IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF LOUISIANA
NEW ORLEANS DIVISION

UNITED STATES OF AMERICA and the LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY, Plaintiffs, v. THE DOW CHEMICAL COMPANY, PERFORMANCE MATERIALS NA, INC., and the UNION CARBIDE CORPORATION Defendants.	Civil Action No. 2:21-cv-114 Judge Martin Feldman Magistrate Judge Janis van Meerveld

CONSENT DECREE

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Table 1:

NUMBER	ABBREVIATION	DESCRIPTION
1.1		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	Interim Provisions	Interim Compliance Provisions and Schedule for Instrumentation Upgrades at the Freeport FS-1, Freeport GF-500, Hahnville EO Site Logistics, Orange CDG, Plaquemine LHC-2, Plaquemine Poly A, and Plaquemine Poly C Flares
1.7	WG-Map	Waste Gas Mapping: Level of Detail Needed to Show Main Headers and Process Unit Headers
1.8	Hahnville C_2H_2	Acetylene Streams at the Hahnville Olefins 1 and 2 FGRS
1.9	Hanville H_2/CH_4 Route-Around	Hahnville Olefins 2 Hydrogen/Methane Vent Gas Stream Route-Around of FGRS Olefins 2 FGRS
1.10	Orange H_2 Route-Around	Orange Ethylene Plant Hydrogen Rich Gas Mixture Route-Around of the Ethylene FGRS

Table 2:

NUMBER	ABBREVIATION	DESCRIPTION
2.1	BEP	Louisiana Beneficial Environmental Project Protocol
2.2	Fenceline Monitoring	Fenceline Monitoring Requirements

Concurrently with the lodging of this Consent Decree, Plaintiffs, the United States of America (United States), on behalf of the United States Environmental Protection Agency (EPA) and the Louisiana Department of Environmental Quality (LDEQ), have filed a complaint in this action seeking injunctive relief and civil penalties from the Defendants, The Dow Chemical Company, Performance Materials NA, Inc., and the Union Carbide Corporation. (Defendants *or* Applicable Defendant(s)), for alleged violations of the Clean Air Act (CAA), 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 chemical manufacturing facilities located in or near Freeport, Texas (Freeport Facility), Hahnville, Louisiana (Hahnville Facility), Plaquemine, Louisiana (Plaquemine Facility), and Orange, Texas (Orange Facility);

Co-plaintiff LDEQ also seeks injunctive relief and civil penalties from the Applicable Defendants at the Hahnville and Plaquemine Facilities for alleged violations of the Louisiana Environmental Quality Act (LEQA), La.R.S. 30:2001 *et seq*.;

The Dow Chemical Company owns and operates the Freeport and Plaquemine Facilities, including the Steam-Assisted Flares used at those facilities as safety devices and to control emissions of air pollutants generated by the manufacturing processes;

The Union Carbide Corporation owns and operates the Hahnville Facility, including the Steam-Assisted Flares used at that facility as safety devices and to control emissions of air pollutants generated by the manufacturing processes;

The Union Carbide Corporation is a wholly owned subsidiary of The Dow Chemical Company;

Performance Materials NA, Inc. owns and operates the Orange Facility, including the Steam-Assisted Flares used at that facility as safety devices and to control emissions of air pollutants generated by the manufacturing processes;

Performance Materials NA, Inc. became a wholly owned subsidiary of The Dow Chemical Company on April 1, 2019;

The Complaint alleges that the Defendants violated one or more of the following CAA or Louisiana or Texas state air pollution requirements:

a. The Prevention of Significant Deterioration (PSD) requirements found in 42 U.S.C. § 7475 and 40 C.F.R. §§ 52.21(a)(2)(iii) and 52.21(j)-52.21(r)(5);

b. The Non-Attainment New Source Review (NNSR) requirements found in 42 U.S.C. §§ 7502(c)(5), 7503(a)-(c) and 40 C.F.R. Part 51, Appendix S, Part IV, Conditions 1-4;

c. The New Source Performance Standards (NSPS) promulgated at 40 C.F.R. Part 60, Subparts A, Kb, DDD and NNN pursuant to Section 111 of the CAA, 42 U.S.C. § 7411;

d. The National Emission Standards for Hazardous Air Pollutants (NESHAPs) promulgated at: 40 C.F.R. Part 61, Subparts A and FF; and 40 C.F.R. Part 63, Subparts A, F, G, H, Y, SS, XX, YY, and FFFF pursuant to Section 112 of the CAA, 42 U.S.C. § 7412;

e. 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);

f. The portions of the Title V permits for the Freeport, Hahnville, Orange, and Plaquemine Facilities that adopt, incorporate, or implement the provisions cited in c-d and g; and

g. The federally enforceable Louisiana and Texas state implementation plan (SIP) provisions that incorporate, adopt, and/or implement the federal requirements listed in c-e.

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

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;

Implementing the Consent Decree's compliance requirements is estimated to cost approximately $294 million;

Between January 1, 2015 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):

Pollutant	Amount in TPY (2015 – through implementation)
VOCs	5,689
Carbon Dioxide Equivalents (CO_2e)	517,423
HAPs	480
Nitrogen Oxides (NOx)	127

Implementing the Consent Decree's compliance requirements will also reduce carbon monoxide (CO) from the Covered Flares;

LDEQ estimates that the Louisiana beneficial environmental projects (BEPs) required to be implemented pursuant to Section VI of this Consent Decree will cost $424,786;

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);

The Defendants deny any past and continuing violations of the statutory and regulatory requirements set forth in the preceding clauses and deny any liability to the United States and LDEQ arising out of the occurrences alleged in the Complaint; and

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 Dow Chemical Company and the Union Carbide Corporation because they are located and do business within the jurisdictional boundaries for the United States District Court for the Eastern District of Louisiana, as established under 28 U.S.C. § 98. This Court has supplemental jurisdiction over the state law claims asserted by LDEQ pursuant to 28 U.S.C. § 1367. Venue is proper 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 it is the judicial district in which The Dow Chemical Company and the Union Carbide Corporation are located, are doing business, and in which a substantial part of the alleged violations occurred. For purposes of this Consent Decree, Defendants, including Performance Materials NA, Inc., consent to: i) this Court's jurisdiction over them; and ii) venue in this judicial district.

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

5. At least sixty Days before a transfer of the ownership or operation of any of the Covered Facilities or Covered Flares, the Applicable Defendant(s) must provide a copy of this Consent Decree to the proposed transferee. At least thirty Days before any such transfer, the Applicable Defendant(s) must provide written notice of the prospective transfer to EPA and the United States, in accordance with Section XVII (Notices). For transfers of the Hahnville or Plaquemine Facilities or of the Covered Flares located at those two facilities, at least thirty Days before such transfer, the Applicable Defendant(s) must also provide written notice of the prospective transfer to LDEQ in accordance with Section XVII (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 Applicable Defendant(s) intend(s) to request that the United States or LDEQ agree to a transferee's assumption of any obligations of the Consent Decree, the Applicable Defendant(s) 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 Applicable Defendant(s) must: (i) notify the United States and, if applicable, LDEQ of the proposed transfer and of the specific Consent Decree provisions that the Applicable Defendant(s) propose(s) 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, after consultation with LDEQ, if applicable, will notify the Applicable Defendant(s) 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 Applicable Defendant(s), the transferee, and, if applicable, LDEQ must file with the Court a joint motion

requesting the Court approve a modification substituting the transferee for the Applicable Defendant(s) as the defendant responsible for complying with the terms and conditions of the Consent Decree that the Applicable Defendant(s) intend(s) the transferee to assume.

9. If the Applicable Defendant(s) does(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 Applicable Defendant(s) 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 Applicable Defendant(s) as the defendant(s) 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 will be granted unless the Applicable Defendant(s) 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 Applicable Defendant(s) 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 Applicable Defendant(s) 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. These copies may be provided by hard copy, electronic copy or by providing online access with a notice to the affected people. The Applicable Defendant(s) 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 Applicable Defendant(s) will not raise as a defense the failure by any of its(their) officers, directors, employees, agents, or contractors to take any actions necessary to comply with the provisions of 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. *Applicable Defendant(s)* means: (i) with respect to all four Covered Facilities, The Dow Chemical, Company; (ii) with respect to the Hahnville Facility, The Dow Chemical Company and the Union Carbide Corporation; and (iii) with respect to the Orange Facility, The Dow Chemical Company and Performance Materials NA, Inc.

b. *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.

c. *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. Assist Steam does not include water vapor that exists in the header prior to the flare and is accounted for in the measurement of the Net Heating Value of the Vent Gas.

d. *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. The periods provided for in sub-Paragraphs 38.f (Maintenance of FGRS) and 38.g (FGRS Shut Down) may be included in the amount of time that the Compressors are Available for Operation.

e. *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(2).

f. *BTU/scf* means British Thermal Unit per standard cubic foot.

g. *Calendar Quarter* means a three-month period ending on March 31, June 30, September 30, or December 31.

h. *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, and/or stopples.

i. *Center Steam* means the portion of Assist Steam introduced into the stack of a Flare to reduce burnback.

j. *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.

k. *Combustion Zone* means the area of the Flare flame where the Combustion Zone Gas combines for combustion.

l. *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. Assist air does not include the surrounding ambient air.

m. *Complaint* means the complaint filed by the United States and LDEQ in this action.

n. *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.

o. *Consent Decree* or *Decree* means this Consent Decree, including any and all tables and attached appendices.

p. *Covered Facility* or *Covered Facilities* means the Freeport, Hahnville, Orange, and Plaquemine Facilities.

q. *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 Freeport Flares,
- the Hahnville Flares,
- the Orange Flares, and
- the Plaquemine Flares.

r. *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 Eastern District of Louisiana.

s. *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.

t. *Defendants* means The Dow Chemical Company, the Union Carbide Corporation, and Performance Materials NA, Inc.

u. *Design Capacity* means, with respect to a FGRS, the sum of the capacities, in mscf per Day, of the installed flare gas recovery Compressors**.**

v. *Effective Date* has the meaning ascribed to it in Section XVIII.

w. *EPA* means the United States Environmental Protection Agency and any of its successor departments or agencies.

x. *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.

y. *Flare* means a combustion device lacking an enclosed combustion chamber that uses an uncontrolled volume of ambient air to burn gases.

z. *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.

aa. *Flare Tip Velocity* or *Vtip* means the velocity of gases exiting the Flare tip as defined in Paragraph 40.

bb. *Freeport Facility* means the petrochemical manufacturing facility owned and operated by The Dow Chemical Company, located at 2301 Brazosport Boulevard, Freeport, Texas.

cc. *Freeport Flares* means the following 10 Steam-Assisted Flares located at the Freeport Facility:

- LHC-7 Large FS-1
- LHC-8 Elevated FS-1
- LHC-8 Ground GF-500
- LHC-8 Small FS-1018
- Marine Large FS-1
- Marine Octene FS-100
- PDC
- Poly 3
- Poly 4
- Poly Pilot Plant

dd. *Hahnville Facility* means the petrochemical manufacturing facility owned and operated by the Union Carbide Corporation, located at Louisiana Highway 3142 Hahnville, Louisiana.

ee. *Hahnville Flares* means the following 8 Steam-Assisted Flares located at the Hahnville Facility:

- Acrylics
- Butanol 1

- Butanol 2
- EO Site Logistics
- Olefins 1
- Olefins 2
- Oxide Emergency
- SPU

ff. *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.

gg. *KSCFH* or *kscfh* means thousand standard cubic feet per hour.

hh. *LDEQ* means the Louisiana Department of Environmental Quality and any of its successor departments or agencies.

ii. *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.

jj. *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 Applicable Defendant(s) has(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.

kk. *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 Applicable Defendant(s) has(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 was 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.

ll. *MSCF* or *mscf* means million standard cubic feet.

mm. *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).

nn. *Net Heating Value* means Lower Heating Value.

oo. *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.

pp. *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.

qq. *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.

rr. *New Source Review* or *NSR* means the PSD and 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.

ss. *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.

tt. *Orange Facility* means the petrochemical manufacturing facility owned and operated by Performance Materials NA, Inc., located at 2739 Farm-to-Market Road 1006, Orange, Texas.

uu. *Orange Flares* means the following 2 Steam-Assisted Flares located at the Orange Facility:

- CDG; and
- Ethylene

vv. *Paragraph* means a portion of this Decree identified by an Arabic numeral.

ww. *Parties* means the United States, LDEQ, and the Defendants.

xx. *Pilot Gas* means gas introduced into a Flare tip that provides a flame to ignite the Vent Gas.

yy. *Plaquemine Facility* means the petrochemical manufacturing facility owned and operated by The Dow Chemical Company, located at 21255 Louisiana Highway 1, Plaquemine, Louisiana.

zz. *Plaquemine Flares* means the following six Steam-Assisted Flares located at the Plaquemine Facility:

- LHC-2
- LHC-3
- LHC Tank Farm
- Poly A
- Poly B
- Poly C

aaa. *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.

bbb. *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.

ccc. *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.

ddd. *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.

eee. *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.

fff. *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 measuring the concentrations of hydrogen, nitrogen, oxygen, carbon monoxide, carbon dioxide, and/or water (steam) in the Waste Gas, the contribution of the calculated flow of the above compounds for which a concentration is measured 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.

ggg. *SCFD* or *scfd* means standard cubic feet per Day.

hhh. *SCFH* or *scfh* means standard cubic feet per hour.

iii. *SCFM* or *scfm* means standard cubic feet per minute.

jjj. *Section* means a portion of this Decree identified by a roman numeral.

kkk. *Smoke Emissions* has the meaning set forth in Section 3.5 of Method 22 of 40 C.F.R. Part 60, Appendix A. For purposes of this 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.

lll. *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.

mmm. *Steam-Assisted Flare* means a Flare that uses Assist Steam piped to a Flare tip to assist in combustion.

nnn. *Supplemental Gas* means all gas introduced to a Flare in order to improve the combustible characteristics of the Combustion Zone Gas.

ooo. *Sweep Gas* means gas intentionally introduced into a Flare header system to prevent oxygen buildup in the Flare header.

ppp. *Total Steam* means the total of all Assist Steam that is supplied to a Flare and includes, but is not limited to, lower steam, Center Steam, and upper steam.

qqq. *United States* means the United States of America, acting on behalf of EPA.

rrr. *Unobstructed Cross Sectional Area of the Flare Tip* or $A_{tip\text{-}unob}$ 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 $A_{tip\text{-}unob}$ of these four types.

sss. *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.

ttt. *Visible Emissions* means five minutes or more of Smoke Emissions during any two consecutive hours.

uuu. *VOC* or *Volatile Organic Compounds* has the meaning ascribed to it in 40 C.F.R. § 51.100(s).

vvv. *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. Within thirty Days after the Effective Date of this Consent Decree, Defendants must pay the following amounts as a civil penalty:

a. $2,325,000 to the United States, and

b. $675,000 to LDEQ.

14. Defendants must pay the civil penalty due to the United States by FedWire Electronic Funds Transfer (EFT) to the United States Department of Justice in accordance with written instructions to be provided to Defendants, following entry of the Consent Decree, by the Financial Litigation Unit (FLU) of the United States Attorney's Office for the Eastern District of Louisiana. The payment instructions provided by the FLU will include a Consolidated Debt Collection System (CDCS) number, which 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:

Ms. Karen Williams
The Dow Chemical Company
P.O. Box 150 (E-105)
Plaquemine, LA 70764
(225) 353-1675
KBWilliams@dow.com

Ms. Fran Falcon
The Dow Chemical Company
332 SH 332 E (APB-1B022)
Lake Jackson, TX 77566
(979) 238-9764
FQFalcon@dow.com

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 XVII (Notices).

15. At the time of payment, Defendants must send a copy of the EFT authorization form and the EFT transaction record, together with a cover letter, stating that the payment is for the civil penalty owed in accordance with the Consent Decree in *United States, et al. v. The Dow Chemical Company, et al.*, Civil Action No. 2:21-cv-114 (E.D. La.), and DOJ No. 90-5-2-1-11114, to the United States pursuant to Section XVII (Notices) of this Consent Decree; and by first class mail to: United States Attorney's Office, Eastern District of Louisiana, 650 Poydras Street, Suite 1600, New Orleans, Louisiana 70130, and to EPA at cinwd_acctsreceivable@epa.gov and first class mail at: EPA Cincinnati Finance Office, 26 W. Martin Luther King Drive, Cincinnati, Ohio 45268.

16. The Defendants must not deduct any penalties paid under this Consent Decree in accordance with 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 or by EFT in accordance with written instructions provided to Defendants upon request. Any bank check must reference this Consent Decree and the civil action number.

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 Applicable Defendant(s) must submit a report, conforming to 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 Applicable Defendant(s) has(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 Applicable Defendant(s) 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. By no later than the Effective Date, the Applicable Defendant(s) must install and commence operation of the instrumentation, controls, and monitoring systems set forth in Paragraphs 20-23 at each Covered Flare (except for: Newly Installed Covered Flares; Portable Flares; and particular monitoring systems at the Hahnville EO Site Logistics, Orange CDG, Plaquemine LHC-2, Plaquemine Poly A, and Plaquemine Poly C Flares that must comply with this Paragraph or with the portions of Paragraphs 20, 21, and 23 and additional procedures specified in Appendix 1.6).

b. 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 Applicable Defendant(s) must complete installation and commence operation of the instrumentation, controls, and monitoring systems set forth in Paragraphs 20-23. The Applicable Defendant(s) 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 and Assist Steam Monitoring Systems.

a. For each Covered Flare (except for the Hahnville EO Site Logistics, Orange CDG, Plaquemine Poly A, and Plaquemine Poly C Flares, which must comply with this Paragraph pursuant to the terms and schedule set forth in Appendix 1.6), the Applicable Defendant(s) 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.

b. For each Covered Flare, the Applicable Defendant(s) 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 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.

c. Each flow rate monitoring system must be able to correct for the temperature and pressure of the system and output parameters in Standard Conditions.

d. In lieu of a monitoring system that directly measures volumetric flow rate, the Applicable Defendant(s) may choose from the following additional options for monitoring any gas stream:

(1) Mass flow monitors may be used for determining the volumetric flow rate of Assist Steam provided that the Applicable Defendant(s) convert(s) the mass flow rates to

volumetric flow rates pursuant to the methodology in Step 2 of Appendix 1.2;

(2) Mass flow monitors may be used for determining the volumetric flow rate of Vent Gas, provided the Applicable Defendant(s) determine(s) 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 Applicable Defendant(s) convert(s) the mass flow rates to volumetric flow rates pursuant to the methodology in Step 2 of Appendix 1.2; and

(3) 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 Applicable Defendant(s) comply(ies) with the methodology in Step 2 of Appendix 1.2 for calculating volumetric flow rates. For Vent Gas, the Applicable Defendant(s) 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 Applicable Defendant(s) must install and commence operation of equipment, including, as necessary, main and trim control valves and piping that enables the Applicable Defendant(s) to control Assist Steam flow to each Covered Flare in a manner sufficient to ensure compliance with this Decree.

22. Video Camera. The Applicable Defendant(s) must install and begin 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 the Effective Date. Video camera records must be maintained for one year from the date of recording as noted in Paragraph 99.

23. Vent Gas Compositional Monitoring or Direct Monitoring of Net Heating Value of Vent Gas. For each Covered Flare, the Applicable Defendant(s) 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 (except for the Plaquemine LHC-2, which must comply with this Paragraph pursuant to the terms and schedule set forth in Appendix 1.6.). The Applicable Defendant(s) 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 Applicable Defendant(s) 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 Applicable Defendant(s) elect(s) this method, the Applicable Defendant(s) 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.

c. If the Applicable Defendant(s) elect(s) 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 Applicable Defendant(s) 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, of all Pilot Gas to a Covered Flare, the Applicable Defendant(s) may elect to either: a) install (if not already installed) an instrument or b) use a restriction orifice and pressure measurements. The Applicable Defendant(s) 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:

(1) 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 for the Plaquemine LHC-2 and Plaquemine Poly C Flare, which must comply with this Subparagraph pursuant to the terms and schedule set forth in Appendix 1.6.);

(2) 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 Applicable Defendant(s);

(3) Be capable of measuring the appropriate parameter over the range of values expected for that measurement location; and

(4) Have an associated data recording system with a resolution that is equal to or better than the required instrumentation/ system accuracy.

b. The Applicable Defendant(s) 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) or the requirements of 40 C.F.R. 63.1103(e)(4)(ix) (Calibration error approach for Gas Chromatographs).

d. For each instrumentation and monitoring system required by Paragraphs 20 and 23 (or installed pursuant to Paragraph 24), the Applicable Defendant(s) 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 (except for the Plaquemine LHC-2, which must comply with this Paragraph pursuant to the terms and schedule set forth in Appendix 1.6):

Instrumentation and Monitoring System	Recording and Averaging Times
Vent Gas, Assist Steam 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

The term continuously means to make a measurement as often as the manufacturer's stated design capabilities of the flow monitors (Vent Gas, Assist Steam, and Pilot Gas) and Vent Gas Net Heating Value Analyzers during each fifteen minute block period, but in no case will flow monitors or Vent Gas Net Heating Value Analyzers make less than one measurement in each fifteen-minute block period. The measurement results are then averaged and recorded to represent each fifteen-minute block period. Nothing in this Paragraph prohibits the Applicable Defendant(s) 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 Applicable Defendant(s) 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 it 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 a 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 Applicable Defendant(s) 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 Applicable Defendant(s) must characterize the Waste Gas being disposed of at each Covered Flare and determine its source as follows:

(1) Volumetric (in scfm) flow rate. The Applicable Defendant(s) must identify the volumetric flow of Waste Gas, in scfm on a thirty-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 Applicable

Defendant(s) has(have) instrumentation capable of measuring and/or calculating the volumetric flow rate of hydrogen, nitrogen, oxygen, carbon monoxide, carbon dioxide, and/or water (steam) in the Waste Gas, the Applicable Defendant(s) may calculate the volumetric flow of: (a) all Waste Gas flows excluding hydrogen, nitrogen, oxygen, carbon monoxide, carbon dioxide, and/or water (steam); and (b) hydrogen, nitrogen, oxygen, carbon monoxide, carbon dioxide, and/or water (steam) flows in the Waste Gas. The Applicable Defendant(s) 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 Applicable Defendant(s) must provide the date, time, and nature of the event that results in the exclusion of any flows from the calculation.

(2) Baseload Waste Gas Flow Rates. The Applicable Defendant(s) 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. The Applicable Defendant(s) may propose to EPA for review and approval a different 12-month period if the above described 12-month period is not representative of normal operations.

(3) Identification of Constituent Gases. The Applicable Defendant(s) 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 Applicable Defendant(s) may use an engineering evaluation, measurements from

monitoring, or a combination of both to determine Waste Gas constituents.

(4) Waste Gas Mapping. Using all available information including, but not limited to, instrumentation, isotopic tracing, and/or engineering calculations, the Applicable Defendant(s) 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 Applicable Defendant(s) 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 Applicable Defendant(s) 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 sixty 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 Applicable Defendant(s) must describe any equipment, processes, or procedures the Applicable Defendant(s) plan(s) 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 Applicable Defendant(s) may revise the installation and operation dates provided the Applicable Defendant(s): i) do so in writing to EPA before the First Updated Waste Gas Minimization Plan is due and ii) provides a reasonable explanation for the revised date. In formulating this plan, the Applicable Defendant(s) must review and evaluate the results of the Waste Gas Mapping required by sub-Paragraph 29.a(4). Any schedule revision accompanied by a reasonable explanation and made before the First Updated Waste Gas Minimization Plan is due will be considered part of the Initial Waste Gas Minimization Plan.

d. Taking a Covered Flare Permanently Out of Service. Where applicable, Applicable Defendant(s) must identify any Covered Flare it(they) intend(s) 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 Applicable Defendant(s) must describe and evaluate all Prevention Measures, including a schedule for expeditiously implementing and commencing operation of all Prevention Measures, to address the following:

(1) 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

(2) 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, Applicable Defendant(s) 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 twelve-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 Applicable Defendant(s) 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 Applicable Defendant(s) must use this updated mapping to plan reductions;

b. Reductions Based on Root Cause Analysis. The Applicable Defendant(s) 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 Applicable Defendant(s) propose(s) to extend any schedule set forth in the Initial WGMP or subsequent WGMP, the Applicable Defendant(s) 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 and continuing until the Applicable Defendant(s) has(have) achieved compliance with all provisions of this Section V (Compliance Requirements) applicable to a Covered Facility other than the requirements of this Paragraph, the Applicable Defendant(s) 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 Applicable Defendant(s): a) commence(s) operation of a Newly Installed Covered Flare or permanently remove(s) a Covered Flare from service, b) connect(s) a new Waste Gas stream to a Covered Flare, c) intentionally modifies(y) the Baseload Waste Gas Flow Rate to a Covered Flare, d) install(s) additional FGRS, or e) change(s) the design of a Covered Flare. Each update must update, if and as necessary, the information required in sub-Paragraphs 29.a(1)-29.a(3). Each update must update, if and as necessary, the information required in sub-Paragraphs 30.a and 30.b. To the extent the Applicable Defendant(s) propose(s) to extend any schedule set forth in a previous WGMP (excepting schedule changes made to the Initial Waste Gas Management Plan prior to the First Updated Waste Gas Management Plan as described in Paragraph 29.c) for any of the Covered Facilities, the Applicable Defendant(s) 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 the latest WGMP, the Applicable Defendant(s) 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 Applicable Defendant(s) 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 Applicable Defendant(s) 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:

(1) The date and time that the Reportable Flaring Incident started and ended;

(2) 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;

(3) The steps, if any, the Applicable Defendant(s) 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;

(4) A detailed analysis that sets forth the root cause and all contributing causes of the Reportable Flaring Incident, to the extent determinable;

(5) 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 Applicable Defendant(s) conclude(s) 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 Applicable Defendant(s) conclude(s) that corrective action is not required under Paragraph 35, the report must explain the basis for that conclusion; and

(6) To the extent that investigations of the causes or possible corrective actions are still underway forty-five 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 Applicable Defendant(s) 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:

(1) Date;

(2) Duration;

(3) Amount of VOCs and HAPs emitted;

(4) Root cause(s);

(5) Corrective action(s) completed;

(6) Corrective action(s) still outstanding; and

(7) An analysis of any trends identified by the Applicable Defendant(s) 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 Applicable Defendant(s) 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 Applicable Defendant(s) 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

37. FGRS Capacity and Start-Up. Applicable Defendant(s) must commence operation of the FGRS described for the listed Covered Flares as follows:

Covered Facility	Covered Flares	FGRS Design Capacity (kscf/hour)	FGRS ID / Design Capacity (kscf/hour)	Number of FGRS Compressors/Type	Compliance Deadline for Installation and Commencing Operation
Freeport	LHC7-FS-1	120	C-40A (60) C-40B (60)	2 compressor system/liquid ring	3/31/2023
Freeport	LHC-8-FS-1 and GF-500	180	C-430 (60) C-431 (60) C-432 (60)	3 compressor system/liquid ring	12/31/2023

Hahnville	Olefins 1	180	GB-1500A (60) GB-1500B (60) GB-1500C (60)	3 compressor system/liquid ring	12/31/2023
Hahnville	Olefins 2	240	GB-3900A (60) GB-3900B (60) GB-3900C (60) GB-3900D (60)	4 compressor system/liquid ring	12/31/2024
Orange	Ethylene	120	To Be Determined (TBD)	2 compressor system/TBD	12/31/2024
Plaquemine	LHC-2	180	2K-80A (60) 2K-80B (60) 2K-80C (60)	3 compressor system/liquid ring	10/1/2021
Plaquemine	LHC-3	420	TBD	This FGRS must be sized at a minimum of 420 kscf/hour and must include at least 3 individual compressors. Defendants must inform Plaintiffs in writing of the number, type, and identifier for each compressor making up the FGRS no later than 12/31/24.	12/31/2025

38. FGRS: Operation and Availability Requirements.

a. General. After the applicable compliance deadline specified in Paragraph 37, the Applicable Defendant(s) must operate each FGRS in a manner to minimize Waste Gas to the applicable Covered Flares while ensuring safe chemical plant operations. The Applicable Defendant(s) 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 Applicable Defendant(s) to recover Regeneration Waste Gas Streams in a FGRS.

b. Acetylene Streams at the Hahnville Olefins 1 and 2 FGRS. The Hahnville Plant uses an Acetylene Removal Unit (ARU) to remove acetylene from a product stream as described in Appendix 1.8. For safety reasons, the Applicable Defendants may send the gas flow from the ARU directly to the Hahnville Olefins 1 flare without sending the gas flow to the Hahnville Olefins 1 FGRS as described and shown in Appendix 1.8. During any outage of the Hahnville Olefins 1 Flare, the ARU gas flow may be sent to the Hahnville Olefins 2 Flare without sending the gas flow to the Hahnville Olefins 2 FGRS as described and shown in Appendix 1.8.

c. Requirements Related to Hydrogen/Methane Vent Gas Flows to the Hahnville Olefins 2 Flare. A mixture of hydrogen/methane gas is generated at the Hahnville Plant's methanator as described and shown in Appendix 1.9. By no later than the Olefins 2 FGRS's operational date as set forth in Paragraph 37, the Applicable Defendants must route the Hydrogen/Methane gas around the Olefins 2 FGRS directly to the Olefins 2 Flare or to the Olefins 1 Flare as described and shown in Appendix 1.9.

d. Requirements Related to Hydrogen Rich Gas Mixture Flows and Supplemental Gas to the Orange Ethylene Flare. A hydrogen rich gas mixture is generated at the Orange Ethylene Plant as described and shown in Appendix 1.10. By no later than the Orange FGRS's operational date as set forth in Paragraph 37, the Applicable Defendants must route the hydrogen rich gas mixture around the Orange FGRS directly to the Ethylene Flare as described and shown in Appendix 1.10.

e. Requirements Related to Compressors Being Available for Operation. By no later than the applicable compliance deadline specified in Paragraph 37, the Applicable Defendant(s) must comply with the following requirements for each FGRS listed in Paragraph 37 when Potentially Recoverable Gas is being generated:

(1) Freeport LHC-7-FS-1 FGRS. The Freeport LHC-7-FS-1 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.f and 38.g below may be included in the amount of time that the Compressors are Available for Operation when determining compliance with the requirement to have one Compressor Available for Operation or in operation 98% of the time.

(2) Freeport LHC-8-FS-1 and GF-500. The Freeport LHC-8-FS-1 and GF-500 FGRS must have two Compressors Available for Operation or in operation 95% of the time and one Compressor Available for Operation or in operation at all times. The periods provided for in sub-Paragraphs 38.f and 38.g below may be included in the amount of time that the Compressors are Available for Operation when determining compliance with the requirement to have one Compressor Available for Operation or in operation "at all times."

(3) Hahnville OL1. The Hahnville OL1 FGRS must have two Compressors Available for Operation or in operation 95% of the time and one Compressor Available for Operation or in operation at all times. The periods provided for in sub-Paragraphs 38.f and 38.g below may be included in the amount of time that the Compressors are Available for Operation when determining compliance with the requirement to have one Compressor Available for Operation or in operation "at all times."

(4) Hahnville OL2. The Hahnville OL2 FGRS must have three Compressors Available for Operation or in operation 95% of the time and two Compressors Available for Operation or in operation at all times. The periods provided for in sub-Paragraphs 38.f and 38.g 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 "at all times.

(5) Orange Ethylene FGRS. The Orange Ethylene 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.f and 38.g below may be included in the amount of time that the Compressors are Available for Operation when determining compliance with the requirement to have one Compressor Available for Operation or in operation 98% of the time.

(6) Plaquemine LHC-2. The Plaquemine LHC-2 FGRS must have two Compressors Available for Operation or in operation 95% of the time and one Compressor Available for Operation or in operation at all times. The periods provided for in sub-Paragraphs 38.f and 38.g below may be included in the amount of time that the Compressors are Available for Operation when determining compliance with the requirement to have one Compressor Available for Operation or in operation "at all times."

(7) Plaquemine LHC3. The Plaquemine LHC3 FGRS must comply with the following where the total number of Compressors is represented by "n" – The Applicable Defendant must have n-1 Compressors Available for Operation and/or in operation 95% of the time and n-2 Compressors Available for Operation and/or in operation at all times. The periods provided for in sub-Paragraphs 38.f and 38.g below may be included in the amount of time that the Compressors are Available for Operation when determining compliance with the requirement to have n-2 Compressor Available for Operation or in operation "at all times."

f. Maintenance of FGRS. Periods of maintenance on and subsequent restart of the Compressor(s) and other equipment required to keep the FGRS operating, 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 Applicable Defendant(s) 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 Applicable Defendant(s) must use best efforts to minimize the generation of Waste Gas during such periods.

g. 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 forty-five Days after any such outage, the Applicable Defendant(s) 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 Applicable Defendant(s) 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.

h. Alternative FGRS. The Applicable Defendant(s) may submit a request to EPA for approval of an alternative FGRS that is not explicitly referenced in Paragraph 37 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 Paragraph 37.

i. 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 Applicable Defendant(s) 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 Applicable Defendant(s) must operate each Covered Flare at all times when emissions may be vented to it.

b. No Visible Emissions. The Applicable Defendant(s) must specify, as required by Appendix 1.5, the smokeless design capacity of each Covered Flare and operate with no Visible Emissions, except for periods not to exceed a total of five minutes during any two 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. The Applicable Defendant(s) must monitor for Visible Emissions from each Covered Flare while it is In Operation as specified below in sub-Paragraphs 39.b(1) or (2). 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. A previously conducted Method 22 visible emission observation is sufficient to meet the initial Visible Emission demonstration requirement if the most recent Method 22 visible emission observation was conducted within three years prior to the Effective date. Subsequent Visible Emissions observations must be conducted using either method listed in sub-Paragraphs 39.b(1) or (2). The Applicable Defendant(s) must record and report any instances where Visible Emissions are observed for more than five minutes during any two consecutive hours as specified in 40 C.F.R. § 63.655(g)(11)(ii).

(1) At least once per Day, the Applicable Defendant(s) must conduct Visible Emissions observations using an observation period of five minutes using Method 22 at 40 C.F.R. Part 60, Appendix A-7. If at any time the Applicable Defendant(s) see(s) Visible Emissions, even if the minimum required daily Visible Emission monitoring has already been performed, the Applicable Defendant(s) must immediately begin an observation period of five 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 five-minute observation period, the observation period using Method 22 at 40 C.F.R. Part 60, Appendix A-7 must be extended to two hours or until five minutes of Visible Emissions are observed.

(2) Alternatively, the Applicable Defendant(s) may use a video surveillance camera to continuously record (at least one frame every fifteen 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 Applicable Defendant(s) 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 or Flare Flame Presence. The Applicable Defendant(s) must operate each Covered Flare with a pilot flame or flare flame present at all times. The Applicable Defendant(s) must continuously monitor the presence of the pilot flame(s) or flare flame(s) using a device (including, *inter alia*, thermocouple, ultraviolet beam sensor, or infrared sensor) capable of detecting that the pilot flame or flare flame is present.

d. Monitoring According to Applicable Provisions. The Applicable Defendant(s) 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 Applicable Defendant(s) must implement good air pollution control practices to minimize emissions from each Covered Flare; provided however that the Applicable Defendant(s) is(are) not in violation of this requirement for any practice that this Decree requires the Applicable Defendant(s) 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 Applicable Defendant(s) to install or maintain Flare monitoring equipment in addition to or different from the equipment required by this Decree.

40. Flare Tip Velocity or Vtip. By no later than the Effective Date, the Applicable Defendant(s) 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 (Vtip) must be less than 60 feet per second. The Applicable Defendant(s) must calculate Vtip using the procedures specified in Appendix Appendix 1.2, or

b. Vtip must be less than 400 feet per second and also less than the maximum allowed Flare Tip Velocity (Vmax) as calculated according to Equation 11 in Appendix 1.2. The Applicable Defendant(s) must monitor Vtip and gas composition, and must determine NHVvg 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 Applicable Defendant(s) 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 or EPA determines by regulation or applicable Alternative Means of Emission Limitation that compliance with the 270 NHV_{cz} requirement can be used in lieu of the 300 NHV_{vg} requirement.

42. Operation According to Design. By no later than the Effective Date, the Applicable Defendant(s) 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 Applicable Defendant(s) 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; (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; (iii) modification of applicable federal regulations allowing Applicable Defendant(s) to comply with NHV_{cz} in lieu of 40 C.F.R. §§ 60.18(c)(3)(ii) and 63.11(b)(6)(ii); or (iv) the approval of an Alternative Means of Emission Limitation, if it provides that Applicable Defendant(s) may comply with NHV_{cz} in lieu of NHV_{vg}, the Applicable Defendant(s) must operate each Covered Flare with an NHV_{vg} of greater than or equal to 300 BTU/scf determined on a fifteen-minute block period basis when Waste Gas is routed to the Covered Flare for at least fifteen minutes. The Applicable Defendant(s) must monitor and calculate NHV_{vg} at each Covered Flare in accordance with Appendix 1.2.

b. Net Heating Value of Combustion Zone Gas (NHV_{cz}) for all Covered Flares. By no later than the Effective Date, at any time a Covered Flare is In Operation, the Applicable Defendant(s) must operate that Flare so as to maintain the NHV_{cz} at or above 270 BTU/scf determined on a fifteen-minute block period basis when Waste Gas is routed to the Covered Flare for at least fifteen minutes (except for the Plaquemine LHC-2 and Plaquemine Poly C Flares, which must comply with this Subparagraph and the requirements of Appendix 1.2 in accordance with the terms set forth in Appendix 1.6, and except for the Freeport FS-1 and GF-500 Flares, which must comply with the terms set forth in Appendix 1.6 until May 31, 2021, after which the two flares must comply with this Subparagraph). The Applicable Defendant(s) must monitor and calculate NHV_{cz} at each Covered Flare in accordance with Appendix 1.2

(except for the Plaquemine LHC-2 and Plaquemine Poly C Flares, which must comply with this Subparagraph and the requirements of Appendix 1.2 in accordance with the terms set forth in Appendix 1.6).

44. 98% Combustion Efficiency. By no later than the Effective Date, the Applicable Defendant(s) 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 Applicable Defendant(s) must operate each Covered Flare in compliance with the applicable requirements in Paragraph 43 (except for the Plaquemine LHC-2 and Plaquemine Poly C Flares, which must comply with this Subparagraph and the requirements of Appendix 1.2 in accordance with the terms set forth in Appendix 1.6).

45. Standard During Instrument or Video Camera Downtime. If one or more of the following conditions (collectively referred to as *Instrument or Video Camera Downtime*) is present and renders the Applicable Defendant(s) incapable of operating a Covered Flare in accordance with the applicable NHV standards in Paragraph 43, the Applicable Defendant(s) 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 or a data recording system, 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).

e. Malfunction of a video camera or a video recording system.

The calculation of Instrument or Video Camera Downtime must be made in accordance with 40 C.F.R. § 60.13(h)(2). In no event may Instrument Downtime exceed 110 hours per calendar quarter that the Covered Flare affected by the Instrument Downtime is In Operation. For purposes of calculating the 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 Applicable Defendant(s) from asserting Force Majeure as provided in Section XI as the cause of any period of Instrument Downtime.

46. Recordkeeping for All Covered Flares: Timing and Substance. The Applicable Defendant(s) must comply with the following recordkeeping requirements:

a. By no later than the Effective Date, for each Covered Flare, the Applicable Defendant(s) must calculate and record each of the following parameters:

(1) Volumetric flow rates of all gas streams that contribute to the Vent Gas volumetric flow rate (in scfm) (in fifteen-minute block averages and in accordance with any calculation requirements of Paragraphs 20 and Step 2 of Appendix 1.2);

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

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

(4) NHV_{cz} (in BTU/scf) (in fifteen-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 Applicable Defendant(s) must record the duration of all periods of Instrument Downtime for each Covered Flare that exceed 110 hours of Instrument Downtime in a Calendar Quarter that the Covered Flare is In Operation.

The Applicable Defendant(s) 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) taken.

c. By no later than the compliance dates specified in Paragraph 37 the Applicable Defendant(s) must record the dates and times of any periods that the Applicable Defendant(s) deviate(s) from the standards in Paragraph 38.e (FGRS Compressor availability). The Applicable Defendant(s) 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) taken.

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

F. Fenceline Monitoring Requirements

47. The Applicable Defendant(s) must install, maintain, and operate at each Covered Facility a Fenceline Monitoring Project in accordance with Appendix 2.2.

VI. LOUISIANA BENEFICIAL ENVIRONMENTAL PROJECTS

48. The Defendants must implement the state beneficial environmental projects (BEPs) in accordance with all provisions of Appendix 2.1.

49. The Applicable Defendant(s) is(are) responsible for the satisfactory completion of the BEPs in accordance with the requirements of this Decree. In the context of this Consent Decree, *Satisfactory Completion* means completing the BEP in accordance with the requirements and schedules set forth in Appendix 2.1. The Applicable Defendant(s) may use contractors or consultants in planning and implementing the BEP.

50. BEP Completion Report. As part of the first Semi-Annual Report required by Section IX (Reporting Requirements) after a BEP is completed, the Applicable Defendant(s)

must submit a BEP Completion Report to LDEQ, with a copy to EPA, in accordance with Section XVII (Notices). The BEP Completion Reports must contain the following information:

a. a detailed description of the BEP as implemented;

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

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

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

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

51. LDEQ may require information in addition to that described in the preceding Paragraph in order to evaluate the Applicable Defendant's(s') BEP Completion Report(s).

52. After receiving the BEP Completion Report certifying completion of the BEP, LDEQ must notify the Applicable Defendant(s) whether the Applicable Defendant(s) have satisfactorily completed the BEP. If the Applicable Defendant(s) has(have) not completed the BEP in accordance with this Consent Decree, stipulated penalties may be assessed under Section X.

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

54. Each submission required under this Section must be signed by an official with knowledge of the BEPs and must bear the certification language set forth in Paragraph 67.

55. Any public statement, oral or written, in print, film, or other media, made by the

Applicable Defendant(s) making reference to the 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. The Dow Chemical Company et al.* (E.D. LA) taken on behalf of LDEQ under the Clean Air Act."

56. For federal, state and local income tax purposes, the Applicable Defendant(s) agree(s) that it(they) will neither capitalize into inventory or basis nor deduct any costs or expenditures incurred in performing the BEP.

VII. PERMITS

57. Permits Needed for Compliance Obligations. The Applicable Defendant(s) must obtain all federal, state, and local permits necessary for performing any compliance obligation under this Consent Decree, including, without limitation, permits for the construction of pollution control technology and the installation of equipment at each Covered Facility. The Applicable Defendant(s) 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.

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

a. For the Hahnville and Plaquemine 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 58.c, whichever is later, the Applicable Defendant(s) 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 58.c, as applicable, into a federally enforceable Title V permit for the Hahnville and Plaquemine Facilities, such that the requirements listed in sub-Paragraph 58.c: (i) become and remain after Consent Decree termination "applicable requirements" as that term is defined in 40 C.F.R. § 70.2 and (ii) survive the termination of this Consent Decree. The underlying basis for the inclusion of the terms in Para 58.c into a LDEQ consolidated preconstruction and Title V CAA permit will be LDEQ's preconstruction permitting authority and not this Consent Decree.

b. For the Freeport and Orange Facilities.

(1) By no later than one year after the Effective Date or one year after the respective deadline for the compliance requirements listed in Paragraph 58.c, whichever is later, the Applicable Defendant(s) must complete and submit to the necessary permitting authorities in the state of Texas appropriate applications to incorporate the requirements listed in sub-Paragraph 58.c, as applicable, into a non-Title V, federally enforceable permit for the Freeport and Orange Facilities, such that the requirements listed in sub-Paragraph 58.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.

(2) By no later than three years after the Effective Date or one year after the respective deadline for the compliance requirements listed in Paragraph 58.c, whichever is later, the Applicable Defendant(s) 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 the Freeport and Orange Facilities to incorporate the requirements listed in sub-Paragraph 58.c into each facility's federally enforceable Title V permit.

c. The following requirements of the Consent Decree will 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.b (NHV_{cz} Standards), Paragraph 44 (98% CE), Paragraph 45 (Standard During Instrument Downtime), Paragraph 46 (Recordkeeping), and Paragraph 47 (Fenceline Program) and Appendix 2.2. Nothing in this Paragraph prohibits the Applicable Defendant(s) from seeking to incorporate Paragraph 24 (Optional Equipment) in a permit that survives termination of this Decree.

d. For purposes of Paragraph 58, the requirements in Paragraph 47 and Appendix 2.2 (Fenceline Program) must be incorporated into the following permits (or the successor permit for that Covered Facility):

(1) For the Freeport, Texas Facility – Permit NSR 20432 and Permit O2213;

(2) For the Hahnville, Louisiana Facility – Permit 2422-V9;

(3) For the Orange, Texas Facility – Permit NSR 914 and Permit O2074; and

(4) For the Plaquemine, Louisiana Facility – Permit 2024-V12.

59. The permit applications and process of incorporating the requirements of this Consent Decree into Title V Permits must 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.

60. Following submission of the complete permit applications, the Applicable Defendant(s) must 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

61. Prohibitions.

a. Definition. *CD Emissions Reductions* means any NOx, VOC, PM, PM_{TOTAL}, PM_{10}, $PM_{2.5}$, HAP, or CO emissions reductions that result from any projects conducted or controls used to comply with this Consent Decree.

b. The Applicable Defendant(s) must not apply for, obtain, trade, sell, generate, or use CD Emissions Reductions:

(1) As netting reductions,

(2) As emissions offsets, or

(3) 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 twenty-four month period selected by the Applicable Defendant(s) 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 Applicable Defendant(s) been complying with this Consent Decree during that twenty-four month period.

62. 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. 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 Applicable Defendant(s) must not trade or sell any CD Emissions Reductions; and

c. CD Emissions Reductions for purposes of the state of Texas or state of Louisiana air toxics modeling programs.

IX. REPORTING REQUIREMENTS

63. Semi-Annual Reports. By no later than March 31 and September 30 of each year after the Effective Date, until termination of this Decree pursuant to Section XXI, the Applicable Defendant(s) must submit a Semi-Annual Report to EPA, and LDEQ for the Hahnville and Plaquemine Facilities, except that the first Semi-Annual Report is due ninety 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 must contain the following information for the preceding six months (*i.e.*, January through June will be addressed in the report to be submitted by September 30, and July through December will be addressed in the report submitted by March 31);

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 Applicable Defendant's(s') progress in satisfying its(their) obligations in connection with the BEP(s) 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 BEP 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 must 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 110 hours 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.

(A) 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 for less than 110 hours in a Calendar Quarter and was due to one or more of the exceptions set forth in Paragraph 45, the report must so note; and

(B) 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 110 hours 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.e. For any period of non-compliance, the Applicable Defendant(s) must identify the date, cause, and corrective action taken.

i. Any additional matters that the Applicable Defendant(s) believe should be brought to the attention of EPA, or LDEQ for the Hahnville and Plaquemine Facilities.

64. Fenceline Air Monitoring Reports. The Applicable Defendant(s) 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 must 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).

65. Annual Emissions Data. In the Semi-Annual Report that is submitted by or on March 31 of each year, the Applicable Defendant(s) 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, NOx, CO2, methane, and ethane. 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 63 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 Applicable Defendant(s) must so state in the report. In such a case, the Applicable Defendant(s) 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 thirty Days of the Day the Applicable Defendant(s) become aware of the cause of the violation. Nothing in this Paragraph or the following Paragraph relieves the Applicable Defendant(s) of its(their) obligation to provide the notice required by Section XI (Force Majeure).

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

67. Each report submitted by the Applicable Defendant(s) 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.

68. The reporting requirements of this Consent Decree do not relieve the Applicable Defendant(s) 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.

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

X. STIPULATED PENALTIES

70. The Applicable Defendant(s) is(are) liable for stipulated penalties to the United States, and LDEQ for the Hahnville and Plaquemine Facilities, for violations of this 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.

71. Late Payment of Civil Penalty. If the Applicable Defendant(s) fail(s) 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.

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

Violation	**Stipulated Penalty**	
72.a. Violations of Paragraph 18. Failure to timely submit a Flare Data and Monitoring Systems and Protocol Report that complies with the requirements of Paragraph 18.	Period of Delay or Noncompliance	Penalty per Day per Violation
	Days 1-30	$300
	Days 31-60	$400
	Days 61 and later	$500

72.b. Violations of Paragraph 19-23. Failure to install the equipment and monitoring systems required by Paragraphs 19-23 by the compliance date or the dates and maintain them in accordance with the respective, applicable technical specifications in those Paragraphs and Paragraph 25, (except for the QA/QC requirements referenced in sub-Paragraph 24.a.i., which are covered in sub-Paragraph 72.c below).	Period of Delay or Noncompliance per Monitoring System/ Control Instrument Days 1-30 Days 31-60 Days 61 and later	Penalty per Day per Monitoring System/Control Instrument $750 $1,250 $2,000 or an amount equal to 1.2 times the economic benefit of delayed compliance, whichever is greater
72.c. Violations of the QA/QC requirements in Paragraph 25.a.i. Failure to comply with the QA/QC requirements referenced in Paragraph 25.a.i.	Violation of a: Daily requirement Quarterly requirement Annual requirement	Penalty per Violation $100 $200 per Day late $500 per Day late
72.d Violations of Paragraph 27. Except for 110 hours 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 Applicable Defendant(s) 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.	Per Monitoring System/ Control Instrument, Number of Hours per Calendar Quarter 0.25-50.0 50.25-100.0 Over 100.0	Penalty per Hour per Monitoring System/ Control Instrument $250 $500 $1,000
72.e. Violations of Paragraph 29, 30, or 31. Failure to timely submit a WGMP that complies with the requirements of the applicable Paragraph.	Period of Delay or Noncompliance Days 1-30 Days 31-60 Days 61 and later	Penalty per Day per Violation $500 $750 $1,000

72.f. Violations of Paragraph 34. 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.	Period of Delay or Noncompliance — Penalty per Day per Violation Days 1-30 — $800 Days 31-60 — $1,600 Days 61 and later — $3,000
72.g. Violations of Paragraph 35. Failure to complete any corrective action in accordance with the requirements of Paragraph 35.	Period of Delay or Noncompliance — Penalty per Day per Violation Days 1-30 — $1,000 Days 31-60 — $2,000 Days 61 and later — $5,000
72.h. Violations of Paragraph 37 . For failing to timely install any FGRS listed in Paragraph 37.	Period of Delay or Noncompliance per FGRS — Penalty per Day per FGRS 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
72.i. Violations of Paragraph 38. For each failure to have the requisite number of FGRS Compressors Available for Operation or in operation in accordance with Paragraph 38.	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.

72.j. Violations of Paragraphs 43.b and 45. For each Covered Flare, each failure to comply with the NHV_{cz} standard in Paragraph 43.b or the Standard During Instrument Downtime in Paragraph 45.	On a per Covered Flare basis, Hours per Calendar Quarter in Noncompliance — Penalty per Hour per Covered Flare Hours 0.25-50.0 — $50 Hours 50.25-100.0 — $100 Hours over 100.0 — $300 For purposes of calculating the number of hours of noncompliance with the NHV_{cz} standard, all fifteen-minute periods of violation must be added together to determine the total.
72.l. Violations of Paragraph 46. Failure to record any information required to be recorded pursuant to Paragraph 46.	$100 per Day
72.m. Violations of Paragraph 47 (Fenceline Monitoring Requirements). For each failure to comply with a requirement of Paragraph 47 or Appendix 2.2.	Period of Delay or Noncompliance — Penalty per Day Days 1-30 — $500 Days 31-60 — $1,500 Days 61 and later — $3,000

73. Failure to Meet Reporting Requirements. For each failure to submit a Semi-Annual Report that complies with the requirements of Section IX:

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

74. BEP Compliance. If the Applicable Defendant(s) fail(s) to satisfactorily complete the BEP(s) by the deadline set forth in Appendix 2.1, the Applicable Defendant(s) must pay stipulated penalties for each Day for which they fail to satisfactorily complete the BEP, as follows:

Period of Delay or Noncompliance	Penalty per Violation per Day
Days 1-30	$500
Days 31-60	$1,000
Days 61 and later	$2,000

75. 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 57 to the state of Texas or LDEQ:

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

76. 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 78, 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.

77. The Applicable Defendant(s) must pay stipulated penalties to the United States, and LDEQ for violations arising from the Hahnville and Plaquemine Facilities, within sixty 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 Hahnville and Plaquemine

Facilities. For stipulated penalties arising from violations at the Hahnville and Plaquemine Facilities, the Applicable Defendant(s) must pay fifty-percent of the total stipulated penalty amount due to the United States and fifty-percent to LDEQ, except in the case of stipulated penalties related to the performance of a BEP (Paragraph 74) where one-hundred percent of the stipulated penalty must be paid to LDEQ. For all other violations, the Applicable Defendant(s) 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.

78. 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 Hahnville and Plaquemine 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 Hahnville and Plaquemine Facilities, where only LDEQ demands stipulated penalties for a violation, and the United States does not join in the demand within thirty Days of receiving the demand, or timely joins in the demand but subsequently elects to waive or reduce stipulated penalties for that violation, the Applicable Defendant(s) must pay the stipulated penalties due for the violation to the LDEQ, provided however, that the Applicable Defendant(s) will not pay more than fifty percent of the total stipulated penalties that could have been due if both the United States and LDEQ had issued a demand.

79. By no later than sixty Days after receiving a demand for stipulated penalties, the Applicable Defendant(s) 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 will not accrue commencing on the later of either: (i) the date that, during dispute resolution under Section XII, the Plaintiffs and the Applicable Defendant(s) agree(s) upon; or (ii) the date that the Applicable Defendant(s) file a motion with the Court under Paragraph 92; provided however, that in order for stipulated penalties to cease accruing pursuant to either (i) or (ii), the Applicable Defendant(s) must place the disputed amount in an interest-bearing commercial escrow account, the administrative costs of which are to be borne by the Applicable Defendant(s), and are not subject to deduction from any amount(s) owed to the United States or LDEQ. The interest rate must be determined in accordance with 28 U.S.C. § 1961. If the dispute is resolved in the Applicable Defendant's(s') favor, the escrowed amount plus accrued interest will be returned to the Applicable Defendant(s); otherwise, the United States, and LDEQ for violations arising from the Hahnville and Plaquemine facilities, 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.

80. The Applicable Defendant(s) 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 Applicable Defendant(s) must pay stipulated penalties owing to LDEQ in the manner set forth and with the confirmation notices required by Paragraph 17.

81. If the Applicable Defendant(s) fail(s) to pay stipulated penalties according to the terms of this Consent Decree, the Applicable Defendant(s) is(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 may be construed to limit the United States or LDEQ from seeking

any remedy otherwise provided by law for the Applicable Defendant's(s') failure to pay any stipulated penalties.

82. The payment of penalties and interest, if any, do not alter in any way the Applicable Defendant's(s') obligation(s) to complete the performance of the requirements of this Consent Decree.

83. 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 and LDEQ expressly reserves the right to seek any other relief it deems appropriate for the Applicable Defendant's(s') violation(s) of this Decree or applicable law, including but not limited to an action against any Applicable Defendant(s) 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

84. *Force Majeure*, for purposes of this Consent Decree, is defined as any event beyond the control of the Applicable Defendant(s), of any entity controlled by the Applicable Defendant(s), or of the Applicable Defendant's(s') contractors, which delays or prevents the performance of any obligation under this Decree despite the Applicable Defendant's(s') best efforts to fulfill the obligation. The requirement that the Applicable Defendant(s) 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 Applicable Defendant's(s') financial inability to perform any obligation under this Consent Decree.

85. 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 Applicable Defendant(s) must provide written notice to EPA, and LDEQ for the Hahnville and Plaquemine Facilities, in accordance with Section XVII no later than fifteen Days after the date the Applicable Defendant(s) 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 Applicable Defendant's(s') 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 Applicable Defendant(s), such event may cause or contribute to an endangerment to public health, welfare or the environment. The Applicable Defendant(s) must include with any notice all the available documentation upon which the Applicable Defendant(s) rely to support the claim that the delay was attributable to a Force Majeure. Failure to comply with the above requirements will preclude the Applicable Defendant(s) 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 Applicable Defendant(s) will be deemed to know of any circumstance of which the Applicable Defendant(s), any entity controlled by an Applicable Defendant(s), or an Applicable Defendant's(s') contractors knew or should have known.

86. If EPA, after a reasonable opportunity for review and comment by LDEQ for the

Hahnville and Plaquemine 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 Hahnville and Plaquemine 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 Applicable Defendant(s) in writing of the length of the extension, if any, for performing the obligations affected by the Force Majeure.

87. If EPA, after a reasonable opportunity for review and comment by LDEQ for the Hahnville and Plaquemine Facilities, does not agree that the delay or anticipated delay has been or will be caused by a Force Majeure, EPA will notify the Applicable Defendant(s) in writing of its decision.

88. If the Applicable Defendant(s) elect(s) to invoke the dispute resolution procedures set forth in Section XII (Dispute Resolution), it(they) must do so no later than forty-five Days after receiving EPA's notice of decision. In any such dispute resolution proceeding, the Applicable Defendant(s) has(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 Applicable Defendant(s) complied with the requirements of Paragraphs 84 and 85. If the Applicable Defendant(s) carry this burden, the delay at issue will be deemed to not be a violation by the Applicable Defendant(s) of the affected obligation of this Consent Decree identified to EPA and the Court.

XII. DISPUTE RESOLUTION

89. 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.

90. 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 the Applicable Defendant(s) send(s) the United States, and with respect to the Hahnville and Plaquemine Facilities, LDEQ, a written Notice of Dispute. Such Notice of Dispute must clearly state the matter in dispute. The period of informal negotiations must not exceed sixty 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 forty-five Days after the conclusion of the informal negotiation period, the Applicable Defendant(s) invoke(s) formal dispute resolution procedures as set forth below.

91. Formal Dispute Resolution. The Applicable Defendant(s) must invoke formal dispute resolution procedures, within the time period provided in the preceding Paragraph, by serving on the United States and, with respect to the Hahnville and Plaquemine Facilities, LDEQ, 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 Applicable Defendant's(s') position and any supporting documentation relied upon by the Applicable Defendant(s).

92. The United States, after consultation with LDEQ for the Hahnville and Plaquemine Facilities, must serve its Statement of Position within forty-five Days of receiving

the Applicable Defendant's(s') Statement of Position. The United States' Statement of Position must 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 Applicable Defendant(s), unless the Applicable Defendant(s) files(file) a motion for judicial review of the dispute in accordance with the following Paragraph.

93. The Applicable Defendant(s) may seek judicial review of the dispute by filing with the Court and serving on the United States and, with respect to the Hahnville and Plaquemine Facilities, LDEQ, in accordance with Section XVII (Notices), a motion requesting judicial resolution of the dispute. The motion must be filed within forty-five Days of receiving the United States' Statement of Position pursuant to the preceding Paragraph. The motion must contain a written statement of the Applicable Defendant's(s') 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 Decree.

94. The United States will respond to the Applicable Defendant's(s') motion within the time period allowed by the Local Rules of this Court. LDEQ may participate for the Hahnville and Plaquemine Facilities. The Applicable Defendant(s) may file a reply memorandum, to the extent permitted by the Local Rules.

95. Standard of Review. In a formal dispute resolution proceeding under this Section, the Applicable Defendant(s) bear(s) the burden of demonstrating that its(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, after consultation with LDEQ for the Hahnville

and Plaquemine Facilities, 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 Applicable Defendant(s) reserve(s) the right to argue to the contrary. An administrative record of the dispute will be maintained by EPA and will contain all Statements of Position, including supporting documentation. Upon written request from the Applicable Defendant(s), EPA will provide a copy of the administrative record. Where appropriate, EPA may allow submission of supplemental statements of position by the parties to the dispute.

96. The invocation of dispute resolution procedures under this Section will not, by itself, extend, postpone, or affect in any way any obligation of the Applicable Defendant(s) 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 79. If the Applicable Defendant(s) does(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

97. The United States, and LDEQ for the Hahnville and Plaquemine 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 Applicable Defendant's(s') compliance with this Consent Decree.

98. Upon request, the Applicable Defendant(s) must provide EPA, and LDEQ for the Hahnville and Plaquemine Facilities, or their authorized representatives, splits of any samples taken by the Applicable Defendant(s). Upon request, EPA and LDEQ must provide the Applicable Defendant(s) split(s) of any samples taken by EPA or LDEQ.

99. Notwithstanding Section XXI (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 Applicable Defendant(s) 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 Applicable Defendant's(s') 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 Hahnville and Plaquemine Facilities, the Applicable Defendant(s) must provide copies of any documents, records, or other information required to be maintained under this Paragraph. The Applicable Defendant(s) must retain the data recorded by the video cameras required pursuant to Paragraph 22 for one year from the date of recording.

100. Except for emissions data, the Applicable Defendant(s) 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 Applicable

Defendant(s) seek(s) to protect as CBI, the Applicable Defendant(s) must follow the procedures set forth in 40 C.F.R. Part 2. To assert that any information required to be submitted to LDEQ is entitled to be protected as confidential, the Applicable Defendant(s) must follow the law and procedures as set forth in the applicable provisions of La. R.S. 30:2030; La. R.S. 30:2074.D; and LAC 33:I.Chapter 5.

101. 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 Applicable Defendant(s) to maintain documents, records, or other information imposed by applicable federal or state laws, regulations, or permits.

XIV. EFFECT OF SETTLEMENT/RESERVATION OF RIGHTS

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

a. *BTU/scf Flared Gas Requirements* means the requirements found in the following regulations:

(1) 40 C.F.R. § 60.18(c)(3)(ii);

(2) 40 C.F.R. § 63.11(b)(6)(ii); and

(3) 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* means the requirements found in the following regulations:

(1) 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);

(2) 40 C.F.R. § 60.18(c)(2) and 40 C.F.R. § 63.11(b)(5) (both relate to flame presence);

(3) 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); and

(4) 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* means the requirements found in the following regulations:

(1) 40 C.F.R. § 60.11(d);

(2) 40 C.F.R. § 61.12(c); and

(3) 40 C.F.R. § 63.6(e)(1)(i).

d. *PSD/NNSR Requirements* means the Prevention of Significant Deterioration and Non-Attainment New Source Review requirements found in the following:

(1) 42 U.S.C. § 7475;

(2) 40 C.F.R. §§ 52.21(a)(2)(iii) and 52.21(j)-52.21(r)(5);

(3) 42 U.S.C. §§ 7502(c)(5) and 7503(a-(c);

(4) 40 C.F.R. Part 51, Appendix S, Part IV, Conditions 1-4;

(5) any applicable, federally enforceable state or local regulation that implements, adopts, or incorporates the federal provisions cited in sub-Paragraphs 102.d(1)-(4); and

(6) any applicable Title V permit requirement that implements, adopts, or incorporates the federal provisions or federally enforceable state provisions cited in sub-Paragraphs 102.d(1)-(5).

e. *Requirements Related to Monitoring, Operation, and Maintenance According to Flare Design* means the requirements found in the following regulations:

(1) 40 C.F.R. § 60.18(d);

(2) 40 C.F.R. § 63.11(b)(1); and

(3) 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.

103. 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.

104. Resolution of Claims for Violating PSD/NNSR Requirements at the Covered Flares. With respect to emissions of VOCs, NOx, and CO from the Covered Flares, entry of this Consent Decree resolves the civil claims of the United States and LDEQ against the Applicable Defendant(s) for violations of the PSD/NNSR Requirements resulting from construction or modification from the date of the pre-Lodging construction or modification through the Date of Lodging.

105. 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 Applicable Defendant(s) 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.

106. 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 Applicable Defendant(s) 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.

107. Resolution of Title V Violations. Entry of this Consent Decree resolves the civil claims of the United States and LDEQ against the Applicable Defendant(s) 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 103-105 for the time frames set forth in those Paragraphs.

108. Reservation of Rights - Resolution of Liability in Paragraphs 106-107 can be Rendered Void. Notwithstanding the resolution of liability in Paragraphs 106-107, for the period of time between the Date of Lodging and the post-lodging dates specified in Paragraph 106, those resolutions of liability will be rendered void if the Applicable Defendant(s) 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 106-107 will not be rendered void if the Applicable

Defendant(s), as expeditiously as practicable, remedy such material failure and pay all stipulated penalties due as a result of such material failure.

109. 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 103-106. 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 Decree or otherwise.

110. 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 Defendant's(s') violations, the Applicable Defendant(s) 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 103-106.

111. This Consent Decree is not a permit, or a modification of any permit, under any federal, state, or local laws or regulations. The Applicable Defendant(s) is(are) responsible for maintaining compliance with all applicable federal, state, and local laws, regulations, and permits; and the Applicable Defendant's(s') 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 Applicable Defendant's(s') 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.

112. This Consent Decree does not limit or affect the rights of the Applicable Defendant(s) 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 Applicable Defendant(s), except as otherwise provided by law.

113. 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

114. 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 Applicable Defendant(s).

XVI. 26 U.S.C. § 162(f)(2)(A)(ii) IDENTIFICATION

115. For purposes of the identification requirement of Section 162(f)(2)(A)(ii) of the Internal Revenue Code, 26 U.S.C. § 162(f)(2)(A)(ii), performance of Section V (Compliance Requirements), Paragraphs 18-32 and 34-47; Section VII (Permits), Paragraphs 57-58; Section IX (Reporting Requirements), Paragraphs 63-67; Section XIII (Information Collection and

Retention), Paragraphs 97-100; Section II (Applicability), Paragraph 10; and related Appendices 1.2-1.10 and 2.2 is restitution or required to come into compliance with law.

XVII. NOTICES

116. 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 first class mail or courier is required and will be sufficient to comply with the notice requirements of this Consent Decree; however, for the submission of technical information or data, the Applicable Defendant(s) must submit the data in electronic form (*viz.*, an optical disk, hard disk drive (HDD), solid state drive (SSD), or an approved flash memory device). 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 # 90-5-2-1-11114 and as to EPA as set forth below.
As to the United States by first-class mail:	EES Case Management Unit Environment and Natural Resources Division United States Department of Justice P.O. Box 7611 Washington, D.C. 20044-7611 Re: DJ # 90-5-2-1-11114
As to the United States Attorney by first-class mail:	United States Attorney Eastern District of Louisiana 650 Poydras Street, Suite 1600 New Orleans, LA 70130

As to EPA by first-class mail:

Director, Air Enforcement Division
Office of Civil Enforcement
United States 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)
United States EPA, Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270-2102

As to EPA by email:

parrish.robert@epa.gov
foley.patrick@epa.gov
stucky.maria@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

and

Dwana C. King
Oscar Magee
P.O. Box 4302
Office of the Secretary, Legal Affairs Division
Louisiana Department of Environmental Quality
Baton Rouge, Louisiana 70821-4302

As to the Defendants:

Rich A. Wells
Vice President Operations U.S. Gulf Coast
Site Director Texas Operations
The Dow Chemical Company
2301 N. Brazosport Blvd.
Freeport, TX 77541

and

Carlos J. Moreno
Counsel, U.S. Operations, Regulatory & NA
The Dow Chemical Company
332 SH 332 E (4A016)
Lake Jackson, TX 77566

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

118. 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.

XVIII. EFFECTIVE DATE

119. 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.

XIX. RETENTION OF JURISDICTION

120. 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 XX, and c) effectuating or enforcing compliance with the terms of this Consent Decree.

XX. MODIFICATION

121. Except as otherwise allowed in Paragraphs 14 and 117 (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.

122. Any disputes concerning modification of this Consent Decree must be resolved pursuant to Section XII (Dispute Resolution), provided, however, that, instead of the burden of proof provided by Paragraph 95, the Party seeking the modification bears the burden of demonstrating that it is entitled to the requested modification in accordance with Federal Rule of Civil Procedure 60(b).

XXI. TERMINATION

123. Before seeking termination of the entire Consent Decree or the set of requirements applicable to one or more Covered Facilities, the Applicable Defendant(s) 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.e (availability of FGRS compressors), 43.b (NHV_{cz} standard), 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 BEPs in Section VI;

e. Apply for and receive federally enforceable permits for the Hahnville and Plaquemine Facilities issued pursuant to LDEQ's consolidated preconstruction and Title V CAA permitting program, which incorporate the requirements set forth in Paragraph 58.c. The cited basis for the incorporated requirements in the LDEQ's consolidated permit cannot be this Consent Decree and will be the minor NSR authority to issue new limits; and

f. Apply for and receive federally enforceable Non-Title V permits for the Freeport and Orange Facilities incorporating the requirements set forth in Paragraph 58.c. and submit applications to incorporate the requirements

set forth in Paragraph 58.c into a Title V operating permit for the Freeport and Orange Facilities. The cited basis for the incorporated requirements cannot be this Consent Decree and will be the federally enforceable non-Title V permit.

124. After the Applicable Defendant(s) 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 Applicable Defendant(s) may submit a request for termination to the United States by certifying such compliance in accordance with the certification language in Paragraph 67 (Request for Termination). In the Request for Termination, the Applicable Defendant(s) must demonstrate that it(they) have satisfied the conditions for termination set forth in the preceding Paragraph, as well as submit all necessary supporting documentation.

125. Following receipt by the United States, and LDEQ for the Hahnville and Plaquemine Facilities, of the Applicable Defendant's(s') Request for Termination, the Parties will confer informally concerning the request. If the United States, after consultation with LDEQ for the Hahnville and Plaquemine Facilities, agrees that the Decree may be terminated, the Parties will submit, for the Court's approval, a joint stipulation terminating the Decree.

126. If the United States, after consultation with LDEQ for the Hahnville and Plaquemine Facilities, does not agree that the Decree may be terminated, or if the Applicable Defendant(s) do not receive a written response from the United States within ninety Days of the Applicable Defendant's(s') submission of the Request for Termination, the Defendants may invoke dispute resolution under Section XII.

XXII. PUBLIC PARTICIPATION

127. This Consent Decree will be lodged with the Court for a period of not less than thirty 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 Applicable Defendant(s) 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 Applicable Defendant(s) and LDEQ in writing that it no longer supports entry of the Decree.

128. 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 Hahnville and Plaquemine Facilities are located, (b) an opportunity for public comment for a period of not less than forty-five Days 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 Decree disclose facts or considerations that indicate that this Decree is inappropriate, improper, or inadequate.

XXIII. SIGNATORIES/SERVICE

129. Each undersigned representative of the Applicable Defendant(s), 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.

130. This Consent Decree may be signed in counterparts, and its validity cannot be challenged on that basis. The Applicable Defendant(s) 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.

XXIV. INTEGRATION

131. 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.

XXV. FINAL JUDGMENT

132. Upon approval and entry of this Consent Decree by the Court, this Decree constitutes a final judgment of the Court as to the United States, LDEQ, and the Applicable Defendant(s).

XXVI. APPENDICES

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

Dated and entered this 9th Day of June, 2021

UNITED STATES DISTRICT JUDGE
EASTERN DISTRICT OF LOUISIANA

THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. The Dow Chemical Company et al.* (E.D. LA.).

FOR THE UNITED STATES OF AMERICA:

JEAN E. WILLIAMS
Acting Assistant Attorney General
Environment and Natural Resources Division
U.S. Department of Justice

Attorney-in-Charge:

s/ Steven D. Shermer
STEVEN D. SHERMER
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Senior Attorney
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650 Poydras Street, Suite 1600
New Orleans, LA 70130
(O) (504) 680-3005
(F) (504) 680-3184
brock.dupre@usdoj.gov

THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. The Dow Chemical Company et al.* (E.D. LA.).

FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY:

LAWRENCE STARFIELD

Digitally signed by LAWRENCE STARFIELD
Date: 2021.05.24 12:32:31 -04'00'

Lawrence E. Starfield
Acting Assistant Administrator
Office of Enforcement and Compliance Assurance
United States Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. The Dow Chemical Company et al.* (E.D. LA.).

FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION 6:

Digitally signed by CHERYL SEAGER
DN: c=US, o=U.S. Government, ou=Environmental Protection Agency, cn=CHERYL SEAGER, 0.9.2342.19200300.100.1.1=68001003651793
Date: 2020.09.21 11:38:55 -05'00'

Cheryl Seager
Director - Compliance Assurance and Enforcement Division
United States Environmental Protection Agency
Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270-2102

THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. The Dow Chemical Company, et al.* (E.D. LA.), subject to the public notice and comment requirements of La. R.S. 30:2050.7.

FOR THE LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY:

Lourdes Iturralde
Assistant Secretary
Office of Environmental Compliance
Louisiana Department of Environmental Quality
P.O. Box 4312
Baton Rouge, Louisiana 70821-4312

Dwana C. King, Deputy General Counsel
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Page Reserved

THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. The Dow Chemical Company et al.* (E.D. LA.).

FOR THE DOW CHEMICAL COMPANY:

Rich A. Wells
Vice President Operations U.S. Gulf Coast
Site Director Texas Operations
The Dow Chemical Company
2301 N. Brazosport Blvd.
Freeport, TX 77541

THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. The Dow Chemical Company et al.* (E.D. LA.).

FOR UNION CARBIDE CORPORATION:

Rich A. Wells
Vice President Operations U.S. Gulf Coast
Site Director Texas Operations
The Dow Chemical Company
2301 N. Brazosport Blvd.
Freeport, TX 77541

THE UNDERSIGNED PARTIES enter into this Consent Decree entered in the matter of the *United States et al. v. The Dow Chemical Company et al.* (E.D. LA.).

FOR PERFORMANCE MATERIALS NA:

Rich A. Wells
Vice President Operations U.S. Gulf Coast
Site Director Texas Operations
The Dow Chemical Company
2301 N. Brazosport Blvd.
Freeport, TX 77541

United States, et al.
v.
Dow Chemical Company, 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

APPENDIX 1.2

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 CO_2, 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})

The Company 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 Company 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.

APPENDIX 1.2

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

For any gas stream for which the Company complies with Paragraph 23 by collecting compositional analysis data in accordance with the method set forth in 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.

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

For any gas stream for which the Company complies with Paragraph 23 by collecting direct Net Heating Value monitoring data in accordance with the method set forth in 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 Company complies with Paragraph 23 by collecting direct Net Heating Value monitoring data in accordance with the method set forth in 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).

$$NHV_{vg} = NHV_{measured} + 938x_{H2} \qquad \textit{Equation 2}$$

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

For any Covered Flare for which the Company complies with Paragraph 23 by using a continuous monitoring system in accordance with the method set forth in 23.a or 23.b: The Company 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 Company need not elect to use the same methodology at all Covered Flares with a continuous monitoring system; however, for each such Covered Flare, the Company 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 Company intends to change the calculation method that applies to a Covered Flare, the Company must notify the EPA 30 days in advance of such a change.

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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 Company 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 Premix 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 Company complies 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

APPENDIX 1.2

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, Premix Assist Air gas streams, or purge nitrogen for which the Company complies 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 Company elects to use a mass flow monitor to determine volumetric flow rate of Vent Gas, the Company must collect compositional analysis data for such Vent Gas in accordance with the method set forth in 21.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. For purge nitrogen, use a molecular weight of 28 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.

$$Q_{vol} = \frac{Q_{mass} * 385.3}{MWt} \qquad \textit{Equation 3}$$

For gas streams for which the molecular weight of the gas is known and for which the Company complies 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 21.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, supplemental gas, and assist gas flow rates.

$$NHV_{cz} = \frac{(Q_{vg} - Q_{NG2} + Q_{NG1}) * NHV_{vg} + (Q_{NG2} - Q_{NG1}) * NHV_{NG}}{Q_{vg} + Q_s + Q_{a,premix}} \qquad \textit{Equation 4}$$

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,

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the Company 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 Premix Assist Air flow, $NHV_{cz} = NHV_{vg}$.

$$NHV_{cz} = \frac{Q_{vg} * NHV_{vg}}{Q_{vg} + Q_s + Q_{a,premix}} \qquad \textit{Equation 5}$$

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.

$$NHV_{dil} = \frac{\left[\left(Q_{vg} - Q_{NG2} + Q_{NG1}\right) * NHV_{vg} + \left(Q_{NG2} - Q_{NG1}\right) * NHV_{NG}\right] * Diam}{\left(Q_{vg} + Q_s + Q_{a,premix} + Q_{a,perimeter}\right)} \qquad \textit{Equation 6}$$

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 Company 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.

$$NHV_{dil} = \frac{Q_{vg} * Diam * NHV_{vg}}{\left(Q_{vg} + Q_s + Q_{a,premix} + Q_{a,perimeter}\right)} \qquad \textit{Equation 7}$$

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Step 5: 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, as determined for each 15-minute block period when Waste Gas is routed to a Covered Flare for at least 15-minutes. Equation 8 shows this relationship.

$$NHV_{cz} \geq 270\ BTU/scf \qquad \textit{Equation 8}$$

Step 6: Ensure that during flare operation, $NHV_{dil} \geq 22$ BTU/ft^2

A flare actively receiving Perimeter Assist Air must be operated to ensure that NHV_{dil} is equal to or above 22 BTU/ft^2, as determined for each 15-minute block period when Supplemental, Sweep, and/or Waste Gas is routed to a Covered Flare for at least 15-minutes. Equation 9 shows this relationship.

$$NHV_{dil} \geq 22\ BTU/ft^2 \qquad \textit{Equation 9}$$

Calculation Method for Determining Compliance with V_{tip} Operating Limits.

The Company shall determine V_{tip} 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 V_{tip} shall be calculated using Equation 10.

$$Vtip = \frac{Q_{cum}}{Areax900} \qquad \textit{Equation 10}$$

(d) If Settling Defendants choose to comply with Paragraph 40.b, Defendants shall also determine the NHVvg using Step 1 above and calculate V_{max} using Equation 11 in order to compare V_{tip} to V_{max} on a 15-minute Block Average basis.

$$log_{10}(V_{max}) = \frac{NHV_{vg} + 1{,}212}{850} \qquad \textit{Equation 11}$$

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Key to the Abbreviations:

$385.3 = conversion\ factor\ (scf/lb\text{-}mol)$
$850 = Constant$
$900 = Conversion\ factor,\ (seconds\ /\ 15\text{-}minute\ block\ average)$
$1{,}212 = Constant$
$Area$ = 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.
$Diam = Effective\ diameter\ of\ the\ unobstructed\ area\ of\ the\ flare\ tip\ for\ flare\ vent\ gas\ flow,\ ft.\ Determine\ the\ diameter\ as\ Diam = 2 * \sqrt{Area\ \div\ \pi}$
$i = individual\ component\ in\ Vent\ Gas\ (unitless)$
$MWt = molecular\ weight\ of\ the\ gas\ at\ the\ flow\ monitoring\ location\ (lb/lb\text{–}mol)$
$n = number\ of\ components\ in\ Vent\ Gas\ (unitless)$
$NHV_{cz} = Net\ Heating\ Value\ of\ Combustion\ Zone\ Gas\ (BTU/scf)$
$NHV_i = Net\ Heating\ Value\ of\ component\ i\ according\ to\ Table\ 1\ of\ this\ Appendix\ (BTU/scf)$
$NHV_{measured} = Net\ Heating\ Value\ of\ Vent\ Gas\ stream\ as\ measured\ by\ monitoring\ system\ (BTU/scf)$
$NHV_{NG} = Net\ Heating\ Value\ of\ Supplemental\ Gas\ to\ flare\ during\ the\ 15-minute\ block\ period\ (BTU/scf)$
$NHV_{vg} = Net\ Heating\ Value\ of\ Vent\ Gas\ (BTU/scf)$
$Q_{a,perimeter} = cumulative\ vol\ flow\ of\ perimeter\ assist\ air\ during\ the\ 15-minute\ block\ period\ (scf)$
$Q_{a,premix} = cumulative\ vol\ flow\ of\ premix\ assist\ air\ during\ the\ 15-minute\ block\ period\ (scf)$
$Qcum = cumulative\ volumetric\ flow\ over\ 15\text{-}minute\ block\ average\ period\ (scf)$
$Q_{mass} = massflow\ rate\ (pounds\ per\ second)$
$Q_{NG1} = cumulative\ vol\ flow\ of\ Supplemental\ Gas\ to\ flare\ during\ previous\ 15-minute\ block\ period\ (scf)$
$Q_{NG2} = cumulative\ vol\ flow\ of\ Supplemental\ Gas\ to\ flare\ during\ the\ 15-minute\ block\ period\ (scf)$
$Q_s = cumulative\ vol\ flow\ of\ Total\ Steam\ during\ the\ 15-minute\ block\ period\ (scf)$
$Q_{vg} = cumulative\ vol\ flow\ of\ Vent\ Gas\ during\ the\ 15-minute\ block\ period\ (scf)$
$Q_{vol} = volumetric\ flow\ rate\ (scf\ per\ second)$
$Vmax = Maximum\ allowed\ flare\ tip\ velocity\ (\ feet\ per\ second)$
$Vtip = Flare\ tip\ velocity\ (feet\ per\ second)$
$x_i = concentration\ of\ component\ i\ in\ Vent\ Gas\ (vol\ fraction)$
$x_{H2} = concentration\ of\ H2\ in\ Vent\ Gas\ at\ time\ sample\ was\ input\ into\ NHV\ monitoring\ system\ (vol\ fraction)$

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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_2H_2	26.04	2	1,404	2.5
Benzene	C_6H_6	78.11	6	3,591	1.3
1,2-Butadiene	C_4H_6	54.09	4	2,794	2.0
1,3-Butadiene	C_4H_6	54.09	4	2,690	2.0
iso-Butane	C_4H_{10}	58.12	4	2,957	1.8
n-Butane	C_4H_{10}	58.12	4	2,968	1.8
cis-Butene	C_4H_8	56.11	4	2,830	1.6
iso-Butene	C_4H_8	56.11	4	2,928	1.8
trans-Butene	C_4H_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_3H_6	42.08	3	2,185	2.4
Ethane	C_2H_6	30.07	2	1,595	3.0
Ethylene	C_2H_4	28.05	2	1,477	2.7
Hydrogen	H_2	2.02	0	1,212[A]	4.0
Hydrogen Sulfide	H_2S	34.08	0	587	4.0
Methane	CH_4	16.04	1	896	5.0
Methyl-Acetylene	C_3H_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_5H_{12}	72.15	5	3,655	1.4
Propadiene	C_3H_4	40.06	3	2,066	2.16
Propane	C_3H_8	44.10	3	2,281	2.1
Propylene	C_3H_6	42.08	3	2,150	2.4
Water	H_2O	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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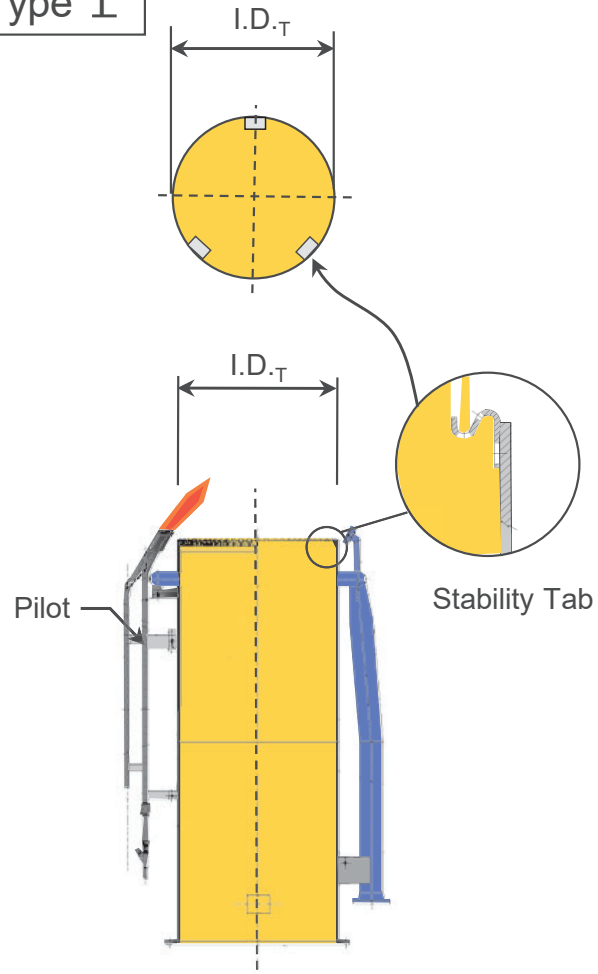
APPENDICES TO CONSENT DECREE

APPENDIX 1.3

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

APPENDIX 1.3

Type Ⅰ



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

Where:

$A_{tip\text{-}unob}$ = 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

Example:

$I.D._T$ = 41.5 inches

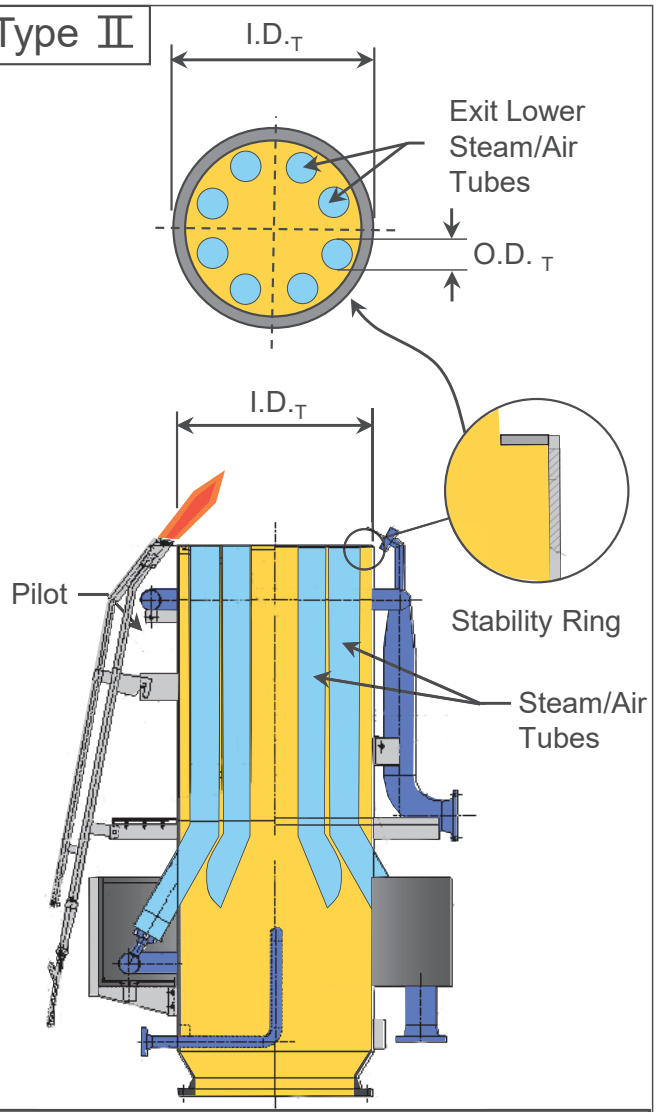
X_T = 3

A_{ST} = 3 Sq. inches

$A_{tip\text{-}unob} = \pi(41.5)^2/4 - (3 * 3)$

$A_{tip\text{-}unob}$ = 1344 Sq. inches

Type Ⅱ



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

Where:

$A_{tip\text{-}unob}$ = 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

Example:

$I.D._T$ = 47.5 inches

A_{ST} = 100 Sq. inches

$O.D._T$ = 6.5 inches

N_T = 8

$A_{tip\text{-}unob} = \pi (47.5)^2/4 - 100 - 8 * \pi * (6.5)^2/4$

$A_{tip\text{-}unob}$ = 1322 Sq. inches

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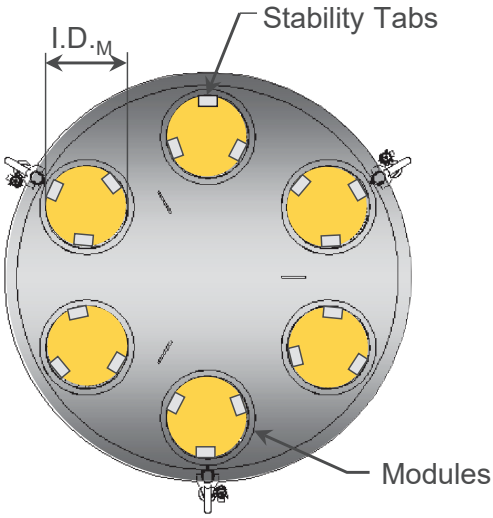
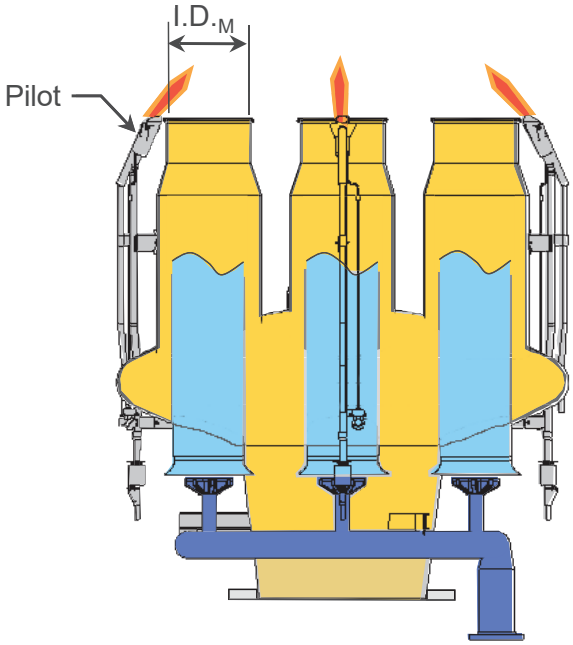
Type III





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

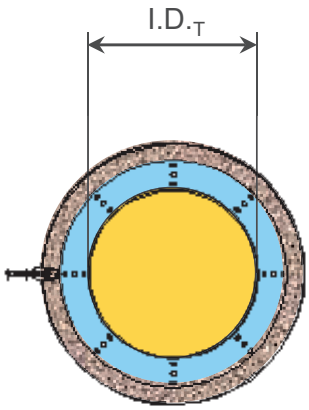
Where:
- $A_{tip\text{-}unob}$ = Unobstructed Cross Sectional Area of Flare Tip
- $I.D._M$ = Inside Diameter of One Tip Module
- N_M = Number of Modules
- X_T = Number of Stability Tabs per Module
- A_{ST} = Area of a Stability Tab

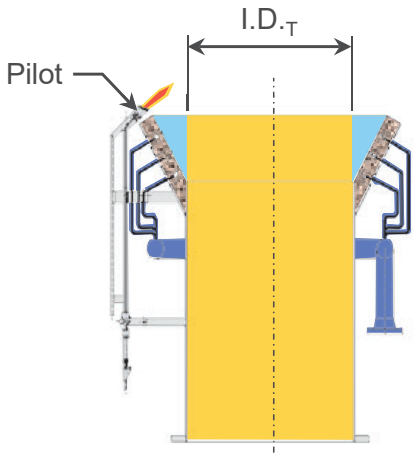
Example:
- $I.D._M$ = 17 inches
- N_M = 6
- X_T = 3
- A_{ST} = 3 Sq. inches

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

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

Type IV





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

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

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

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

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

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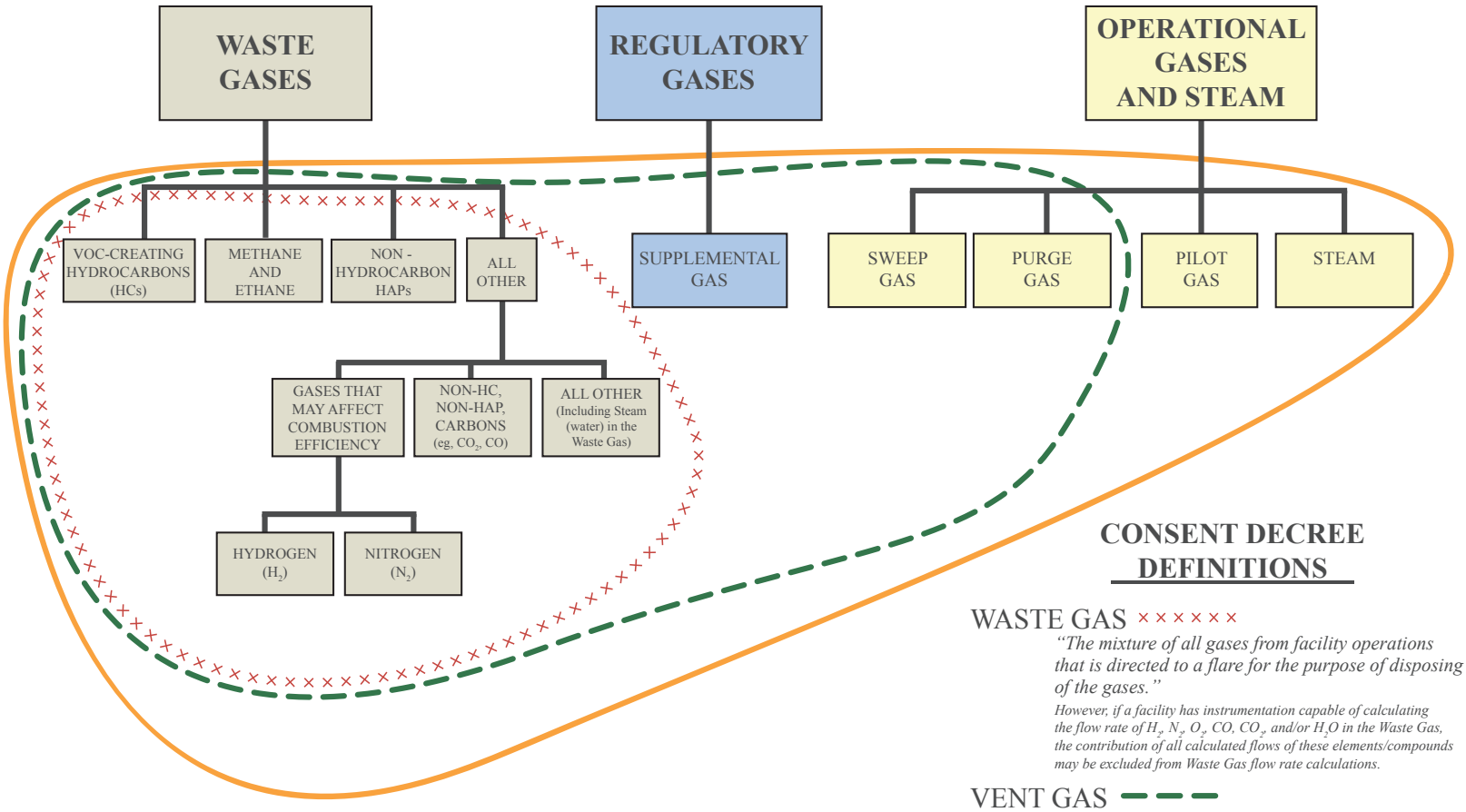
APPENDIX 1.4

Depiction of Gases Associated with Steam-Assisted Flares

DEPICTION OF GASES ASSOCIATED WITH STEAM-ASSISTED FLARES



CONSENT DECREE DEFINITIONS

WASTE GAS ××××××

"The mixture of all gases from facility operations that is directed to a flare for the purpose of disposing of the gases."

However, if a facility has instrumentation capable of calculating the flow rate of H_2, N_2, O_2, CO, CO_2, and/or H_2O in the Waste Gas, the contribution of all calculated flows of these elements/compounds may be excluded from Waste Gas flow rate calculations.

VENT GAS – – –

"The mixture of all gases found prior to the flare tip. This includes all Waste Gas, Supplemental Gas, Sweep Gas, and Purge Gas."

COMBUSTION ZONE GAS ——

"The mixture of all gases and steam found just after the flare tip. This includes all Vent Gas, Pilot Gas, and Total Steam."

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APPENDICES TO CONSENT DECREE

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 Whether the Flare is a Temporary-Use Flare, and if so, the duration and time periods of use
    2.7 Flare Gas Recovery System ("FGRS"), if any, and date first installed

3. Flare Components: Complete description of each major component of the Flare, except the Flare Gas Recovery System (*see* Part 5), including but not limited to:

    3.1 Flare stack (for elevated flares)
    3.2 Flare tip
        3.2.1 Date installed
        3.2.2 Manufacturer
        3.2.3 Tip Size
        3.2.4 Tip Drawing
    3.3 Knockout or surge drum(s) or pot(s), including dimensions and design capacities
    3.4 Water seal(s), including dimensions and design parameters
    3.5 Flare header(s)
    3.6 Sweep Gas system
    3.7 Purge gas system
    3.8 Pilot gas system
    3.9 Supplemental gas system
    3.10 Assist system
    3.11 Ignition system

4. Simplified process diagram(s) showing the configuration of the components listed in Paragraph 3

APPENDIX 1.5

5. 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 diagrams referenced in Part 4

6. Flare Design Parameters

6.1 Maximum Vent Gas Flow Rate and/or Mass Rate

6.2 Maximum Sweep Gas Flow Rate and/or Mass Rate

6.3 Maximum Purge Gas Flow and/or Mass Rate, if applicable

6.4 Maximum Pilot Gas Flow and/or Mass Rate

6.5 Maximum Supplemental Gas Flow Rate and/or Mass Rate

6.6 If steam-assisted, Minimum Total Steam Rate, including all available information on how that Rate was derived

7. Gases Venting to Flare

7.1. Sweep Gas
- 7.1.1 Type of gas used
- 7.1.2 Actual set operating flow rate (in scfm)
- 7.1.3 Average lower heating value expected for each type of gas used

7.2 Purge Gas, if applicable
- 7.2.1 Type of gas used
- 7.2.2 Actual set operating flow rate (in scfm)
- 7.2.3 Average lower heating value expected for each type of gas used

7.3 Pilot Gas
- 7.3.1 Type of gas used
- 7.3.2 Actual set operating flow rate (in scfm)
- 7.3.3 Average lower heating value expected for each type of gas used

7.4 Supplemental Gas
- 7.4.1 Type of gas used
- 7.4.2 Average lower heating value expected for each type of gas used

7.5 Steam (if applicable)
- 7.5.1 Drawing showing points of introduction of Lower, Center, Upper, and any other steam

7.6 Simplified flow diagram that depicts the points of introduction of all gases, including Waste Gases, at the Flare (in this diagram, the detailed drawings of 7.5.1 may be simplified; in addition, detailed Waste Gas mapping is not required; a simple identification of the header(s) that carries(y) the Waste Gas to the Flare

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

8. Existing Monitoring Systems

8.1 A brief narrative description, including manufacturer and date of installation, of all existing monitoring systems, including but not limited to:

8.1.1 Waste Gas and/or Vent Gas flow monitoring
8.1.2 Waste Gas and/or Vent Gas heat content analyzer
81.3 Sweep Gas flow monitoring
8.1.4 Purge Gas flow monitoring
8.1.5 Supplemental Gas flow monitoring
8.1.6 Steam flow monitoring
8.1.7 Waste Gas or Vent Gas molecular weight analyzer
8.1.8 Gas Chromatograph
8.1.9 Sulfur analyzer(s)
8.1.10 Video camera
8.1.11 Thermocouple

8.2 Drawing(s) showing locations of all existing monitoring systems

9. Monitoring Equipment to be Installed to Comply with Consent Decree

10. Narrative Description of the Monitoring Methods and Calculations that will be used to comply with the NHV_{CZ} Requirements in the Consent Decree

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APPENDIX 1.6

Interim Compliance Provisions and Schedule for Instrumentation Upgrades at the Freeport FS-1, Freeport GF-500, Hahnville EO Site Logistics, Orange CDG, Plaquemine LHC-2, Plaquemine Poly A, and Plaquemine Poly C

1. Freeport FS-1 and GF-500 Flares: Combustion Efficiency Requirements. By not later than the Effective Date through May 31, 2021 or the date 14-days after the issuance of CAA Title V Permit Number O2213, whichever is sooner, at the Freeport FS-1 and GF-500 Flares, the Applicable Defendant must:

    a. Comply with the requirements set forth in Paragraph 43.b; or

    b. Make best efforts to operate the flares as close to the requirements set forth in Paragraph 43.b as possible. Notwithstanding the preceding sentence, any 15-minute block period with an NHVcz value at either flare of less than 240 BTU/scf shall be a violation of this Consent Decree and shall be subject to stipulated penalties pursuant to Paragraph 72.j.

    After May 31, 2021 or the date 14-days after the issuance of CAA Title V Permit Number O2213, whichever is sooner, the Applicable Defendant must comply with Paragraph 43.b of this Consent Decree at the Freeport FS-1 and GF-500 Flares.

2. Hahnville EO Site Logistics Flare: Vent Gas Monitoring Requirements. By not later than the Effective Date through September 30, 2021, at the Hahnville EO Site Logistics Flare, the Applicable Defendants must:

    a. Measure volumetric Vent Gas flow as required by Paragraph 20 and Appendix 1.2 of this Consent Decree; or

    b. Calculate volumetric Vent Gas flow using a fixed molecular weight of 19.50 to convert measured Vent Gas mass flow to volumetric flow.

    Failure comply with either Paragraph 2.a or b above is a violation of this Consent Decree and therefore subject to stipulated penalties pursuant to Paragraph 72.b of this Consent Decree. After September 30, 2021, the Applicable Defendant must comply with Paragraph 20 of this Consent Decree at the Hahnville EO Site Logistics Flare.

3. Orange CDG Flare: Vent Gas Monitoring Requirements. By no later than the Effective Date through June 30, 2022 at the Orange CDG Flare, the Applicable Defendants must:

    a. Measure volumetric Vent Gas Flow as required by Paragraph 20 and Appendix 1.2 of this Consent Decree; or

    b. Calculate volumetric Vent Gas flow using a fixed molecular weight of 28 to convert measured Vent Gas mass flow to volumetric flow.

    Failure to comply with either Paragraph 3.a. or b above is a violation of this Consent Decree and therefore subject to stipulated penalties pursuant to Paragraph 72.b. of this Consent Decree. After June 30, 2022, the Applicable Defendant must comply with Paragraph 20 of this Consent Decree at the Orange CDG flare.

4. Plaquemine LHC-2 Flare: Requirements for Monitoring NHV_{vg} and Calculating NHV_{cz}. By no later than the Effective Date through June 30, 2021, at the Plaquemine LHC-2 Flare, the Applicable Defendant must:

   a. Use the currently installed Gas Chromatograph (GC) to determine the concentration of individual components in the Vent Gas for the purpose of monitoring the NHV_{vg} value at the Flare at least every 45-minutes, and use that NHV_{vg} value to calculate NHV_{cz} every 15-minutes as required by Paragraph 43.b. and Appendix 1.2 of this Consent Decree; or

   b. Measure NHV_{vg} and calculate NHV_{cz} as required by Paragraphs 23, 26, and 43 and Appendix 1.2 of this Consent Decree.

   Failure comply with either Paragraph 4.a or b above is a violation of this Consent Decree and therefore subject to stipulated penalties pursuant to Paragraph 74.b and 72.j of this Consent Decree. After June 30, 2021, the Applicable Defendants must comply with Paragraphs 23, 26, and 43 and Appendix 1.2 of the Consent Decree at the Plaquemine LHC-2 Flare.

5. Plaquemine LHC-2 Flare: GC Calibration. By no later than the Effective Date through June 30, 2021, at the Plaquemine LHC-2 Flare, the Applicable Defendant must:

   a. Use single point calibration at the existing GC at least once per week using the following percent calibration error calculation standard for each compound listed below:

      Hydrogen – 42.5%
      Ethylene – 5%
      Ethane – 3%
      Oxygen – 0.5%
      Nitrogen – 25%
      Methane – 20%
      Propylene – 2%
      Propane – 2%

      The percent calibration error must be calculated for each compound using the same equation found in pursuant to the equation set forth in Section 12.3 of EPA's Performance Specification 9 – Specifications and Test Procedures for Gas Chromatographic Continuous Emission Monitoring Systems in Stationary Sources, August 7, 2017:

      12.3 Calibration Error Determination. Determine the percent calibration error (CE) at each concentration for each pollutant using the following equation.

$$CE = \frac{C_m - C_a}{C_a} \times 100 \qquad \text{Eq. 9-2}$$

C_m = average instrument response, ppm.

C_a = cylinder gas value, ppm.

The calibration is complete provided each compound demonstrates a calibration error of less than 10%; or

b. Comply with the calibration standards and procedures in Paragraph 25 of this Consent Decree.

Failure comply with either Paragraph 5.a or b above is a violation of this Consent Decree and therefore subject to stipulated penalties pursuant to Paragraph 72.c of this Consent Decree. After June 30, 2021, the Applicable Defendants must comply with Paragraph 25 of this Consent Decree at the Plaquemine LHC-2 Flare.

6. Plaquemine Poly A Flare: Vent Gas Monitoring Requirements. By not later than the Effective Date through October 31, 2020, at the Plaquemine Poly A Flare, the Applicable Defendant must:

   a. Measure volumetric Vent Gas flow as required by Paragraph 20 of the Consent Decree; or

   b. Measure volumetric Vent Gas flow by using a fixed molecular weight of 30.76 to convert measured Vent Gas mass flow to volumetric flow.

   Failure comply with either Paragraph 6.a or b above is a violation of this Consent Decree and therefore subject to stipulated penalties pursuant to Paragraph 74.b of this Consent Decree. After October 31, 2020, the Applicable Defendant must comply with Paragraph 20 of this Consent Decree at the Plaquemine Poly A Flare.

7. Plaquemine Poly C Flare: Vent Gas Flow Measurement. By no later than the Effective Date and until December 31, 2021, at the Plaquemine Poly C Flare, the Applicable Defendant must:

   a. Use the currently installed Vent Gas flow meter to measure Vent Gas flow, and because the meter may be slightly inaccurate, monitor the flare flame every 15-minutes to minimize the indicia of over-steaming (*i.e.*, visible steam), and maintain the Flare's steam-to-vent gas ratio at the lowest practicable value possible; or

   b. Meet the minimum Vent Gas flow meter accuracy requirement contained in Table 13 of the 40 CFR Part 63, Subpart CC as required by Paragraph 25.a of the Consent Decree.

   Failure comply with either Paragraph 7.a or b above is a violation of this Consent Decree and therefore subject to stipulated penalties pursuant to Paragraph 72.c of this Consent

Decree. After December 31, 2021, the Applicable Defendant must comply with Paragraph 25 of this Consent Decree at the Plaquemine Poly C Flare.

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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.

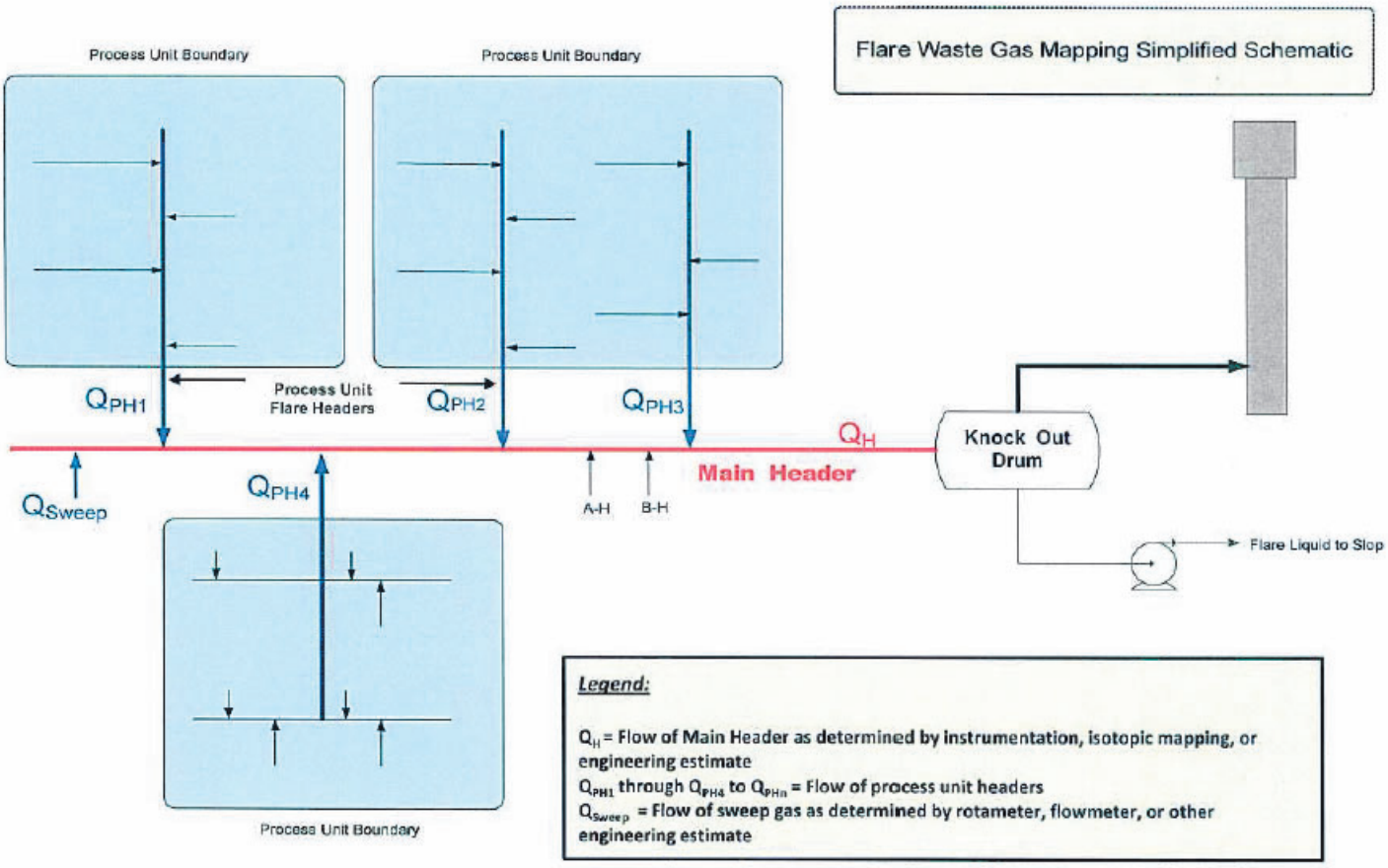
Flare Waste Gas Mapping Simplified Schematic
Process Unit Boundary
Process Unit Boundary
Q_{PH1}
Process Unit Flare Headers
Q_{PH2}
Q_{PH3}
Q_H
Main Header
Knock Out Drum
Flare Liquid to Slop
Q_{Sweep}
Q_{PH4}
A-H
B-H
Process Unit Boundary
Legend:
Q_H = Flow of Main Header as determined by instrumentation, isotopic mapping, or engineering estimate
Q_{PH1} through Q_{PH4} to Q_{PHn} = Flow of process unit headers
Q_{Sweep} = Flow of sweep gas as determined by rotameter, flowmeter, or other engineering estimate

Table 1: Example of Flare Source Description Table

Process Unit Header	Sources	Detailed Source Description
Q_{PH1} (Ex: FCCU Gas Con Unit)	3 PSVs	PSV-14 on 110-D-5 Gas Con Absorber PSV-12 on 110-D-1 Amine Scrubber PSV-7 on 110-F-1 Batch Caustic Vessel
	2 Pump Seal Purges	110-G-1 LPG Pump 110-G-2 Rich Amine Pump
	1 Sample Station	110-S-1 LPG
	1 PSV	PSV 17 on 112-D-1 Main Column
	1 Pressure Control Valve	PCV 21 – Emergency Wet Gas Compressor
	1 PSV	PSV-21 on Flush Oil Drum
	1 Pump Seal Purge	110-G-23 Slurry Oil Pump
Q_{PH2} (Ex: Gas Oil Treater)	Continue same as PH1	Continue same as PH1
Q_{PH3}	Continue same as PH1	Continue same as PH1
Q_{PH4}	Continue same as PH1	Continue same as PH1
A-H	1 PSVs	PSV-17 on 109-E-42 Slurry Heat Exchanger
B-H	2 Pump Seal Purges	110-G-3 Gas Oil Feed 110-G-4 Main Column Reflux

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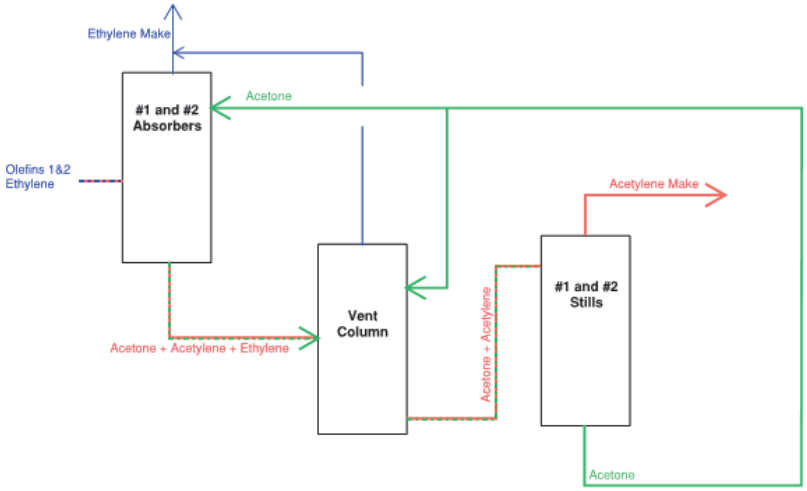
APPENDIX 1.8

Acetylene Streams at the Hahnville Olefins 1 and 2 FGRS

Existing Acetylene System

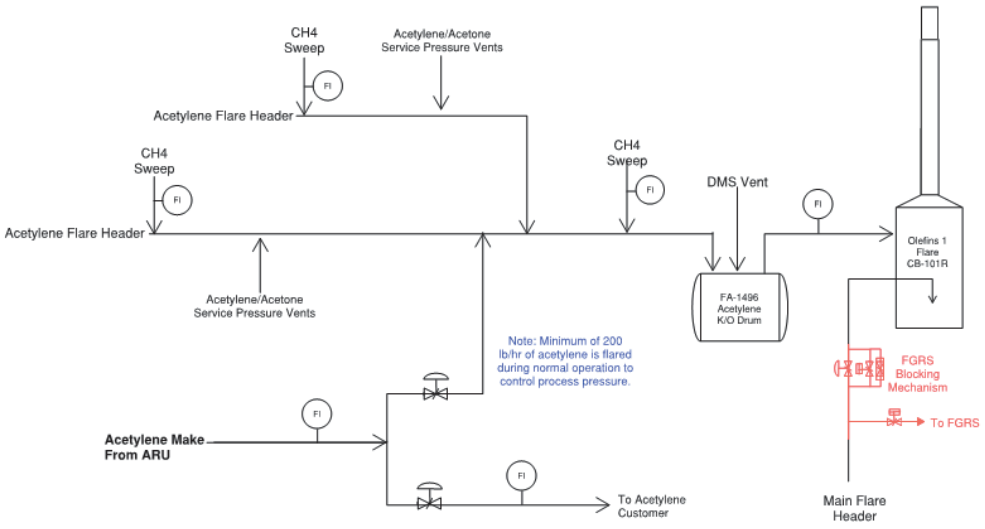
The Hahnville, Louisiana Olefins complex includes an Acetylene Removal Unit (ARU) that processes Olefins 1 and 2 off-specification ethylene to produce on-specification ethylene. The ARU process uses an acetone absorption system. The acetylene is stripped in the #1 and #2 Stills and the process produces approximately 2,700 lbs/hr of acetylene gas. A high-level flow diagram of this process is included below:



A portion of the acetylene make is sold to a third-party customer, and the remainder of this gas is sent to the Olefins 1 Acetylene Flare header. A minimum flow of acetylene gas is always sent to the Olefins 1 Flare to control pressure on the system, but the flow increases when the customer cannot consume all the available acetylene. When the customer is down or when ARU is experiencing certain reliability issues, the maximum flow of 2,700 lb/hr of acetylene is flared. In addition, the following streams are included with the acetylene stream:

1. A methane sweep is added to the Acetylene Flare header due to the potential instability of pure acetylene; and
2. A small vent source (DMS Vent) containing methane and dimethylsulfide vents into this line for approximately 2 hours every 2 weeks.

The acetylene header is routed to the Olefins 1 Flare separately from the main flare Olefins 1 Flare header. A flow diagram of the acetylene flare header is shown below:

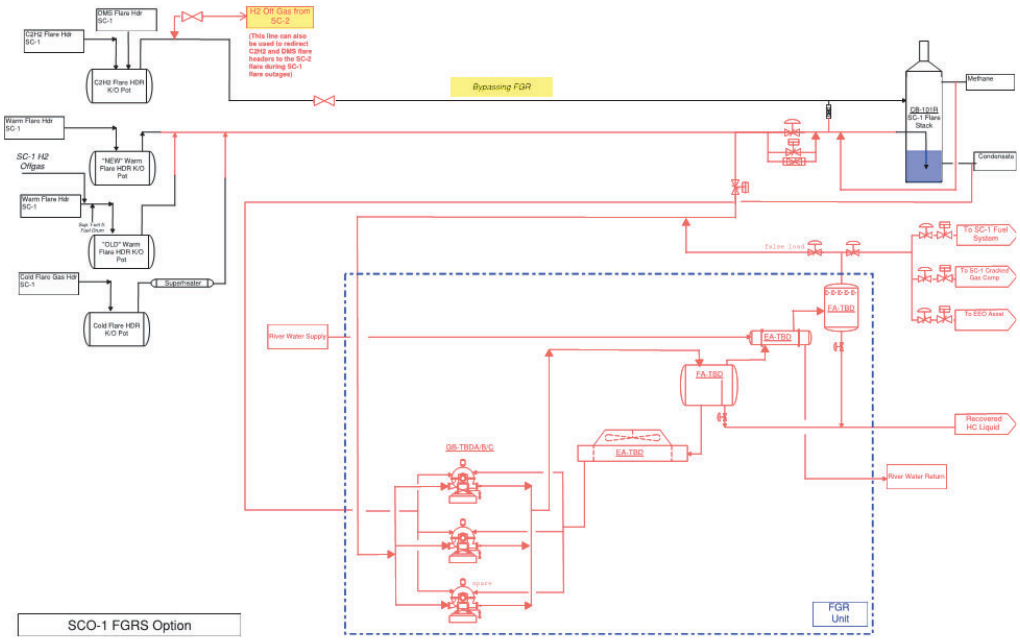


Acetylene Route-Around of Olefins 1 and 2 FGRS

The acetylene header flow may be routed around the Olefins 1 FGRS to the Olefins 1 Flare, eliminating process safety concerns around compressing acetylene above the current safe operating limit of 20 psig.

During times when the Olefins 1 Flare system is out of service, the acetylene header flow may be routed around the Olefins 2 FGRS to the Olefins 2 Flare by installing a cross-tie connection between the existing Olefins 1 Acetylene Flare header and the Olefins 2 Hydrogen/Methane Vent Gas bypass.

A drawing for the future Olefins 1 FGRS (including the cross-tie to the Olefins 1 Acetylene Flare header) is provided below:


DMS Flare Hdr SC-1
C2H2 Flare Hdr SC-1
H2 Off Gas from SC-2
(This line can also be used to redirect C2H2 and DMS flare headers to the SC-2 flare during SC-1 flare outages)
C2H2 Flare HDR K/O Pot
Bypassing FGR
Warm Flare Hdr SC-1
SC-1 H2 Offgas
"NEW" Warm Flare HDR K/O Pot
Warm Flare Hdr SC-1
"OLD" Warm Flare HDR K/O Pot
Cold Flare Gas Hdr SC-1
Superheater
Cold Flare HDR K/O Pot
GB-101B SC-1 Flare Stack
Methane
Condensate
To SC-1 Fuel System
To SC-1 Cracked Gas Comp
To EEC Asset
false load
FA-TBD
River Water Supply
EA-TBD
FA-TBD
Recovered HC Liquid
GB-TRDA/B/C
EA-TBD
River Water Return
FGR Unit
SCO-1 FGRS Option

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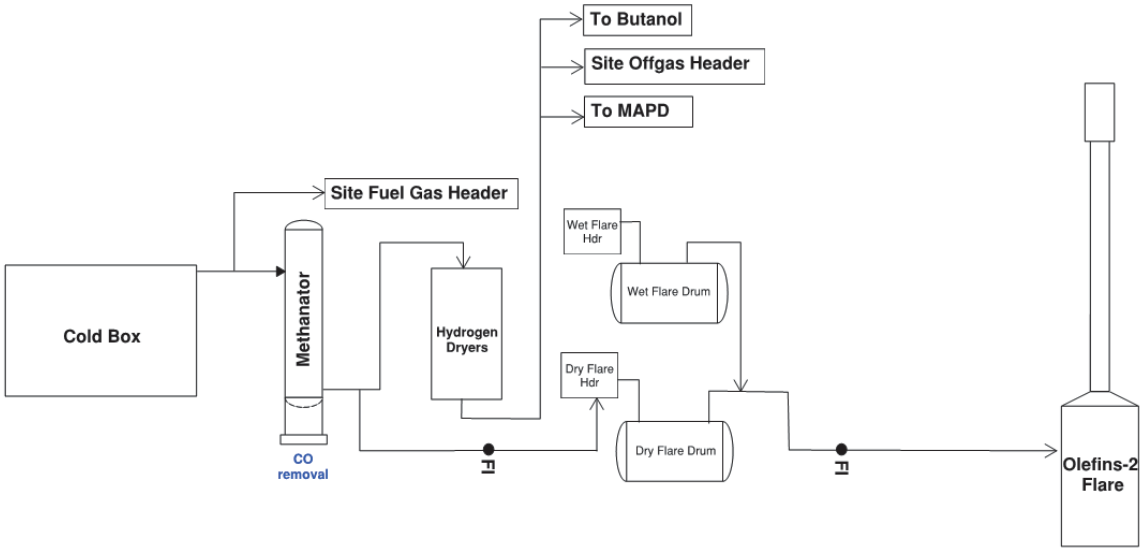
APPENDIX 1.9

Hahnville Olefins 2 Hydrogen/Methane Vent Gas Stream Route-Around of FGRS Olefins 2 FGRS

Existing Hydrogen Delivery System and Olefins 2 Flare

The Hahnville Olefins 2 plant produces hydrogen/methane gas. A portion of this gas mixture is used by the Butanol 1 and Butanol 2 plants at the site, a portion of this gas mixture is used as fuel in the Energy Systems facilities at the site, and the remainder of this gas mixture is routed from an existing unit operation called the methanator, which is part of the hydrogen delivery system, to the Olefins 2 flare (hereafter "Hydrogen/Methane Vent Gas"). The Hydrogen/Methane Vent Gas flows from the methanator through the Dry Flare Drum to the Olefins 2 flare.

A process flow diagram of the existing hydrogen delivery system and methanator is provided below.



Future Design of the Olefins 2 FGRS

By no later than the operational date of the Olefins 2 FGRS as set forth in Paragraph 37 of this Consent Decree, the Hydrogen/Methane Vent Gas must be routed around the Olefins 2 FGRS directly to the Olefins 1 or Olefins 2 Flares. This must be accomplished by installing a pipeline during the FGRS project from the methanator portion of the hydrogen delivery system to the Olefins 1 and Olefins 2 Flares.

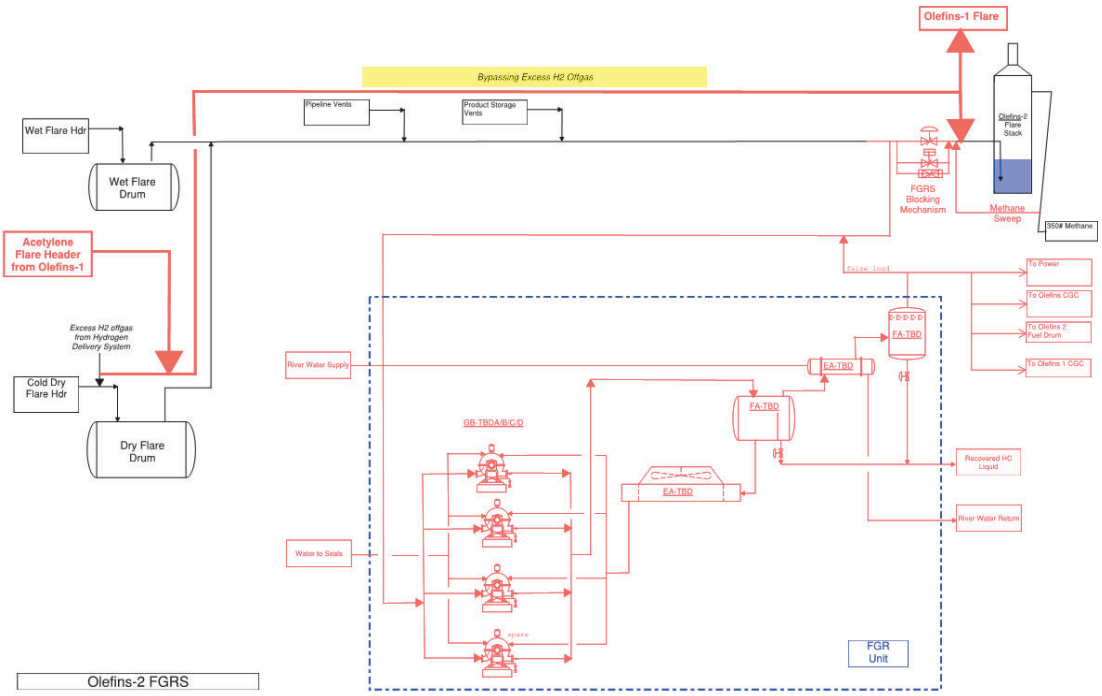
Once the FGRS is installed, Hydrogen/Methane Vent Gas must be flared at:

1. The Olefins 2 flare; or
2. Routed to the Olefins 1 flare so that the gas can be used as supplemental fuel in that flare, as needed (shown as the arrow to the Olefins 1 flare on the following flow diagram).

In addition, during times when the Olefins 1 plant or flare is not in service, the acetylene by-pass stream from the Olefins 1 area can be routed to the Olefins 2 flare through the same bypass line. More details regarding the acetylene bypass stream in included in Appendix 1.8.

A process flow diagram showing the future FGRS and the bypass pipeline for hydrogen/methane is shown on the next page.

Hahnville, LA Olefins 2 Flare Gas Recovery System Process Flow Diagram



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APPENDIX 1.10

Orange Ethylene Plant Hydrogen Rich Gas Mixture Route-Around of the Ethylene FGRS

Existing Operations: Ethylene Plant Flare

I. Hydrogen Rich Gas Mixture

The Orange, Texas Ethylene plant produces approximately 15,000 pounds per hour of a hydrogen rich gas mixture. A portion of this gas mixture is used in the Ethylene plant and the remainder is sent to internal Dow customers (Energy facilities and a Dow user plant) or to an on-site third-party customer. When the customer(s) shut down, the excess gas mixture is routed from the hydrogen delivery system to the Ethylene plant flare. During these operations, the average flow of the hydrogen rich gas mixture to the Ethylene plant flare is about 7,600 pounds per hour, and the maximum hourly flow ranges from 11,500 pounds per hour to 15,000 pounds per hour, depending on the operating conditions of the site fuel system.

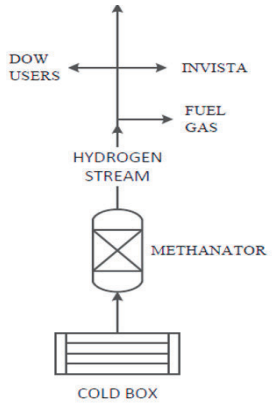
The composition of the hydrogen rich gas mixture is approximately:

Hydrogen = 97.54 mol%
Methane = 2.36 mol%
Water = 0.1 mol%

Molecular Weight = 2.35 lb/lb-mole

II. Origin of Hydrogen Rich Gas Mixture

Cracked gas from the compressors is routed through a number of heat exchangers to cool and condense the gas/liquids to very low temperatures. Hydrogen is separated from the cracked gas mixture in the last cooling step called the Cold Box. Hydrocarbon liquids from the Cold Box are routed to the distillation train, and hydrogen gas is sent to a methanator for further removal of some carbon monoxide that is present with the hydrogen gas. The hydrogen header ties into the flare after the methanator. A flow diagram is shown below:

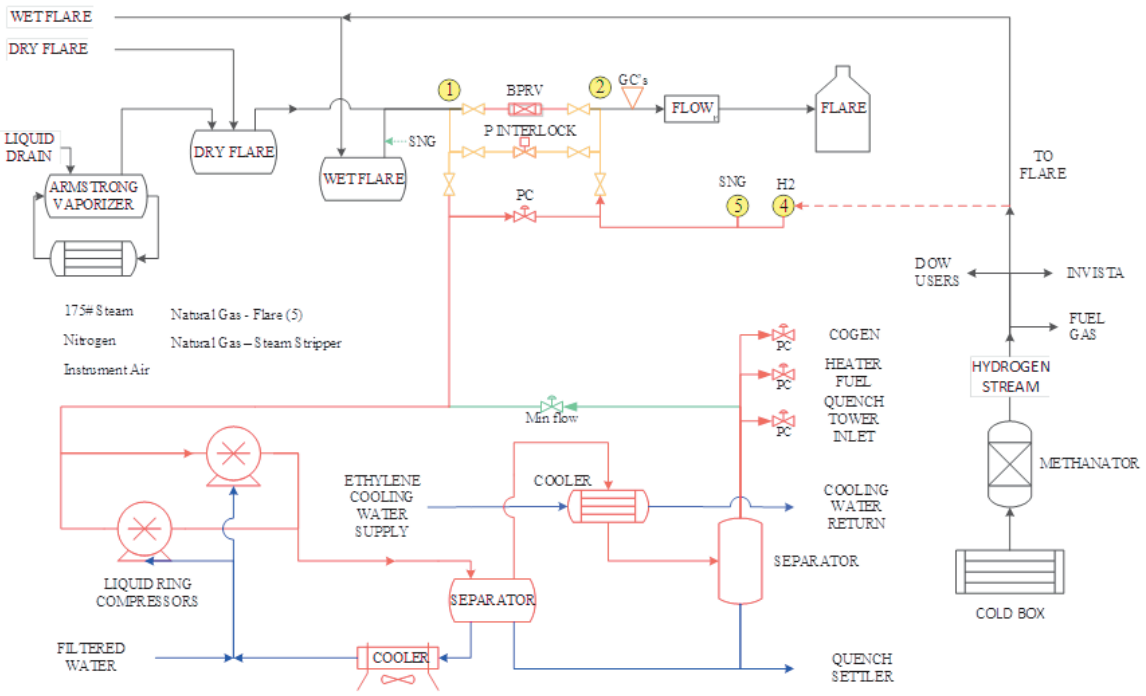


Proposed Future Design and Ethylene Plant FGRS

The hydrogen rich gas mixture, by no later than the operational deadline for the Ethylene Plant FGRS as set forth in Paragraph 37 of this Consent Decree, must be routed around the FGRS as described and shown in the drawing below.

Hydrogen Rich Gas Mixture - During times when the hydrogen rich gas mixture is not consumed by internal or third-party consumers, the excess hydrogen gas mixture will bypass or be routed around the future FGRS. Piping will be installed and will run from the hydrogen processing system directly to the Ethylene Plant flare. This is shown as Stream #4 on the FGRS flow diagram.

A drawing of the future Ethylene Plant FGRS is shown below:



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APPENDIX 2.1

Louisiana Beneficial Environmental Projects Protocol

The Defendants shall spend at least $424,786 to implement 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 ("Louisiana Beneficial Environmental Projects") of this Consent Decree. All reporting on the Projects will be done consistent with Section IX ("Reporting Requirements") of the Consent Decree and this Appendix.

The compliance deadlines for the BEPs may be extended by a written, mutual agreement among the Parties.

1) **Keep Louisiana Beautiful (KLB) Environmental Education Program**

Implementation. As a term and condition of the settlement between the Defendants and LDEQ that is reflected in this Consent Decree, the Defendants shall pay $300,000 to Keep Louisiana Beautiful (KLB) within thirty (30) days of the Effective Date in order to fund the KLB Environmental Education Program under La. Admin. Code Tit. 33, I Chapter 25. In the first Semi-Annual Report that is required by Section IX, the Defendants shall confirm whether that payment was made as required by this Consent Decree. LDEQ has agreed that KLB will perform the Environmental Education Program that is to be funded with that payment, as described herein.

Purpose. The purpose of the KLB Environmental Education program is to provide Louisiana educators with resources, knowledge, and professional development opportunities that will increase their knowledge of environmental issues, particularly those that are specific to Louisiana; and to provide the infrastructure and resources necessary for these teachers to bring comprehensive environmental education and hands-on field experiences to their classrooms so that it reaches the students of Louisiana. Mastery of these environmental issues will motivate teachers to teach their students and empower them to preserve and protect the unique natural beauty of Louisiana. Students will be taught skills to identify and solve environmental problems that they face on a regular basis in their lives now, so that they may be better prepared to do so in the future. An increase in knowledge and awareness of local issues will result in a change in knowledge, attitudes, and behaviors as it relates to environmental care and stewardship. This program is designed to reach all teachers and students from Kindergarten through the Fifth Grade throughout Louisiana.

One Year Budget Description

$50,000 – Outreach Environmental Educator - KLB will hire or contract with an Outreach Environmental Educator (OEE) to develop and implement an engagement plan for the education program and manage all the tasks outlined in this proposal. The OEE will organize and implement all aspects of the teacher workshops, webinars, and professional development classes; research and provide content for the on-line network; and develop and manage the grants program including establishing grant guidelines, grant eligibility, monitoring, review and outcomes tracking.

Approximately $35 per hour x 30 hours per week x 47.5 weeks = $50,000

$3,600 – Statewide Mileage and Travel – For the OEE to reach out to all school districts and conduct trainings and professional development.

$8,495 – Green Teacher Coalition will be developed to create a platform for sharing knowledge, information and engagement opportunities for teachers and their students. Teachers and students will participate and compete in the annual Love the Boot cleanup week. A webpage, e-newsletter, print materials, resources and webinars for teachers are other examples of how the coalition might further develop environmental educators throughout the state. The coalition will educate, engage and cultivate teachers and students on environmental issues such as litter, recycling, plastic pollution, and waste reduction.

$17,250 – Teacher trainings and professional development workshops to develop their base knowledge on the subjects to increase the likelihood that they will teach the content in the classroom. Materials, teacher stipends, lesson plan manuals, and supplies for workshops. Full-day Saturday workshops will be conducted throughout the state.

Workshop Expenses: ($100 teacher stipend to attend + $15 materials) $115 per teacher x 150 teachers = $17,250

$11,250 – Environmental Education grants to implement litter lesson plans and to cover the cost of hands-on field study and field trips for students. Pre and Post tests required and reporting. Fifteen $750 grants reaching approximately 500-700 students.

$9,405 – Keep Louisiana Beautiful management and administrative fee. The Executive Director of KLB is responsible for supervising the successful implementation of the BEP. This fee is to cover time associated to supervise the OEE, to oversee all aspects of the BEP including the coalition, workshops and grant programs; to track and monitor progress; to ensure BEP grant monies are spent in accordance with the contract and expenditures are well documented; to achieve agreed upon outcomes; and to submit required progress and monitoring reports. $44 per hour x 4.5 hours per week x 47.5 weeks = $9,405

$100,000 Total Per Year

$300,000 Total three-year term

2) **Environmental & Natural Resource Education Through the Louisiana Envirothon Program**

Implementation. As a term and condition of the settlement between the Defendants and LDEQ that is reflected in this Consent Decree, Defendants shall pay $75,000 to LDEQ within thirty (30) days of the Effective Date to fund the Louisiana Envirothon Program under La. Admin. Code Tit. 33, I Chapter 25. In the first Semi-Annual Report that is required by Section IX, the Defendants

shall confirm whether that payment was made as required by this Consent Decree. LDEQ has agreed that in conjunction with the other Envirothon partners, that it will perform the Environmental Education Program that is to be funded with that payment, as described herein.

Purpose. Envirothon is a statewide environmental problem-solving competition for students. Through Envirothon, students demonstrate knowledge of environmental science and natural resource management. Students participate in hands-on experiences, enabling them to become environmentally aware, action-oriented citizens. Envirothon has proven to be an exciting and useful tool for incorporating environmental education and conservation into studies and promoting STEM careers and subjects. Envirothon assists in meeting the new science standards on phenomenon-based learning in Louisiana. Envirothon is a partnership of between state government, universities, and private entities, with LDEQ as the main/lead partner.

Cost

Total per year	**$15,000**
Total for 5 years	**$75,000**

3) Air Monitoring Equipment and Related Accessories: Jerome Hydrogen Sulfide Handheld Monitor and Drone

Implementation. As a term and condition of the settlement between the Defendants and LDEQ that is reflected in this Consent Decree, Defendants shall pay $49,786 to LDEQ within thirty (30) days of the Effective Date in order to fund the purchase of the monitoring equipment (i.e., a Jerome Hydrogen Sulfide Handheld Monitor and drone compatible with the monitor) under La. Admin. Code Tit. 33, I Chapter 25. In the first Semi-Annual Report that is required by Section IX, the Defendants shall confirm whether that payment was made as required by this Consent Decree. LDEQ has agreed that it will purchase and operate the equipment as described herein.

Purpose. The LDEQ personnel will use the air monitoring equipment and drone described above for ambient air analysis, odor nuisance monitoring, leak detection, and as an accuracy check for other monitors.

Total air monitoring equipment/drone cost is $49,786

Total Amount for BEPs = $424,786

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APPENDIX 2.2

Scope of Work for the
Fenceline Monitoring Project

APPENDIX 2.2

SCOPE OF WORK FOR THE FENCELINE MONITORING PROJECT

1. **Applicability.** The requirements of this Fenceline Monitoring Project apply to the Covered Facilities listed in Paragraph 12.p of this Consent Decree.

2. **Timing and Public Transparency**. No later than 270 Days after the Effective Date, the Applicable Defendant(s) must submit in writing to EPA a report: a) showing the location of all monitors at each Covered Plant that will be utilized to comply with the Monitoring Requirements of Paragraph 3 below; b) providing an active/live/not password protected URL to a mockup of the publicly available website to be used to report monitoring data pursuant to this Fenceline Monitoring Project; and c) a statement indicating that the website is properly indexed (including, but not limited to the following search terms, "benzene," "fenceline monitoring," and the Plant name and location) with the major search engines (*e.g.,* Google, Bing, Yahoo) to allow the public to easily find the website.

   The Fenceline Monitoring System described in 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 Applicable Defendant(s) 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 Applicable Defendant(s) must post each individual sample result for each monitor within 30 Days of the end of the biweekly sampling period or within 30 days of sampling collected pursuant to the "alternative sampling frequency for burden reduction" requirements set forth in Paragraph 3(e)(3) below. The Applicable Defendant(s) 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 Applicable Defendant(s) must commence sampling along the property boundary of each of the Covered Facilities. The Applicable Defendant(s) 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 subparagraphs 3(b) through 3(g).

b. The target analyte for the Fenceline Monitoring System is benzene.

c. Siting of monitors. The Applicable Defendant(s) must determine the passive monitor locations comprising each Fenceline Monitoring System in accordance with Section 8.2 of

Method 325A of Rule Appendix A, with the exception of the number of duplicates and blanks, which will be determined pursuant to 40 C.F.R. § 63.658(c)(3).

(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 Covered Facilities, 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 for purposes of the Appendix, an additional monitor is not required if the only emission sources within 50 meters of the monitoring boundary are equipment leak sources satisfying all of the requirements in 40 C.F.R. § 63.658(c)(1)(i) through (iv).

(2) If there are 19 or fewer monitoring locations, the Applicable Defendant(s) shall collect at least one co-located duplicate sample per sampling period and at least one field blank per sampling period. If there are 20 or more monitoring locations, the Applicable Defendant(s) shall collect at least two co-located duplicate samples per sampling period and at least one field blank per sampling period, as described in 40 C.F.R. § 63.658(c)(3). The co-located duplicates may be collected at any one of the perimeter sampling locations.

(3) The Applicable Defendant(s) 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 Applicable Defendant(s) must collect and record meteorological data according to the applicable requirements in sub-Paragraphs 3(d)(1) and 3(d)(2).

(1) The Applicable Defendant(s) 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 Covered Facilities.

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

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

e. Sampling Frequency. The Applicable Defendant(s) 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 a 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.

(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 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 $\mu g/m^3$, the Applicable Defendant(s) 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 $\mu g/m^3$ for 2 years (52 consecutive samples), every other sampling period can be skipped for that individual monitoring site, *i.e.*, sampling can 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 $\mu g/m^3$ 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 $\mu g/m^3$ 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 $\mu g/m^3$ 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 $\mu g/m^3$, 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 $\mu g/m^3$, the Applicable Defendant(s) may revert back to the reduced monitoring frequency applicable for that individual monitoring site immediately prior to the sample reading exceeding 0.9 $\mu g/m^3$. If any sample collected this quarter is above 0.9 $\mu g/m^3$, that individual monitoring site must return to the 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 $\mu g/m^3$.

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

(1) Calculation of the Δc. The Applicable Defendant(s) 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 Applicable Defendant(s) 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 Applicable Defendant(s) must use zero as the lowest sample result when calculating Δc.

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

(2) The Applicable Defendant(s) must calculate the annual average Δc based on the average of the 26 most recent 14-Day sampling periods. The Applicable Defendant(s) 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 micrograms per cubic meter ($\mu g/m^3$) on an annual average basis. If the annual average Δc value for benzene is less than or equal to 9 $\mu g/m^3$, the concentration is below the action level. If the annual average Δc value for benzene is greater than 9 $\mu g/m^3$, the concentration is above the action level, and the Applicable Defendant(s) 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 Applicable Defendant(s) 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 are 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.

(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).

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 $\mu g/m^3$ or if all corrective action measures identified require more than 45 Days to implement, the Applicable Defendant(s) must develop a corrective action plan that describes the corrective action(s) completed to date, additional measures that the Applicable Defendant(s) proposes to employ to reduce benzene concentrations in question below the action level, and a schedule for completion of these measures. The Applicable Defendant(s) 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 $\mu g/m^3$ 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).