monitors may be used for determining the volumetric flow rate of Vent Gas, provided the Defendants determine the molecular weight of such Vent Gas using compositional analysis data collected pursuant to the monitoring method specified in Paragraph 23.a and provided that the Defendants convert the mass flow rates to volumetric flow rates pursuant to the methodology in Step 2 of Appendix 1.2; and
- iii. Continuous pressure/temperature monitoring system(s) and appropriate engineering calculations may be used in lieu of a continuous volumetric flow monitoring system provided the molecular weight of the gas is known and provided the Defendants comply with the methodology in Step 2 of Appendix 1.2 for calculating volumetric flow rates. For Vent Gas, the Defendants must determine molecular weight using compositional

analysis data collected pursuant to the monitoring method specified in Paragraph 23.a.

21. Assist Steam Control Equipment. The Defendants must install and commence operation of equipment, including, as necessary, main and trim control valves and piping which enables the Defendants to control Assist Steam flow to each Covered Steam-Assisted Flare in a manner sufficient to ensure compliance with this Decree.

22. Video Camera. The Defendants must install and commence operation of a video camera that is capable of monitoring and recording, in digital format, the flame of and any Smoke Emissions from each Covered Flare by March 31, 2018 or the Effective Date, whichever is later.

23. Vent Gas Compositional Monitoring or Direct Monitoring of Net Heating Value of Vent Gas. For each Covered Flare, the Defendants must either determine the concentration of individual components in the Vent Gas or directly monitor the Net Heating Value of the Vent Gas (NHV_{vg}) in compliance with one of the methods specified in this Paragraph. The Defendants may elect to use different monitoring methods (of the methods provided in this Paragraph) for different gaseous streams that make up the Vent Gas provided the composition or Net Heating Value of all gas streams that contribute to the Vent Gas are determined. The Defendants must:

- a. Install, operate, calibrate, and maintain a monitoring system capable of continuously measuring (*i.e.*, at least once every 15 minutes), calculating, and recording the individual component concentrations present in the Vent Gas, except as provided in Appendix 1.6; or

b. Install, operate, calibrate, and maintain a calorimeter capable of continuously measuring (*i.e.*, at least once every 15 minutes), calculating, and recording the NHV_{vg} at Standard Conditions. If the Defendants elect this method, the Defendants may install, operate, calibrate, and maintain a monitoring system capable of continuously measuring, calculating, and recording the hydrogen concentration in the Vent Gas. The sample extraction point of the calorimeter may be located upstream of the introduction of Supplemental Gas or Sweep Gas or Purge Gas if the composition and flow rate of any such Supplemental Gas or Sweep Gas or Purge Gas is known and if this known value then is used in the calculation of the Net Heating Value of Vent Gas. Notwithstanding the deadline imposed by Paragraph 19.a, the calorimeter for Baton Rouge Chemical Plant Flare 7 must be installed by no later than February 28, 2018 or the Effective Date, whichever is later.

c. If the Defendants elect the method in Paragraph 23.b, and the net heating value of the Vent Gas exceeds the upper calibrated span of the calorimeter on the Covered Flare, then the Defendants must use the value of the upper calibrated span of that calorimeter for calculating the NHV_{vg} at Standard Conditions until the net heating value of the Vent Gas returns to within the measured calibrated span. Use of this method will not constitute instrument system downtime for the period of time that the net heating value of the Vent Gas exceeds the upper calibrated span of the calorimeter.

Direct compositional or Net Heating Value monitoring is not required for purchased (“pipeline quality”) natural gas streams. The Net Heating Value of purchased natural gas streams may be determined using annual or more frequent grab sampling at any one representative location.

Alternatively, the Net Heating Value of any purchased natural gas stream can be assumed to be 920 BTU/scf.

24. Instrumentation and Monitoring Systems: Optional Equipment for any Covered Flare. At its option, in order to continuously measure and calculate flow, in scfm and pounds per hour, of all Pilot Gas to a Covered Flare, the Defendants may elect to either: a) install (if not already installed) an instrument or b) use a restriction orifice and pressure measurements. The

Defendants may use the data generated by this instrument or restriction orifice as part of the calculation of the Net Heating Value of the Combustion Zone Gas.

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

- a. The instrumentation and monitoring systems identified in Paragraphs 20 and 23 must:
 - i. Meet or exceed all applicable minimum accuracy, calibration and quality control requirements specified in Table 13 of 40 C.F.R. Part 63, Subpart CC, except as provided in Appendix 1.6;
 - ii. Have an associated readout (*i.e.*, a visual display or record) or other indication of the monitored operating parameter that is readily accessible onsite for operational control or inspection by the Defendants;
 - iii. Be capable of measuring the appropriate parameter over the range of values expected for that measurement location; and
 - iv. Have an associated data recording system with a resolution that is equal to or better than the required instrumentation/system accuracy.
- b. The Defendants must operate, maintain, and calibrate each instrument and monitoring system identified in Paragraphs 20 and 23 according to a monitoring plan that contains the information listed in 40 C.F.R. § 63.671(b)(1) through (5).
- c. All monitoring systems permitted by Paragraph 23.a must also meet the requirements of 40 C.F.R. § 63.671(e)(1) through (3) (Additional Requirements for Gas Chromatographs) except that Gas Chromatographs for the Baytown Flares may comply with the requirements of Appendix 1.6.

d. For each instrumentation and monitoring system required by Paragraphs 20 and 23 (or installed pursuant to Paragraph 24), the Defendants must comply with the out-of-control procedures described in 40 C.F.R. § 63.671(c)(1) and (2), and with the data reduction requirements specified in 40 C.F.R. § 63.671(d)(1) through (3).

e. The language in 40 C.F.R. § 63.671, Table 13 of 40 C.F.R. Part 63, Subpart CC, or in any regulatory provision cross-referenced in 40 C.F.R. § 63.671 or Table 13 of 40 C.F.R. Part 63, Subpart CC, that limits the applicability of these regulatory requirements to periods when “regulated material” (as defined in 40 C.F.R. § 63.641) is routed to a Flare is not applicable for purposes of this Consent Decree. In addition, for purposes of this Decree, the language in 40 C.F.R. § 63.671, Table 13 of 40 C.F.R. Part 63, Subpart CC, or in any regulatory provision cross-referenced in 40 C.F.R. § 63.671 or Table 13 of 40 C.F.R. Part 63, Subpart CC, that refers to a continuous parametric monitoring system will instead be read to refer to the instrumentation and monitoring systems required by Paragraphs 20 and 23.

26. Instrumentation and Monitoring Systems: Recording and Averaging Times. The instrumentation and monitoring systems identified in Paragraphs 20 and 22-24 must be able to produce and record data measurements and calculations for each parameter at the following time intervals:

<u>Instrumentation and Monitoring System</u>	<u>Recording and Averaging Times</u>
Vent Gas, Assist Steam Flow Monitoring Systems, Assist Air Flow Monitoring Systems, and Pilot Gas Flow (if installed)	Measure continuously and record 15-minute block averages
Vent Gas Compositional Monitoring (if using the methodology in Paragraph 23.a.)	Measure no less than once every 15 minutes and record that value, except as provided in Appendix 1.6
Vent Gas Net Heating Value Analyzer (if using the methodology in Paragraph 23.b.)	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 prohibits the Defendants 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.

27. **Instrumentation and Monitoring Systems: Operation.** The Defendants must operate each of the instruments and monitoring systems required by Paragraphs 20 and 22-23 and collect data on a continuous basis when the Covered Flare that the instrument and/or monitoring system is associated with is In Operation and Capable of Receiving Sweep, Supplemental, and/or Waste Gas, except for the periods of instrument downtime specified in sub-Paragraphs 45(a)-(d).

B. Determining Whether a Covered Flare that has a Water Seal is Not Receiving Potentially Recoverable Gas Flow

28. For each 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 drum 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 in the drum and the water level in the drum;

- b. For the water seal drum associated with the respective Covered Flare, the water level in the drum is: (i) at the level of the weir or (ii) if the water level in the drum is measured, the measurement indicates that the water seal is present; and
- c. Downstream of the seal drum, there is no flow of Supplemental Gas directed to the Covered Flare.

C. Waste Gas Minimization

29. Initial Waste Gas Minimization Plan (“Initial WGMP”). By no later than 365 Days after the Effective Date, for each Covered Flare, the Defendants must submit to EPA an Initial Waste Gas Minimization Plan that discusses and evaluates flaring Prevention Measures on both a facility-wide and Covered Flare-specific basis for each Covered Facility. The Initial WGMP must include but not be limited to:

- a. Waste Gas Characterization and Mapping. The Defendants must characterize the Waste Gas being disposed of at each Covered Flare and determine its source as follows:
 - i. Volumetric (in scfm) and mass (in pounds) flow rate. The Defendants must 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 each Covered Flare for the one-year period of time ending 180 Days before the submission of the Initial WGMP. To the extent that, for any particular Covered Flare, the Defendants have 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, the Defendants may calculate the volumetric and mass flow of: (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. The Defendants may use either an engineering evaluation or measurements from monitoring 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 Covered Facilities), except those described in the next sentence, must 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 may be excluded from the calculation of flow rate. The Defendants must provide 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. The Defendants must use flow rate data for the one-year period of time ending 180 Days before the submission of the Initial WGMP to determine the Baseload Waste Gas Flow Rate, in scfd, to each Covered Flare or to the set of Covered Flares that are connected on a Flare loop.

iii. Identification of Constituent Gases. The Defendants must use best efforts to identify the constituent gases within each Covered Flare's Waste Gas and the percentage contribution of each such constituent during baseload conditions. The Defendants may use an engineering evaluation, measurements from monitoring, or a combination of both to determine Waste Gas constituents.

iv. Waste Gas Mapping. Using all available information including, but not limited to, instrumentation, isotopic tracing, and/or engineering calculations, the Defendants must identify and estimate the flow from each process unit header (sometimes referred to as a "subheader") to the main header(s) servicing each Covered Flare. Using that information, the Defendants must complete an identification of each Waste Gas tie-in to the main header(s) and process unit header(s), as applicable, consistent with Appendix 1.7. Temporary connections to the main header(s) of a Covered Flare and/or process unit header(s) are not required to be included in the mapping.

b. Reductions Previously Realized. The Defendants must describe the equipment, processes, and procedures installed or implemented to reduce flaring at the Covered Flares for the period of time between the Effective Date and 60 Days prior to the submission of the Initial

WGMP. The description must specify the date of installation or implementation and the amount of reductions (in both flow and mass of pollutants) realized.

c. Planned Reductions. The Defendants must describe any equipment, processes, or procedures the Defendants plan to install or implement to eliminate or reduce flaring from the Covered Flares. The description must specify a schedule for expeditiously installing and commencing operation of these steps. The description must also include a projection of the amount of reductions to be realized. After submitting the Initial WGMP, the Defendants may revise the installation and operation dates provided the Defendants: i) do so in writing to EPA before the First Updated Waste Gas Minimization Plan is due and ii) provide a reasonable explanation for the revised date. In formulating this plan, the Defendants must review and evaluate the results of the Waste Gas Mapping required by sub-Paragraph 29.a.iv.

d. Taking a Covered Flare Permanently Out of Service. The Defendants must identify any Covered Flare they intend to permanently take out of service, including the date for completing the decommissioning. Taking a Covered Flare “permanently out of service” means physically removing piping in the Flare header or physically isolating the piping with a welded blind so as to eliminate direct piping to the Covered Flare and surrendering any permit to operate such Covered Flare.

e. Prevention Measures. The Defendants must describe and evaluate all Prevention Measures, including a schedule for expeditiously implementing and commencing 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 must include a review of flaring from the Covered Flares that has occurred during these activities in the three years prior to the Effective Date and must consider the feasibility of performing these activities without flaring; and

ii. 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 of flaring from the Covered Flares must 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.

30. First Updated Waste Gas Minimization Plan (“First Updated WGMP”). By no later than 730 Days after the Effective Date, the Defendants must submit to EPA a First Updated WGMP that updates, if and as necessary, the information, diagrams, and drawings required in the Flare Data and Monitoring Systems and Protocol Report required by Paragraph 18 and the information required in sub-Paragraphs 29.a–29.e for the 12-month period after the period covered by the Initial Waste Gas Minimization Plan. The First Updated WGMP must also include:

a. Updated Waste Gas Mapping. The Defendants must update the Waste Gas mapping from each process unit header (sometimes referred to as a “subheader”) to the main header(s) servicing each Covered Flare, if more information becomes available. The Defendants must use this updated mapping to plan reductions;

b. Reductions Based on Root Cause Analysis. The Defendants must review all of the root cause analysis reports submitted under Paragraph 34 to

determine if reductions in addition to the reductions achieved through any required corrective action under Paragraph 35 can be realized; and

c. Revised Schedule. To the extent the Defendants propose to extend any schedule set forth in the Initial WGMP, the Defendants may do so only with good cause, the determination of which is subject to Section XII (Dispute Resolution).

31. Subsequent Updates to WGMPs (“Subsequently Updated WGMP”). On an annual basis after submitting the First Updated WGMP until termination of the Decree, the Defendants must submit an updated WGMP for a Covered Facility as part of the Semi-Annual Report required by Section IX (Reporting Requirements) if, at that Covered Facility, the Defendants: a) commence operation of a Newly Installed Covered Flare or permanently remove a Covered Flare from service, b) connect a new Waste Gas stream to a Covered Flare, c) intentionally modify the Baseload Waste Gas Flow Rate to a Covered Flare, d) install additional FGRS, or e) change the design of a Covered Flare. Each update must update, if and as necessary, the information required in sub-Paragraphs 29.a.i - 29.a.iii. Each update must update, if and as necessary, the information required in sub-Paragraphs 30.a and 30.b. To the extent the Defendants propose to extend any schedule set forth in a previous WGMP for any of the Covered Facilities, the Defendants may do so only with good cause, the determination of which is subject to Section XII (Dispute Resolution).

32. Waste Gas Minimization Plan: Implementation. By no later than the dates specified in a WGMP, the Defendants must implement the actions described therein.

33. Enforceability of WGMPs. The terms of each WGMP (including Initial, First Updated, and Subsequently Updated WGMPs) submitted under this Consent Decree are specifically enforceable.

34. Root Cause Analysis for Reportable Flaring Incidents.

a. Internal Reporting and Recordkeeping. Commencing no later than 365 Days after the Effective Date, except as provided in Paragraph 36, the Defendants must conduct an investigation into the root cause(s) of each Reportable Flaring Incident at any of the Covered Facilities and prepare and keep as a record an internal report that contains the information listed below. The Defendants must conduct the investigation into the root cause(s) of each Reportable Flaring Incident and prepare the internal report by no later than 45 Days following the end of a Reportable Flaring Incident. The internal report must include, at a minimum, the following information:

- i. The date and time that the Reportable Flaring Incident started and ended;
- ii. The volume of Waste Gas flared and an estimate of the individual quantities of VOCs and HAPs that were emitted during the Reportable Flaring Incident and the calculations that were used to determine the quantities;
- iii. The steps, if any, the Defendants took to limit the duration of the Reportable Flaring Incident and to limit the quantity of VOC and HAP emissions associated with the Reportable Flaring Incident;
- iv. A detailed analysis that sets forth the root cause and all contributing causes of the Reportable Flaring Incident, to the extent determinable;

v. An analysis of the measures, if any, that are available to reduce the likelihood of a recurrence of a Reportable Flaring Incident resulting from the same root cause or contributing causes. The analysis must discuss the alternatives, if any, that are available, the probable effectiveness and the cost of the alternatives, if an alternative is eliminated based on cost. Possible design, operation, and maintenance changes must be evaluated. If the Defendants conclude that corrective action(s) is (are) required under Paragraph 35, the report must include a description of the action(s) and, if not already completed, a schedule for its (their) implementation, including proposed commencement and completion dates. If the Defendants conclude that corrective action is not required under Paragraph 35, the report must explain the basis for that conclusion; and

vi. To the extent that investigations of the causes or possible corrective actions are still underway 45 Days after the Reportable Flaring Incident ended, a statement of the anticipated date by which a follow-up report fully conforming to the requirements of this Paragraph will be completed.

b. Submitting Summary of Internal Flaring Incident Reports. In each Semi-Annual Report due under Section IX (Reporting Requirements), the Defendants must include a summary of the following items for each Reportable Flaring Incident that occurred during the six-month period that the Semi-Annual Report covers:

- i. Date;
- ii. Duration;
- iii. Amount of VOCs and HAPs emitted;
- iv. Root cause(s);
- v. Corrective action(s) completed;
- vi. Corrective action(s) still outstanding; and
- vii. An analysis of any trends identified by the Defendants in the number of Reportable Flaring Incidents, the root causes, or the types of corrective action(s).

35. Corrective Action Implementation. In response to any Reportable Flaring Incident, the Defendants must take, as expeditiously as practicable, such interim and long-term corrective actions, if any, as are consistent with good engineering practice to minimize the likelihood of a recurrence of the root cause and all contributing causes of that Reportable Flaring Incident.

36. In lieu of preparing a new report under Paragraph 34 and analyzing and implementing corrective action under Paragraph 35 for a Reportable Flaring Incident that has as its root cause the same root cause as a previously reported Reportable Flaring Incident, the Defendants may cross-reference and use the prior report and analysis when preparing the report required by Paragraph 34.

D. Flare Gas Recovery Systems for Covered Facilities with Compressors

37. FGRS Capacity and Start-Up. By no later than the applicable compliance deadline in Appendix 1.8, or the Effective Date, whichever is later, the Defendants must commence operation of the FGRS described in Appendix 1.8 for the listed Covered Flares.

38. FGRS: Operation and Availability Requirements.

a. General. After the applicable compliance deadline specified in Appendix 1.8, or the Effective Date, whichever is later, the Defendants must operate each FGRS in a manner to minimize Waste Gas to the applicable Covered Flares while ensuring safe chemical plant operations. The Defendants also must operate each FGRS consistent with good engineering and maintenance practices and in accordance with its design and the manufacturer's specifications.

Nothing in this Paragraph 38 will require the Defendants to recover Regeneration Waste Gas Streams in a FGRS.

b. Requirements Related to Compressors Being Available for Operation. By no later than the applicable compliance deadline specified in Appendix 1.8 or the Effective Date, whichever is later, the Defendants must comply with the following requirements for each FGRS listed in Appendix 1.8 when Potentially Recoverable Gas is being generated:

i. Baytown Olefins Plant FGRS Operation and Availability.

(1) The Baytown Olefins Plant FGRS must have one Compressor Available for Operation or in operation 98% of the time. The periods provided for in sub-Paragraphs 38.c. and 38.d. below may be included in the amount of time that a Compressor is Available for Operation when determining compliance with the requirement to have a Compressor Available for Operation or in operation.

(2) During turnaround periods that occur approximately every 8-10 years in which fuel gas consumers are shutdown and unable to use Waste Gas recovered by the FGRS, the Baytown Olefins Plant may use, in lieu of the Baytown Olefins Plant FGRS, a thermal oxidizer that achieves at least a 98% CE to combust the amount of Waste Gas that cannot be used by fuel gas consumers during the turnaround period.

ii. Beaumont Chemical Plant FGRS Operation and Availability. The

Beaumont Chemical Plant FGRS must have one Compressor Available for

Operation or in operation 98% of the time and an installed Duplicate Spare Compressor. The periods provided for in sub-Paragraphs 38.c. and 38.d. below may be included in the amount of time that a Compressor is Available for Operation when determining compliance with the requirement to have a Compressor Available for Operation or in operation.

iii. Baytown Chemical Plant FGRS Operation and Availability. The Baytown Chemical Plant FGRS must have two Compressors Available for Operation or in operation 100% of the time, three Compressors Available for Operation or in operation 95% of the time, and four Compressors Available for Operation or in operation 90% of the time. The periods provided for in sub-Paragraphs 38.c. and 38.d. below may be included in the amount of time that a Compressor is Available for Operation when determining compliance with the requirement to have a Compressor Available for Operation or in operation.

iv. Baton Rouge Chemical Plant FGRS Operation and Availability. The Baton Rouge Chemical Plant FGRS must have one Compressor Available for Operation or in operation 98% of the time and two Compressors Available for Operation or in operation 90% of the time. The periods provided for in sub-Paragraphs 38.c. and 38.d. below 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 or in operation 90% of the time.

c. Maintenance of FGRS. Periods of maintenance on and subsequent restart of the Compressor(s) may be included in the amount of time that a Compressor is Available for Operation when determining compliance with the requirement to have a Compressor Available for Operation or in operation; provided however, these periods must not exceed 1,344 hours per Compressor in a five-year rolling sum period, rolled daily. The Defendants must use best efforts to schedule maintenance activities during a turnaround of the process units venting to the Covered Flare(s) served by the applicable FGRS. To the extent it is not practicable to undertake these maintenance activities during a turnaround of these units, the Defendants must use best efforts to minimize the generation of Waste Gas during such periods.

d. FGRS Shut Down. Periods in which the FGRS is shut down (including the subsequent restart) due to operating conditions (such as high temperatures or large quantities of entrained liquid in the Vent Gas) outside the design operating range of the FGRS, including the associated knock-out drum(s), such that the outage is necessary for safety or to preserve the mechanical integrity of the FGRS may be included in the amount of time that a Compressor is Available for Operation when determining compliance with the requirement to have the Compressor Available for Operation or in operation. By no later than 45 Days after any such outage, the Defendants must investigate the root cause and all contributing causes of the outage and must implement, as expeditiously as practicable, corrective action, if any, to prevent a recurrence of the cause(s). In the reports due under Section IX (Reporting Requirements) of this Decree, the Defendants must describe each outage that occurred under the conditions identified

in this sub-Paragraph, including the date, duration, cause(s), corrective action, and the status of the implementation of corrective action.

e. Alternative FGRS. The Defendants may submit a request to the EPA for approval of an alternative FGRS that is not explicitly referenced in Appendix 1.8 or in this Section in order to ensure compliance with availability requirements, provided that the proposed alternative FGRS provides equivalent or better Waste Gas recovery capacity than the FGRS required by Appendix 1.8.

f. Period to be Used for Computing Percentage of Time. For purposes of calculating compliance with the periods of time (90%, 95%, 98%, and 100%) that a Compressor or group of Compressors must be Available for Operation and/or in operation, as required by sub-Paragraph 38.b, the period to be used must be an 8,760-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 must not be used in computing the 8,760-hour rolling sum. The rolling sum must include only the previous 8,760 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.

E. Flare Combustion Efficiency

39. General Emission Standards Applicable to Covered Flares. By no later than the Effective Date, the Defendants must comply with the requirements set forth in this Paragraph at each Covered Flare at all times when that Covered Flare is In Operation.

a. Operation during Emissions Venting. The Defendants must operate each Covered Flare at all times when emissions may be vented to it.

b. No Visible Emissions. The Defendants must specify the smokeless design capacity of each Covered Flare and operate with no Visible Emissions, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours, when the Covered Flare is In Operation and the Vent Gas flow is less than the smokeless design capacity of the Covered Flare. For purposes of this Consent Decree, Visible Emissions may be determined by a person trained in accordance with Section 2.3 of Method 22 or documented by a video camera. By no later than March 31, 2018 or the Effective Date, whichever is later, the Defendants must monitor for Visible Emissions from each Covered Flare while it is In Operation as specified below in sub-Paragraphs 39.b.i or ii. An initial Visible Emissions demonstration must be conducted using an observation period of 2 hours using Method 22 at 40 C.F.R. Part 60, Appendix A-7. Subsequent Visible Emissions observations must be conducted using either method listed in sub-Paragraphs 39.b.i or ii. The Defendants must record and report any instances where Visible Emissions are observed for more than 5 minutes during any 2 consecutive hours as specified in 40 C.F.R. § 63.655(g)(11)(ii).

i. At least once per Day, the Defendants must conduct Visible Emissions observations using an observation period of 5 minutes using Method 22 at 40 C.F.R. Part 60, Appendix A-7. If at any time a Defendant sees Visible Emissions, even if the minimum required daily Visible Emission monitoring has already been performed, the Defendants must immediately begin an observation period of 5 minutes using Method 22 at 40 C.F.R. Part 60, Appendix A-7. If Visible Emissions are observed for more than one continuous minute during any 5-minute observation period, the observation period using Method 22 at 40 C.F.R. Part 60, Appendix A-7 must be extended to 2 hours or until 5 minutes of Visible Emissions are observed.

ii. Alternatively, the Defendants may use a video surveillance camera to continuously record (at least one frame every 15 seconds with time and date stamps) images of the Flare flame and a reasonable distance above the Flare flame at an angle suitable for Visible Emissions observations. The Defendants must provide real-time video surveillance camera output to the control room or other continuously staffed location where the camera images may be viewed at any time.

c. Pilot Flame Presence. The Defendants must operate each Covered Flare with a pilot flame present at all times. The Defendants must continuously monitor the presence of the pilot flame(s) using a device (including, but not limited to, a thermocouple, ultraviolet beam sensor, or infrared sensor) capable of detecting that the pilot flame is present.

d. Monitoring According to Applicable Provisions. The Defendants must comply with all applicable Subparts of 40 C.F.R. Parts 60, 61, or 63 that state how a particular Covered Flare must be monitored.

e. Good Air Pollution Control Practices. At all times, including during periods of startup, shutdown, and/or Malfunction, the Defendants must implement good air pollution control practices to minimize emissions from each Covered Flare; provided however that the Defendants are not in violation of this requirement for any practice that this Consent Decree

requires the Defendants to implement after the Effective Date for the period between the Effective Date and the compliance requirement, and nothing in this sub-Paragraph 39.e requires the Defendants to install or maintain Flare monitoring equipment in addition to or different from the equipment required by this Consent Decree.

40. Flare Tip Velocity or V_{tip} . By no later than the Effective Date, the Defendants must operate each Covered Flare in compliance with either sub-Paragraph 40.a. or 40.b. below, provided that the appropriate monitoring systems are in place, whenever the Vent Gas flow rate is less than the smokeless design capacity of the Covered Flare.

a. The actual Flare Tip Velocity (V_{tip}) must be less than 60 feet per second. The Defendants shall monitor V_{tip} using the procedures specified in Appendix 1.2, or

b. V_{tip} must be less than 400 feet per second and also less than the maximum allowed Flare Tip Velocity (V_{max}) as calculated according to Equation 11 in Appendix 1.2. The Defendants shall monitor V_{tip} and gas composition, and shall determine NH_{Vg} using the procedures specified in Appendix 1.2. The Unobstructed Cross Sectional Area of the Flare Tip must be calculated consistent with Appendix 1.3.

41. Revisions to 40 C.F.R. §§ 60.18(b)–(f) and/or 63.11(b). To the extent that, from the Date of Lodging until termination of this Consent Decree, revisions are made to 40 C.F.R. §§ 60.18(b)–(f) and/or 63.11(b) that are final and effective, but inconsistent with any of the requirements in Paragraphs 39.a–d, 40, or 43.a, the Defendants must comply with the final, effective regulations and any requirements in Paragraphs 39.a–d, 40, or 43.a, that are not

inconsistent with these final, effective regulations. As used in this Paragraph, “inconsistent” means that compliance with both provisions is not possible.

42. Operation According to Design. By no later than the Effective Date, the Defendants must operate and maintain each Covered Flare in accordance with its design and the requirements of this Consent Decree.

43. Net Heating Value Standards. The Defendants must comply with the following Net Heating Value standards, except as provided in Paragraphs 45 (Standard During Instrument Downtime).

a. Net Heating Value of Vent Gas (NHV_{vg}) for all Covered Flares. Beginning on the Effective Date and continuing until the earlier of: (i) termination of this Consent Decree; or (ii) the requirements in 40 C.F.R. §§ 60.18(c)(3)(ii) and 63.11(b)(6)(ii) related to the NHV_{vg} are modified, the Defendants must operate each Covered Flare with an NHV_{vg} of greater than or equal to 300 BTU/scf determined on a 15-minute block period basis, except as provided in Appendix 1.6, when Waste Gas is routed to the Covered Flare for at least 15 minutes. The Defendants must monitor and calculate NHV_{vg} at each Covered Flare in accordance with Appendix 1.2, except as provided below for the Finishing Flare at the Baton Rouge Plastics Plant.

b. Net Heating Value of Combustion Zone Gas (NHV_{cz}) for all Covered Flares.

i. By no later than the Effective Date, at any time a Covered Flare is In Operation, the Defendants must operate that Flare so as to maintain the NHV_{cz} at or above

270 BTU/scf determined on a 15-minute block period basis, except as provided in Appendix 1.6, when Waste Gas is routed to the Covered Flare for at least 15 minutes. The Defendants must monitor and calculate NHV_{cz} at each Covered Flare in accordance with Appendix 1.2, except as provided below for the Finishing Flare at the Baton Rouge Plastics Plant.

ii. Baton Rouge Plastics Plant Finishing Flare. Pursuant to 40 C.F.R. § 63.670(j)(6), direct compositional or net heating value monitoring is not required for the Finishing Flare at the Baton Rouge Plastics Plant. The Defendants must monitor and calculate NHV_{cz} at the Finishing Flare in accordance with Appendix 1.2, except that the Defendants will use a net heating value of 703 btu/scf for the Waste Gas routed to the Finishing Flare. The Finishing Flare must comply with all requirements of 40 C.F.R. § 63.670(j)(6).

c. Dilution Operating Limits for Covered Flares with Perimeter Assist Air (NHV_{dil}). By no later than the Effective Date, while each Covered Flare that is actively receiving Perimeter Assist Air is In Operation, the Defendants must maintain the net heating value dilution parameter (NHV_{dil}) at or above 22 BTU/square foot determined on a 15-minute block period basis. The Defendants must monitor and calculate NHV_{dil} at each Covered Flare that is actively receiving Perimeter Assist Air in accordance with Appendix 1.2.

44. 98% Combustion Efficiency. By no later than the Effective Date, the Defendants must operate each Covered Flare with a minimum of a 98% Combustion Efficiency at all times when Waste Gas is vented to it. To demonstrate continuous compliance with the 98%

Combustion Efficiency, the Defendants must operate each Covered Flare in compliance with the applicable requirements in Paragraph 43.

45. Standard During Instrument Downtime. If one or more of the following conditions (collectively referred to as “Instrument Downtime”) is present and renders the Defendants incapable of operating a Covered Flare in accordance with the applicable NHV standards in Paragraph 43, the Defendants must operate that Covered Flare in accordance with good air pollution control practices so as to minimize emissions from and ensure good combustion efficiency at that Covered Flare:

- a. Malfunction of an instrument, for an instrument needed to meet the requirement(s);
- b. Repairs following instrument Malfunction, for an instrument needed to meet the requirement(s);
- c. Scheduled maintenance of an instrument in accordance with the manufacturer’s recommended schedule, for an instrument needed to meet the requirement(s); and/or
- d. Quality Assurance/Quality Control activities on an instrument needed to meet the requirement(s).

The calculation of Instrument Downtime must be made in accordance with 40 C.F.R.

§ 60.13(h)(2). In no event shall Instrument Downtime exceed 5% of the time in a Calendar Quarter that the Covered Flare affected by the Instrument Downtime is In Operation. For purposes of calculating the 5% of Instrument Downtime allowed pursuant to this Paragraph, the time used for NHV Analyzer or gas chromatograph calibration and validation activities may be excluded. Nothing in this Paragraph is intended to prevent the Defendants from asserting Force Majeure as provided in Section XI as the cause of any period of Instrument Downtime.

46. Portable Flares.

a. Applicability. The provisions of this Paragraph apply to Portable Flares.

b. Distinction between Planned and Unplanned Outages of Covered Flares. For purposes of this Paragraph, a “planned” outage means an outage of a Covered Flare that is scheduled 30 Days or more in advance of the outage. An “unplanned” outage is an outage of a Covered Flare that either is scheduled less than 30 Days in advance or is unscheduled.

c. Outages Lasting 504 Hours or Less. For any planned or unplanned outage of a Covered Flare that the Defendants know or reasonably anticipate will result in 504 hours or less of downtime on a 1,095-Day rolling sum period, rolled daily, the Defendants must make good faith efforts to ensure that the Portable Flare that replaces the Covered Flare complies with all of the requirements of this Consent Decree that are applicable to the Covered Flare that the Portable Flare replaces.

d. Outages Lasting More than 504 Hours.

i. Planned Outages. For any planned outage of a Covered Flare that the Defendants know or reasonably can anticipate will last more than 504 hours on a 1,095-Day rolling sum period, rolled daily, the Defendants must ensure that the Portable Flare complies with all of the requirements of this Consent Decree related to the Covered Flare that it replaces as of the date that the Portable Flare is In Operation and Capable of Receiving Waste, Supplemental, and/or Sweep Gas including, but not limited to, the Net Heating Value Standards in Paragraph 43.

ii. Unplanned Outages. For any unplanned outage of a Covered Flare that, in advance of the outage, the Defendants cannot reasonably anticipate will last longer than 504 hours, the Defendants must ensure that the Portable Flare complies with all of the requirements of this Consent Decree related to the Covered Flare that it replaces by no later than 30 Days after the date that the Defendants know or reasonably should have known that the outage

will last more than 504 hours, including, but not limited to, the Net Heating Value Standards in Paragraph 43.

e. Recordkeeping. The Defendants must keep records sufficient to document compliance with the requirements of this Paragraph any time they use a Portable Flare.

47. Recordkeeping for All Covered Flares: Timing and Substance. The Defendants must comply with the following recordkeeping requirements:

a. By no later than the Effective Date, for each Covered Flare, the Defendants must calculate and record each of the following parameters:

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 Paragraphs 20, 26, and Step 2 of Appendix 1.2);

ii. Assist Steam volumetric flow rate (in scfm) (in 15-minute block averages and in accordance with any calculation requirements of Paragraphs 20, 26, and Step 2 of Appendix 1.2);

iii. Assist Air volumetric flow rate (in scfm) (in 15-minute block averages and in accordance with any calculation requirements of Paragraphs 20, 26, and Step 2 of Appendix 1.2);

iv. NHV_{vg} (in BTU/scf) (in 15-minute block averages in accordance with Step 1 of Appendix 1.2); and

v. NHV_{cz} (in BTU/scf) (in 15-minute block averages in accordance with Step 3 of Appendix 1.2).

b. By no later than the Effective Date, for each Covered Flare, the Defendants must record the duration of all periods of Instrument Downtime for each Covered Flare that exceed 5% of the time in a Calendar Quarter that the Covered Flare is In Operation. The Defendants must

record which instrument(s) experienced the downtime, which Covered Flare was affected by the downtime, an explanation of the cause(s) of the deviation, and a description of the corrective action(s) that the Defendants took.

c. By no later than the compliance dates specified in Appendix 1.8 or the Effective Date, whichever is later, the Defendants must record the dates and times of any periods that the Defendants deviate from the standards in Paragraph 38.b (FGRS Compressor availability). The Defendants must also record the duration of the deviation, an explanation of the cause(s) of the deviation, and a description of the corrective action(s) that the Defendants took.

d. By no later than the Effective Date, at any time that the Defendants deviate from the emissions standards in Paragraphs 43 - 45 at any Covered Flare, the Defendants must record the duration of the deviation, an explanation of the cause(s) of the deviation, and a description of the corrective action(s) that the Defendants took.

F. Fenceline Monitoring Requirements

48. The Defendants must complete a project, in accordance with the requirements and schedule in Appendix 2.2, to install and operate a set of ambient air monitors that will sample for benzene along the fenceline perimeter of the Baytown Chemical Plant, Baytown Olefins Plant, Beaumont Chemical Plant, and Baton Rouge Chemical Plant (“Fenceline Monitoring Systems”).

VI. SUPPLEMENTAL ENVIRONMENTAL PROJECT AND LOUISIANA BENEFICIAL ENVIRONMENTAL PROJECTS

49. The Defendants must implement the Supplemental Environmental Project (“SEP”) and state beneficial environmental projects (“BEPs”) in accordance with all provisions of Appendix 2.1. The Defendants estimate the cost to implement the SEP is \$ 1,000,000 and the cost to implement the BEPs is \$ 1,572,000.

50. The Defendants are responsible for the satisfactory completion of the SEP and BEPs in accordance with the requirements of this Decree. “Satisfactory completion” means completing each SEP and BEP in accordance with the requirements and schedules of each work plan in Appendix 2.1. The Defendants may use contractors or consultants in planning and implementing the SEP.

51. With regard to the SEP, the Defendants certify the truth and accuracy of each of the following:

a. All cost information provided to EPA in connection with EPA’s approval of the SEP is complete and accurate, and the Defendants in good faith estimate the cost to implement the SEP is \$ 1,000,000;

b. As of the date the Defendants execute this Decree, the Defendants are not required to perform or develop the SEP by any federal, state, or local law or regulation and are not required to perform or develop the SEP by agreement, grant, or as injunctive relief awarded in any other action in any forum;

c. The SEP is not a project the Defendants were planning or intending to construct, perform, or implement other than in settlement of the claims resolved in this

Decree;

d. The Defendants have not received and will not receive credit for the SEP in any other enforcement action;

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

f. (i) The Defendants are not a party to any open federal financial assistance transaction that is funding or could fund the same activity as the SEP described in this Section; and (ii) the Defendants have inquired of the SEP recipient(s) and/or SEP implementer(s) whether any are a party to an open federal financial assistance transaction that is funding or could fund the same activity as the SEP and have been informed by the recipient(s) and/or the implementer(s) that none are 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.

52. SEP/BEP Completion Report. As part of the first Semi-Annual Report required by Section IX (Reporting Requirements) after the SEP or a BEP is completed, the Defendants must submit a SEP/BEP Completion Report to the United States, as well as to LDEQ for the BEPs, in accordance with Section XVI (Notices). The SEP/BEP Completion Reports must contain the following information:

- (1) a detailed description of the SEP or BEP as implemented;

(2) a description of any problems encountered in completing the SEP or BEPs and the solutions thereto;

(3) an itemized list of all eligible SEP and BEP costs expended;

(4) a certification that the SEP or BEP has been fully implemented pursuant to the provisions of this Decree; and

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

53. EPA may require information in addition to that described in the preceding Paragraph in order to evaluate the Defendants' SEP/BEP Completion Report(s).

54. After receiving the SEP/BEP Completion Report certifying completion of the SEP, the United States must notify the Defendants whether the Defendants have satisfactorily completed the SEP. After receiving a SEP/BEP Completion Report certifying completion of a BEP, the LDEQ must notify the Defendants whether the Defendants have satisfactorily completed the BEP. If the Defendants have not completed the SEP in accordance with this Consent Decree, stipulated penalties may be assessed under Section X.

55. Disputes concerning the satisfactory performance of the SEP and BEPs and the amount of eligible SEP and BEP costs shall be resolved under Section XII (Dispute Resolution). No other disputes arising under this Section will be subject to Section XII (Dispute Resolution).

56. Each submission required under this Section must be signed by an official with knowledge of the SEP or BEP and must bear the certification language set forth in Paragraph 71.

57. Any public statement, oral or written, in print, film, or other media, made by the Defendants making reference to the SEP or BEPs under this Decree must include the following language: “This project was undertaken in connection with the settlement of an enforcement action, *United States, et al. v. Exxon Mobil Corp., et al.* (S.D. Tex.), taken on behalf of the U.S. Environmental Protection Agency under the Clean Air Act.”

58. For federal income tax purposes, the Defendants agree that they will neither capitalize into inventory or basis nor deduct any costs or expenditures incurred in performing the SEP.

VII. PERMITS

59. Permits Needed for Compliance Obligations. The Defendants must obtain all federal, state, and local permits necessary for performing any compliance obligation under this Consent Decree and the SEP, including, without limitation, permits for the construction of pollution control technology and the installation of equipment at each Covered Facility. The Defendants may seek relief under the provisions of Section XI (Force Majeure) for any delay in performing any such obligation resulting from a failure to obtain, or a delay in obtaining, any permit or approval required to fulfill such obligation, provided that the Defendants have submitted timely and complete applications and have taken all other actions necessary to obtain all such permits or approvals.

60. Permits to Ensure Survival of Consent Decree Limits and Standards after Termination of Consent Decree.

a. For the Baton Rouge Facilities. By no later than one year after the

Effective Date or one year after the respective deadline for the compliance requirements listed in Paragraph 60.c, whichever is later, the Defendants must complete and submit to LDEQ's consolidated preconstruction and Title V CAA permitting program, appropriate applications to incorporate the requirements listed in sub-Paragraph 60.c, as applicable, into a federally enforceable Title V permit for each of the Baton Rouge Facilities, such that the requirements listed in sub-Paragraph 60.c: (i) become and remain "applicable requirements" as that term is defined in 40 C.F.R. § 70.2 and (ii) survive the termination of this Consent Decree.

b. For the Baytown, Beaumont, and Mont Belvieu Facilities.

i. By no later than one year after the Effective Date or one year after the respective deadline for the compliance requirements listed in Paragraph 60.c, whichever is later, the Defendants must complete and submit to the necessary permitting authorities in the State of Texas appropriate applications to incorporate the requirements listed in sub-Paragraph 60.c, as applicable, into a non-Title V, federally enforceable permit for each of the Baytown Facilities, Beaumont Facilities, and Mont Belvieu Plastics Plant, such that the requirements listed in sub-Paragraph 60.c: (i) become and remain "applicable requirements" as that term is defined in 40 C.F.R. § 70.2 and (ii) survive the termination of this Consent Decree.

ii. By no later than three years after the Effective Date or one year after the respective deadline for the compliance requirements listed in Paragraph 60.c, whichever is later, the Defendants must complete and submit to the necessary permitting authorities in the State of Texas appropriate applications to modify, amend, or revise the Title V permit for each of the Baytown Facilities, Beaumont Facilities, and Mont Belvieu Plastics Plant to incorporate the requirements listed in sub-Paragraph 60.c into each facility's federally enforceable Title V permit.

c. The following requirements of the Consent Decree shall survive termination: Paragraphs 19–23 (Instrumentation and Monitoring Systems), Paragraphs 25–27 (Specifications, Calibration, Quality Control, and Maintenance / Recording and Averaging Times

/ Operation), Paragraph 28, (Determining whether Flare has Potentially Recoverable Gas), Paragraph 38 (FGRS: Operation and Availability Requirements), Paragraphs 39–40 (Flaring Efficiency standards), Paragraph 42 (Operation According to Design), Paragraph 43 (NHV Standards), Paragraph 44 (98% CE), Paragraph 45 (Standard During Instrument Downtime), Paragraph 47 (Recordkeeping), and Paragraph 48 (Fenceline Monitoring). Nothing in this Paragraph shall prohibit the Defendants from seeking to incorporate Paragraph 24 (Optional Equipment) in a permit that survives termination of this Decree.

61. The permit applications and process of incorporating the requirements of this Consent Decree into Title V Permits shall be in accordance with applicable state or local Title V rules, including applicable administrative amendment provisions of such 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.

62. This Consent Decree shall not terminate for the Baton Rouge Facilities until the Defendants receive permits for the Baton Rouge Facilities that have been issued pursuant to LDEQ’s consolidated preconstruction and Title V CAA permitting program which incorporate the requirements set forth in Paragraph 60.c. This Consent Decree shall not terminate for all other Covered Facilities until the Defendants submit an application to the necessary permitting authorities to incorporate the requirements set forth in Paragraph 65.c into a Title V operating permit for each Covered Facility. Requirements incorporated into Title V operating permits or other operating permits pursuant to Paragraph 60.c shall survive termination of this Consent Decree.

63. Following submission of the complete permit applications, the Defendants shall cooperate with LDEQ and TCEQ by promptly submitting all available information that either state agency seeks following its receipt of the permit materials.

VIII. EMISSION CREDIT GENERATION

64. Prohibitions.

a. Definition. “CD Emissions Reductions” means any NO_x, VOC, PM, PM_{TOTAL}, PM₁₀, PM_{2.5}, HAP, or CO emissions reductions that result from any projects conducted or controls used to comply with this Consent Decree.

b. Except as provided in Paragraph 65, the Defendants must not apply for, obtain, trade, sell, generate, or use CD Emissions Reductions:

- i. As netting reductions,
- ii. As emissions offsets, or
- iii. For the purpose of determining whether a project would result in a significant emissions increase or significant net emissions increase in any major or minor NSR permit or permit proceeding, or for the purpose of obtaining offsets in any non-attainment NSR permit or permit proceeding. Baseline actual emissions during any 24-month period selected by the Defendants must be adjusted downward to exclude any portion of the baseline emissions that would have been eliminated as CD Emissions Reductions (including the Waste Gas Minimization Requirements of Section V.C) had the Defendants been complying with this Consent Decree during that 24-month period.

65. Outside the Scope of the Prohibition. Nothing in this Section is intended to prohibit the Defendants from using or generating:

- a. Emission reductions, netting credits, or emission offsets from process units at a Covered Facility that are not subject to an emission limitation pursuant to this Consent Decree;
- b. Emission reductions, netting credits, or emission offsets:
 - (1) For the purpose of maintaining compliance with plantwide applicability limits authorized by Permit Nos. 102982 and 3452 (Baytown Olefins Plant);
 - (2) For the purpose of permitting the North American Growth project, as authorized by Permit Nos. 102982 and 3452 (Baytown Olefins Plant) and Permit Nos. 103048 and 19016 (Mont Belvieu Plastics Plant); or
 - (3) From looping the Baytown Olefins Plant Flares, fixing block valves, and revising natural gas tie-ins, as authorized by Permit Nos. 102982 and 3452 (Baytown Olefins Plant) and Permit Nos. 103048 and 19016 (Mont Belvieu Plastics Plant);
- c. Emission reductions, netting credits, or emission offsets from installing and operating the FGRS and flameless thermal oxidizer, as authorized by Standard Permit No. 131869 at the Baytown Olefins Plant and Standard Permit No. 123967 at the Mont Belvieu Plastics Plant;
- d. Emission reductions, netting credits, or emission offsets from the operation of the In-Process Waste Gas Recovery Systems enumerated in the whereas clauses of this Consent Decree, including the flare gas recovery unit at the Baton Rouge Polyolefins Plant described in Federal Operating Permit No. 0840-00003-V6;
- e. CD Emissions Reductions for a Covered Facility's compliance with any rules or regulations designed to address regional haze or the non-attainment status of any area (excluding NSR rules, but including, for example, RACT rules) that apply to a Covered Facility; provided, however, that the Defendants must not trade or sell any CD Emissions Reductions; and,
- f. CD Emissions Reductions for purposes of the State of Texas or Louisiana air toxics modeling programs.

IX. REPORTING REQUIREMENTS

66. Semi-Annual Reports. By no later than February 28th and August 31st of each year after the Effective Date, until termination of this Decree pursuant to Section XX, the Defendants must submit a “Semi-Annual Report” to EPA, and LDEQ for the Baton Rouge Facilities, except that the first Semi-Annual Report shall be due 60 Days after the first full half year after the Effective Date of this Consent Decree (a “half year” runs between January 1 and June 30 and between July 1 and December 31). Each Semi-Annual Report shall contain the following information for the preceding six months (*i.e.*, January through June will be addressed in the report to be submitted by August 31, and July through December will be addressed in the report submitted by February 28):

- a. A description of the status of work performed and progress made toward implementing all requirements of Section V (Compliance Requirements) at the Covered Facilities. This topic should describe any major milestones completed and remaining to be completed;
- b. A description of any problems encountered or anticipated in meeting the requirements in Section V (Compliance Requirements) at the Covered Facilities, together with implemented or proposed solutions;
- c. A description of the status of any permit applications, including a summary of all permitting activity, pertaining to compliance with this Consent Decree;
- d. A copy of any reports that were submitted only to LDEQ and that

pertain to compliance with this Consent Decree;

e. A description of the Defendants' progress in satisfying its obligations in connection with the SEP under Section VI including, at a minimum, a narrative description of activities undertaken; status of any construction or compliance measures, including the completion of any milestones set forth in the SEP Work Plan (attached as Appendix 2.1), and a summary of costs incurred since the previous report;

f. Any updated WGMP for the Covered Facilities that is required to be submitted by Paragraph 31;

g. Any summary of internal flaring incident reports as required by Paragraph 34;

h. A summary of the following, per Covered Flare per Calendar Quarter (hours shall be rounded to the nearest tenth):

- (1) The total number of hours of Instrument Downtime claimed pursuant to Paragraph 45, expressed as both an absolute number and a percentage of time the Covered Flare that the instrument/equipment monitors is In Operation and Capable of Receiving Sweep, Supplemental, and/or Waste Gas;
- (2) If the total number of hours of Instrument Downtime claimed pursuant to Paragraph 45 exceeds 5% of the time in a Calendar Quarter the Covered Flare affected by the downtime is In Operation, an identification of the periods of downtime by date, time, cause (including Malfunction or maintenance), and, if the cause is asserted to be a Malfunction, the corrective action taken;
- (3) The total number of hours, expressed as both an absolute number of hours and a percentage of time that the Covered Flare was In Operation, in which

the requirements of Paragraphs 43-44 were not applicable because the only gas or gases being vented were Pilot Gas or Purge Gas;

(4) Exceedances of Combustion Efficiency Standards.

i. The total number of hours, expressed as both an absolute number of hours and a percentage of time the Covered Flare was In Operation, of exceedances of the emissions standards in Paragraphs 43-44; provided however, that if the exceedance of these standards was less than 5% of the time in a Calendar Quarter and was due to one or more of the exceptions set forth in Paragraph 45, the report shall so note; and

ii. If the exceedance of the emissions standards in Paragraphs 43-44 was not due to one of the exceptions in Paragraph 45 (Instrument Downtime), or if the exceedance was due to one or more of the exceptions in Paragraph 45 and the total number of hours caused by the exceptions exceeds 5% of the time in a Calendar Quarter that the Covered Flare affected by the Instrument Downtime was In Operation, an identification of each block period that exceeded the standard, by time and date; the cause of the exceedance (including startup, shutdown, maintenance, or Malfunction), and if the cause is asserted to be a Malfunction, an explanation and any corrective actions taken; and

(5) Compliance with Compressor Availability Requirements. Sufficient information to document compliance with the FGRS Compressor availability requirements of sub-Paragraph 38.b. For any period of non-compliance, the Defendants must identify the date, cause, and corrective action taken.

i. Any additional matters that the Defendants believe should be

brought to the attention of EPA, or LDEQ for the Baton Rouge Facilities.

67. Fenceline Air Monitoring Reports. The Defendants must submit Fenceline Air Monitoring Reports as part of each Semi-Annual Report. The Fenceline Air Monitoring Reports must contain the following information:

a. In spreadsheet format, the individual sample results for each monitor comprising each Fenceline Monitoring System, each bi-weekly annual

average benzene concentration difference value (once annual averages are available), and the corresponding meteorological data for the relevant monitoring periods. The first two columns of each spreadsheet shall be the date and time for each sample taken; and

- b. A detailed description of the findings of any root cause analysis and corrective action(s) undertaken pursuant to Paragraph 3(g) of Appendix 2.2, including the known results of the corrective action(s) and the anticipated emissions reductions (in TPY per pollutant).

68. Annual Emissions Data. In the Semi-Annual Report that is submitted on February 28 of each year, the Defendants must provide, for each Covered Flare, for the prior calendar year, the amount of emissions of the following compounds (in tons per year): VOCs, HAPs, NO_x, CO₂, methane, and ethane.

69. Each Semi-Annual Report must also include a description of any non-compliance with the requirements of this Consent Decree not otherwise identified by Paragraph 66 along with an explanation of the violation's likely cause and of the remedial steps taken, or to be taken, to prevent or minimize such violation. If the cause of a violation cannot be fully explained at the time the report is due, the Defendants must so state in the report. In such a case, the Defendants must investigate the cause of the violation and then submit an amendment to the report, including a full explanation of the cause of the violation, within 30 Days of the Day the Defendants become aware of the cause of the violation. Nothing in this Paragraph or the following Paragraph relieves the Defendants of their obligation to provide the notice required by Section XI (Force Majeure).

70. All reports required under this Section must be submitted to the persons and in the manner designated in Section XVI (Notices).

71. Each report submitted by the Defendants under this Section must be signed by an official of each Covered Facility and 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.

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

73. Any information provided pursuant to this Consent Decree may be used by the United States, and LDEQ for the Baton Rouge Facilities, in any proceeding to enforce the provisions of this Consent Decree and as otherwise permitted by law.

X. STIPULATED PENALTIES

74. The Defendants are jointly and severally liable for stipulated penalties to the United States, and LDEQ for the Baton Rouge Facilities, for violations of this Consent Decree as specified below, unless excused under Section XI (Force Majeure). A violation includes failing to perform any obligation required by the terms of this Decree, including any work plan or schedule approved under this Decree, according to all applicable requirements of this Decree and within the specified time schedules established by or approved under this Decree.

75. Late Payment of Civil Penalty. If the Defendants fail to pay the civil penalty amounts required to be paid under Section IV (Civil Penalty) when due, the Defendants must pay a stipulated penalty of \$2,500 per Day for each Day that the payment is late.

76. Failure to Meet Compliance Requirements. For the following violations of Section V (Compliance Requirements):

Violation	Stipulated Penalty	
<p>76.a. <u>Violations of Paragraph 18.</u> Failure to timely submit a Flare Data and Monitoring Systems and Protocol Report that complies with the requirements of Paragraph 18.</p>	<p>Period of Delay or <u>Noncompliance</u></p> <p>Days 1–30 Days 31–60 Days 61 and later</p>	<p><u>Penalty per Day per Violation</u></p> <p>\$ 300 \$ 400 \$ 500</p>
<p>76.b. <u>Violations of Paragraph 19-23.</u> Failure to install the equipment and monitoring systems required by Paragraphs 19-23 by the compliance date and maintain them in accordance with the respective, applicable technical specifications in those Paragraphs and Paragraphs 25–26, (except for the QA/QC requirements referenced in sub-Paragraph 25.a.i., which are covered in sub-Paragraph 76.c below).</p>	<p>Period of Delay or Noncompliance per Monitoring System/<u>Control Instrument</u></p> <p>Days 1–30 Days 31–60 Days 61 and later</p>	<p><u>Penalty per Day per Monitoring System/Control Instrument</u></p> <p>\$ 750 \$ 1,250 \$ 2,000 or an amount equal to 1.2 times the economic benefit of delayed compliance, whichever is greater</p>
<p>76.c. <u>Violations of the QA/QC requirements in Paragraph 25.a.i.</u> Failure to comply with the QA/QC requirements referenced in Paragraph 25.a.i.</p>	<p><u>Violation of a:</u></p> <p>Daily requirement Quarterly requirement Annual requirement</p>	<p><u>Penalty per Violation</u></p> <p>\$ 100 \$ 200 per Day late \$ 500 per Day late</p>

<p>76.d. <u>Violations of Paragraph 27.</u> Except for 5% of the time per Calendar Quarter, failure to operate each monitoring system required by Paragraphs 20 and 22-23 in accordance with Paragraph 27; provided however, that the Defendants will not be liable for a stipulated penalty for violation of Paragraph 27 if, during the period of downtime, the only gas(es) being sent to the Covered Flare in question is/are Purge Gas and/or Pilot Gas. For any monitoring system that serves a dual purpose, this stipulated penalty applies per instrument only.</p>	<table> <thead> <tr> <th><u>Per Monitoring System/ Control Instrument, Number of Hours per Calendar Quarter</u></th> <th><u>Penalty per Hour per Monitoring System/ Control Instrument</u></th> </tr> </thead> <tbody> <tr> <td>0.25–50.0</td> <td>\$ 250</td> </tr> <tr> <td>50.25–100.0</td> <td>\$ 500</td> </tr> <tr> <td>Over 100.0</td> <td>\$ 1,000</td> </tr> </tbody> </table>	<u>Per Monitoring System/ Control Instrument, Number of Hours per Calendar Quarter</u>	<u>Penalty per Hour per Monitoring System/ Control Instrument</u>	0.25–50.0	\$ 250	50.25–100.0	\$ 500	Over 100.0	\$ 1,000
<u>Per Monitoring System/ Control Instrument, Number of Hours per Calendar Quarter</u>	<u>Penalty per Hour per Monitoring System/ Control Instrument</u>								
0.25–50.0	\$ 250								
50.25–100.0	\$ 500								
Over 100.0	\$ 1,000								
<p>76.e. <u>Violations of Paragraph 29, 30, or 31.</u> Failure to timely submit a WGMP that complies with the requirements of the applicable Paragraph.</p>	<table> <thead> <tr> <th><u>Period of Delay or Noncompliance</u></th> <th><u>Penalty per Day per Violation</u></th> </tr> </thead> <tbody> <tr> <td>Days 1–30</td> <td>\$ 500</td> </tr> <tr> <td>Days 31–60</td> <td>\$ 750</td> </tr> <tr> <td>Days 61 and later</td> <td>\$ 1,000</td> </tr> </tbody> </table>	<u>Period of Delay or Noncompliance</u>	<u>Penalty per Day per Violation</u>	Days 1–30	\$ 500	Days 31–60	\$ 750	Days 61 and later	\$ 1,000
<u>Period of Delay or Noncompliance</u>	<u>Penalty per Day per Violation</u>								
Days 1–30	\$ 500								
Days 31–60	\$ 750								
Days 61 and later	\$ 1,000								
<p>76.f. <u>Violations of Paragraph 34.</u> Failure to timely develop a root cause flaring investigation report that complies with the requirements in sub-Paragraph 34.a; or failure to keep it as an internal record; or failure to timely submit a summary of the flaring incident reports that complies with the requirements in sub-Paragraph 34.b.</p>	<table> <thead> <tr> <th><u>Period of Delay or Noncompliance</u></th> <th><u>Penalty per Day per Violation</u></th> </tr> </thead> <tbody> <tr> <td>Days 1 – 30</td> <td>\$ 800</td> </tr> <tr> <td>Days 31 – 60</td> <td>\$ 1,600</td> </tr> <tr> <td>Days 61 and later</td> <td>\$ 3,000</td> </tr> </tbody> </table>	<u>Period of Delay or Noncompliance</u>	<u>Penalty per Day per Violation</u>	Days 1 – 30	\$ 800	Days 31 – 60	\$ 1,600	Days 61 and later	\$ 3,000
<u>Period of Delay or Noncompliance</u>	<u>Penalty per Day per Violation</u>								
Days 1 – 30	\$ 800								
Days 31 – 60	\$ 1,600								
Days 61 and later	\$ 3,000								
<p>76.g. <u>Violations of Paragraph 35.</u> Failure to complete any corrective action in accordance with the requirements of Paragraph 35.</p>	<table> <thead> <tr> <th><u>Period of Delay or Noncompliance</u></th> <th><u>Penalty per Day per Violation</u></th> </tr> </thead> <tbody> <tr> <td>Days 1 – 30</td> <td>\$ 1,000</td> </tr> <tr> <td>Days 31 – 60</td> <td>\$ 2,000</td> </tr> <tr> <td>Days 61 and later</td> <td>\$ 5,000</td> </tr> </tbody> </table>	<u>Period of Delay or Noncompliance</u>	<u>Penalty per Day per Violation</u>	Days 1 – 30	\$ 1,000	Days 31 – 60	\$ 2,000	Days 61 and later	\$ 5,000
<u>Period of Delay or Noncompliance</u>	<u>Penalty per Day per Violation</u>								
Days 1 – 30	\$ 1,000								
Days 31 – 60	\$ 2,000								
Days 61 and later	\$ 5,000								

<p>76.h. <u>Violations of Paragraph 37.</u> For failing to timely install any FGRS listed in Appendix 1.8 in accordance with the requirements of Paragraph 37 and Appendix 1.8.</p>	<table border="0"> <tr> <td style="text-align: center;"><u>Period of Delay or Noncompliance per FGRS</u></td> <td style="text-align: center;"><u>Penalty per Day per FGRS</u></td> </tr> <tr> <td>Days 1–30</td> <td>\$ 1,250</td> </tr> <tr> <td>Days 31–60</td> <td>\$ 3,000</td> </tr> <tr> <td>Days 61 and later</td> <td>\$ 5,000 or an amount equal to 1.2 times the economic benefit of delayed compliance, whichever is greater</td> </tr> </table>	<u>Period of Delay or Noncompliance per FGRS</u>	<u>Penalty per Day per FGRS</u>	Days 1–30	\$ 1,250	Days 31–60	\$ 3,000	Days 61 and later	\$ 5,000 or an amount equal to 1.2 times the economic benefit of delayed compliance, whichever is greater
<u>Period of Delay or Noncompliance per FGRS</u>	<u>Penalty per Day per FGRS</u>								
Days 1–30	\$ 1,250								
Days 31–60	\$ 3,000								
Days 61 and later	\$ 5,000 or an amount equal to 1.2 times the economic benefit of delayed compliance, whichever is greater								
<p>76.i. <u>Violations of Sub-Paragraph 38.b.</u> For each failure to have the requisite number of FGRS Compressors Available for Operation or in operation in accordance with sub-Paragraph 38.b.</p>	<p>Per FGRS, \$750 per hour or fraction thereof over the allowed percentage in a rolling 8,760-hour period that a Compressor required to be Available for Operation is not Available for Operation; provided however, that stipulated penalties will not apply for any hour in which a Compressor’s unavailability did not result in flaring.</p>								
<p>76.j. <u>Violations of Paragraphs 43 and 45.</u> For each Covered Flare, each failure to comply with the Combustion Zone Net Heating Value standard in Paragraph 43 or the Standard During Instrument Downtime in Paragraph 45.</p>	<table border="0"> <tr> <td style="text-align: center;"><u>On a per Covered Flare basis, Hours per Calendar Quarter in Noncompliance</u></td> <td style="text-align: center;"><u>Penalty per Hour per Covered Flare</u></td> </tr> <tr> <td>Hours 0.25–50.0</td> <td>\$ 50</td> </tr> <tr> <td>Hours 50.25–100.0</td> <td>\$ 100</td> </tr> <tr> <td>Hours over 100.0</td> <td>\$ 300</td> </tr> </table> <p>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.</p>	<u>On a per Covered Flare basis, Hours per Calendar Quarter in Noncompliance</u>	<u>Penalty per Hour per Covered Flare</u>	Hours 0.25–50.0	\$ 50	Hours 50.25–100.0	\$ 100	Hours over 100.0	\$ 300
<u>On a per Covered Flare basis, Hours per Calendar Quarter in Noncompliance</u>	<u>Penalty per Hour per Covered Flare</u>								
Hours 0.25–50.0	\$ 50								
Hours 50.25–100.0	\$ 100								
Hours over 100.0	\$ 300								

<p>76.k. <u>Violations of Sub-Paragraphs 46.d.i or 46.d.ii.</u> For each failure to ensure that a Portable Flare that falls under the conditions of sub-Paragraph 46.d.i or 46.d.ii complies with the requirements of those sub-Paragraphs.</p>	<table> <thead> <tr> <th data-bbox="828 203 1218 237">Number of Days</th> <th data-bbox="1218 203 1581 237"><u>Penalty per Day</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="828 237 1218 273">Portable Flare Did <u>Not Comply</u></td> <td data-bbox="1218 237 1581 273"></td> </tr> <tr> <td data-bbox="828 273 1218 306">Days 1–7</td> <td data-bbox="1218 273 1581 306">\$ 1,000</td> </tr> <tr> <td data-bbox="828 306 1218 340">Days 8–15</td> <td data-bbox="1218 306 1581 340">\$ 2,000</td> </tr> <tr> <td data-bbox="828 340 1218 373">Days 16 and later</td> <td data-bbox="1218 340 1581 373">\$ 5,000</td> </tr> </tbody> </table>	Number of Days	<u>Penalty per Day</u>	Portable Flare Did <u>Not Comply</u>		Days 1–7	\$ 1,000	Days 8–15	\$ 2,000	Days 16 and later	\$ 5,000
Number of Days	<u>Penalty per Day</u>										
Portable Flare Did <u>Not Comply</u>											
Days 1–7	\$ 1,000										
Days 8–15	\$ 2,000										
Days 16 and later	\$ 5,000										
<p>76.l. <u>Violations of Paragraph 47.</u> Failure to record any information required to be recorded pursuant to Paragraph 47.</p>	<p>\$100 per Day</p>										
<p>76.m. <u>Violations of Paragraph 48 (Fenceline Monitoring Requirements).</u> For each failure to comply with a requirement of Paragraph 48 or Appendix 2.2.</p>	<table> <thead> <tr> <th data-bbox="828 630 1218 663">Period of Delay or <u>Noncompliance</u></th> <th data-bbox="1218 630 1581 663"><u>Penalty per Day</u></th> </tr> </thead> <tbody> <tr> <td data-bbox="828 663 1218 697">Days 1–30</td> <td data-bbox="1218 663 1581 697">\$ 500</td> </tr> <tr> <td data-bbox="828 697 1218 730">Days 31–60</td> <td data-bbox="1218 697 1581 730">\$ 1,500</td> </tr> <tr> <td data-bbox="828 730 1218 764">Days 61 and later</td> <td data-bbox="1218 730 1581 764">\$ 3,000</td> </tr> </tbody> </table>	Period of Delay or <u>Noncompliance</u>	<u>Penalty per Day</u>	Days 1–30	\$ 500	Days 31–60	\$ 1,500	Days 61 and later	\$ 3,000		
Period of Delay or <u>Noncompliance</u>	<u>Penalty per Day</u>										
Days 1–30	\$ 500										
Days 31–60	\$ 1,500										
Days 61 and later	\$ 3,000										

77. Failure to Meet Reporting Requirements. For each failure to submit a Semi-

Annual Report that complies with the requirements of Section IX:

<u>Period of Delay or Noncompliance per Semi-Annual Report</u>	<u>Penalty per Day per Semi-Annual Report</u>
Days 1–30	\$ 300
Days 31–60	\$ 1,000
Days 61 and later	\$ 2,000

78. SEP Compliance. If the Defendants fail to satisfactorily complete the SEP by the deadline set forth in Appendix 2.1, the Defendants must pay stipulated penalties for each Day for which they fail to satisfactorily complete the SEP, as follows:

<u>Period of Delay or Noncompliance</u>		<u>Penalty per Violation per Day</u>
Days	1–30	\$ 500
Days	31–60	\$ 1,000
Days	61 and later	\$ 2,000

79. Incorporation of Consent Decree Requirements into Federally Enforceable Permits. For each failure to timely submit a permit application to incorporate the Consent Decree requirements required by Paragraph 60 to the State of Texas or LDEQ:

<u>Period of Delay or Non-Compliance</u>		<u>Penalty per Violation per Day</u>
Days	1–30	\$500
Days	31–60	\$1,500
Day	61 and later	\$3,000

80. Stipulated penalties under this Section begin to accrue on the Day after performance is due or on the Day a violation occurs, whichever is applicable, and, except as provided in Paragraph 83, will continue to accrue until performance is satisfactorily completed or until the violation ceases. Stipulated penalties will accrue simultaneously for separate violations of this Consent Decree.

81. The Defendants must pay stipulated penalties to the United States, and LDEQ for violations arising from the Baton Rouge Facilities, within 60 Days of a written demand by either

Plaintiff unless the demand is disputed through compliance with the requirements of the dispute resolution provisions in Section XII of this Consent Decree. LDEQ may only demand stipulated penalties for violations at the Baton Rouge Facilities. For stipulated penalties arising from violations at the Baton Rouge Facilities, the Defendants must pay 50 percent of the total stipulated penalty amount due to the United States and 50 percent to LDEQ. For all other violations, the Defendants must pay the total stipulated penalty due to the United States. The Plaintiff making a demand for payment of a stipulated penalty must simultaneously send a copy of the demand to the other Plaintiff.

82. The United States may, in the unreviewable exercise of its discretion, reduce or waive stipulated penalties otherwise due to it under this Consent Decree. For stipulated penalties arising from violations at the Baton Rouge Facilities, either Plaintiff may in the unreviewable exercise of its discretion, reduce or waive the portion of the stipulated penalties otherwise due to it under this Consent Decree. However, for stipulated penalties arising from violations at the Baton Rouge Facilities, where only LDEQ demands stipulated penalties for a violation, and the United States does not join in the demand within 30 Days of receiving the demand, or timely joins in the demand but subsequently elects to waive or reduce stipulated penalties for that violation, the Defendants must pay the stipulated penalties due for the violation to the LDEQ, provided however, that the Defendants shall not pay more than 50 percent of the total stipulated penalties that could have been due if both the United States and LDEQ had issued a demand.

83. By no later than 60 Days after receiving a demand for stipulated penalties, the Defendants may dispute liability for any or all stipulated penalties demanded by invoking the

dispute resolution procedures of Section XII of this Decree (Dispute Resolution). In the event of a dispute over stipulated penalties, stipulated penalties shall not accrue commencing on the later of either: (i) the date that, during dispute resolution under Section XII, the Plaintiffs and the Defendants agree upon; or (ii) the date that the Defendants file a motion with the Court under Paragraph 97; provided however, that in order for stipulated penalties to cease accruing pursuant to either (i) or (ii), the Defendants must place the disputed amount in an interest-bearing commercial escrow account. The interest rate must be determined in accordance with 28 U.S.C. § 1961. If the dispute is resolved in the Defendants' favor, the escrowed amount plus accrued interest will be returned to the Defendants; otherwise, the United States will be entitled to the amount determined by the Court to be due, plus interest that has accrued on such amount in the escrow account.

84. The Defendants must pay stipulated penalties owing to the United States in the manner set forth and with the confirmation notices required by Paragraph 14, except that the transmittal letter must state that the payment is for stipulated penalties and must state for which violation(s) the penalties are being paid. The Defendants must pay stipulated penalties owing to LDEQ in the manner set forth and with the confirmation notices required by Paragraph 17.

85. If the Defendants fail to pay stipulated penalties according to the terms of this Consent Decree, the Defendants are 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 will be construed to limit the United States or LDEQ from seeking any remedy otherwise provided by law for the Defendants' failure to pay any stipulated penalties.

86. The payment of penalties and interest, if any, do not alter in any way the Defendants' obligation to complete the performance of the requirements of this Consent Decree.

87. Non-Exclusivity of Remedy. Stipulated penalties are not the United States' or LDEQ's exclusive remedy for violations of this Consent Decree. Subject to the provisions of Section XIV (Effect of Settlement/Reservation of Rights), the United States expressly reserves the right to seek any other relief it deems appropriate for the Defendants' violation of this Decree or applicable law, including but not limited to an action against any Defendant for statutory penalties, additional injunctive relief, mitigation or offset measures, and/or contempt. However, the amount of any statutory penalty assessed for a violation of this Consent Decree must be reduced by an amount equal to the amount of any stipulated penalty assessed and paid pursuant to this Consent Decree.

XI. FORCE MAJEURE

88. "Force Majeure," for purposes of this Consent Decree, is defined as any event beyond the control of the Defendants, of any entity controlled by the Defendants, or of the Defendants' contractors, which delays or prevents the performance of any obligation under this Consent Decree despite the Defendants' best efforts to fulfill the obligation. The requirement that the Defendants exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential Force Majeure and best efforts to address the effects of any potential Force Majeure: (a) as it is occurring and (b) following the potential Force Majeure, such that the delay and any adverse effects of the delay are minimized. "Force Majeure" does not include the Defendants' financial inability to perform any obligation under this Consent Decree.

89. 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, the Defendants must provide written notice to EPA, and LDEQ for the Baton Rouge Facilities, in accordance with Section XVI no later than 15 Days after the date the Defendants first knew, or by the exercise of due diligence should have known, that the event might cause a delay. This notice must specifically reference this Paragraph of the Consent Decree and must 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 implementing any measures to be taken to prevent or mitigate the delay or the effect of the delay; the Defendants' rationale for attributing such delay to a Force Majeure if it intends to assert such a claim; and a statement as to whether, in the opinion of the Defendants, such event may cause or contribute to an endangerment to public health, welfare or the environment. The Defendants must include with any notice all available documentation supporting the claim that the delay was attributable to a Force Majeure. Failure to comply with the above requirements will preclude the Defendants 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. The Defendants will be deemed to know of any circumstance of which any Defendant, any entity controlled by a Defendant, or a Defendant's contractors knew or should have known.

90. If EPA, after a reasonable opportunity for review and comment by LDEQ for the Baton Rouge Facilities, agrees that the delay or anticipated delay is attributable to a Force Majeure, the time for performance of the obligations under this Consent Decree that are affected

by the Force Majeure will be extended by EPA, after a reasonable opportunity for review and comment by LDEQ for the Baton Rouge Facilities, 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 will not, by itself, extend the time for performance of any other obligation. EPA will notify the Defendants in writing of the length of the extension, if any, for performing the obligations affected by the Force Majeure.

91. If EPA, after a reasonable opportunity for review and comment by LDEQ for the Baton Rouge Facilities, does not agree that the delay or anticipated delay has been or will be caused by a Force Majeure, EPA will notify the Defendants in writing of its decision.

92. If the Defendants elect to invoke the dispute resolution procedures set forth in Section XII (Dispute Resolution), it must do so no later than 45 Days after receiving EPA's notice of decision. In any such dispute resolution proceeding, the Defendants 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, 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 the Defendants complied with the requirements of Paragraphs 88 and 89. If the Defendants carry this burden, the delay at issue will be deemed to not be a violation by the Defendants of the affected obligation of this Consent Decree identified to EPA and the Court.

XII. DISPUTE RESOLUTION

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

94. Informal Dispute Resolution. Any dispute subject to dispute resolution under this Consent Decree will first be the subject of informal negotiations. The dispute will be considered to have arisen when a Defendant sends the United States a written Notice of Dispute. Such Notice of Dispute must clearly state the matter in dispute. The period of informal negotiations must 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 will be considered binding unless, within 45 Days after the conclusion of the informal negotiation period, the Defendants invoke formal dispute resolution procedures as set forth below.

95. Formal Dispute Resolution. The Defendants must 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 must include, but need not be limited to, any factual data, analysis, or opinion supporting the Defendants' position and any supporting documentation relied upon by the Defendants.

96. The United States must serve its Statement of Position within 45 Days of receiving the Defendants' 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 will be binding on the Defendants, unless the Defendants file a motion for judicial review of the dispute in accordance with the following Paragraph.

97. The Defendants may seek judicial review of the dispute by filing with the Court and serving on the United States, in accordance with Section XVI (Notices), a motion requesting judicial resolution of the dispute. The motion must be filed within 45 Days of receiving the United States' Statement of Position pursuant to the preceding Paragraph. The motion must contain a written statement of the Defendants' position on the matter in dispute, including any supporting factual data, analysis, opinion, or documentation, and must set forth the relief requested and any schedule within which the dispute must be resolved for orderly implementation of the Consent Decree.

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

99. Standard of Review. In a formal dispute resolution proceeding under this Section, the Defendants bear the burden of demonstrating that their position complies with this Consent Decree and the CAA, and that they are entitled to relief under applicable principles of law. The United States reserves the right to argue that its position is reviewable only on the administrative record and must be upheld unless arbitrary and capricious or otherwise not in accordance with law, and the Defendants reserve the right to argue to the contrary.

100. The invocation of dispute resolution procedures under this Section will not, by itself, extend, postpone, or affect in any way any obligation of the Defendants under this Consent Decree, unless and until final resolution of the dispute so provides. Stipulated penalties with respect to the disputed matter will accrue from the first Day of noncompliance, but payment may be stayed pending resolution of the dispute as provided in Paragraph 83. If the Defendants do not prevail on the disputed issue, stipulated penalties will be assessed and paid as provided in Section X (Stipulated Penalties).

XIII. INFORMATION COLLECTION AND RETENTION

101. The United States, LDEQ for the Baton Rouge Facilities, and their representatives, contractors, and consultants, have the right of entry into any facility covered by this Consent Decree, 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 or LDEQ in accordance with the terms of this Consent Decree;
- c. obtain documentary evidence, including photographs and similar data; and
- d. assess the Defendants' compliance with this Consent Decree.

102. Upon request, the Defendants must provide EPA and LDEQ, or their authorized representatives, splits of any samples taken by the Defendants. Upon request, EPA and LDEQ must provide the Defendants splits of any samples taken by EPA or LDEQ.

103. Notwithstanding Section XX (Termination), and except for data recorded by any video camera required pursuant to Paragraph 22, until three years after the termination of this

Consent Decree, the Defendants must retain, and must instruct their contractors and agents to preserve, all non-identical copies of all documents, records, or other information (including documents, records, or other information in electronic form) in their or their contractors' or agents' possession or control, or that come into their or their contractors' or agents' possession or control, and that relate to Defendants' performance of its obligations under this Consent Decree. This information-retention requirement applies regardless of any contrary corporate or institutional policies or procedures. At any time during this information-retention period, upon request by the United States, or LDEQ for the Baton Rouge Facilities, the Defendants must provide copies of any documents, records, or other information required to be maintained under this Paragraph. The Defendants shall retain the data recorded by the video cameras required pursuant to Paragraph 22 for one year from the date of recording.

104. Except for emissions data, the Defendants 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 the Defendants seek to protect as CBI, the Defendants must follow the procedures set forth in 40 C.F.R. Part 2.

105. 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 or LDEQ pursuant to applicable federal or state laws, regulations, or permits, nor does it limit or affect any duty or obligation of the Defendants to maintain documents, records, or other information imposed by applicable federal or state laws, regulations, or permits.

XIV. EFFECT OF SETTLEMENT/RESERVATION OF RIGHTS

106. Definitions. For purposes of this Section XIV, the following definitions apply:

a. “BTU/scf Flared Gas Requirements” shall mean the requirements found in the following regulations:

- i. 40 C.F.R. § 60.18(c)(3)(ii);
- ii. 40 C.F.R. § 63.11(b)(6)(ii); and
- iii. The provisions of 40 C.F.R. Part 60, 61, and 63 that require compliance with 40 C.F.R. § 60.18(c)(3)(ii) (for example 40 C.F.R. § 61.349(a)(2)(iii)) or 40 C.F.R. § 63.11(b)(6)(ii) (for example 40 C.F.R. § 63.113(a)(1)(i)) and are applicable requirements in a federally enforceable permit for a Covered Facility as of the Effective Date.

b. “General Flare Requirements” shall mean the requirements found in the following regulations:

- i. 40 C.F.R. § 60.18(c)(1) and 40 C.F.R. § 63.11(b)(4) (both relate to a prohibition on Visible Emissions);
- ii. 40 C.F.R. § 60.18(c)(2) and 40 C.F.R. § 63.11(b)(5) (both relate to flame presence);
- iii. 40 C.F.R. § 60.18(c)(4) and 40 C.F.R. § 63.11(b)(7) (both relate to exit velocity requirements for Steam-Assisted Flares);
- iv. 40 C.F.R. § 60.18(c)(5) and 40 C.F.R. § 63.11(b)(8) (both relate to exit velocity requirements for Air-Assisted Flares); and
- v. 40 C.F.R. § 60.18(e) and 40 C.F.R. § 63.11(b)(3) (both relate to operation during emissions venting).

c. “Good Air Pollution Control Practice Requirements” shall mean the requirements found in the following regulations:

- i. 40 C.F.R. § 60.11(d);
- ii. 40 C.F.R. § 61.12(c); and
- iii. 40 C.F.R. § 63.6(e)(1)(i).

d. “PSD/NNSR Requirements” shall mean the Prevention of Significant

Deterioration and Non-Attainment New Source Review requirements found in the following:

- i. 42 U.S.C. § 7475;
- ii. 40 C.F.R. §§ 52.21(a)(2)(iii) and 52.21(j)–52.21(r)(5);
- iii. 42 U.S.C. §§ 7502(c)(5) and 7503(a)–(c);
- iv. 40 C.F.R. Part 51, Appendix S, Part IV, Conditions 1–4;
- v. any applicable, federally enforceable state or local regulation that implements, adopts, or incorporates the federal provisions cited in sub-Paragraphs 106.d.i–iv; and
- vi. any applicable Title V permit requirement that implements, adopts, or incorporates the federal provisions or federally enforceable state provisions cited in sub-Paragraphs 106.d.i–v.

f. “Requirements Related to Monitoring, Operation, and Maintenance According to

Flare Design” shall mean the requirements found in the following regulations:

- i. 40 C.F.R. § 60.18(d);
- ii. 40 C.F.R. § 63.11(b)(1); and
- iii. The provisions of 40 C.F.R. Part 60, 61, and 63 that require compliance with 40 C.F.R. § 60.18(d) (for example 40 C.F.R. § 61.349(a)(2)(iii)) or 40 C.F.R. § 63.11(b)(1) (for example 40 C.F.R. § 63.113(a)(1)(i)) and are applicable requirements in a federally enforceable permit for a Covered Facility as of the Effective Date.

107. Entry of this Consent Decree resolves the civil claims of the United States and LDEQ for the violations alleged in the Complaint filed in this action and occurring through the Date of Lodging, and as noted below.

108. Resolution of Claims for Violating PSD/NNSR Requirements at the Covered Flares. With respect to emissions of VOCs, NO_x, and CO from the following Covered Flares, entry of this Consent Decree resolves the civil claims of the United States and LDEQ against the Defendants for violations of the PSD/NNSR Requirements resulting from construction or modification from the date of the pre-Lodging construction or modification through the following dates:

Covered Flares	Resolution of Claims Expires
Baton Rouge Chemical Plant Flares	9/30/2017
Baytown Chemical Plant Flares	9/30/2017
Baytown Olefins Plant Flares	9/30/2017
Beaumont Chemical Plant Flares	7/1/2020

109. Resolution of Pre-Lodging Claims at the Covered Flares for Failing to Comply with: (a) BTU/scf Flared Gas Requirements; (b) General Flare Requirements; (c) Good Air Pollution Control Practice Requirements; and (d) Requirements Related to Monitoring, Operation, and Maintenance According to Flare Design.

With respect to emissions of VOCs and HAPs from the Covered Flares, entry of this Consent Decree resolves the civil claims of the United States and LDEQ against the Defendants

for violations of the following requirements from the date those claims accrued until the Date of Lodging: a) BTU/scf Flared Gas Requirements, b) General Flare Requirements, c) Good Air Pollution Control Practice Requirements, and d) Requirements Related to Monitoring, Operation, and Maintenance According to Flare Design.

110. Resolution of Claims Continuing Post-Lodging for Failing to Comply with Requirements Related to Monitoring, Operation, and Maintenance According to Flare Design for all Covered Flares.

With respect to emissions of VOCs and HAPs from the Covered Flares, entry of this Consent Decree resolves the civil claims of the United States and LDEQ against the Defendants for violations of Requirements Related to Monitoring, Operation, and Maintenance According to Flare Design, but only to the extent that the claims are based on the Defendants' use of too much steam in relation to Vent Gas flow. The resolution in this Paragraph extends through the Effective Date for the Covered Flares.

111. Resolution of Title V Violations. Entry of this Consent Decree resolves the civil claims of the United States and LDEQ against the Defendants for the violations of Sections 502(a), 503(c), and 504(a) of the CAA, 42 U.S.C. §§ 7661a(a), 7661b(c), 7661c(a), and of 40 C.F.R. §§ 70.1(b), 70.5(a) and (b), 70.6(a) and (c), and 70.7(b), that are based upon the violations resolved by Paragraphs 108–110 for the time frames set forth in those Paragraphs.

112. Reservation of Rights — Resolution of Liability in Paragraphs 108 and 110-111 can be Rendered Void. Notwithstanding the resolution of liability in Paragraphs 108 and 110-

111, for the period of time between the Date of Lodging and the post-lodging dates specified in Paragraphs 108 and 110, those resolutions of liability will be rendered void if the Defendants materially fail to comply with any of the obligations and requirements of Section V (Compliance Requirements) and Section VIII (Emission Credit Generation). To the extent that a material failure involves a particular Covered Facility, the resolution of liability will be rendered void only with respect to claims involving that particular Covered Facility. The resolutions of liability in Paragraphs 108 and 110-111 will not be rendered void if the Defendants, as expeditiously as practicable, remedy such material failure and pay all stipulated penalties due as a result of such material failure.

113. The United States and LDEQ reserve all legal and equitable remedies available to enforce the provisions of this Consent Decree. This Consent Decree will not be construed to limit the rights of the United States or LDEQ to obtain penalties or injunctive relief under the Clean Air Act, LEQA, or implementing regulations, or under other federal or state laws, regulations, or permit conditions, except as specified in Paragraphs 107-111. The United States and LDEQ further reserve 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 Covered Facilities, whether related to the violations addressed in this Consent Decree or otherwise.

114. In any subsequent administrative or judicial proceeding initiated by the United States or LDEQ for injunctive relief, civil penalties, other appropriate relief relating to a Covered Facility or Defendants' violations, the Defendants must 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 or LDEQ 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 107–111.

115. This Consent Decree is not a permit, or a modification of any permit, under any federal, state, or local laws or regulations. The Defendants are responsible for maintaining compliance with all applicable federal, state, and local laws, regulations, and permits; and the Defendants' compliance with this Consent Decree is no defense to any action commenced pursuant to any such laws, regulations, or permits, except as set forth herein. The United States and LDEQ do not, by their consent to the entry of this Consent Decree, warrant or aver in any manner that the Defendants' compliance with any aspect of this Consent Decree will result in compliance with provisions of the Clean Air Act, 42 U.S.C. § 7401 *et seq.*, LEQA, La.R.S. 30:2001 *et seq.*, or with any other provisions of federal, state, or local laws, regulations, or permits.

116. This Consent Decree does not limit or affect the rights of the Defendants or of the United States or LDEQ 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 the Defendants, except as otherwise provided by law.

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

XV. COSTS

118. The Parties must bear their own costs of this action, including attorneys' fees, except that the United States and LDEQ are 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 the Defendants.

XVI. NOTICES

119. Unless otherwise specified in this Decree, whenever notifications, submissions, or communications are required by this Consent Decree, they must be made in writing and addressed as follows. Submission by U.S. mail or courier is required and shall be sufficient to comply with the notice requirements of this Consent Decree; however, for the submission of technical information or data, the Defendants must submit the data in electronic form (*e.g.*, a disk or hard drive). The email addresses listed below are to permit the submission of additional electronic courtesy copies.

As to the United States by email: eescdcopy.enrd@usdoj.gov
Re: DJ # 90-5-2-1-10128 and 10128/1

and as to EPA as set forth below.

As to the United States by mail: EES Case Management Unit
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Washington, D.C. 20044-7611
Re: DJ # 90-5-2-1-10128 and 10128/1

and as to EPA as set forth below.

As to the United States Attorney
for the Southern District of Texas
by mail:

United States Attorney
Southern District of Texas

Andrew A. Bobb
Assistant U.S. Attorney
1000 Louisiana St., Suite 2300
Houston, TX 77002

As to EPA by mail:

Director, Air Enforcement Division
Office of Civil Enforcement
U.S. Environmental Protection Agency
Mail Code 2242-A
Regular Mail: 1200 Pennsylvania Ave, N.W.
William Jefferson Clinton Building
Room 1119
Washington, DC 20460-0001
Express Mail: Use same address but use 20004 as the
zip code

and

Associate Director
Air, Toxics, and Inspections Coordination
Branch (6 EN-A)
U.S. EPA, Region 6
1445 Ross Avenue
Dallas, Texas 75202

As to EPA by email:

parrish.robert@epa.gov
foley.patrick@epa.gov
osbourne.margaret@epa.gov

As to LDEQ:

Celena J. Cage
Administrator, Enforcement Division
Office of Environmental Compliance
Louisiana Department of Environmental Quality
P. O. Box 4312
Baton Rouge, Louisiana 70821-4312

As to the Defendants:

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Spring, TX 77389
doug.j.vanpelt@exxonmobil.com

120. Any Party may, by written notice to the other Parties, change its designated notice recipient or notice address provided above.

121. Notices submitted pursuant to this Section will be deemed submitted upon mailing, unless otherwise provided in this Consent Decree or by mutual agreement of the Parties in writing.

XVII. EFFECTIVE DATE

122. The Effective Date of this Consent Decree is 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.

XVIII. RETENTION OF JURISDICTION

123. The Court retains jurisdiction over this case until termination of this Consent Decree, for the purpose of: a) resolving disputes arising under this Decree pursuant to Section XII, b) entering orders modifying this Decree pursuant to Section XIX, and c) effectuating or enforcing compliance with the terms of this Decree.

XIX. MODIFICATION

124. Except as otherwise allowed in Paragraphs 14 and 120 (notice recipients and addresses), the terms of this Consent Decree, including any attached appendices, may be modified only by a subsequent written agreement signed by all the Parties. Where the modification constitutes a material change to this Decree, it will be effective only upon approval by the Court.

125. Any disputes concerning modification of this Decree must be resolved pursuant to Section XII (Dispute Resolution), provided, however, that, instead of the burden of proof provided by Paragraph 99, 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).

XX. TERMINATION

126. Before seeking termination of the entire Consent Decree or the set of requirements applicable to one or more Covered Facilities, the Defendants must:

- a. Pay the civil penalty and any accrued stipulated penalties as required by this Consent Decree;
- b. Satisfactorily comply with all provisions of Section V (Compliance Requirements) applicable to the Covered Facility that is subject to the termination request;
- c. Operate for at least one year in satisfactory compliance with the limitations and standards set forth in Paragraphs 38.b (availability of FGRS compressors), 43 (NHV and NHV_{dil} standards), and 44 (98% Combustion Efficiency) for all of the Covered Flares at the Covered Facility that is subject to the termination request;
- d. Complete the SEP and BEPs in Section VI;
- e. Apply for and receive all non-Title V air permits, including any permits issued pursuant to LDEQ's consolidated preconstruction and Title V CAA permitting program, necessary to ensure that the Consent Decree limits and standards specified in Paragraph 60.c survive termination of this Consent Decree for all of the Covered Flares at the Covered Facility that is subject to the termination request; and
- f. Apply for a modification or amendment to the applicable Title V permit(s) to incorporate the limits and standards in Paragraph 60.c into the Title V permit(s) for the Covered Facility that is subject to the termination request.

127. After the Defendants believe they have satisfied the conditions for termination set forth in the preceding Paragraph for either the entire Consent Decree or for one or more of the Covered Facilities, the Defendants may submit a request for termination to the United States by certifying such compliance in accordance with the certification language in Paragraph 71 (“Request for Termination”). In the Request for Termination, the Defendants must demonstrate that they have satisfied the conditions for termination set forth in the preceding Paragraph, as well as submit all necessary supporting documentation.

128. Following receipt by the United States, and LDEQ for the Baton Rouge Facilities, of the Defendants’ Request for Termination, the Parties will confer informally concerning the request. If the United States, after consultation with LDEQ for the Baton Rouge Facilities, agrees that the Decree may be terminated, the Parties will submit, for the Court’s approval, a joint stipulation terminating the Decree.

129. If the United States, after consultation with LDEQ for the Baton Rouge Facilities, does not agree that the Decree may be terminated, or if the Defendants do not receive a written response from the United States within 90 Days of the Defendants’ submission of the Request for Termination, the Defendants may invoke dispute resolution under Section XII.

XXI. PUBLIC PARTICIPATION

130. 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. The Defendants consent to entry of this Consent Decree without further notice and agree not to withdraw from or oppose entry of this Consent Decree by the Court or to challenge any provision of the Decree, unless the United States has notified the Defendants and LDEQ in writing that it no longer supports entry of the Decree.

131. The Parties agree and acknowledge that final approval by LDEQ and entry of this Consent Decree are subject to the requirements of La. R.S. 30:2050.7, which provides for: (a) public notice of this Consent Decree in the newspaper of general circulation and the official journal of the parish in which the Baton Rouge Facilities are located, (b) an opportunity for public comment and consideration of any comments received, and (c) concurrence by the State Attorney General. LDEQ reserves the right to withdraw or withhold consent if the comments regarding this Consent Decree disclose facts or considerations which indicate that this Consent Decree is inappropriate, improper, or inadequate.

XXII. SIGNATORIES/SERVICE

132. Each undersigned representative of the Defendants, LDEQ, 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 or Parties he or she represents to this document.

133. This Consent Decree may be signed in counterparts, and its validity cannot be challenged on that basis. The Defendants agree 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.

XXIII. INTEGRATION

134. This Consent Decree constitutes the final, complete, and exclusive agreement and understanding among the Parties with respect to the settlement embodied in the Decree and supersedes all prior agreements and understandings, whether oral or written, concerning the settlement embodied herein. Other than deliverables that are subsequently submitted and approved pursuant to this Decree, the Parties acknowledge there are no representations, agreements, or understandings relating to the settlement other than those expressly contained in this Consent Decree.

XXIV. FINAL JUDGMENT

135. Upon approval and entry of this Consent Decree by the Court, this Consent Decree constitutes a final judgment of the Court as to the United States, LDEQ, and the Defendants.

XXV. APPENDICES


136. The Appendices listed in the Tables of Appendices are attached to and part of this Consent Decree.

Dated and entered this _____ Day of _____, 201____

UNITED STATES DISTRICT JUDGE
SOUTHERN DISTRICT OF TEXAS

Subject to the notice and comment provisions of 28 C.F.R. § 50.7, THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. Exxon Mobil Corp. et al.* (S.D. Tex.).

FOR THE UNITED STATES OF AMERICA



JEFFREY H. WOOD
Acting Assistant Attorney General
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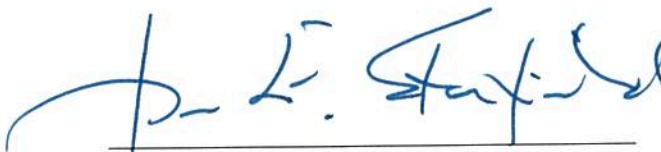
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Subject to the notice and comment provisions of 28 C.F.R. § 50.7, THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. Exxon Mobil Corp. et al.* (S.D. Tex.).


**FOR THE UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY**



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Office of Enforcement and Compliance Assurance
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1200 Pennsylvania Avenue
Washington, D.C. 20460



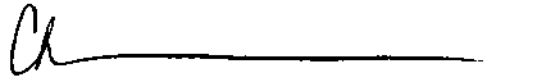
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Subject to the notice and comment provisions of 28 C.F.R. § 50.7, THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. Exxon Mobil Corp. et al.* (S.D. Tex.).

**FOR THE UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY, REGION 6**



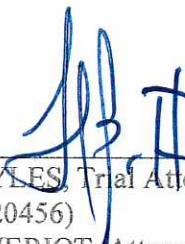
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Director - Compliance Assurance and Enforcement
Division
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Dallas, TX 75202-2733

Subject to the notice and comment provisions of La. R.S. 30:2050.7 and 28 C.F.R. § 50.7, THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. Exxon Mobil Corp. et al.* (S.D. Tex.).

FOR THE LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY



LOURDES ITURRALDE
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THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. Exxon Mobil Corp. et al.* (S.D. Tex.).

**FOR EXXON MOBIL CORP. and
EXXONMOBIL OIL CORP.**



NEIL A. CHAPMAN
Vice President, Exxon Mobil Corporation
Vice President, ExxonMobil Oil Corporation

United States, et al.
v.
Exxon Mobil Corp., et al.

APPENDICES TO CONSENT DECREE

APPENDIX 1.1

[Reserved]

United States, et al.
v.
Exxon Mobil Corp., et al.

APPENDICES TO CONSENT DECREE

APPENDIX 1.2

**Calculating Combustion Efficiency, Net Heating Value of the
Combustion Zone Gas (NHV_{cz}), the Net Heating Value Dilution
Parameter (NHV_{dil}), and Flare Tip Velocity (V_{tip})**

CALCULATING CE, NHV_{cz}, NHV_{dil}, and (V_{tip})

All abbreviations, constants, and variables are defined in the Key on Page 8 of this Appendix.

Combustion Efficiency Equation:

$$CE = [CO_2]/([CO_2] + [CO] + [OC])$$

where:

$[CO_2]$ = Concentration in volume percent or ppm-meters of carbon dioxide in the combusted gas immediately above the Combustion Zone

$[CO]$ = Concentration in volume percent or ppm-meters of carbon monoxide in the combusted gas immediately above the Combustion Zone

$[OC]$ = Concentration in volume percent or ppm-meters of the sum of all organic carbon compounds in the combusted gas immediately above the Combustion Zone, counting each carbon molecule separately where the concentration of each individual compound is multiplied by the number of carbon atoms it contains before summing (e.g., 0.1 volume percent ethane shall count as 0.2 percent OC because ethane has two carbon atoms)

For purposes of using the *CE* equation, the unit of measurement for CO₂, CO, and OC must be the same; that is, if “volume percent” is used for one compound, it must be used for all compounds. “Volume percent” cannot be used for one or more compounds and “ppm-meters” for the remainder.

Step 1: Determine the Net Heating Value of the Vent Gas (NHV_{vg})

Except as provided in Consent Decree Paragraph 43.b.ii for the Baton Rouge Plastics Plant Finishing Flare, the Defendants shall determine the Net Heating Value of the Vent Gas (NHV_{vg}) based on composition monitoring data on a 15-minute block average basis according to the following requirements. If the Defendants monitors separate gas streams that combine to comprise the total Vent Gas flow to a Covered Flare, the 15-minute block average Net Heating Value shall be determined separately for each measurement location according to the following requirements and a flow-weighted average of the gas stream Net Heating Values shall be used to determine the 15-minute block average Net Heating Value of the cumulative Vent Gas. The NHV_{vg} 15-minute block averages shall be calculated for set 15-minute time periods starting at 12 midnight to 12:15 AM, 12:15 AM to 12:30 AM and so on, concluding at 11:45 PM to midnight.

Step 1a: Equation or Output to be Used to Determine NHV_{vg} at a Measurement Location

For any gas stream for which the Defendants comply with Paragraph 23 by collecting compositional analysis data in accordance with the method set forth in Paragraph 23.a: Equation 1 shall be used to determine the NHV_{vg} of a specific sample by summing the Net Heating Value for each individual component by individual component volume fractions. Individual component Net Heating Values are listed in Table 1 of this Appendix.

$$NHV_{vg} = \sum_{i=1}^n (x_i \cdot NHV_i) \quad \text{Equation 1}$$

For any gas stream for which the Defendants comply with Paragraph 23 by collecting direct Net Heating Value monitoring data in accordance with the method set forth in Paragraph 23.b but for which a Hydrogen Concentration Monitor is not used: Use the direct output (measured value) of the monitoring system(s) (in BTU/scf) to determine the NHV_{vg} for the sample.

For any gas stream for which the Defendants comply with Paragraph 23 by collecting direct Net Heating Value monitoring data in accordance with the method set forth in Paragraph 23.b and for which a Hydrogen Concentration Monitor is also used: Equation 2 shall be used to determine the NHV_{vg} for each sample measured via the Net Heating Value monitoring system. Where hydrogen concentration data is collected, Equation 2 performs a net correction for the measured heating value of hydrogen since the theoretical Net Heating Value for hydrogen is 274 Btu/scf, but for the purposes of this Consent Decree, a Net Heating Value of 1,212 Btu/scf may be used ($1,212 - 274 = 938$ BTU/scf).

$$NHV_{vg} = NHV_{measured} + 938x_{H2} \quad \text{Equation 2}$$

Step 1b: Calculation Method to be Used in Applying Equation/Output to Determine NHV_{vg}

For any Covered Flare for which the Defendants comply with Paragraph 23 by using a continuous monitoring system in accordance with the method set forth in Paragraph 23.a or 23.b: The Defendants may elect to determine the 15-minute block average NHV_{vg} using either the Feed-Forward Calculation Method or the Direct Calculation Method (both described below). The Defendants need not elect to use the same methodology at all Covered Flares with a continuous monitoring system; however, for each such Covered Flare, the Defendants must elect one calculation method that will apply at all times, and use that method for all continuously monitored flare vent streams associated with that Covered Flare. If the Defendants intend to change the calculation method that applies to a Covered Flare, the Defendants must notify the EPA 30 days in advance of such a change.

Feed-Forward Calculation Method. When calculating NHV_{vg} for a specific 15-minute block:

1. Use the results from the first sample collected during an event (for periodic Vent Gas flow events) for the first 15-minute block associated with that event.

2. If the results from the first sample collected during an event (for periodic Vent Gas flow events) are not available until after the second 15-minute block starts, use the results from the first sample collected during an event for the second 15-minute block associated with that event.
3. For all other cases, use the results that are available from the most recent sample prior to the 15-minute block period for that 15-minute block period for all Vent Gas streams. For the purpose of this requirement, use the time that the results become available rather than the time the sample was collected. For example, if a sample is collected at 12:25 AM and the analysis is completed at 12:38 AM, the results are available at 12:38 AM and these results would be used to determine compliance during the 15-minute block period from 12:45 AM to 1:00 AM.

Direct Calculation Method. When calculating NHV_{vg} for a specific 15-minute block:

1. If the results from the first sample collected during an event (for periodic Vent Gas flow events) are not available until after the second 15-minute block starts, use the results from the first sample collected during an event for the first 15-minute block associated with that event.
2. For all other cases, use the arithmetic average of all NHV_{vg} measurement data results that become available during a 15-minute block to calculate the 15-minute block average for that period. For the purpose of this requirement, use the time that the results become available rather than the time the sample was collected. For example, if a sample is collected at 12:25 AM and the analysis is completed at 12:38 AM, the results are available at 12:38 AM and these results would be used to determine compliance during the 15-minute block period from 12:30 AM to 12:45 AM.

Step 2: Determine Volumetric Flow Rates of Gas Streams

The Defendants shall determine the volumetric flow rate in standard cubic feet (scf) of Vent Gas, along with the volumetric flow rates (in scf) of any Supplemental Gas, Assist Steam, and Assist Air, over a 15-minute block average basis. The 15-minute block average volumetric flow rates shall be calculated for set 15-minute time periods starting at 12 midnight to 12:15 AM, 12:15 AM to 12:30 AM and so on, concluding at 11:45 PM to midnight.

For any gas streams for which the Defendants comply with Paragraph 20 by using a monitoring system that directly records volumetric flow rate: Use the direct output (measured value) of the monitoring system(s) (in scf), as corrected for the temperature and pressure of the system to standard conditions (i.e., a temperature of 20 °C (68 °F) and a pressure of 1 atmosphere) to then calculate the average volumetric flow rate of that gas stream for the 15-minute block period.

For Vent Gas, Assist Steam, or Assist Air gas streams for which the Defendants comply with Paragraph 20 by using a mass flow monitor to determine volumetric flow rate: Equation 3 shall be used to determine the volumetric flow rate of Vent Gas, Assist Air, or Assist Steam by converting mass flow rate to volumetric flow at standard conditions (i.e., a temperature

of 20 °C (68 °F) and a pressure of 1 atmosphere). Equation 3 uses the molecular weight of the gas stream as an input to the equation; therefore, if the Defendants elect to use a mass flow monitor to determine volumetric flow rate of Vent Gas, the Defendants must collect compositional analysis data for such Vent Gas in accordance with the method set forth in Paragraph 23.a. For Assist Steam, use a molecular weight of 18 pounds per pound-mole. For Assist Air, use a molecular weight of 29 pounds per pound-mole. The converted volumetric flow rates at standard conditions from Equation 3 shall then be used to calculate the average volumetric flow rate of that gas stream for the 15-minute block period.

$$Q_{vol} = \frac{Q_{mass} * 385.3}{MWt} \quad \text{Equation 3}$$

For gas streams for which the molecular weight of the gas is known and for which the Defendants comply with Paragraph 20 by using continuous pressure/temperature monitoring system(s): Use appropriate engineering calculations to determine the average volumetric flow rate of that gas stream for the 15-minute block period. For Assist Steam, use a molecular weight of 18 pounds per pound-mole. For Assist Air, use a molecular weight of 29 pounds per pound-mole. For Vent Gas, molecular weight must be determined by collecting compositional analysis data for such Vent Gas in accordance with the method set forth in Paragraph 23.a.

Step 3: Calculate the Net Heating Value of the Combustion Zone Gas (NHV_{cz})

For any Covered Flare at which: 1) the Feed-Forward Calculation Method is used; 2) gas composition or Net Heating Value monitoring is performed in a location representative of the cumulative Vent Gas stream; and 3) Supplemental Gas flow additions to the Flare are directly monitored: Equation 4 shall be used to determine the 15-minute block average NHV_{cz} based on the 15-minute block average Vent Gas, Pilot Gas, Supplemental Gas, and assist gas flow rates.

$$NHV_{cz} = \frac{(Q_{vg} - Q_{NG2} + Q_{NG1}) * NHV_{vg} + (Q_{NG2} - Q_{NG1}) * NHV_{NG} + (Q_{pg} * NHV_{pg})}{Q_{vg} + Q_s + Q_{pg}} \quad \text{Equation 4}$$

For the first 15-minute block period of an event, Q_{NG1} shall use the volumetric flow value for the current 15-minute block period (i.e. $Q_{NG1} = Q_{NG2}$). NHV_{NG} shall be determined using one of the following methods: 1) direct compositional or Net Heating Value monitoring of the natural gas stream in accordance with Step 1; or 2) for purchased (“pipeline quality”) natural gas streams, the Defendants may elect to either: a) use annual or more frequent grab sampling at any one representative location; or b) assume a Net Heating Value of 920 BTU/scf.

For all other Covered Flares: Equation 5 shall be used to determine the 15-minute block average NHV_{cz} based on the 15-minute block average Vent Gas and assist gas flow rates. For periods when there is no Assist Steam flow or Assist Air flow, $NHV_{cz} = NHV_{vg}$.

$$NHV_{cz} = \frac{(Q_{vg} * NHV_{vg}) + (Q_{pg} * NHV_{pg})}{Q_{vg} + Q_s + Q_{pg}} \quad \text{Equation 5}$$

Step 4: Calculate the Net Heating Value Dilution Parameter (NHV_{dil})

For any Covered Flare at which: 1) the Feed-Forward Calculation Method is used; 2) gas composition or Net Heating Value monitoring is performed in a location representative of the cumulative Vent Gas stream; and 3) Supplemental Gas flow additions to the Flare are directly monitored: Equation 6 shall be used to determine the 15-minute block average NHV_{dil} only during periods when Perimeter Assist Air is used. For 15-minute block periods when there is no cumulative volumetric flow of Perimeter Assist Air, the 15-minute block average NHV_{dil} parameter does not need to be calculated.

$$NHV_{dil} = \frac{[(Q_{vg} - Q_{NG2} + Q_{NG1}) * NHV_{vg} + (Q_{NG2} - Q_{NG1}) * NHV_{NG} + (Q_{pg} * NHV_{pg})] * Diam}{(Q_{vg} + Q_s + Q_{pg} + Q_{a,perimeter})} \quad \text{Equation 6}$$

For the first 15-minute block period of an event, Q_{NG1} shall use the volumetric flow value for the current 15-minute block period (i.e. $Q_{NG1} = Q_{NG2}$). NHV_{NG} shall be determined using one of the following methods: 1) direct compositional or Net Heating Value monitoring of the natural gas stream in accordance with Step 1; or 2) for purchased (“pipeline quality”) natural gas streams, the Defendants may elect to either: a) use annual or more frequent grab sampling at any one representative location; or b) assume a Net Heating Value of 920 BTU/scf.

For all other Covered Flares: Equation 7 shall be used to determine the 15-minute block average NHV_{dil} based on the 15-minute block average Vent Gas and Perimeter Assist Air flow rates, only during periods when Perimeter Assist Air is used. For 15-minute block periods when there is no cumulative volumetric flow of Perimeter Assist Air, the 15-minute block average NHV_{dil} parameter does not need to be calculated.

$$NHV_{dil} = \frac{[(Q_{vg} * NHV_{vg}) + (Q_{pg} * NHV_{pg})] * Diam}{(Q_{vg} + Q_s + Q_{pg} + Q_{a,perimeter})} \quad \text{Equation 7}$$

Step 5: Ensure that during Flare operation, $NHV_{vg} \geq 300$ BTU/scf

The Flare must be operated to ensure that NHV_{vg} is equal to or above 300 BTU/scf (Equation 8 shows this relationship), as determined for:

1. Each 15-minute block period during which Waste Gas is routed to a Covered Flare for all 15-minutes (a “Complete 15-minute Block Period”), and
2. Any 15-minute block period during which Waste Gas is routed to a Covered Flare for less than all 15-minutes (a “Partial 15-Minute Block Period”), and is immediately subsequent and contiguous to a Complete 15-minute Block Period.

Partial 15-Minute Block Periods are not required to achieve a NHV_{vg} equal to or above 300 BTU/scf if they immediately precede a Complete 15-minute Block Period.

$$NHV_{vg} \geq 300 \text{ BTU/scf} \qquad \text{Equation 8}$$

Step 6: Ensure that during Flare operation, $NHV_{cz} \geq 270$ BTU/scf

The Flare must be operated to ensure that NHV_{cz} is equal to or above 270 BTU/scf (Equation 8 shows this relationship), as determined for:

1. Each Complete 15-minute Block Period, and
2. Any Partial 15-Minute Block Period that is immediately subsequent and contiguous to a Complete 15-minute Block Period.

Partial 15-Minute Block Periods are not required to achieve a NHV_{cz} equal to or above 270 BTU/scf if they immediately precede a Complete 15-minute Block Period.

$$NHV_{cz} \geq 270 \text{ BTU/scf} \qquad \text{Equation 9}$$

Step 7: Ensure that during Flare operation, $NHV_{dil} \geq 22$ BTU/ft²

A Flare actively receiving Perimeter Assist Air must be operated to ensure that NHV_{dil} is equal to or above 22 BTU/ft² (Equation 9 shows this relationship), as determined for:

1. Each Complete 15-minute Block Period, and
2. Any Partial 15-Minute Block Period that is immediately subsequent and contiguous to a Complete 15-minute Block Period.

Partial 15-Minute Block Periods are not required to achieve a NHV_{dil} equal to or above 22 BTU/ft² if they immediately precede a Complete 15-minute Block Period.

$$NHV_{dil} \geq 22 \text{ BTU/ft}^2 \qquad \text{Equation 10}$$

Calculation Method for Determining Compliance with Vtip Operating Limits.

Defendants shall determine Vtip on a 15-minute Block Average basis according to the following requirements:

(a) Defendants shall use design and engineering principles and the guidance in Appendix 1.3 to determine the Unobstructed Cross Sectional Area of the Flare Tip. The Unobstructed Cross Sectional Area of the Flare Tip is the total tip area that Vent Gas can pass through. This area does not include any stability tabs, stability rings, and upper steam or air tubes because Vent Gas does not exit through them.

(b) Defendants shall determine the cumulative volumetric flow of Vent Gas for each 15-minute Block Average Period using the data from the continuous flow monitoring system required in Paragraph 20 according to the requirements in Step 2 above.

(c) The 15-minute Block Average Vtip shall be calculated using Equation 11.

$$V_{tip} = \frac{Q_{cum}}{Area \times 900} \quad \text{Equation 11}$$

(d) If the Defendants choose to comply with Paragraph 40.a.ii, Defendants shall also determine the NHV_{vg} using Step 1 above and calculate V_{max} using Equation 12 in order to compare Vtip to V_{max} on a 15-minute Block Average basis.

$$\log_{10}(V_{max}) = \frac{NHV_{vg} + 1,212}{850} \quad \text{Equation 12}$$

Key to the Abbreviations:

385.3 = conversion factor (scf/lb-mol)

850 = Constant

900 = Conversion factor, (seconds / 15-minute block average)

1,212 = Constant for heating value of hydrogen (H₂)

Area = The unobstructed cross sectional area of the flare tip is the total tip area that Vent Gas can pass through, ft². This area does not include any stability tabs, stability rings, and upper steam or air tubes because Flare Vent Gas does not exit through them. Use design and engineering principles to determine the unobstructed cross sectional area of the Flare tip.

Diam = Effective diameter of the unobstructed area of the flare tip for Flare Vent Gas flow, ft. Determine the diameter as $Diam = 2 * \sqrt{Area \div \pi}$

i = individual component in Vent Gas (unitless)

MWt = molecular weight of the gas at the flow monitoring location (lb/lb-mol)

n = number of components in Vent Gas (unitless)

NHV_{CZ} = Net Heating Value of Combustion Zone Gas (BTU/scf)

NHV_{*i*} = Net Heating Value of component *i* according to Table 1 of this Appendix (BTU/scf)

NHV_{measured} = Net Heating Value of Vent Gas stream as measured by monitoring system (BTU/scf)

NHV_{NG} = Net Heating Value of Supplemental Gas to flare during the 15 – minute block period (BTU/scf)

NHV_{pg} = Net Heating Value of Pilot Gas (BTU/scf)

NHV_{vg} = Net Heating Value of Vent Gas (BTU/scf)

Q_{a,perimeter} = cumulative vol flow of perimeter assist air during the 15 – minute block period (scf)

Q_{cum} = cumulative volumetric flow over 15-minute block average period (actual cf)

Q_{mass} = massflow rate (pounds per second)

Q_{NG1} = cumulative vol flow of Supplemental Gas to flare during previous 15 – minute block period (scf)

Q_{NG2} = cumulative vol flow of Supplemental Gas to flare during the 15 – minute block period (scf)

Q_{pg} = cumulative vol flow of Pilot Gas during the 15 – minute block period (scf)

Q_s = cumulative vol flow of Total Steam during the 15 – minute block period (scf)

Q_{vg} = cumulative vol flow of Vent Gas during the 15 – minute block period (scf)

Q_{vol} = volumetric flow rate (scf per second)

V_{max} = Maximum allowed flare tip velocity (feet per second)

V_{tip} = Flare tip velocity (feet per second)

x_i = concentration of component *i* in Vent Gas (vol fraction)

x_{H2} = concentration of H₂ in Vent Gas at time sample was input into NHV monitoring system (vol fraction)

Table 1
Individual Component Properties

Component	Molecular Formula	MW_i (pounds per pound-mole)	CMN_i (mole per mole)	NHV_i (British thermal units per standard cubic foot)	LFL_i (volume %)
Acetylene	C ₂ H ₂	26.04	2	1,404	2.5
Benzene	C ₆ H ₆	78.11	6	3,591	1.3
1,2-Butadiene	C ₄ H ₆	54.09	4	2,794	2.0
1,3-Butadiene	C ₄ H ₆	54.09	4	2,690	2.0
iso-Butane	C ₄ H ₁₀	58.12	4	2,957	1.8
n-Butane	C ₄ H ₁₀	58.12	4	2,968	1.8
cis-Butene	C ₄ H ₈	56.11	4	2,830	1.6
iso-Butene	C ₄ H ₈	56.11	4	2,928	1.8
trans-Butene	C ₄ H ₈	56.11	4	2,826	1.7
Carbon Dioxide	CO ₂	44.01	1	0	∞
Carbon Monoxide	CO	28.01	1	316	12.5
Cyclopropane	C ₃ H ₆	42.08	3	2,185	2.4
Ethane	C ₂ H ₆	30.07	2	1,595	3.0
Ethylene	C ₂ H ₄	28.05	2	1,477	2.7
Hydrogen	H ₂	2.02	0	1,212 ^A	4.0
Hydrogen Sulfide	H ₂ S	34.08	0	587	4.0
Methane	CH ₄	16.04	1	896	5.0
Methyl-Acetylene	C ₃ H ₄	40.06	3	2,088	1.7
Nitrogen	N ₂	28.01	0	0	∞
Oxygen	O ₂	32.00	0	0	∞
Pentane+ (C5+)	C ₅ H ₁₂	72.15	5	3,655	1.4
Propadiene	C ₃ H ₄	40.06	3	2,066	2.16
Propane	C ₃ H ₈	44.10	3	2,281	2.1
Propylene	C ₃ H ₆	42.08	3	2,150	2.4
Water	H ₂ O	18.02	0	0	∞

^A The theoretical Net Heating Value for hydrogen is 274 Btu/scf, but for the purposes of this Consent Decree, a Net Heating Value of 1,212 Btu/scf shall be used.

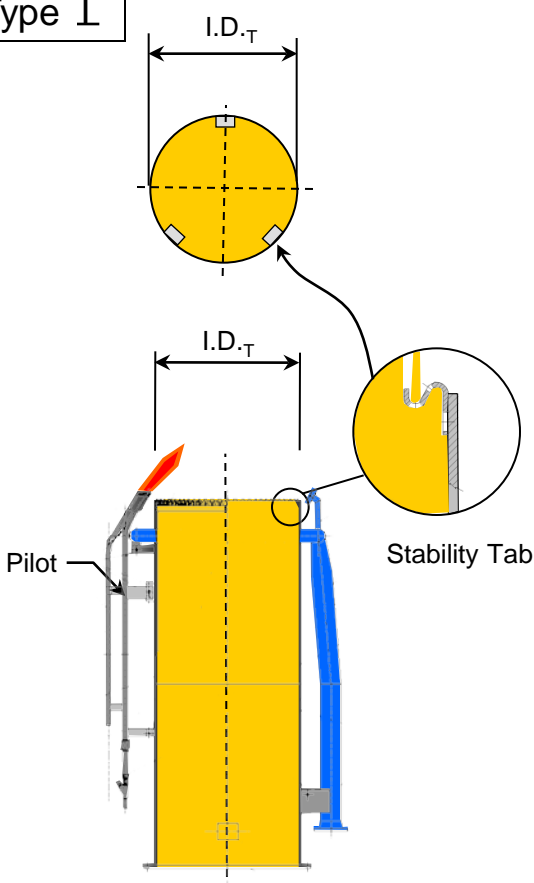
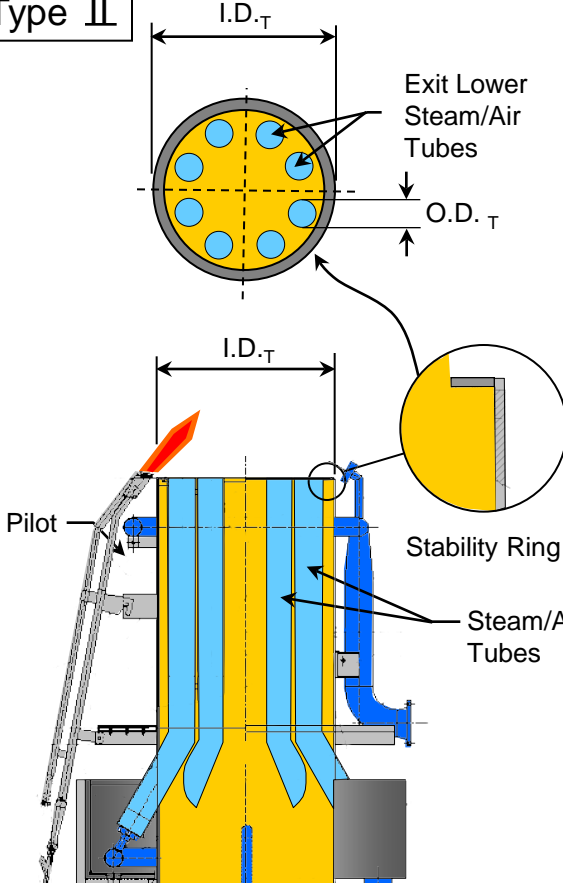
Note: If a component is not specified in this Table 1, the heats of combustion may be determined using any published values where the net enthalpy per mole of offgas is based on combustion at 25 °C and 1 atmosphere (or constant pressure) with offgas water in the gaseous state, but the standard temperature for determining the volume corresponding to one mole of Vent Gas is 20 °C.

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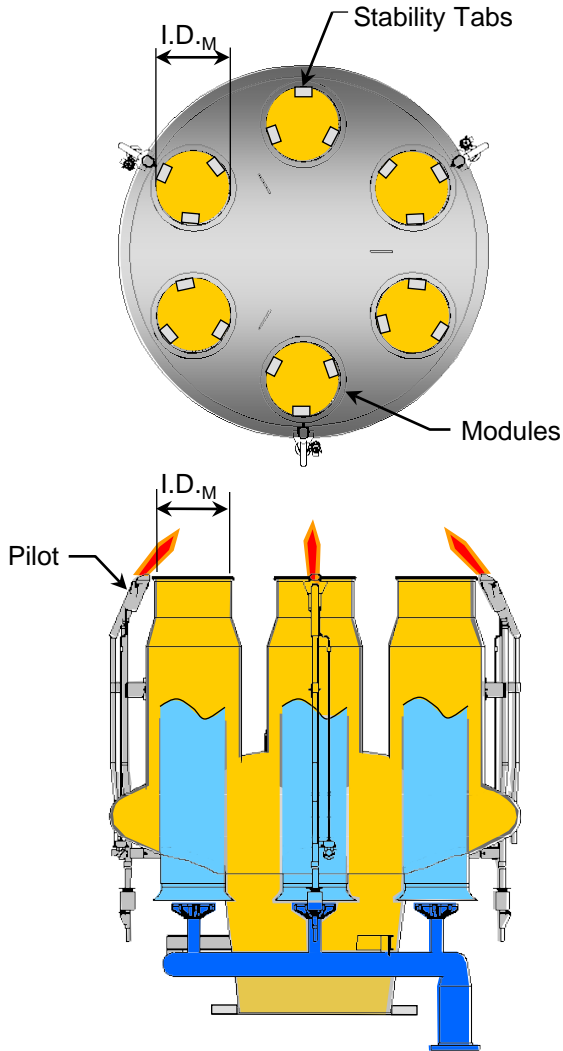
APPENDICES TO CONSENT DECREE

APPENDIX 1.3

**Calculating the Unobstructed Cross Sectional Area of Various
Types of Flare Tips**

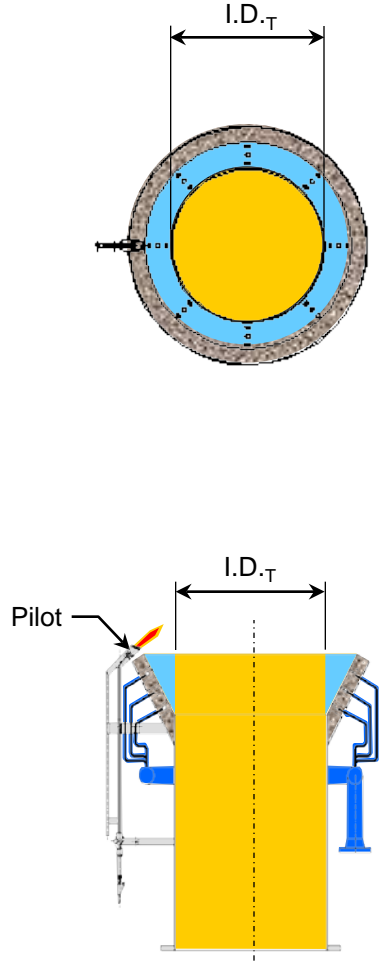
<div style="display: flex; justify-content: space-between;"> Type I Type II </div>  <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> $A_{tip-unob} = \pi(I.D.T)^2/4 - (X_T * A_{ST})$ </div>	 <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> $A_{tip-unob} = \pi(I.D.T)^2/4 - A_{ST} - N_T * \pi * (O.D.T)^2/4$ </div>
<p>Where:</p> <ul style="list-style-type: none"> $A_{tip-unob}$ = Unobstructed Cross Sectional Area of Flare Tip $I.D.T$ = Inside Diameter Flare Tip X_T = Number of Stability Tabs A_{ST} = Area of a Stability Tab 	<p>Where:</p> <ul style="list-style-type: none"> $A_{tip-unob}$ = Unobstructed Cross Sectional Area of Flare Tip $I.D.T$ = Inside Diameter Flare Tip A_{ST} = Area of Stability Ring $O.D.T$ = Outside Diameter of Steam/Air Tubes N_T = Number of Steam/Air Tubes
<p>Example: $I.D.T = 41.5$ inches $X_T = 3$ $A_{ST} = 3$ Sq. inches</p>	<p>Example: $I.D.T = 47.5$ inches $A_{ST} = 100$ Sq. inches $O.D.T = 6.5$ inches $N_T = 8$</p>
<p>$A_{tip-unob} = \pi(41.5)^2/4 - (3 * 3)$ $A_{tip-unob} = 1344$ Sq. inches</p>	<p>$A_{tip-unob} = \pi(47.5)^2/4 - 100 - 8 * \pi * (6.5)^2/4$ $A_{tip-unob} = 1322$ Sq. inches</p>

Type III



$$A_{tip-unob} = N_M * (\pi * (I.D._M)^2 / 4 - X_T * A_{ST})$$

Type IV



$$A_{tip-unob} = \pi (I.D._T)^2 / 4$$

Where: $A_{tip-unob}$ = Unobstructed Cross Sectional Area of Flare Tip
 $I.D._M$ = Inside Diameter of One Tip Module
 N_M = Number of Modules
 X_T = Number of Stability Tabs per Module
 A_{ST} = Area of a Stability Tab

Where: $A_{tip-unob}$ = Unobstructed Cross Sectional Area of Flare Tip
 $I.D._T$ = Inside Diameter of Flare Tip

Example: $I.D._M = 17$ inches
 $N_M = 6$ $X_T = 3$
 $A_{ST} = 3$ Sq. inches

Example: $I.D._T = 41.5$ inches

$$A_{tip-unob} = 6 * (\pi * (17)^2 / 4 - 3 * 3)$$

$$A_{tip-unob} = 1308 \text{ Sq. inches}$$

$$A_{tip-unob} = \pi (41.5)^2 / 4$$

$$A_{tip-unob} = 1353 \text{ Sq. inches}$$

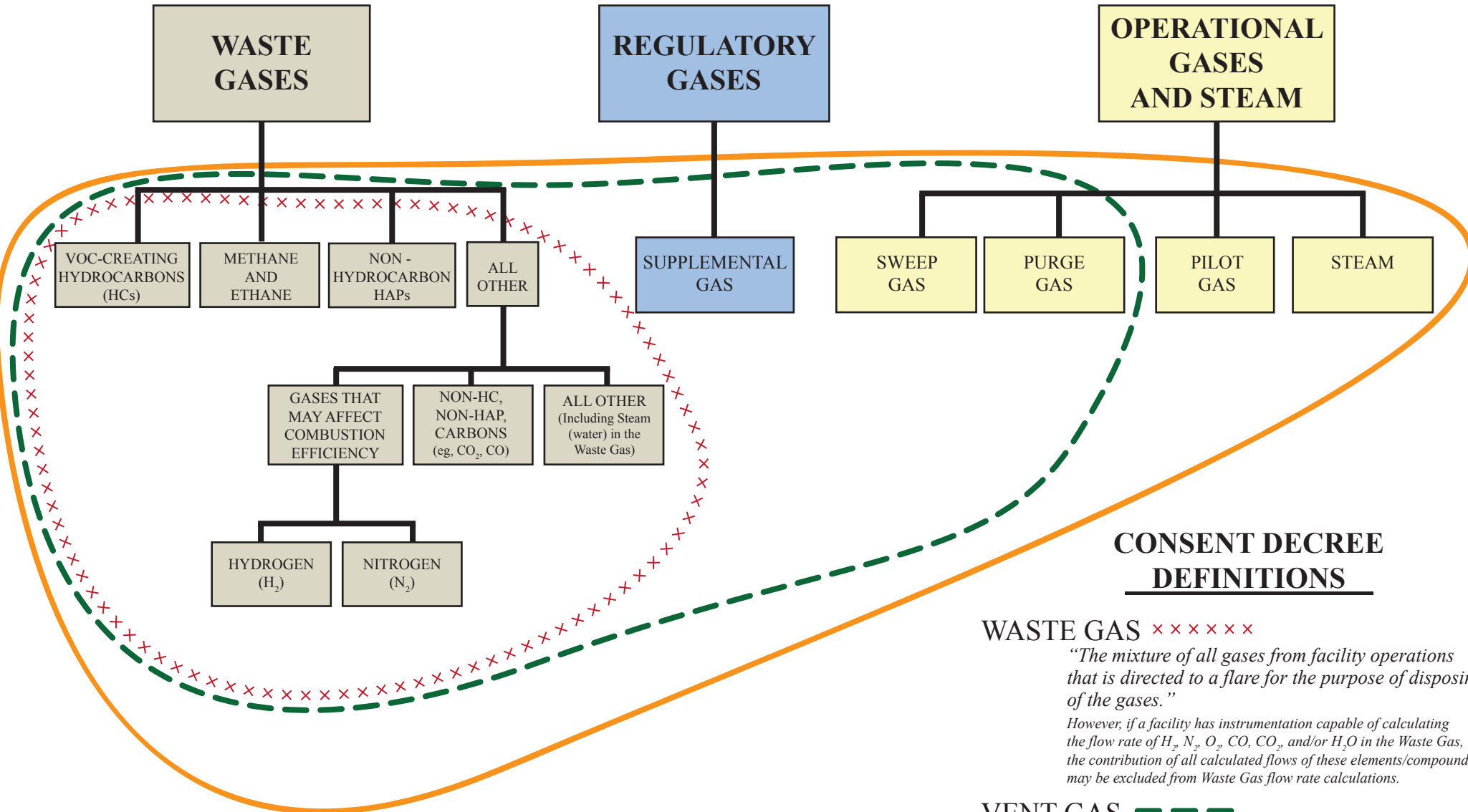
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APPENDIX 1.4

Depiction of Gases Associated with Steam-Assisted Flares

DEPICTION OF GASES ASSOCIATED WITH STEAM-ASSISTED FLARES



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WASTE GAS x x x x x
“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 H₂, N₂, O₂, CO, CO₂, and/or H₂O 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.”

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APPENDIX 1.5

**Outline of Requirements for the Flare Data and Initial Monitoring
Systems Report**

APPENDIX 1.5

**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 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
 - 3.2.1 Date installed
 - 3.2.2 Manufacturer
 - 3.2.3 Tip Size
 - 3.2.4 Tip Drawing
 - 3.2.5 Smokeless design capacity
 - 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 1.5

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)
 - 7.6 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 and show(s) its(their) location in relation to the location of the introduction of the other gases is all that is required)

APPENDIX 1.5

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
 - 8.1.3 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 or Calorimeter
 - 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

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APPENDIX 1.6

**Interim Specifications for Existing Gas Chromatographs at
Baytown Facilities**

APPENDIX 1.6

1. Duration of Interim Specifications.

- a. By no later than the Effective Date and until December 31, 2018, the Gas Chromatographs (GCs) existing at the Baytown Facilities may be used to determine the concentration of individual components in the Vent Gas for the purpose of monitoring the Vent Gas Net Heating Value at the Baytown Flares.
- b. Until December 31, 2018, if an existing GC is used, the Defendants may determine the Net Heating Value of the Vent Gas, Net Heating Value of the Combustion Zone Gas, and all required inputs on a 1-hour block average basis in lieu of the 15-minute basis required by Paragraphs 23(a), 26, and 43 of the Consent Decree.
- c. Until December 31, 2018, if an existing GC is used, it may meet or exceed the following specifications, calibration, quality control and maintenance requirements in Paragraph 2 of this Appendix in lieu of the corresponding requirements in Paragraphs 25(a)(i) and (c) of the Consent Decree (“Interim Specifications, Calibration, Quality Control, and Maintenance”).
- d. After December 31, 2018, any GC at the Baytown Facilities that is used to comply with the Consent Decree’s compliance requirements must comply with all requirements of Paragraphs 23(a), 25, 26, and 43 of the Consent Decree.
- e. Prior to December 31, 2018, the Defendants shall have 12 hours of downtime for each GC at the Baytown Facilities in addition to the amount of Instrument Downtime permitted in Paragraph 45 of the Consent Decree in order to enable the tie in of a calorimeter at each GC location. This additional 12 hours of downtime shall be allotted in the Calendar Quarter in which the tie in occurs at each GC.

2. Interim Specifications, Calibration, Quality Control, and Maintenance for GCs Existing at the Baytown Facilities as of the Effective Date.

a. Existing GCs at the Baytown Facilities that are used to determine Net Heating Value must follow the procedure in Performance Specification 9 of 40 C.F.R. Part 60, Appendix B, except:

- i. Weekly mid-level calibration checks may be used (rather than daily, triplicate analysis),
- ii. Multi-point calibration checks may be conducted quarterly (rather than monthly) for ethylene, propylene, and butylene isomers (cis-2-butene, trans-2-butene, and 1-butene and isobutylene), and 1,3 butadiene. At a minimum, a

monthly single-point calibration check and single-point calibration error determination will be conducted for all other analytes listed in Paragraph 2.c.i.,

- (I) The minimum acceptable range for the single-point calibration gas for the following analytes (as applicable for the Flare) must be:
 - i. Acetylene: 0.1-2 mol%;
 - ii. Argon (for Oxygen): 0.1-2 mol%;
 - iii. Carbon Dioxide: 0.2-2 mol%;
 - iv. Carbon Monoxide: 0.2-2 mol%;
 - v. Ethane: 0.2-10 mol%;
 - vi. Hydrogen: 0.5-30 mol%;
 - vii. Isobutane: 0.1-3 mol%;
 - viii. Isopentane: 0.5-7 mol%;
 - ix. Methane: 5-65 mol%;
 - x. Methyl Chloride: 0-7 mol%;
 - xi. N-Butane: 0.2-2 mol%;
 - xii. Nitrogen: as needed balance mol%; and
 - xiii. Propane: 0.2-12 mol%

iii. Sampling line system and sampling components (*e.g.*, probe sampling line, calibration valve, and sampling loop (or sampling introduction system)) temperature must be maintained at a minimum temperature of 60 °C (rather than 120 °C), and

iv. For the Baytown Flares, entry of this Consent Decree will satisfy the requirements in Performance Specification 9 of 40 C.F.R. Part 60, Appendix B, for the pre-survey sample analysis and GC selection.

b. Existing GCs at the Baytown Facilities that are used to determine Net Heating Value must be capable of measuring the appropriate parameter over the range of values expected for that measurement location, except that these GCs will directly measure hydrogen from 0-20 mol%. In determining the NHV_{vg} , the Defendants may not use a value for hydrogen that is greater than 20 mol% of the individual Vent Gas component concentrations; and

c. Existing GCs at the Baytown Facilities must also meet the requirements of 40 C.F.R. § 63.671(e)(1) through (3) (Additional Requirements for Gas Chromatographs) except:

- i. The GCs at those three facilities shall be capable of speciating the following compounds:
 - 1) Hydrogen
 - 2) Nitrogen
 - 3) Carbon Dioxide

- 4) Methane
- 5) Ethane
- 6) Ethene (a.k.a.: Ethylene)
- 7) Propane
- 8) Propene (a.k.a.: Propylene)
- 9) 2-Methylpropane (a.k.a.: iso-Butane)
- 10) Butane (a.k.a.: n-Butane)
- 11) But-1-ene (a.k.a.: butene, alpha-butylene) and 2-methylpropene (a.k.a.: iso-butylene, iso-butene) (these two constituents will be measured on the same column and the reported result will be one value: the sum of the two constituents)
- 12) E-but-2-ene (a.k.a.: beta-butylene, trans-butene)
- 13) Z-but-2-ene (a.k.a.: beta-butylene, cis-butene)
- 14) 1,3 butadiene
- 15) Pentane plus (a.k.a.: C₅+) (*i.e.*, all HCs with five Cs or more);

ii. The Defendants may use Iso-Pentane and the Iso-Pentane response factor to quantify all C₅+ hydrocarbons in lieu of n-Pentane and the n-Pentane response factor required by 40 C.F.R. § 63.671(e)(2)(i)(K); and

iii. The Defendants may use calibration gas that includes one or more of the following additional optional compounds:

- 1) Acetylene (used for correction of propylene if acetylene can be present),
- 2) Argon (for Oxygen),
- 3) Carbon Monoxide,
- 4) Methyl Chloride, and
- 5) Nitrogen.

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APPENDIX 1.7

**Waste Gas Mapping: Level of Detail Needed to Show Main Headers
and Process Unit Headers**

APPENDIX 1.7

**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 Initial Waste Gas Minimization Plan (“Initial WGMP”) and, as needed, later updated.

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 Initial WGMP:

1. A simplified schematic consistent with the example schematic included on the second page of this Appendix.
2. A 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.

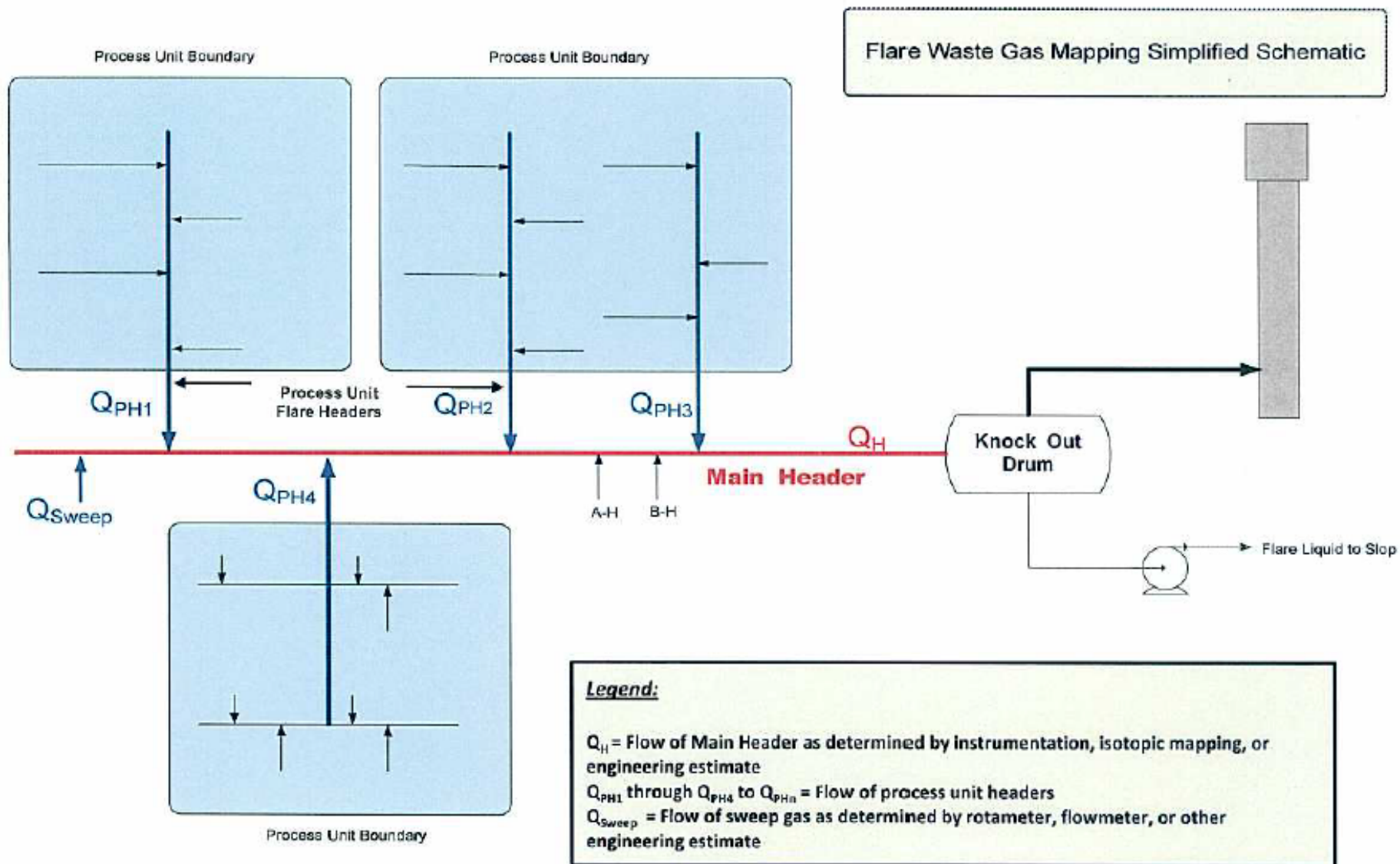


Table 1: Example of Flare Source Description Table

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

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APPENDIX 1.8

Flare Gas Recovery Systems – Description and Compliance Dates

Appendix 1.8

Flare Gas Recovery Systems – Description and Compliance Dates

Covered Facility	Covered Flares	FGRS Nominal Design Capacity (mscf/Day)	FGRS ID / Nominal Design Capacity (mscf/Day)	FGRS Type	Compliance Deadline for Installation and Commencing Operation
Baton Rouge Chemical Plant	Flare 10; Flare 16; Flare 25; and Flare 26	3.8	C-101A (1.9) C-101B (1.9)	2 compressor system: 2 reciprocating compressors	Effective Date
Baytown Chemical Plant	FS-9; FS-23; and FS-24	5.0	C-604 A (1.7) C-604B (1.7) C-4755 (0.2) C-8755 (0.6) C-506 (0.8)	5 compressor system: 3 reciprocating compressors; 1 liquid ring; 1 rotary screw	Effective Date
Baytown Olefins Plant	Primary Flare; Secondary Flare; and BOP-X Flare	5.3	C-03 (5.3)	1 compressor, with warehouse spare: 1 screw compressor	Effective Date
Beaumont Chemical Plant	LP East; HP West; and UDEX	2.9	2.9	1 compressor with 1 installed Duplicate Spare Compressor: (Liquid jet ejector compressor system)	6/30/2020

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APPENDIX 2.1

**Supplemental Environmental Project (“SEP”) and
State Beneficial Environmental Projects (“BEPs”)**

Appendix 2.1

The Defendants shall spend at least \$2,572,000 to implement the Federal Supplemental Environmental Project (“SEP”) and State Beneficial Environmental Projects (“BEPs”) described below (collectively referred to as “Project(s)”). These Projects shall comply with the requirements of this Appendix and with Section VI (“Supplemental Environmental Projects”) of this Consent Decree. All reporting on the Projects will be done consistent with Section X (“Reporting Requirements”) of the Consent Decree and this Appendix.

The compliance deadlines for the SEP may be extended by a written, mutual agreement between the United States and the Defendants. The compliance deadlines for the BEPs may be extended by a written, mutual agreement among the Parties.

I. Federal SEP.

Baytown Area Phyto-Pollution Reduction SEP.

Purpose:

The purpose of the Baytown Area Phyto-Pollution Reduction SEP is to improve air quality and achieve other environmental benefits through the planting of trees in areas in the City of Baytown, Texas. Approximately 50% of the total number of trees to be planted will be planted within a 1-mile radius of the Defendants’ Baytown Facilities. The remaining trees will be planted within a 4-mile radius of the Defendants’ Baytown Facilities. All locations where trees will be planted are depicted in the attached map (“Legend for Tree Locations”). The environmental benefits are expected to include, among others, the reduction of ozone, nitrogen dioxide, sulfur dioxide, and particulates, as well as the generation of oxygen, resulting in improved air quality; and the reduction of carbon dioxide, a greenhouse gas. Trees planted near high-traffic roadways also act as vegetative buffers which reduce the transport of particulate emissions from roadway traffic. Roadside vegetation has been shown to reduce a population’s exposure to air pollution through the interception of airborne particles and through the uptake of gaseous air pollution via leaf stomata, in addition to affecting pollutant transport and dispersion.

The Baytown Area Phyto-Pollution Reduction SEP is expected to supplement the number of trees which would normally be planted in the communities near the Baytown Facilities by the City of Baytown using its own funds. Thus, the City of Baytown will not reduce the amount of its own funds expended for tree planting in the SEP-designated areas as a result of these funds.

Scope:

The Defendants will enter into an agreement with the City of Baytown Parks and Recreation Department (“Baytown PARD”) which ensures the Baytown PARD will plant approximately 1,458 trees in designated areas in Baytown as defined below. The trees will be placed in existing wells in sidewalk locations or new ones will be created. The trees will be one of the species on the following Table of Acceptable Tree Species, all of which have been pre-approved by Baytown PARD. The trees will be at least 2.5 caliper and at least 8 feet in height at the time of planting, unless Baytown PARD approves a smaller size. The agreement between the Defendants and the Baytown PARD will also ensure that trees planted under the Baytown Area

Appendix 2.1

Phyto-Pollution Reduction SEP are covered by a warranty of at least two years and are inspected pursuant to Baytown PARD contracted tree planting specifications during the two-year period.

The Defendants may submit a request for EPA's review and approval that proposes other tree species that may be used to fulfill the requirements of this SEP in addition to those listed in the Table of Acceptable Tree Species. Any additional tree species proposed must meet the same specifications listed in this SEP, and the Defendants must submit data quantifying potential VOC emissions from the proposed species. EPA's decision to approve or deny the Defendants' request will not be subject to judicial review.

In implementing the Baytown Area Phyto-Pollution Reduction SEP, the Defendants will spend approximately \$1,000,000 in SEP Eligible Costs. SEP Eligible Costs shall only include the costs of acquiring the trees, planting trees, and work directly related to such planting (such as sidewalk preparation, soil preparation, staking, etc.). SEP Eligible Costs shall not include any administrative costs incurred by Baytown PARD, the City of Baytown, or others in connection with the SEP or otherwise.

Project Schedule:

The Baytown Area Phyto-Pollution Reduction SEP will be implemented in five (5) phases:

- Phase 1: Approximately 292 trees shall be planted during the fall of 2018.
- Phase 2: Approximately 292 trees shall be planted during the spring of 2019.
- Phase 3: Approximately 292 trees shall be planted during the fall of 2019.
- Phase 4: Approximately 291 trees shall be planted during the spring of 2020.
- Phase 5: Approximately 291 trees shall be planted during the fall of 2020.

The phasing set forth above may be revised by mutual, written agreement of the Defendants and the EPA to account for the availability of trees and other factors, as long as the entire amount of approximately 1,458 trees is planted by December 31, 2020. The timing of any of the phases may also be revised by mutual, written agreement to allow for the trees to be planted under the best weather conditions possible.

SEP Reports:

At least once per calendar year as part of a Semi-Annual Report required by Section X of the Consent Decree (Reporting Requirements), until this SEP is completed, the Defendants shall submit to EPA a report that identifies the locations of the trees planted, the species of trees planted, and an itemization of the SEP Eligible Costs incurred since the last report submitted by the Defendants. In addition, each report shall explain any problems encountered in performing the SEP and any proposed solutions.

As part of the first Semi-Annual Report due after the Phase 5 planting is completed, the Defendants shall include a completion report for the Baytown Area Phyto-Pollution Reduction SEP that: i) identifies the locations of all of the trees planted, ii) identifies the species of all of the

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trees planted, iii) includes an itemized listing of all SEP Eligible Costs expended (including backup documentation), iv) identifies any trees that needed to be replaced during the warranty period as of the date of the report, and v) estimates the environmental benefits achieved as a result of the Baytown Area Phyto-Pollution Reduction SEP. EPA may, in its sole discretion, require information in addition to that described above reasonably necessary to determine the adequacy of project completion or the eligibility of SEP Eligible Costs expended and the Defendants shall provide such information.

Project Planting Details:

- A. The trees will be planted in nine (9) primary areas around Baytown, Texas, as described below. The Baytown PARD has chosen these locations for tree plantings in an effort to maximize their environmental and public health benefits:
1. Along major thoroughfares lacking in tree cover:
 - a. That are key entries to the city:
 - i. Spur 330 & I-110,
 - ii. SH 146 to Main, and
 - iii. SH 146 Business to South Alexander Drive;
 - b. Areas along 330 near the Defendants' Baytown Facilities.
 2. At various city parks, at entrances with little or no trees.
 3. Within large city parks, along park roads which have little or no trees to create shaded corridors.
 4. In and around park parking lots to reduce the heat island effect.
 5. Along jogging and walking trails within city parks.
 6. Along the Goose Creek Trail System where trees can be planted and are currently unavailable to provide shade.
 7. At existing picnic areas where shade shelters do not provide adequate shade.
 8. At key locations within parks which need screening or shade
 9. During each seasonal planting, a percentage of trees from 5% to 10% will be reserved for locations within parks where new projects are taking place which were unforeseen or unexpected at the time this proposal was created.
- B. The current estimate is to plant 1,458 trees sized in the following manner within the areas listed immediately above. The percentages were worked out in order to try to balance the number of each size of tree to be planted:
- | | |
|------------|-----|
| 30 gallon: | 16% |
| 45 gallon: | 23% |
| 65 gallon: | 27% |

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100 gallon: 34%

- C. Species of trees to be planted conform to the Baytown PARD's usual list of trees selected for mass plantings during past efforts to green park and public areas or to provide perimeter buffers at new parks. The actual numbers of each species to be planted will be determined by the sites chosen and based on the varieties of trees already existing within the parks or other facilities or the varieties needed for environmental balance as well as a balance between evergreen and deciduous species.

List of Acceptable Tree Species			
Common Name	Scientific Name		
River Birch	Betula	Nigra	
Cedar elm	Ulmus	crassifolia	
Drummond Red Maple	Acer	rubrum	var dummondii
Red Maple	Acer	rubrum	
Basham Crape Myrtle	Lagerstroemia	Indica	'Basham'
Eastern Redbud	Cercis	canadensis	
Eastern Redbud	Cercis	canadensis	'Forest Pansy'
Little Gem Magnolia	Magnolia	grandiflora	'Little Gem'
Sweetbay Magnolia	Magnolia	virginiana	
Bald Cypress	Taxodium	distichum	
Pecan	Carya	Illinoensis	
Pride of Houston Yaupon Holly	Ilex	vomitorea	
Possumhaw Holly	Ilex	decidua	
Possumhaw viburnum	Viburnum	nudum	

Appendix 2.1

II. State BEPs.

A. Baton Rouge Area Mobile Monitoring Lab BEP.

Purpose:

This BEP requires the Defendants to purchase a new mobile air monitoring laboratory (MAML) which will be operated by the Louisiana Department of Environmental Quality (LDEQ). All funding provided by the Defendants will be made contingent on the funds being used for the purchase and, if any funds remain after the purchase, the operation of a new MAML by the LDEQ. LDEQ will use the new MAML, which is estimated to cost \$1.5 million, to expand its air monitoring and incident response capability across Louisiana.

The BEP will be complete after: i) the Defendants remit \$1.5 million dollars to the LDEQ pursuant to 33 La. Admin. Code Pt I, § 2501 within thirty (30) days after the Effective Date of the Consent Decree, ii) LDEQ provides written confirmation all funds received will be spent on the purchase of a new MAML, and iii) LDEQ notifies the Parties the new MAML has been ordered and delivered to LDEQ. Payment will be deposited into an escrow account which will be administered by the LDEQ and dedicated to purchasing a MAML.

Scope:

The MAML is a self-contained, mobile air-monitoring laboratory capable of continuous, real-time sampling and analysis. The vehicle will be equipped with a number of innovative technologies which enhance LDEQ's air monitoring resources.

The MAML vehicle purchased by the LDEQ will meet at least the following specifications:

- Freightliner M2 truck chassis or International Workforce truck chassis (35' total length),
- Diesel engine, water cooled,
- GPS navigation,
- LAN with 8 port switch,
- UPS (uninterruptable power supply – battery),
- Small lab refrigerator, and
- Exterior gas cylinder tank storage.

The LDEQ expects the new MAML will be deployed throughout the state of Louisiana on special monitoring projects to provide instantaneous, onsite data directly relating to air quality issues. It will allow the LDEQ to provide a more proactive approach to improving Louisiana's air quality by providing an additional tool to evaluate compliance with ambient air quality standards and identify areas of concern proactively. Other air quality areas the MAML may support include:

- Air monitoring support and emergency response following accidents and natural disasters,

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- Investigation of specific areas based on air pollution complaints and concerns,
- Air monitoring studies to further investigate any exceedances of Louisiana or federal air quality standards measured by the statewide ambient monitoring network, or
- Conducting other air quality investigations as ordered by the LDEQ Secretary.

The MAML will be able to sample for the following:

- Sulfur dioxide
- Hydrogen Sulfide
- Carbon Monoxide
- Oxides of Nitrogen
- Ozone
- Mercury (gaseous)
- PM 10, PM 2.5
- Ammonia
- Speciated Reduced Sulfur Compounds
- Methane/non-Methane Hydrocarbons
- TO 15 Toxic Organic Chemicals
- Speciated Hydrocarbons (PAMS)
- Meteorological conditions



B. Baton Rouge Area Stationary Ambient Air Monitoring Upgrade and/or Maintenance BEP.

Purpose and Scope:

This BEP requires the Defendants to fund upgrades or maintenance to enhance the monitoring capabilities for one or both of the stationary ambient air monitoring station(s) owned and operated by LDEQ in North Baton Rouge near the Defendants' Baton Rouge Facilities up to \$72,000. The monitoring upgrade(s) will entail the use of a self-contained, ultra-sensitive, Fourier Transform Infrared Spectroscopy (FTIR) based gas analyzer which rapidly detects toxic gases including Toxic Industrial Chemicals. This instrumentation is also capable of detecting Chemical Warfare Agents and Hazardous Production Material.

The data collected will be used to track trends in air quality and to determine compliance with Clean Air Act's National Ambient Air Quality Standards. Data from this monitoring will be provided to the general public in near-real time by way of the LDEQ website (www.deq.louisiana.gov). Information will also be provided to Baton Rouge-area radio, television, and local newspapers, which report the air quality readings in the daily weather report, mainly during ozone season. Citizens are also able sign up to receive email notifications.

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Hourly air quality readings and daily air quality forecasts will be made available from the monitoring.

The total cost to complete this BEP is estimated to be \$72,000. These costs include the cost to purchase, install, calibrate, and maintain the new monitoring equipment.

The BEP will be complete after: i) the Defendants remit \$72,000 dollars to the LDEQ pursuant to 33 La. Admin. Code Pt I, § 2501 within thirty (30) days after the Effective Date of the Consent Decree, ii) LDEQ provides written confirmation all funds received will be spent on upgrades for one or both stationary ambient air monitoring station(s) owned and/or operated by LDEQ in North Baton Rouge, and iii) LDEQ notifies the Parties the new equipment has been ordered and delivered to LDEQ. Payment shall be deposited into an escrow account which shall be administered by the LDEQ and dedicated to the stationary ambient air monitoring upgrades.

United States, et al.
v.
Exxon Mobil Corp., et al.

APPENDICES TO CONSENT DECREE

APPENDIX 2.2

Fenceline Monitoring Requirements

Appendix 2.2

FENCELINE MONITORING REQUIREMENTS

1. **Applicability.** The requirements of this Fenceline Monitoring Project apply to the following Covered Facilities that are owned and/or operated by the Defendants: Baytown Chemical Plant, Baytown Olefins Plant, Beaumont Chemical Plant, and Baton Rouge Chemical Plant (collectively referred to herein as the “Subject Facilities”).
2. **Timing and Public Transparency.** No later than 270 Days after the Effective Date, the Defendants must submit in writing to EPA a report: a) showing the location of all monitors at each Subject Facility that will be utilized to comply with the Monitoring Requirements of Paragraph 3 below and b) providing a URL to a mockup of the publicly available website to be used to report monitoring data pursuant to this Fenceline Monitoring Project.

The Fenceline Monitoring Systems described in the Paragraph 3 below must commence collecting data 365 Days after the Effective Date (Effective Date is defined at Section XVIII of the Consent Decree).

The Defendants must post to a publicly available website each individual sample result for each monitor, each biweekly annual average concentration difference value (once annual averages are available), and any corrective action plan submitted to EPA pursuant to Paragraph 3(g)(corrective action plans posted to the website may be redacted to protect confidential business information). The Defendants must post each individual sample result for each monitor within two weeks of the end of the biweekly sampling period or within one week of sampling collected pursuant to the “alternative sampling frequency for burden reduction” requirements set forth in Paragraph 3(e)(3) below. The Defendants must post each annual average difference value within 45 Days of the sampling period that allows the creation of a new annual average difference value. The data must be presented in a tabular format.

3. Monitoring Requirements.

(a) The Defendants must commence sampling along the property boundary of each of the Subject Facilities. The Defendants must collect and analyze the samples in accordance with Methods 325A and 325B of Appendix A to 40 C.F.R. Part 63 (Test Methods – Pollutant Measurement Methods From Various Waste Media) (hereafter “Rule Appendix A”) and sub-Paragraphs 3(b) through 3(h).

(b) The target analyte for the Fenceline Monitoring Systems is benzene.

(c) Siting of monitors. The Defendants must determine the passive monitor locations comprising each Fenceline Monitoring System in accordance with Section 8.2 of Method 325A of Rule Appendix A.

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(1) As it pertains to this Fenceline Monitoring Project, known sources of VOCs, as used in Section 8.2.1.3 in Method 325A of Rule Appendix A for siting passive monitors means a wastewater treatment unit, process unit, or any emission source requiring HAP control according to the requirements of any state or federal air permit applicable to the Subject Facility, including marine vessel loading operations. For marine loading operations that are located offshore, one passive monitor should be sited on the shoreline adjacent to the dock.

(2) The Defendants must collect at least one co-located duplicate sample for every 10 field samples per sampling period and at least two field blanks per sampling period, as described in Section 9.3 in Method 325A of Rule Appendix A. The co-located duplicates may be collected at any one of the perimeter sampling locations.

(3) The Defendants must follow the procedure in Section 9.6 of Method 325B of Rule Appendix A to determine the detection limit of benzene for each sampler used to collect samples and co-located samples and blanks. Each monitor used to conduct sampling in accordance with this Appendix must have a detection limit that is at least an order of magnitude lower than the benzene action level.

(d) Collection of meteorological data. The Defendants must collect and record meteorological data according to the applicable requirements in sub-Paragraphs 3(d)(1) and 3(d)(2).

(1) The Defendants must collect and record the average temperature and barometric pressure during each sampling period using either an on-site meteorological station in accordance with Section 8.3 of Method 325A of Rule Appendix A or, alternatively, using data from a United States Weather Service (USWS) meteorological station provided the USWS meteorological station is within 40 kilometers (25 miles) of the applicable Subject Facility.

(2) If an on-site meteorological station is used, the Defendants must follow the calibration and standardization procedures for meteorological measurements in EPA-454/B-08-002 and at:

http://www3.epa.gov/ttnamti1/files/ambient/met/Volume_IV_Meteorological_Measurements.pdf.

(e) Sampling Frequency. The Defendants must use a sampling period and sampling frequency as specified in this sub-Paragraph 3(e).

(1) *Sampling period.* A 14-Day sampling period must be used, unless a shorter sampling period is determined to be necessary under Paragraph 3(g). A sampling period is defined as the period during which sampling tube is deployed at a specific sampling location with the diffusive sampling end cap in-place. The sampling period does not include the time required to analyze the sample. For the purpose of this sub-Paragraph, a 14-Day sampling period may be no shorter than 13 calendar days and no longer than 15 calendar days, but the routine sampling period must be 14 calendar days.

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(2) *Base sampling frequency.* Except as provided in Paragraph 3(e)(3), the frequency of sample collection must be once each contiguous 14-Day sampling period, such that the beginning of the next 14-Day sampling period begins immediately upon the completion of the previous 14-Day sampling period.

(3) *Alternative sampling frequency for burden reduction.* When an individual monitor consistently, as defined in sub-Paragraph 3(e)(3)(i) through (v), yields results at or below 0.9 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), the Defendants may elect to use the applicable minimum sampling frequency specified in Paragraph 3(e)(3)(i) through (v) for that individual monitoring site. When calculating Δc (as defined in Paragraph 3(f)) for the monitoring period when using this alternative for burden reduction, zero must be substituted for the sample result for the monitoring site for any period where a sample is not taken.

(i) If every sample at an individual monitoring site is at or below $0.9 \mu\text{g}/\text{m}^3$ for 2 years (52 consecutive samples), every other sampling period can be skipped for that individual monitoring site, *i.e.*, sampling will occur approximately once per month.

(ii) If every sample at an individual monitoring site that is monitored at the frequency specified in Paragraph 3(e)(3)(i) is at or below $0.9 \mu\text{g}/\text{m}^3$ for 2 years (*i.e.*, 26 consecutive “monthly” samples), five 14-Day sampling periods can be skipped for that individual monitoring site following each period of sampling, *i.e.*, sampling will occur approximately once per quarter.

(iii) If every sample at an individual monitoring site that is monitored at the frequency specified in Paragraph 3(e)(3)(ii) is at or below $0.9 \mu\text{g}/\text{m}^3$ for 2 years (*i.e.*, 8 consecutive quarterly samples), twelve 14-Day sampling periods can be skipped for that individual monitoring site following each period of sampling, *i.e.*, sampling will occur twice a year.

(iv) If every sample at an individual monitoring site that is monitored at the frequency specified in Paragraph 3(e)(3)(iii) is at or below $0.9 \mu\text{g}/\text{m}^3$ for an 2 years (*i.e.*, 4 consecutive semi-annual samples), only one sample per year is required for that individual monitoring site. For yearly sampling, samples must occur at least 10 months but no more than 14 months apart.

(v) If at any time a sample for an individual monitoring site that is monitored at the frequency specified in Paragraphs 3(e)(3)(i) through (iv) returns a result that is above $0.9 \mu\text{g}/\text{m}^3$, that sampling site must return to the original sampling requirements of contiguous 14-Day sampling periods with no skip periods for one quarter (six 14-Day sampling periods). If every sample collected during this quarter is at or below $0.9 \mu\text{g}/\text{m}^3$, the Defendants may revert back to the reduced monitoring frequency applicable for that individual monitoring site immediately prior to the sample reading exceeding $0.9 \mu\text{g}/\text{m}^3$. If any sample collected during this quarter is above $0.9 \mu\text{g}/\text{m}^3$, that individual monitoring site must return to the

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original sampling requirements of contiguous 14-Day sampling periods with no skip periods for a minimum of two years. The burden reduction requirements can be used again for that monitoring site once the requirements of Paragraph 3(e)(3)(i) are met again, *i.e.*, after 52 contiguous 14-Day samples with no results above $0.9 \mu\text{g}/\text{m}^3$.

(f) Action Level. Within 45 Days of completion of each sampling period, the Defendants must determine whether the results are above or below the action level as follows:

(1) The Defendants must determine the benzene difference concentration (Δc) for each 14-Day sampling period by determining the highest and lowest sample results for benzene concentrations from the sample pool and calculating the Δc as the difference in these concentrations. The Defendants must adhere to the following procedures when one or more samples for the sampling period are below the method detection limit for benzene:

(i) If the lowest detected value of benzene is below detection, the Defendants must use zero as the lowest sample result when calculating Δc .

(ii) If all sample results are below the method detection limit, the Defendants must use the method detection limit as the highest sample result.

(2) The Defendants must calculate the annual average Δc based on the average of the 26 most recent 14-Day sampling periods. The Defendants must update this annual average value after receiving the results of each subsequent 14-Day sampling period (*i.e.*, on a “rolling” basis).

(3) The action level for benzene is $9 \mu\text{g}/\text{m}^3$ on an annual average basis. If the annual average Δc value for benzene is less than or equal to $9 \mu\text{g}/\text{m}^3$, the concentration is below the action level. If the annual average Δc value for benzene is greater than $9 \mu\text{g}/\text{m}^3$, the concentration is above the action level, and the Defendants must conduct a root cause analysis and corrective action in accordance with Paragraph 3(g).

(g) Root Cause Analysis and Corrective Action. Within 5 Days of determining that the action level has been exceeded for any annual average Δc and no longer than 50 Days after completion of the sampling period, the Defendants must initiate a root cause analysis to determine the cause of such exceedance and to determine appropriate corrective action, such as those described in Paragraphs 3(g)(1) through (4). The root cause analysis and initial corrective action analysis must be completed and initial corrective actions taken no later than 45 Days after determining there is an exceedance. Root cause analysis and corrective action may include, but is not limited to:

(1) Leak inspection using Method 21 of 40 C.F.R. Part 60, Appendix A-7 and repairing any leaks found.

(2) Leak inspection using optical gas imaging and repairing any leaks found.

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(3) Visual inspection to determine the cause of the high benzene emissions and implementing repairs to reduce the level of emissions.

(4) Employing progressively more frequent sampling, analysis and meteorology (e.g., using shorter sampling periods for Methods 325A and 325B of Appendix A of 40 C.F.R. Part 63, or using active sampling techniques).

(h) If, after completing the corrective action analysis and corrective actions such as those described in Paragraph 3(g), the Δc value for the next 14-Day sampling period for which the sampling start time begins after the completion of the corrective actions is greater than $9 \mu\text{g}/\text{m}^3$ or if all corrective action measures identified require more than 45 Days to implement, the Defendants must develop a corrective action plan that describes the corrective action(s) completed to date, additional measures that the Defendants proposes to employ to reduce fenceline concentrations below the action level, and a schedule for completion of these measures. The Defendants must submit the corrective action plan to EPA within 60 Days after receiving the analytical results indicating that the Δc value for the 14-Day sampling period following the completion of the initial corrective action is greater than $9 \mu\text{g}/\text{m}^3$ or, if no initial corrective actions were identified, no later than 60 Days following the completion of the corrective action analysis required in Paragraph 3(g).