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

UNITED STATES OF AMERICA **LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY** Plaintiffs, v. **SHELL CHEMICAL LP** Defendant.	Civil No. 2:18-cv-1404-EEF-JVM

CONSENT DECREE

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Plaintiff, United States of America ("United States"), on behalf of the United States Environmental Protection Agency ("EPA"), has filed a complaint in this action (the "Complaint") concurrently with this Consent Decree. The Complaint seeks civil penalties and injunctive relief, alleging that Defendant, Shell Chemical LP ("Shell"), violated the Clean Air Act (the "CAA" or "Act"), 42 U.S.C. §§ 7401 *et seq.*, and regulations promulgated pursuant to the Act, with respect to emissions of volatile organic compounds ("VOCs"), hazardous air pollutants ("HAPs"), and other pollutants at Defendant's petrochemical facility located in Norco, Louisiana ("Facility").

The Louisiana Department of Environmental Quality ("LDEQ") is a co-Plaintiff in this case, and also seeks civil penalties and injunctive relief for alleged violations of the CAA and state laws and regulations promulgated pursuant to those laws.

WHEREAS, Shell operates four steam-assisted Flares for the purpose of controlling Facility emissions;

WHEREAS, the Complaint alleges that, in operating the Flares, Shell has violated:

a. The CAA New Source Review ("NSR") provisions concerning Prevention of Significant Deterioration ("PSD"), found at 42 U.S.C. § 7475 and 40 C.F.R. § 52.21(a)(2)(iii) and 52.21(j)-(r)(5);

b. The New Source Performance Standards ("NSPS") promulgated at 40 C.F.R. Part 60, Subpart A, pursuant to Section 111 of the CAA;

c. The National Emissions Standards for Hazardous Air Pollutants ("NESHAPs") promulgated at 40 C.F.R. Part 61, Subpart FF, and 40 C.F.R. Part 63, Subparts A, G, SS, and YY, pursuant to Section 112 of the CAA, 42 U.S.C. § 7412;

d. The Title V requirements of the CAA found at 42 U.S.C. § 7661a(a), 7661c(a); and 40 C.F.R. §§ 70.1(b), 70.5(a) and (b), 70.6(a) and (c), and 70.7(b);

e. The portions of Title V permits for the Facility that adopt, incorporate, or implement the provisions cited in Subparagraphs a-c and f of this Paragraph;

f. The federally enforceable Louisiana state implementation plan ("SIP") provisions that incorporate, adopt, and/or implement the federal requirements listed in a-c; and

g. The Louisiana Administrative Code found in LAC 33:III.501, LAC 33:III.507, and LAC 33:III.517.

WHEREAS, by entering into this Consent Decree, Defendant commits to undertake projects at the Facility, including the operation of monitoring equipment and control technology, intended to (i) assure compliance with the requirements of the CAA and Louisiana's pollution control laws that were allegedly violated at the Facility, (ii) reduce emissions of air pollutants from the Facility by minimizing Waste Gas flows to and ensuring proper Combustion Efficiency at the Flares covered by this Consent Decree (the "Covered Flares"), and (iii) protect public health, welfare, and the environment. Defendant estimates that the Compliance Requirements set forth in Section VI of this Decree will cost approximately $10 million;

WHEREAS, between January 1, 2012 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 (2012-implementation)
VOCs	159
Carbon Dioxide Equivalents ("CO2e")	5,946
HAPs	18
Nitrogen Oxides ("NOx")	2

WHEREAS, prior to the entry of this Consent Decree, without any admission of liability or of violation of law with respect to the Covered Flares, Shell has been operating a flare gas recovery system consisting of one reciprocating compressor, designed to capture Waste Gas vented to the OL-5 Ground and Elevated Flares;

WHEREAS, prior to the entry of this Consent Decree, without any admission of liability or of violation of law, Shell undertook measures to minimize Waste Gas flow to the Covered Flares, including, but not limited to, the following actions:

- Identified the volumetric and mass flow rates of Waste Gas to the Covered Flares;
- Identified the constituents within the Waste Gas using engineering evaluation and sample analyses;
- Optimized the utilization of the FGRS to route Waste Gas from the OL-5 Ground Flare and OL-5 Elevated Flare to the FGRS;
- Implemented practices to minimize the frequency and duration of outages of the FGRS and to minimize the volume of gas flared during such outages; and

- Implemented procedures and/or practices to minimize flaring during planned and unplanned Startups, Shutdowns, and maintenance activities (including Turnarounds), such as a Flare line opening elimination project, which consists of the installation of isolation valves on flare piping to allow for valve maintenance without flare line entry work which required flare header purging and short-term, large-volume flaring.

WHEREAS, in October of 2016, Shell undertook Active Fourier Transform Infrared ("Active FTIR") testing at the OL-5 Ground Flare to determine the combustion efficiency of the OL-5 Ground Flare during normal operations using a range of steam-assist rates at the Flare;

WHEREAS, the instrumentation and monitoring systems cannot be fully installed and operational until all Covered Flares have been shut down for Turnaround;

WHEREAS, Defendant does not admit any liability to the United States or LDEQ arising out of the transactions or occurrences alleged in the Complaint; and

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

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

I. JURISDICTION AND VENUE

1. This Court has jurisdiction over the subject matter of this action, pursuant to 28 U.S.C. §§ 1331, 1345, and 1355, and Section 113(b) of the Act, 42 U.S.C. § 7413(b). The Court has personal jurisdiction over the Parties. The Court has supplemental jurisdiction over the state law claims asserted by LDEQ pursuant to 28 U.S.C. § 1367. Venue lies in this District

pursuant to Section 113(b) of the Act, 42 U.S.C. § 7413(b), and 28 U.S.C. §§ 1391 (b) and (c) and 1395(a), because the Facility is located, the violations alleged in the Complaint are alleged to have occurred, and Defendant conducts business, in this judicial district. For purposes of this Decree, or any action to enforce this Decree, Defendant consents to the Court's jurisdiction over this Decree and any such action and over Defendant and consents to venue in this judicial district.

2. For purposes of this Consent Decree, Defendant agrees that the Complaint states claims upon which relief may be granted, pursuant to Section 113 of the Act, 42 U.S.C. § 7413(b).

3. The United States provided LDEQ with notice of Defendant's alleged violations, in accordance with Section 113(a)(1), (b) of the CAA, 42 U.S.C. § 7413(a)(1), (b).

II. APPLICABILITY

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

5. Shell must give written notice, and provide a copy, of the Consent Decree to any successor in interest, at least sixty (60) Days prior to the transfer of ownership or operation of any portion of the Facility. Shell must notify the United States and LDEQ in accordance with the notice provisions in Section XVI (Notices) of any successor in interest at least thirty (30) Days prior to any such transfer.

6. If Shell intends to request that the United States and LDEQ agree to any transferee's assumption of any obligations of the Consent Decree, Shell must condition any transfer, in whole or in part, of ownership of, operation of, or other interest (exclusive of any non-controlling, non-operational shareholder interest) in the Facility upon the transferee's written agreement to execute a modification to the Consent Decree that must make the terms and conditions of the Consent Decree applicable to and enforceable against the transferee.

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

8. After the submission to the United States and LDEQ of the notice and certification required by the previous Paragraph, either: (i) the United States or LDEQ must notify Shell that the United States or LDEQ, respectively, 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, LDEQ, Shell, and the transferee must file with the Court a joint motion requesting the Court approve a modification substituting the transferee for

Shell as the Defendant responsible for complying with the terms and conditions of the Consent Decree.

9. If, for any reason, Shell does not secure the agreement of the United States or LDEQ to file a joint motion within 60 Days after requesting the United States' and LDEQ's consent to file a joint motion under Paragraph 8, Shell and the transferee may file, without the agreement of the United States or LDEQ, a motion requesting that the Court approve a modification substituting the transferee for Shell as the Party responsible for complying with some or all of the obligations of the Consent Decree. The United States and LDEQ may file an opposition to the motion objecting to the transfer: (i) because EPA or LDEQ has determined that the transferee lacks the financial or technical ability to assume the obligations of the Decree; (ii) because the proposed modification fails to effectively transfer all of the Consent Decree's obligations to the transferee; or (iii) for any other good cause. The motion to modify the Decree shall be granted unless Shell and the transferee: (i) fail to show that the transferee has the financial and technical ability to assume the obligations of the Decree, as requested; (ii) fail to show that the modification language effectively transfers such obligations to the transferee; or (iii) the Court finds other good cause for denying the motion.

10. Unless, pursuant to Paragraph 8 or 9, the Court approves a modification substituting a transferee for Shell as the Party responsible for complying with some or all of the obligations of the Consent Decree, and except as provided in Section XI (Force Majeure), Shell will be responsible for ensuring that performance of the work contemplated under this Consent Decree is undertaken in accordance with the deadlines and requirements contained in this

Consent Decree and any attachments hereto. Shell must provide a copy of all applicable portions of this Consent Decree to all officers and employees whose duties might reasonably include compliance with any provision of this Decree. As part of any contract with a consulting or contracting firm that is retained to perform work required by this Consent Decree, Shell must provide a copy of the applicable provisions of this Consent Decree to each such consulting or contracting firm. Shell must condition any such contract upon performance of the work in conformity with the applicable terms of this Consent Decree. No later than thirty (30) Days after the Date of Lodging of the Consent Decree, Shell also must provide a copy of the applicable provisions of this Consent Decree to each consulting or contracting firm that Shell already has retained to perform work required by this Consent Decree. Copies of the applicable provisions of the Consent Decree do not need to be supplied to firms that are retained solely to supply materials or equipment to satisfy requirements of this Consent Decree.

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

III. DEFINITIONS

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

a. "Ambient Air" or "air" means that portion of the atmosphere, external to buildings, to which persons have access.

b. "Assist Steam" means all steam that is intentionally introduced before or at a Flare tip through nozzles or other hardware conveyance for purposes, including, but not limited to: protecting the design of the Flare tip, promoting turbulence, or mixing or inducing air into the flame. Assist Steam includes, but is not necessarily limited to, Center Steam, lower steam, and upper steam.

c. "Assist Steam Control Equipment" means main and trim control valves and piping that enables control of Assist Steam flow.

d. "Available for Operation" means, with respect to the Compressor in the FGRS, that the Compressor is capable of commencing the recovery of and, as soon as is practicable after the Need for the Compressor to Operate arises, is in fact recovering Potentially Recoverable Gas. For purposes of this definition, "as soon as is practicable" means a period no longer than one hour after the Need for the Compressor to Operate arises.

e. "Baseload Waste Gas Flow Rate" means, for a Covered Flare, the daily average flow rate, in scfd, to the Flare, excluding all flows during periods of Startup, Shutdown, and Malfunction. The flow rate data period that must be used to determine Baseload Waste Gas Flow Rate is set forth in Subparagraph 37.a.ii.

f. "BD-5 Heavy Ends Gas" means the condensed overhead stream from the BD-5 Unit (consisting mainly of C4-C6 range molecules) that is normally routed to furnace feed or hydrotreating.

g. "BD-5 Unit" means the Crude Butadiene Recovery Unit at the Facility.

h. "BTU/scf" means British Thermal Unit per standard cubic foot.

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

j. "Capable of Receiving Sweep, Supplemental, and/or Waste Gas" means, for a Flare, that the flow of Sweep, Supplemental, and/or Waste Gas is not prevented from being directed to the Flare by means of an isolation device such as closed valves, blinds, or stopples.

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

l. "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 as set forth in the equation on page 2 of Appendix 1.2.

m. "Combustion Zone" means the area of the Flare flame where the Combustion Zone Gas combines for combustion.

n. "Combustion Zone Gas" means all gases and steam found after the Flare tip. This gas includes all Vent Gas, Pilot Gas, and Total Steam.

o. "Complaint" means the complaint filed by the United States and LDEQ in this action.

p. "Compressor" means, with respect to the FGRS, the mechanical device designed, installed and operated to recover gas from the Facility's Flare header.

q. "Consent Decree" or "Decree" means this Consent Decree and all tables and appendices attached hereto.

r. "Covered Flare" means each of the following Flares, as well as any Portable Flare in use at the Facility:

i. The OL-5 Ground Flare,

ii. The OL-5 Elevated Flare,

iii. The West Ops Elevated Flare, and

iv. The GO-1 Elevated Flare

s. "Date of Lodging" means the date that this Consent Decree is filed for lodging with the Clerk of the United States District Court for the Eastern District of Louisiana.

t. "Day" means a calendar day unless expressly stated to be a business day. In computing any period of time under this Consent Decree, where the last Day would fall on a Saturday, Sunday, or state or federal holiday, the period will run until the close of business of the next business day.

u. "DEA Treating System" means the diethanolamine stripper that removes carbon dioxide and hydrogen sulfide from the olefins process gas.

v. "Defendant" means Shell Chemical LP.

w. "Effective Date" has the definition provided in Section XVII.

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

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

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

aa. "Facility" means Defendant's petrochemical plant located in Norco, Louisiana.

bb. "Fifteen-Minute Block Average(s)" means 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.

cc. "Flare" means a combustion device lacking an enclosed combustion chamber that uses an uncontrolled volume of Ambient Air to burn gases.

dd. "Flare Gas Recovery System" or "FGRS" means the Facility's system of one or more Compressors, piping, and an associated water seal, rupture disk, or similar

device used to divert gas from a Flare and direct the gas to a fuel gas system, to a combustion device other than the Flare, or to a product, co-product, byproduct, or raw material recovery system.

ee. "In Operation" or "Being In Operation" or "Operating" with respect to a Flare means any and all times that any gas is or can be vented to a Flare. A Flare that is In Operation is Capable of Receiving Sweep, Supplemental, and/or Waste Gas unless all Sweep, Supplemental, and Waste Gas flow is prevented by means of an isolation device, such as closed valves, blinds, and/or stopples.

ff. "KSCFH" or "kscfh" means thousand standard cubic feet per hour.

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

hh. "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.

ii. "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, Defendant will have the burden of proving:

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

ii. 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;

iii. To the maximum extent practicable, the air pollution control equipment or processes were maintained and operated in a manner consistent with good practices for minimizing emissions;

iv. 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;

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

vi. All possible steps were taken to minimize the impact of the excess emissions on Ambient Air quality;

vii. All emission monitoring systems were kept in operation if at all possible;

viii. Defendant's actions during the period of excess emissions were documented by properly signed, contemporaneous operating logs, or other relevant evidence;

ix. The excess emissions were not part of a recurring pattern indicative of inadequate design, operation, or maintenance; and

x. Defendant properly and promptly notified the appropriate regulatory authority.

jj. "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, Defendant has the burden of proving:

i. The instrument or monitoring system downtime was caused by a sudden, unavoidable breakdown of technology, beyond Defendant's control;

ii. 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;

iii. To the maximum extent practicable, the instrument or monitoring system were maintained and operated in a manner consistent with good practices for minimizing emissions;

iv. Repairs were made in an expeditious fashion when Defendant 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;

v. The amount and duration of the instrument or monitoring system downtime was minimized to the maximum extent practicable;

vi. Defendant's actions during the period of instrument or monitoring system downtime were documented by properly signed, contemporaneous operating logs, or other relevant evidence; and

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

kk. "MMSCF" or "mmscf" means million standard cubic feet.

ll. "Need for a Compressor to Operate" means that Potentially Recoverable Gas (determined on a Fifteen-Minute Block Average) is flowing to a Covered Flare serviced by the FGRS.

mm. "Net Heating Value" means Lower Heating Value.

nn. "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 and/or Sweep and/or Purge Gas if the composition and flow rate of any such Supplemental and/or Sweep and/or Purge Gas is a known constant and if this constant is then used in the calculation of the Net Heating Value of the Vent Gas.

oo. "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.

pp. "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} is calculated as set forth in Step 1 of Appendix 1.2.

qq. "Nominal Design Capacity" means, with respect to the FGRS, the capacity, in mmscf per Day, of the installed Flare gas recovery Compressor, excluding the capacity of any installed duplicate spare Compressor or warehouse spare Compressor.

rr. "OL-5 Fuel Gas Mix Drum" means the on-site OL-5 knock out drum that supplies fuel gas to the OL-5 furnaces.

ss. "OL-5 Ground and Elevated Flare System" means the Flare header system that preferentially sends gas to the OL-5 Ground Flare and, during high flow scenarios, automatically to the OL-5 Elevated Flare.

tt. "Paragraph" means a portion of this Decree identified by an arabic numeral.

uu. "Partial Facility Turnaround Scenario" means a Shutdown and Startup of a partial section of a process unit which requires nitrogen purging.

vv. "Parties" means the United States, LDEQ, and Defendant.

ww. "Pilot Gas" means gas introduced through the pilot tip of a Flare that provides a flame to ignite the Vent Gas.

xx. "Portable Flare" means a Flare that is not permanently installed and that receives Waste Gas that has been temporarily redirected to it from a Covered Flare.

yy. "Potentially Recoverable Gas" means all Sweep Gas and Supplemental Gas introduced prior to a Covered Flare's water seal, and all Waste Gas directed to the FGRS. Purge Gas and Supplemental Gas introduced between a Covered Flare's water seal and a Covered Flare's tip are not Potentially Recoverable Gas. Excess fuel gas and excess gases generated during planned or unplanned Startup or Shutdown or in Turnaround, caused by a gas imbalance that cannot be consumed by fuel gas consumers in the Facility (because of pressure, gas quality, and insufficient demand for the gas) are not Potentially Recoverable Gas, provided that when the excess gas is routed around the FGRS and to the Flares, no natural gas is being directly supplied to the OL-5 Fuel Gas

Mix Drum. Nitrogen purges from process units that are in Startup, Shutdown, Turnaround, or Partial Facility Turnaround and that cause the NHV of the fuel gas at the exit of the OL-5 Fuel Gas Mix Drum to fall below 740 BTU/scf are not Potentially Recoverable Gas. BD-5 Unit Heavy Ends Gas is not Potentially Recoverable Gas so long as the unit that typically receives BD-5 Heavy Ends Gas is unavailable. Gas streams containing Acetonitrile generated during maintenance or Shutdown of the BD-5 Unit are not Potentially Recoverable Gas. Acid gas routed to a Covered Flare due to Startup and/or Shutdown of the DEA treating system is not Potentially Recoverable Gas. Hydrogen that is produced cryogenically at the olefins plant and that bypasses the FGRS to reestablish hydrogen balance is not Potentially Recoverable Gas.

zz. "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.

aaa. "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. Only the amount of gas that is necessary to prevent backflow is Purge Gas. 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.

bbb. "Reportable Flaring Incident" means when Waste Gas equal to or greater than 500,000 scf is flared within a 24-hour period at the OL-5 Ground and Elevated Flare System, the GO-1 Elevated Flare, or the West Ops Elevated Flare. For purposes of

calculating whether the triggering level of Waste Gas flow has been met, if Defendant has instrumentation capable of calculating the volumetric flow rate of hydrogen, nitrogen, oxygen, carbon monoxide, carbon dioxide, and/or water (steam) in the Waste Gas, the contribution of all measured flows of any of these elements/compounds may be excluded. A flaring event or events that have the same root cause(s) that last(s) more than 24 hours will be considered a single incident. If the flaring event at more than one of the Covered Flares is due to the same root cause, then, in calculating whether the triggering level of Waste Gas flow has been met, the volume of non-excluded Waste Gas flow at each Covered Flare must be added together.

ccc. "SCFD" or "scfd" means standard cubic feet per day.

ddd. "SCFH" or "scfh" means standard cubic feet per hour.

eee. "SCFM" or "scfm" means standard cubic feet per minute.

fff. "Section" means a portion of this Decree identified by a roman numeral.

ggg. "Shutdown" means the cessation of operation for any purpose.

hhh. "Smoke Emissions" has the definition set forth in Section 3.5 of Method 22 of 40 C.F.R. Part 60, Appendix A. For purposes of this Consent Decree, Smoke Emissions may be documented either 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.

iii. "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 will apply.

jjj. "Startup" means the setting in operation for any purpose.

kkk. "Steam-Assisted Flare" means a Flare that utilizes steam piped to a Flare tip to assist in combustion.

lll. "Subparagraph" means a portion of a Paragraph of this Consent Decree that has a heading identified by a non-capitalized letter.

mmm. "Supplemental Gas" means all gas introduced to a Flare to improve the combustible characteristics of the Combustion Zone Gas.

nnn. "Sweep Gas" means:

i. For a Flare with an FGRS: Gas intentionally introduced into a Flare header system to prevent oxygen buildup in the Flare header. Sweep Gas in these Flares is introduced at points in the Flare header prior to and recovered by the FGRS; and

ii. For a Flare without an FGRS: Gas intentionally introduced into a Flare header system to maintain a constant flow of gas through the Flare header and out of the Flare tip in order to prevent oxygen buildup in the Flare header and to prevent infiltration (backflow) into the Flare tip.

ooo. "Tip Velocity" or "V_{tip}" means the velocity of gases exiting the Flare tip as defined in Paragraph 55.b.

ppp. "Total Steam" means the total of all steam that is introduced into a Flare to assist in combustion. Total Steam includes, but is not limited to, lower steam, Center Steam, and upper steam.

qqq. "Turnaround" means a planned period of Facility maintenance, inspection, and system upgrades or overhauls.

rrr. "United States" means the United States of America, acting on behalf of EPA.

sss. "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 $A_{tip\text{-}unob}$ of these four types.

ttt. "Vent Gas" means all gases found just before the Flare tip. Vent Gas includes all Waste Gas, any portion of Sweep Gas that is not recovered, Purge Gas, and Supplemental Gas, but does not include Pilot Gas or Total Steam.

uuu. "Vent Gas Volumetric Flow Rate" or "Q_{vg}" means the volumetric flow rate of Vent Gas directed to a Covered Flare, in wet scfm, on a Fifteen-Minute Block Average basis.

vvv. "Visible Emissions" means five minutes or more of Smoke Emissions during any two consecutive hours. For purposes of this Consent Decree, Visible Emissions may be determined by an observer knowledgeable with respect to the general

procedures for determining the presence of Smoke Emissions per Method 22 or documented by a video camera.

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

xxx. "Waste Gas" means the mixture of all gases from Facility operations that are directed to a Flare for the purpose of gas disposal. "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, or the minimum amount of Sweep Gas or Purge Gas that is necessary to perform the functions of Sweep Gas or Purge Gas. "Waste Gas" also does not include the minimum amount of gas introduced to a Flare to comply with regulatory and/or enforceable permit requirements regarding the combustible characteristics of Combustion Zone Gas; therefore, "Waste Gas" does not include Supplemental Gas. 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 PENALTIES

13. By no later than thirty (30) Days after the Effective Date, Defendant must pay the following amounts as civil penalties, together with interest accruing from the date on which the Consent Decree is lodged with the Court, at the rate specified in 28 U.S.C. § 1961, as of the date of lodging:

a. $262,500 to the United States, and

b. $87,500 to LDEQ.

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

Brian Patrick
Finance Manager
Shell Norco Manufacturing Complex
15536 River Road
Norco, LA 70079

on behalf of Defendant. Defendant may change the individual to receive payment instructions on its behalf by providing written notice of such change to the United States and EPA in accordance with Section XVI (Notices). At the time of payment, Defendant must send notice that payment has been made: (i) to EPA via email at cinwd_acctsreceivable@epa.gov or via regular mail at EPA Cincinnati Finance Office, 26 W. Martin Luther King Drive, Cincinnati, Ohio 45268; and (ii) to the United States via email or regular mail in accordance with Section XVI. Such notice must state that the payment is for the civil penalty owed pursuant to the Consent Decree in *United States v. Shell Chemical LP*, and must reference the civil action number, CDCS Number and DOJ case number 90-5-2-1-11603.

15. Defendant must pay the civil penalty due to LDEQ by check or EFT in accordance with instructions to be provided to Defendant by LDEQ. If by check, the check shall

be made payable to the Louisiana Department of Environmental Quality, referencing this Civil Action, and mailed to Fiscal Director, LDEQ, Office of Management and Finance, P.O. Box 4303, Baton Rouge, LA 70821-4303. At the time of payment, Defendant must send notice that payment has been made to LDEQ via email at dwana.king@la.gov and Theresa.delafosse@la.gov or via regular mail at LDEQ Fiscal Director, Office of Management and Finance, P.O. Box 4303, Baton Rouge, LA 70821-4303. Such notice must state that the payment is for the civil penalty owed pursuant to the Consent Decree in *United State v. Shell Chemical LP*, and must reference the civil action number.

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

V. FENCELINE MONITORING PROGRAM

17. The Defendant must implement a fenceline monitoring program, in accordance with the requirements and schedule in Appendix 1.8, to install and operate Ambient Air monitors that will sample for benzene along the fence line perimeter of the Facility ("Fenceline Monitoring System").

18. Defendant must commence monitoring, collecting, and reporting data using the Fenceline Monitoring System, in accordance with this Section and the criteria, terms, and procedures as set forth in Appendix 1.8.

19. The Defendant must submit Fenceline Air Monitoring Reports as part of the Semi-Annual Reports required by Section IX (Reporting Requirements) of the CD. The Fenceline Air Monitoring Reports must contain the following information:

a. In spreadsheet format, the individual sample results for each monitor comprising the Fenceline Monitoring System, every two-week rolling 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 will list, respectively, the date and time for each sample taken; and

b. A detailed description of the actions and findings of any root cause analysis and corrective action(s) undertaken pursuant to Paragraph 2(g) of Appendix 1.8, including the known results of the corrective action(s) and the anticipated emissions reductions (in TPY per pollutant).

20. Defendant agrees to continue the Fenceline Monitoring System as described in Appendix 1.8 for a period of five years after the Effective Date, provided, however, that if, after the Date of Lodging, fenceline monitoring regulations are promulgated pursuant to 40 C.F.R. Part 63 that are applicable to the Facility, Defendant will follow the monitoring provisions set forth in those applicable regulations and will no longer be required to follow the Fenceline Monitoring Requirements set forth in Appendix 1.8.

VI. COMPLIANCE REQUIREMENTS

A. Instrumentation and Monitoring Systems

21. Flare Data and Monitoring Systems and Protocol Report. For each Covered Flare, by no later than the dates set forth in Column E of Appendix 1.1, Defendant must submit a report, consistent with the requirements in Appendix 1.5, to EPA, including the following items:

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 Defendant has installed or will install in compliance with Paragraphs 23-27 of this Consent Decree (Paragraphs 8-9 of Appendix 1.5); and

c. A narrative description of the monitoring methods and calculations that Defendant will use to comply with the requirements of Paragraph 58 (Paragraph 10 of Appendix 1.5).

22. Installation and Operation of Monitoring and Control Systems on Covered Flares. By no later than the dates set forth in Column F in Appendix 1.1, Defendant must install and commence operation of the instrumentation, controls, and monitoring systems set forth in Paragraphs 23-27 at each Covered Flare. Before directing any Waste Gas to any Portable Flare(s) at the Facility, Defendant must complete installation of the instrumentation, controls, and monitoring systems set forth in Paragraphs 23-26. Defendant must also operate the instrumentation, controls, and monitoring systems for each Portable Flare(s) in accordance with Paragraphs 23-34.

23. Vent Gas and Assist Steam Monitoring Systems.

a. For each Covered Flare, Defendant 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 analyze pressure and temperature continuously at each point where Vent Gas flow is measured. Different flow monitoring methods may be used to measure different gas streams that make up the Vent Gas provided that the flow rates of all gas streams that contribute to the Vent Gas are determined. Flow must be calculated in scfm and pounds per hour.

b. For each Covered Flare, Defendant 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 analyze continuously the pressure and temperature of Assist Steam at a point of steam flow measurement that accurately represents the flow of Assist Steam to that Flare. Flow must be calculated in scfm and pounds per hour.

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, Defendant may choose from the following additional options for monitoring any gas stream:

i. Mass flow monitors may be used for determining the volumetric flow rate of steam provided that Defendant converts the mass flow rates to volumetric flow rates pursuant to the methodology in Step 2 of Appendix 1.2.

ii. Mass flow monitors may be used for determining the volumetric flow rate of Vent Gas, provided that Defendant determines the molecular weight of such Vent Gas using compositional analysis data collected pursuant to the monitoring method specified in Paragraph 26.a and provided that Defendant converts the mass flow rates to volumetric flow rates pursuant to the methodology in Step 2 of Appendix 1.2; and

iii. Continuous pressure/temperature monitoring system(s) and appropriate engineering calculations may be used in lieu of a continuous volumetric flow monitoring system provided the molecular weight of the gas is known and provided that Defendant complies with the methodology in Step 2 of Appendix 1.2 for calculating volumetric flow rates. For Vent Gas, Defendant must determine molecular weight using compositional analysis data collected pursuant to the monitoring method specified in Paragraph 26.a.

24. Assist Steam Control Equipment. Defendant must install and commence operation of equipment, including, as necessary, main and trim control valves and piping that enables Defendant to control Assist Steam flow to each Covered Flare in a manner sufficient to ensure compliance with this Consent Decree.

25. Video Camera. Defendant must install and commence operation of a video camera that is capable of recording, in digital format, the flame of and any Smoke Emissions from each Covered Flare.

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

b. Install, operate, calibrate, and maintain a calorimeter capable of continuously measuring, calculating, and recording the NHV_{vg} at Standard Conditions. If Defendant elects this method, Defendant 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 and/or Sweep and/or Purge Gas if the composition and flow rate of any such Supplemental and/or Sweep and/or

Purge Gas is a known constant and this constant then is used in the calculation of the Net Heating Value of the Vent Gas.

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.

27. Instrumentation and Monitoring Systems: Optional Equipment for any Covered Flare. At its option, Defendant may include Pilot Gas in calculating the Net Heating Value of the Combustion Zone of any Covered Flare, provided that the Pilot Gas flow is continuously measured and calculated in scfm and pounds per hour. In measuring and calculating Pilot Gas flows for use in determining the Net Heating Value of the Combustion Zone, Defendant must use either: (a) an instrument or (b) a restriction orifice and pressure measurements.

28. Specifications, Calibration, Quality Control and Maintenance. Equipment installed pursuant to Paragraphs 23, 26, and 27 must:

a. Meet or exceed all applicable minimum accuracy, calibration, and quality control requirements specified in the table below:

Parameter	Minimum accuracy requirements	Calibration requirements
Temperature	±1 percent over the normal range of temperature measured, expressed in degrees Celsius (C), or 2.8 degrees C, whichever is greater	Conduct calibration checks at least annually; conduct calibration checks following any period of more than 24 hours throughout which the temperature exceeded the manufacturer's specified maximum rated temperature or install a new temperature sensor. At least quarterly, inspect all components for integrity and all electrical connections for continuity, oxidation, and galvanic corrosion, unless the monitoring system has a redundant temperature sensor. Record the results of each calibration check and inspection. Locate the temperature sensor in a position that provides a representative temperature; shield the temperature sensor system from electromagnetic interference and chemical contaminants.
Flow Rate for All Flows Other Than Flare Vent Gas	±5 percent over the normal range of flow measured or 1.9 liters per minute (0.5 gallons per minute), whichever is greater, for liquid flow ±5 percent over the normal range of flow measured or 280 liters per minute (10 cubic feet per minute), whichever is greater, for gas flow ±5 percent over the normal range measured for mass flow	Conduct a flow sensor calibration check at least biennially (every two years); conduct a calibration check following any period of more than 24 hours throughout which the flow rate exceeded the manufacturer’s specified maximum rated flow rate or install a new flow sensor. At least quarterly, inspect all components for leakage, unless the monitoring system has a redundant flow sensor. Record the results of each calibration check and inspection. Locate the flow sensor(s) and other necessary equipment (such as straightening vanes) in a position that provides

Parameter	Minimum accuracy requirements	Calibration requirements
		representative flow; reduce swirling flow or abnormal velocity distributions due to upstream and downstream disturbances.
Flare Vent Gas Flow Rate	±20 percent of flow rate at velocities ranging from 0.03 to 0.3 meters per second (0.1 to 1 foot per second) ±5 percent of flow rate at velocities greater than 0.3 meters per second (1 foot per second)	Conduct a flow sensor calibration check at least biennially (every two years); conduct a calibration check following any period of more than 24 hours throughout which the flow rate exceeded the manufacturer's specified maximum rated flow rate or install a new flow sensor. At least quarterly, inspect all components for leakage, unless the monitoring system has a redundant flow sensor. Record the results of each calibration check and inspection. Locate the flow sensor(s) and other necessary equipment (such as straightening vanes) in a position that provides representative flow; reduce swirling flow or abnormal velocity distributions due to upstream and downstream disturbances.
Pressure	±5 percent over the normal operating range or 0.12 kilopascals (0.5 inches of water column), whichever is greater	Review pressure sensor readings at least once a week for straight-line (unchanging) pressure and perform corrective action to ensure proper pressure sensor operation if blockage is indicated. Using an instrument recommended by the sensor's manufacturer, check gauge calibration and transducer calibration annually; conduct calibration checks following any period of more than 24 hours throughout which the pressure exceeded the manufacturer's specified maximum rated pressure or install a new pressure sensor.

Parameter	Minimum accuracy requirements	Calibration requirements
		At least quarterly, inspect all components for integrity, all electrical connections for continuity, and all mechanical connections for leakage, unless the monitoring system has a redundant pressure sensor. Record the results of each calibration check and inspection. Locate the pressure sensor(s) in a position that provides a representative measurement of the pressure and minimizes or eliminates pulsating pressure, vibration, and internal and external corrosion.
Net Heating Value by Calorimeter	±2 percent of span	Specify calibration requirements in site specific monitoring plan. Calibration requirements should, at a minimum, follow manufacturer's recommendations. Temperature control (by heating and/or cooling, as necessary) the sampling system to ensure proper year-round operation. Where feasible, select a sampling location at least two equivalent diameters downstream from and 0.5 equivalent diameters upstream from the nearest disturbance. Select the sampling location at least two equivalent duct diameters from the nearest control device, point of pollutant generation, air in-leakages, or other point at which a change in the pollutant concentration or emission rate occurs.
Net Heating Value by Gas Chromatograph	As specified in Performance Specification 9 of 40 CFR Part 60, Appendix B	Follow the procedure in Performance Specification 9 of 40 CFR Part 60, Appendix B, except that a single daily mid-level calibration check may be used (rather than triplicate analysis), the multi-point calibration may be conducted quarterly (rather than monthly), and the sampling line

Parameter	Minimum accuracy requirements	Calibration requirements
		temperature must be maintained at a minimum temperature of 60° C (rather than 120° C).
Hydrogen analyzer	±2 percent over the concentration measured or 0.1 volume percent, whichever is greater	Specify calibration requirements in the site specific monitoring plan. Calibration requirements should, at a minimum, follow manufacturer's recommendations. Select the sampling location at least two equivalent duct diameters from the nearest control device, point of pollutant generation, air in-leakages, or other point at which a change in the pollutant concentration occurs.

b. Have an associated readout (i.e., the portion of the monitoring system that provides a visual display or record) or other indication of the monitored operating parameter that is readily accessible onsite for operational control or inspection by Defendant;

c. Complete a minimum of one cycle of operations (sampling, analyzing, and data recording) for at least each successive 15-minute period;

d. Operate, maintain, and calibrate the instruments in use pursuant to Paragraphs 23, 26, and 27 according to the monitoring plan required by Paragraph 29;

e. Comply with the out-of-control procedures described in Paragraph 31; and

f. Be capable of measuring the appropriate parameter over the range of values expected for that measurement location. The associated data recording system must have a resolution that is equal to or better than the required instrumentation/system accuracy.

29. Monitoring Plan. Defendant must develop and implement a quality control program documented in a monitoring plan that covers each Covered Flare and the equipment installed to comply with Paragraphs 23, 26, and 27 (the "Monitoring Plan"). Defendant must have the Monitoring Plan readily available on-site at all times and will submit a copy of the Monitoring Plan to EPA upon request. The Monitoring Plan must contain the information listed in the following Subparagraphs:

a. Identification of the specific Flare being monitored and the Flare type (i.e., air-assisted only, steam-assisted only, air- and steam-assisted, pressure-assisted, or non-assisted).

b. Identification of the parameter to be monitored by the equipment in use pursuant to Paragraphs 23, 26, and 27 and the expected parameter range, including worst case and normal operation.

c. Description of the monitoring equipment in use pursuant to Paragraphs 23, 26, and 27, including the following information:

i. The manufacturer and model number for all monitoring equipment components.

ii. All applicable performance specifications, as provided by the manufacturer, and any differences expected for this installation and operation.

iii. A description of the location of the sampling probe or other interface for the monitoring system and a justification of how the

location meets the applicable minimum accuracy, calibration, and quality control requirements specified in Subparagraph 28.a, except for pilot flame monitoring.

iv. A description of the placement of the monitoring system readout, or other indication of parameter values, indicating how the location ensures the readout (that portion of the monitoring system that provides a visual display or record) or other indication of the monitored operating parameter from any monitoring system required for compliance is readily accessible onsite for operational control or inspection by the Defendant.

v. The span of the monitoring system. The span of the monitoring system sensor(s) and analyzer(s) must encompass the full range of all expected values.

vi. An explanation of how data outside of the span of the monitoring system will be handled and the corrective action that will be taken to reduce and eliminate such occurrences in the future.

vii. An identification of the parameter detected by the parametric signal analyzer and the algorithm used to convert these values into the operating parameter monitored to demonstrate compliance, if the parameter detected is different from the operating parameter monitored.

d. Description of the data collection and reduction systems, including the following information:

i. A copy of the data acquisition system algorithm used to reduce the measured data into the reportable form of the standard and to calculate the applicable averages.

ii. Identification of whether the algorithm excludes data collected during monitoring system breakdowns, out-of-control periods, repairs, maintenance periods, instrument adjustments or checks to maintain precision and accuracy, calibration checks, and zero (low-level), mid-level (if applicable), and high-level adjustments.

iii. If the data acquisition algorithm does not exclude data collected during monitoring system breakdowns, out-of-control periods, repairs, maintenance periods, instrument adjustments or checks to maintain precision and accuracy, calibration checks, and zero (low-level), mid-level (if applicable), and high-level adjustments, a description of the procedure for excluding this data.

e. Routine quality control and assurance procedures, including descriptions of the procedures listed in Subparagraphs 29.e.i-29.e.iv and a schedule for conducting these procedures. These routine procedures must provide an accurate and valid assessment of monitoring system performance.

i. Initial and subsequent calibration of the monitoring system and acceptance criteria.

ii. Determination and adjustment of the calibration drift of the monitoring system.

iii. Daily checks for indications that the monitoring system is responding. If the monitoring system includes an internal system check, Defendant may use the results to verify the monitoring system is responding, as long as the system provides an alarm to Defendant or Defendant checks the internal system results daily for proper operation and the results are recorded.

iv. Preventive maintenance of the monitoring system, including spare parts inventory.

v. Data recording, calculations, and reporting.

vi. Program of corrective action for a monitoring system that is not operating properly.

30. All monitoring systems permitted by Paragraph 26.a must also meet the requirements of Appendix 1.6 and the following:

a. The quality assurance requirements of Paragraph 28.

i. The calibration gases must meet one of the following three options:

(a) Defendant must use a calibration gas or multiple gases that include(s) all of the compounds listed in (a)(1)-(11), which may be reasonably expected to exist in the waste gas stream. In addition to the gases listed in (a)(1)-(11), defendant may also use calibration gas or gases that include(s) any of the compounds listed in (a)(12)-(15):

1) Hydrogen

2) Methane

3) Ethane

4) Ethylene

5) Propane

6) Propylene

7) n–Butane

8) iso–Butane

9) Butene (general). It is not necessary for Defendant to speciate butene isomers, but the net heating value of trans-butene must be used for co-eluting butene isomers.

10) 1,3–Butadiene. It is not necessary for Defendant to speciate butadiene isomers, but

Defendant must use the response factor and net heating value of 1,3–butadiene for co-eluting butadiene isomers.

11) n–Pentane. Defendant must use the response factor for n-pentane to quantify all C5+ hydrocarbons.

12) Acetylene

13) Carbon monoxide

14) Propadiene

15) Hydrogen sulfide; or

(b) Defendant must use a surrogate calibration gas consisting of hydrogen and C1 through C5 normal hydrocarbons. All of the calibration gases may be combined in one cylinder. If multiple calibration gases are necessary to cover all compounds, Defendant must calibrate the instrument on all of the gases. If Defendant chooses to use a surrogate calibration gas under this Subparagraph, Defendant must:

1) Use the response factor for the nearest normal hydrocarbon (i.e., n-alkane) in the

calibration mixture to quantify unknown components detected in the analysis.

2) Use the response factor for n-pentane to quantify unknown components detected in the analysis that elute after n-pentane; or

(c) The requirements specified in Appendix 1.9.

b. For each instrumentation and monitoring system required by Paragraphs 23 and 26 (or installed pursuant to Paragraph 27), Defendant must comply with the out-of-control procedures and the data reduction requirements specified in Paragraphs 31 and 32.

31. Out-of-control periods. For all equipment in use pursuant to Paragraphs 23, 26, and 27, except for equipment installed for pilot flame monitoring, Defendant must comply with the following out-of-control procedures:

a. A monitoring system is out of control if the zero (low-level), mid-level (if applicable), or high-level calibration drift exceeds two times the accuracy requirement of the table in Paragraph 28.

b. When a monitoring system is out of control, Defendant must take the necessary corrective action and then conduct all necessary tests to verify that the performance requirements are below the applicable limits. The beginning of the out-of-control period is the hour a performance check (e.g., calibration drift) that indicates an exceedance of the performance requirements established in this Section is conducted. The end of the out-of-control period is the hour following the completion of corrective action

and successful demonstration that the system is within the allowable limits. Defendant may not use data recorded during periods the monitoring system is out of control in data averages and calculations that are then used to report emissions or operating levels.

32. Monitoring System Data Reduction. Defendant must prevent creation of excessive data from a monitoring system by taking the following measures:

a. Defendant must round the data to the same number of significant digits used in the applicable operating limit.

b. Periods of non-operation of the process unit (or portion thereof) resulting in cessation of the emissions to which the monitoring applies may not be included in the Fifteen-Minute Block Averages.

c. Periods when the monitoring system is out of control may not be included in Fifteen-Minute Block Averages.

33. Instrumentation and Monitoring Systems: Recording and Averaging Times. The instrumentation and monitoring systems in use pursuant to Paragraphs 23, 26, and 27 must be able to produce and record data measurements and calculations for each parameter at the following time intervals:

Instrumentation and Monitoring System	**Recording and Averaging Times**
Vent Gas, Assist Steam Flow, Monitoring Systems, and Pilot Gas Flow (if installed)	Measure continuously and record Fifteen-Minute Block Averages
Vent Gas Compositional Monitoring (if using the methodology in Subparagraph 26.a)	Measure no less than once every 15 minutes and record that value
Vent Gas Net Heating Value Analyzer (if using the methodology in Subparagraph 26.b)	Measure continuously and record Fifteen-Minute Block Averages
Video Camera	Record at a rate of no fewer than 4 frames per minute

Nothing in this Paragraph is intended to prohibit Defendant 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.

34. Instrumentation and Monitoring Systems: Operation. Defendant must operate each of the instruments and monitoring systems in use pursuant to Paragraphs 23, 26, and 27 to collect data on a continuous basis at all times when the Covered Flare that the instrument and/or monitoring system is associated with is In Operation and Capable of Receiving Sweep, Supplemental, and/or Waste Gas, except for the following periods of time:

a. Monitoring System Malfunctions;

b. Repairs associated with Monitoring System Malfunctions;

c. Scheduled maintenance in accordance with the manufacturer's recommended schedule; and/or

d. Quality Assurance/Quality Control activities (including, as applicable, calibration checks and required zero and span adjustments).

The calculation of downtime must be made in accordance with 40 C.F.R. § 60.13(h)(2).

B. Conditions When Flares Are Not Receiving Potentially Recoverable Gas

35. With respect to either the OL-5 Ground Flare or OL-5 Elevated Flare, the flare is not receiving Potentially Recoverable Gas flow if: (i) the pressure difference between the inlet pressure and the outlet pressure in the water seal drum 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 and (ii) there is no flow of Supplemental Gas downstream of the water seal drum.

36. The OL-5 Elevated Flare is receiving Potentially Recoverable Gas if the bypass line control valve is open and the pressure in the Flare header is greater than the water seal pressure of the water seal in the bypass line.

C. Waste Gas Minimization

37. Initial Waste Gas Minimization Plan. By the date set forth in Column C of Appendix 1.1, for each Covered Flare Defendant must submit to EPA an initial Waste Gas Minimization Plan ("WGMP") that discusses and evaluates flaring Prevention Measures on both a facility-wide and Flare-specific basis. The initial WGMP (the "Initial WGMP") must include, but is not limited to, the following elements:

a. Waste Gas Characterization and Mapping. Defendant must characterize the Waste Gas routed for combustion at each Covered Flare and determine its source as follows:

i. Volumetric (in scfm) and mass (in pounds) flow rate. Defendant must identify the volumetric flow of Waste Gas, in scfm on a 30-day rolling average, and the mass flow rate, in pounds per hour on a 30-day rolling average, vented to each Covered Flare for the one-year period of time that commenced 365 days before the Effective Date. To the extent that, for any particular Covered Flare, Defendant has instrumentation capable of measuring

and/or calculating the volumetric and mass flow rate of hydrogen, nitrogen, oxygen, carbon monoxide, carbon dioxide, and/or water (steam) in the Waste Gas, Defendant may calculate the volumetric and mass flow of all Waste Gas flows excluding hydrogen, nitrogen, oxygen, carbon monoxide, carbon dioxide, and/or water (steam) flows in the Waste Gas. Defendant may use either an engineering evaluation or measurements from monitoring or a combination of the two 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 Facility), 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. Defendant must specifically describe the date, time, and nature of the event that results in exclusion of any flows from the calculation.

ii. Baseload Waste Gas Flow Rates. Defendant must use flow rate data for the one-year period of time that commenced 365 days before the Effective Date to determine the Baseload Waste Gas Flow Rate, in scfd, to each Covered Flare. The Baseload Waste Gas Flow Rate may not include flows during periods of Startup, Shutdown, or Malfunction.

iii. Identification of Constituent Gases. Defendant 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. Defendant may use an engineering evaluation, measurements from monitoring, or a combination thereof, to determine Waste Gas constituents.

iv. Waste Gas Mapping. Using instrumentation, isotopic tracing, and/or engineering calculations, Defendant 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 and all other available information, Defendant 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. Defendant 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 (60) Days prior to the submission of the Initial WGMP. The description must specify the date of installation or implementation and the amount of reductions (in both flow and mass of pollutants) realized.

c. Planned Reductions. Defendant must describe any equipment, processes, or procedures Defendant plans to install or implement to eliminate or reduce flaring. 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(s) of reduction(s) to be realized. After submitting the Initial WGMP, Defendant may revise the installation and operation dates provided that Defendant: (i) does so in a writing submitted 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, Defendant must review and evaluate the results of the Waste Gas Mapping required by Subparagraph 37.a.iv.

d. Taking a Covered Flare Permanently Out of Service. Defendant must identify any Covered Flare it intends to take permanently 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. Defendant must describe and evaluate all Prevention Measures, including a schedule for expeditiously implementing and commencing operation of all Prevention Measures, to address the following:

i. Flaring that has occurred or may reasonably be expected to occur during planned maintenance activities, including Startup and Shutdown. The evaluation must include a review of flaring that has occurred during these activities since January 1, 2010, and must consider the feasibility of performing these activities without flaring.

ii. Flaring that may reasonably be expected to occur due to issues of gas quantity and quality. The evaluation must include a general audit of the FGRS' capacity for each Covered Flare and the storage capacity available for excess Waste Gas.

iii. 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 Prevention Measures 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.

38. First Updated Waste Gas Minimization Plan. By no later than eighteen (18) months after the Initial WGMP is due, Defendant must submit to EPA a first updated WGMP (the "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 21 and the information required in Subparagraphs 37.a-37.e for the twelve (12) month period following the period covered by the Initial WGMP. The First Updated WGMP must also include:

a. Updated Waste Gas Mapping. Defendant 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, as more information becomes available. Defendant must use this updated mapping to plan reductions;

b. Reductions Based on Root Cause Analysis. Defendant must review all of the root cause analysis reports submitted under Paragraph 42 to determine if reductions in addition to the reductions achieved through any required corrective action under Paragraph 43 can be realized; and

c. Revised Schedule. To the extent that Defendant proposes to extend any schedule set forth in the Initial WGMP, Defendant may do so only with good cause as determined by EPA, subject to Section XII (Dispute Resolution).

39. Subsequent Updates to WGMPs. After submission of the First Updated WGMP and on an annual basis thereafter until termination of the Decree, Defendant must submit an updated WGMP as part of the applicable Semi-Annual Report required by Section IX (Reporting Requirements) if Defendant: (a) installs a new Flare or permanently removes a Covered Flare from service, (b) connects a new Waste Gas stream to a Covered Flare, (c) modifies the Baseload Waste Gas Flow Rate to a Covered Flare, (d) installs an additional FGRS or materially alters the FGRS, or (e) changes the design of a Covered Flare. Each update must describe, if and as necessary, changes in the information required in Subparagraphs 37.a-37.e, and 38.a-38.b. To the extent Defendant proposes to extend any schedule set forth in a previous WGMP for the Facility, Defendant may do so only with good cause (as determined by EPA), subject to Section XII (Dispute Resolution).

40. Waste Gas Minimization Plan. By no later than the dates specified in a WGMP, Defendant must implement the actions described therein.

41. Enforceability of WGMPs. The terms of each WGMP (initial and update(s)) submitted under this Consent Decree are specifically enforceable.

42. Root Cause Analysis for Reportable Flaring Incidents.

a. Internal Reporting and Recordkeeping. Except as provided in Paragraph 44, by no later than forty-five (45) Days following the end of a Reportable Flaring Incident at the Facility, Defendant must conduct an investigation into the root causes(s) of the Reportable Flaring Incident and must prepare and keep as a record an internal report that must include, at a minimum, the following:

i. The date and time that the Reportable Flaring Incident started and ended;

ii. The volume of Waste Gas flared and an estimate of the individual quantities of VOCs and HAPs that were emitted during the Reportable Flaring Incident and the calculations that were used to determine those quantities;

iii. The steps, if any, that Defendant took to limit the duration of the Reportable Flaring Incident and to limit the quantity of VOC and HAP emissions associated therewith;

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

v. An analysis of the measures, if any, that are available to reduce the likelihood of a recurrence of a Reportable Flaring Incident resulting from the same root cause or contributing causes in the future. The analysis must discuss the alternatives, if any, that are available, the probable effectiveness of the alternatives, and the cost of the alternatives, if an alternative is eliminated based on cost. Possible design, operation, and maintenance changes must be evaluated. If Defendant concludes that corrective action is required under Paragraph 43, the report must include a

description of the action and, if not already completed, a schedule for its implementation, including proposed commencement and completion dates. If Defendant concludes that corrective action is not required under Paragraph 43, the report must explain the basis for that conclusion; and

vi. To the extent that investigations of the causes and/or possible corrective actions still are underway at the time the internal report is to be completed (i.e. forty-five (45) Days after the Reportable Flaring Incident began), a statement of the anticipated date by which a follow-up report fully conforming to the requirements of this Subparagraph will be submitted.

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

i. Date;

ii. Duration;

iii. Amount of VOCs and HAPs emitted;

iv. Root cause(s);

v. Corrective action(s) completed;

vi. Corrective action(s) still outstanding; and

vii. An analysis of any trends identified by Defendant in the number of Reportable Flaring Incidents, the root causes, or the type(s) of corrective action(s).

43. Corrective Action Implementation. In response to any Reportable Flaring Incident that occurs on or after six months after the Effective Date, Defendant must take, as expeditiously as possible, such interim and/or long-term corrective actions, if any, as are consistent with good engineering practices to minimize the likelihood of a recurrence of the root cause and all contributing causes of that Reportable Flaring Incident.

44. In lieu of preparing a new report under Paragraph 42 and analyzing and implementing corrective action under Paragraph 43 for a Reportable Flaring Incident that has as its root cause the same root cause as a previously reported Reportable Flaring Incident, Defendant may cross-reference and utilize the prior report and analysis when preparing the report required by Paragraph 43.

D. Flare Gas Recovery

45. General. Prior to the Date of Lodging, Defendant completed installation and commenced operation of the FGRS, to recover Potentially Recoverable Gas directed to the OL-5 Ground and OL-5 Elevated Flares. This FGRS consists of a single staged liquid ring reciprocating compressor with a Nominal Design Capacity to recover a total flow of Potentially Recoverable Gas of 693 actual cubic feet per minute (or approximately 41.6 kscfh (1 MMscfd). No later than the date specified in Column D of Appendix 1.1, Defendant must operate the FGRS in a manner that minimizes Waste Gas to the OL-5 Ground and OL-5 Elevated Flares while

ensuring safe operations at the Facility. Defendant must also operate the FGRS at the Facility consistent with good engineering and maintenance practices and in accordance with its design and any applicable manufacturer's specifications.

46. Availability and Operation. By no later than the applicable compliance deadline specified in Paragraph 45 and Appendix 1.1, the FGRS must be Available for Operation for 98% of the time, as calculated according to Paragraph 50. The periods provided for in Paragraphs 47 and 48 below may be included in the amount of time that the FGRS is Available for Operation when determining compliance with the requirement of this Paragraph.

47. Maintenance. Periods of planned and unplanned maintenance on and subsequent restart of the FGRS Compressor may be included in the amount of time that the Compressor is Available for Operation, provided, however, that these periods of maintenance do not exceed 1,764 hours in a five-year rolling sum period, rolled daily. Defendant must use best efforts to schedule maintenance activities during a turnaround of the process units venting to the OL-5 Ground Flare and OL-5 Elevated Flare. To the extent it is not practicable to undertake these maintenance activities during a Turnaround of these units, Defendant must use best efforts to minimize the generation of Waste Gas at the Facility during such periods.

48. Shutdown. Periods in which the FGRS is Shutdown (including for subsequent restart) due to operating conditions (such as high temperatures, large quantities of entrained liquid in Vent Gas, or contaminants in the Vent Gas that are unsuitable for recovery) outside the design operating range of the FGRS, including the associated knock-out drum, may be included in the amount of time that the FGRS must be Available for Operation, so long as the outage is

necessary for safety or to preserve the mechanical integrity of the FGRS. By no later than forty-five (45) Days after any such outage, Defendant must investigate the root cause and all contributing causes of the outage and must implement, as expeditiously as practicable, corrective action to prevent a recurrence of the cause(s). In the reports due under Section IX (Reporting Requirements) of this Consent Decree, Defendant must describe each outage that occurred under the conditions identified in this Paragraph, including the date, duration, cause(s), corrective action taken, and the status of the implementation of the corrective action.

49. Alternative FGRS. Defendant may submit a request to EPA for approval of an alternative Flare gas recovery system that is not explicitly referenced in Paragraph 45 or in this Section in order to ensure compliance with the FGRS availability requirements, provided that the proposed alternative Flare gas recovery system provides equivalent or better Waste Gas recovery capacity than the FGRS.

50. Periods to be Used for Computing Percentage of Time. For purposes of calculating compliance with the 98% of time requirement set forth in Paragraph 46, the period to be used must be a 720-hour rolling average, rolled hourly. The 720-hour rolling average must include only the previous 720-hour period when Potentially Recoverable Gas was generated during all or part of each hour during that period, but need not include Potentially Recoverable Gas that was generated by flows that could not have been prevented through reasonable planning and that were in anticipation of or caused by a natural disaster, act of war or terrorism, or External Utility Loss.

E. Flare Combustion Efficiency

51. General Emission Standards Applicable to Facility Flares. By no later than the dates set forth in Column B (for Subparagraphs 51.a and 51.b) and Column H (for Subparagraph 51.c) of Appendix 1.1, Defendant 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. Defendant must operate each Covered Flare at all times when emissions are vented to the Flare.

b. No Visible Emissions. Defendant must specify the smokeless design capacity of each Covered Flare and operate with no Visible Emissions, except for periods not to exceed a total of five (5) minutes during any two (2) consecutive hours when the Covered Flare is in Operation and the Vent Gas flow rate is less than the smokeless design capacity of the Covered Flare.

c. 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. Defendant must monitor for Visible Emissions from each Covered Flare while it is In Operation, as specified below in Subparagraphs 51.c.i and 51.c.ii. An initial Visible Emissions demonstration must be conducted using an observation period of two (2) hours using Method 22 at 40 C.F.R. Part 60, Appendix A-7. Subsequent Visible Emissions observations must be conducted using one of the methods listed in Subparagraphs 51.c.i and 51.c.ii. Defendant must record

and report in each Semi-Annual Report any instance where Visible Emissions are observed for more than five (5) minutes during any two (2) consecutive hours. The record must include the date and time of the 2-hour period and an estimate of the cumulative number of minutes in the 2-hour period for which emissions were visible.

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

ii. Alternatively, Defendant may use a video surveillance camera to record continuously (at least one frame every fifteen (15) seconds with time and date stamps) images of the Flare flame and at least a reasonable distance above the Flare flame at an

angle suitable for Visual Emissions observations. Defendant must provide real-time video surveillance camera output to the control room or other continuously-manned location where the camera images can be viewed at any time.

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

53. Monitoring According to Applicable Provisions. Defendant must comply with any applicable Subpart of 40 C.F.R. Parts 60, 61, and 63 that states how a particular Covered Flare must be monitored.

54. Good Air Pollution Control Practices. At all times, including during periods of Startup, Shutdown, and Malfunction, Defendant must implement good air pollution control practices to minimize emissions from each Covered Flare; provided, however, that nothing in this Paragraph requires Defendant to install or maintain Flare monitoring equipment in addition to or different from the equipment required by this Consent Decree.

55. Flare Tip Velocity or V_{tip}. By no later than the dates set forth in Column G of Appendix 1.1, at all times Defendant must operate each Covered Flare in compliance with either Subparagraph 55.a or 55.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 must be less than 60 feet per second. The Defendant must monitor V_{tip} using the procedures specified in Appendix 1.2; or

b. V_{tip} must be less than 400 feet per second and also less than the maximum allowed Flare Tip Velocity (V_{max}) as calculated according to Equation 11 in Appendix 1.2. The Defendant must monitor V_{tip}, gas composition, and must determine NHV_{vg} using the procedures specified in Appendix 1.2.

56. 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 51, 52, 55, or 58, Defendant must comply with the final, effective regulations and any requirements in Paragraphs 51, 52, 55, or 58, that are not inconsistent with the final, effective regulations. As used in this Paragraph, "inconsistent" mean that compliance with both provisions is not possible.

57. Operation According to Design. By no later than the dates set forth in Column G of Appendix 1.1, Defendant must operate and maintain each Covered Flare in accordance with its design and the requirements of this Consent Decree.

58. Net Heating Value Standards. Defendant must comply with the following Net Heating Value standards, except as provided in Paragraph 60 (Standard During Instrument Downtime).

a. Net Heating Value of Vent Gas (NHV_{vg}) for Covered Elevated Flares. Beginning on the Date of Lodging and continuing until the earlier of: (i) termination of

this Consent Decree; or (ii) the requirements in 40 C.F.R. §§ 60.18(c)(3)(ii) and 63.11(b)(6)(ii) related to the NHV_{vg} are modified, Defendant must operate each Covered Elevated Flare with an NHV_{vg} of greater than or equal to 300 BTU/scf at all times that the gas being combusted in the Covered Elevated Flare is subject to the control requirements of 40 C.F.R. § 60.18(c)(3)(ii) and/or § 63.11(b)(6)(ii).

b. Net Heating Value of Combustion Zone Gas (NHV_{cz}) for all Covered Elevated Flares. By no later the dates set forth in Column G of Appendix 1.1, at any time that a Covered Elevated Flare is In Operation, Defendant must operate that Flare so as to maintain the NHV_{cz} at or above 270 BTU/scf as determined on a Fifteen-Minute Block Average basis. Defendant must monitor and calculate NHV_{cz} at each Covered Flare in accordance with Appendix 1.2.

c. Net Heating Value of Combustion Zone Gas (NHV_{cz}) for OL-5 Ground Flare. By no later than the date set forth in Column G of Appendix 1.1, at any time that the OL-5 Ground Flare is In Operation, Defendant must operate the OL-5 Ground Flare so as to maintain the NHV_{cz} at or above 470 BTU/scf as determined on a Fifteen-Minute Block Average basis. Defendant must monitor and calculate NHV_{cz} at the OL-5 Ground Flare in accordance with Appendix 1.2.

59. Combustion Efficiency. By no later than the dates set forth in Column G of Appendix 1.1, Defendant must operate each Covered Flare in compliance with the applicable requirements in Paragraph 58.

60. Standard During Instrument Downtime. If one or more of the following conditions (collectively referred to as "Instrument Downtime") is present and renders Defendant incapable of operating a Covered Flare in accordance with the applicable NHV_{cz} standards in Paragraph 58, Defendant must operate that Covered Flare in accordance with good air pollution control practices so as to minimize emissions from and ensure good combustion efficiency at that Covered Flare:

a. Malfunction of an instrument, for an instrument needed to meet the requirement(s);

b. Repairs following instrument Malfunction, for an instrument needed to meet the requirement(s);

c. Scheduled maintenance of an instrument in accordance with the manufacturer's recommended schedule, for an instrument needed to meet the requirement(s); and/or

d. Quality Assurance/Quality Control activities on an instrument needed to meet the requirement(s).

The calculation of Instrument Downtime must be made in accordance with 40 C.F.R. § 60.13(h)(2). Notwithstanding Defendant's compliance with the Standard During Instrument Downtime, Defendant may not claim that a violation of the Net Heating Value Standards in Paragraph 58 was caused by Instrument Downtime to the extent the duration of the Instrument Downtime exceeds 5% of the time in a Calendar Quarter that the Covered Flare affected by the Instrument Downtime is In Operation.

61. Portable Flares Used in Place of Covered Flares.

a. Distinction between Planned and Unplanned Outages of Covered Flares. For purposes of this Paragraph, a "planned" outage means an outage of a Covered Flare that is scheduled 30 days or more in advance of the outage. An "unplanned" outage is an outage of the Covered Flare that either (1) is scheduled fewer than 30 days in advance of the outage, or (2) is unscheduled.

b. Outages Lasting Fewer than 504 Hours. For any planned or unplanned outage of a Covered Flare that Defendant knows or reasonably anticipates will result in 504 hours or less of downtime in a 1,095-day rolling sum average period, rolled daily, Defendant must make good faith efforts to ensure that the Portable Flare used in place of the Covered Flare complies with all of the requirements of this Consent Decree that are applicable to that Covered Flare.

c. Outages Lasting More than 504 Hours.

i. Planned Outages. For any planned outage of a Covered Flare that Defendant knows or reasonably anticipates will last more than 504 hours in a 1,095-day rolling average period, rolled daily, Defendant must ensure that the Portable Flare used in place of the Covered Flare complies with all of the requirements of this Consent Decree related to that Covered Flare as of the date that the Portable Flare is In Operation and Capable of Receiving

Waste, Supplemental, and/or Sweep Gas including, but not limited to, the Net Heating Value Standards in Paragraph 58.

ii. Unplanned Outages. For any unplanned outage of a Covered Flare that, in advance of the outage, Defendant could not reasonably have anticipated would last longer than 504 hours, Defendant must ensure that the Portable Flare used in place of the Covered Flare complies with all of the requirements of this Consent Decree related to that Covered Flare by no later than 30 days after the date that Defendant knows or reasonably should have known that the outage would last 504 hours or more, including, but not limited to, the Net Heating Value Standards in Paragraph 58.

d. Recordkeeping. Defendant must keep records sufficient to document compliance with the requirements of this Paragraph any time a Portable Flare is used.

62. Recordkeeping for All Covered Flares: Timing and Substance. Defendant must comply with the following recordkeeping requirements:

a. By no later than the dates set forth in Column G of Appendix 1.1, for each Covered Flare, Defendant must calculate and record each of the following parameters:

i. Volumetric flow rates for 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

requirement of Paragraphs 23 and 33 and Step 2 of Appendix 1.2);

ii. Assist Steam volumetric flow rate (in scfm) (in Fifteen-Minute Block Averages and in accordance with any calculation requirements of Paragraph 23 and 33 and Step 2 of Appendix 1.2);

iii. NHV_{vg} (in BTU/scf) (in Fifteen-Minute Block Averages in accordance with Step 1 of Appendix 1.2); and

iv. NHV_{cz} (in BTU/scf) (in Fifteen-Minute Block Averages in accordance with Step 3 of Appendix 1.2).

b. Instrument Downtime. By no later than the date set forth in Column G of Appendix 1.1, for each Covered Flare, Defendant must record the duration of all periods of Instrument Downtime that exceed 5% of the time in a Calendar Quarter that the Covered Flare is in Operation. Defendant must record which instrument(s) experienced the downtime, which Covered Flare was affected by the downtime, an explanation of the cause(s) of the deviation, and a description of the corrective action(s) that Defendant took.

c. By no later than the compliance dates set forth in Column D of Appendix 1.1, Defendant must record the date and time of any period when conditions at the Facility deviate from the standards in Paragraph 46 (FGRS Availability and Operation).

Defendant must also record the duration of the deviation, an explanation of the cause(s) of the deviation, and a description of the corrective action(s) that Defendant took.

d. By no later than the dates set forth in Column G of Appendix 1.1, at any time that Defendant deviates from the emission standards in Paragraph 58 at any Covered Flare, Defendant must record the duration of the deviation, an explanation of the cause(s) of the deviation, and a description of the correction action(s) that Defendant took.

VII. PERMITS

63. Permits Needed for Compliance Obligations. Defendant must obtain all required federal, state, and local permits necessary for performing any compliance obligations under this Consent Decree including, without limitation, permits for the construction of pollution control technology and the installation of equipment at the Facility. Defendant 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 Defendant has submitted timely and complete applications and has taken all other actions necessary to obtain all such permits or approvals.

64. Permits to Ensure Survival of Consent Decree Limits and Standards after Termination of Consent Decree. By no later than January 22, 2020, Defendant must complete and submit to LDEQ, pursuant to LDEQ's consolidated preconstruction and Title V CAA permitting program, appropriate applications to incorporate the requirements listed in Paragraph 65, as applicable, into a federally enforceable permit for the Facility, such that the requirements listed in Paragraph 65: (i) become and remain "applicable requirements" as that term is defined

in 40 C.F.R. § 70.2; (ii) are incorporated into a federally enforceable Title V permit for the Facility, and (iii) survive the termination of this Consent Decree.

65. Requirements that Survive Termination. The requirements of the following Paragraphs of this Consent Decree will survive termination: Paragraphs 21-27 (Instrumentation and Monitoring), Paragraphs 28-34 (Specifications, Calibration, Quality Control, and Maintenance/Recording and Averaging Times/Operation), Paragraphs 35-36 (Conditions When Flares Are Not Recovering Potentially Recoverable Gas), Paragraph 45-50 (FGRS: Operation and Availability Requirements), Paragraph 55 (Flare Tip Velocity), Paragraph 57 (Operation According to Design), Paragraph 58 (Net Heating Value Standards), Paragraph 59 (Combustion Efficiency), Paragraph 60 (Standard During Instrument Downtime), and Paragraph 62 (Recordkeeping). If Defendant seeks to terminate prior to the date that is five years from the Effective Date, the requirements of Paragraphs 17-20 (Fenceline Monitoring Program) will also survive termination.

66. The permit applications and process of incorporating the requirements of this Consent Decree 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.

67. This Consent Decree will not terminate until the requirements set forth in Paragraph 65 are incorporated into Title V operating permits for the Facility.

68. Following submission of complete permit applications, Defendant must cooperate with LDEQ by promptly submitting all relevant available information that LDEQ seeks following the receipt of the permit materials.

69. For any permit application required by this Section that is filed after the Effective Date of this Consent Decree, Defendant must submit to EPA and LDEQ, in the manner set forth in Section XVI (Notices), a copy of each application, as well as a copy of any permit proposed as a result of any such application, to allow for timely participation in any public comment process. If, as of the Effective Date, Defendant has already received any permit necessary to implement the requirements of this Consent Decree, then no later than thirty (30) Days after the Effective Date, Defendant must submit copies of any such permit to EPA and LDEQ in the manner set forth in Section XVI (Notices). EPA and/or LDEQ may excuse in writing all or part of the latter submission if copies of the permit have already been submitted before the Effective Date.

VIII. EMISSION CREDIT GENERATION

70. Prohibitions.

a. Definition. "CD Emission Reductions" means any NO_x, VOC, PM, PM_{TOTAL}, PM_{10}, $PM_{2.5}$, HAP, SO_2, CO_2e or CO emission reductions that result from any project conducted or controls used to comply with this Consent Decree.

b. Except as provided in Paragraph 71, Defendant may not use, apply for, obtain, trade, or sell any netting reductions or emission reduction credits that result from CD Emissions Reductions:

i. As netting reductions;

ii. As emissions offsets; or

iii. For the purpose of determining whether a project would result in a significant emissions increase or significant net emissions increase in any major or minor New Source Review ("NSR") permit or permit proceeding, or for the purpose of obtaining offsets in any non-attainment NSR permit or permit proceeding. Baseline actual emissions during any 24-month period selected by Defendant 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 VI.C) had Defendant been complying with this Consent Decree during that 24-month period.

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

a. Netting reduction or emission reduction credits generated by process units at the Facility that are not subject to emission limitation pursuant to this Consent Decree;

b. CD Emissions Reductions for the 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, Reasonably Available Control Technology rules) that apply to the Facility; provided, however, that Defendant must not trade or sell any CD Emissions Reductions; and

c. CD Emissions Reductions for the purposes of the Louisiana air toxics modeling program.

IX. REPORTING REQUIREMENTS

72. Semi-Annual Reports. By March 1st and August 31st of each year after the Effective Date, until termination of this Decree pursuant to Section XX (Termination), Defendant must submit a "Semi-Annual Report" to EPA and LDEQ, containing, for the previous six months (i.e., January through June will be addressed in the report submitted by August 31, and July through December will be addressed in the report to be submitted March 1), the following information:

a. A description of the status of work performed and progress made toward implementing all requirements of Section VI (Compliance Requirements) at the Facility. This description should identify and describe all major milestones completed and remaining to be completed;

b. A description of any problems encountered or anticipated in meeting the requirements in Section VI (Compliance Requirements) at the Facility, 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 report that was submitted only to LDEQ and that pertains to compliance with this Consent Decree;

e. A description of Defendant's progress in satisfying its obligations in connection with the Fenceline Monitoring Program under Section V, 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 Fenceline Monitoring Work Plan attached as Appendix 1.8, and a summary of costs incurred since the previous report;

f. Any updated WGMP for the Facility as required by Paragraph 39,

g. A summary of any internal flaring incident reports as required by Paragraph 42,

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

i. The total number of hours of Instrument Downtime of each monitoring instrument/equipment in use pursuant to Paragraphs 23, 26, and 27, expressed as both an absolute number and a percentage of time that the Covered Flare that the instrument/equipment monitor is In Operation and Capable of Receiving Sweep, Supplemental, and/or Waste Gas;

ii. If the total number of hours of Instrument Downtime on any monitoring instrument/equipment required pursuant to Paragraphs 23 or 26 that exceeds 5% of the time in a Calendar Quarter that the Covered Flare affected by the Instrument

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;

iii. The total number of hours, expressed as both an absolute number of hours and a total percentage of time that the Covered Flare was In Operation in which the requirements of Paragraphs 58-59 were not applicable because the only gas or gases being vented were Pilot Gas or Purge Gas;

iv. 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 58-59; provided, however, that if the exceedances of these standards was less than 5% of the time in a Calendar Quarter and was due to one or more of the exceptions set forth in Paragraph 60, the report must so note;

v. If the exceedance of the emissions standards in Paragraphs 58-59 was not due to one of the exceptions in Paragraph 60 (Standard During Instrument Downtime), or if the exceedance was due to one or more of the exceptions in Paragraph 60 and the total number of hours caused by the exceptions exceeds 5% of the

time in a Calendar Quarter that the Covered Flare affected by the Instrument Downtime was In Operation, an identification of each block period that exceeded the standard, by time and date; the cause of the exceedance (including Startup, Shutdown, maintenance, or Malfunction), and if the cause is asserted to be a Malfunction, an explanation of any corrective actions taken; and

vi. Sufficient information to document compliance with the FGRS Compressor availability requirements of Paragraph 46. For any period of non-compliance, Defendant must identify the date, cause, and corrective action taken; and

vii. Any additional matters that Defendant believes should be brought to the attention of EPA or LDEQ.

73. Annual Emission Data. In the Semi-Annual Report that is submitted on August 31 of each year, Defendant 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, CO, CO_2, methane, and ethane.

74. Each Semi-Annual Report must also include a description of any non-compliance with the requirements of this Consent Decree and 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 that the report is due, Defendant must so state in the report. Defendant must investigate the cause of the violation and submit an

amendment to the report, including a full explanation of the cause of the violation, within thirty (30) Days of the date Defendant becomes aware of the cause of the violation. Nothing in this Paragraph or the following Paragraph relieves Defendant of its obligation to provide the notice required by Section XI (Force Majeure).

75. All reports required to be submitted under this Section must be provided to the persons designated in Section XVI (Notices).

76. Each report submitted by Defendant under this Section must be signed by an official of Defendant 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.

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

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

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

X. STIPULATED PENALTIES

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

81. Late Payment of Civil Penalties. If Defendant fails to pay the civil penalties required to be paid under Section IV (Civil Penalties) when due, Defendant must pay a stipulated penalty of $2,500 per Day for each Day that each payment is late.

82. Failure to Meet the Obligations in Section VI of this Consent Decree. If Defendant fails to meet the obligations required under Section VI (Compliance Requirements) of this Consent Decree, unless excused under Section XI of this Consent Decree (Force Majeure), Defendant must pay stipulated penalties as follows:

Violation	**Stipulated Penalty**	
82.a. Violations of Paragraph 21. Failure to submit a timely Flare Data and Monitoring Systems and Protocol Report that complies with the requirements of Paragraph 21.	Period of Delay or Noncompliance Days 1-30 Days 31-60 Days 61 and later	Penalty per Day per Violation $300 $400 $500

Violation	**Stipulated Penalty**	
82.b. Violations of Paragraphs 22-26. Failure to install the equipment and monitoring systems required by Paragraphs 23-26 within the required time period and/or in accordance with respective, applicable technical specifications in those Paragraphs 28-29 (except for those QA/QC requirements referenced in Subparagraph 28.a which are covered in Subparagraph 82.c below).	Period of Delay or Noncompliance, per Monitoring System/Instrument Days 1-30 Days 31-60 Days 61 and later	Penalty per Day per Violation $750 $1,250 $2,000 or an amount equal to 1.2 times the economic benefit of delayed compliance, whichever is greater
82.c. Violations of QA/QC requirements in Paragraph 28.a. Failure to comply with the QA/QC requirements referenced in Paragraph 28.a.	Violation of a: Daily requirement Quarterly requirement Annual requirement	Penalty per Day per Violation $100 $200 $500
82.d. Violations of Paragraph 34. Except for 5% of the time per Calendar Quarter, failure to operate each monitoring system required by Paragraphs 23 and 25-26 in accordance with Paragraph 34; provided, however, that Defendant will not be liable for a stipulated penalty for violation of Paragraph 34 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.	Period Monitoring System/Control Instrument, Number of Hours per Calendar Year 0.25-50.0 50.25-100.0 Over 100.0	Penalty per Hour per Monitoring System/Control Instrument $250 $500 $1,000

Violation	**Stipulated Penalty**	
82.e. Violations of Paragraph 37, 38, or 39. Failure to submit a timely 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
82.f. Violations of Paragraph 42. Failure to develop a timely root cause flaring investigation report that complies with the requirements of Paragraph 42.a; or failure to keep it as an internal record; or failure to submit a timely summary of the flaring incident reports that complies with the requirements of Subparagraph 42.b.	Period of Delay or Noncompliance Days 1-30 Days 31-60 Days 61 and later	Penalty per Day per Violation $800 $1,600 $3,000
82.g. Violations of Paragraph 43. Failure to complete any corrective action in accordance with the requirements of Paragraph 43.	Period of Delay or Noncompliance Days 1-30 Days 31-60 Days 61 and later	Penalty per Day per Violation $1,000 $2,000 $5,000
82.h. Violations of Paragraph 46. After the dates specified in Appendix 1.1, for each day (as determined by the 30-day rolling average) that Defendant fails to maintain availability of the FGRS Compressor, in accordance with Paragraph 46; provided, however, that stipulated penalties will not apply if the Compressor's unavailability did not result in flaring of Potentially Recoverable Gases.	Period of Noncompliance Days 1-30 Days 31-60 Days 61 and later	Penalty per Day per Violation $2,400 $7,200 $18,000
82.i. Violations of Paragraphs 58 and 60. After the dates specified in Appendix 1.1, for each Covered Flare, each failure to comply with the Net Heating Value standards in Paragraph 58 or the	On a per Covered Flare Basis, Hours per Calendar Quarter in Noncompliance	Penalty per Hour, or Fraction Thereof per Covered Flare

Violation	**Stipulated Penalty**	
Standard During Instrument Downtime in Paragraph 60.	Hours 0.25-50.0 Hours 50.25-100.0 Hours over 100.0 For purposes of calculating the number of hours of noncompliance with an NHV standard, all 15-minute periods of violation will be added together to determine the total.	$25 $75 $150
82.j. Violations of Paragraph 62. Failure to record any information required to be recorded pursuant to Paragraph 62.	$100 per Day per item of information not recorded	

With respect to calculating the applicable penalty pursuant to Paragraph 82.b (determining whether to impose a stipulated penalty of either a fixed amount or 1.2 times the economic benefit of delayed compliance), the decision of which alternative to seek rests exclusively within the discretion of the United States, or, in the event that only LDEQ seeks a stipulated penalty, exclusively within the discretion of LDEQ.

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

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

84. Fenceline Monitoring. The following stipulated penalties will accrue per violation per Day for each failure to meet a requirement of Section V (Fenceline Monitoring Program).

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

85. Incorporation of Consent Decree Requirements into Federally Enforceable Permits. For each failure to submit a timely permit application to LDEQ that incorporates the Consent Decree requirements of Paragraph 65:

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

86. Stipulated penalties under this Section will begin to accrue on the Day after performance is due or on the Day a violation occurs, whichever is applicable, and 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.

87. Defendant must pay stipulated penalties to the United States and LDEQ within 30 Days of a written demand by either Plaintiff, as applicable. Unless the United States or LDEQ has reduced or waived stipulated penalties pursuant to Paragraph 88, Defendant must pay 50 percent of the total stipulated penalty amount due to the United States and 50 percent to LDEQ.

The Plaintiff making a demand for payment of a stipulated penalty must simultaneously send a copy of the demand to the other Plaintiff.

88. The United States or LDEQ may, in the unreviewable exercise of its discretion, reduce or waive stipulated penalties otherwise due to it under this Consent Decree. Only one (1) stipulated penalty amount per violation per day shall be payable. Before either Plaintiff makes a written demand for stipulated penalties, the Plaintiffs shall consult each other and shall notify Defendant within the demand for payment whether the Plaintiffs are jointly pursuing the stipulated penalties. Where the Plaintiffs jointly pursue stipulated penalties, Defendant shall pay fifty (50) percent of the total penalty owed to the United States and fifty (50) percent of the total penalty owed to LDEQ. Where only one Plaintiff pursues stipulated penalties, only that Plaintiff shall recover the full amount of the penalty and the Plaintiff not joining in the pursuit of stipulated penalties shall be deemed to have waived such penalties. The Plaintiff making a demand for payment of stipulated penalties shall simultaneously send a copy of the demand to the other Plaintiff.

89. Stipulated penalties will continue to accrue as provided in Paragraph 86, during any Dispute Resolution, but need not be paid until the following:

a. If the dispute is resolved by agreement or by a decision of EPA or LDEQ that is not appealed to the Court, Defendant must pay accrued penalties determined to be owing, together with interest, to the United States or LDEQ within 30 Days of the effective date of the agreement or the receipt of EPA's or LDEQ's decision or order.

b. If the dispute is appealed to the Court and the United States or LDEQ prevails in whole or in part, Defendant must pay all accrued penalties determined by the Court to be owing, together with interest, within sixty (60) Days of receiving the Court's decision or order, except as provided in Subparagraph c, below.

c. If any Party appeals the District Court's decision, Defendant must pay all accrued penalties determined to be owing, together with interest, within fifteen (15) Days of receiving the final appellate court decision.

90. Defendant 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. Defendant must pay stipulated penalties owing to LDEQ in the manner set forth and with the confirmation notices required by Paragraph 15, except that the transmittal letter must state for which violation(s) the stipulated penalties are being paid.

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

92. The payment of penalties and interest, if any, does not alter in any way Defendant's obligation to complete the performance of the requirements of this Consent Decree.

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

XI. FORCE MAJEURE

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

95. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree, whether or not caused by a force majeure event, Defendant

must provide notice orally or by email to EPA and LDEQ, within seventy-two (72) hours of when Defendant 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. Within seven (7) Days thereafter, Defendant must provide in writing to EPA and LDEQ an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Defendant'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 Defendant, such event may cause or contribute to an endangerment to public health, welfare or the environment. Defendant must include with any notice all available documentation supporting the claim that the delay was attributable to a force majeure. Failure to comply with the above requirements will preclude Defendant 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. Defendant will be deemed to know of any circumstance of which Defendant, any entity controlled by Defendant, or Defendant's contractors knew or should have known.

96. If the United States, after a reasonable opportunity for review and comment by LDEQ, agrees that the delay or anticipated delay is attributable to a force majeure event, the time for performance of the obligations under this Consent Decree that are affected by the force majeure event will be extended by the United States, after a reasonable opportunity for review and comment by LDEQ, for such time as is necessary to complete those obligations. An

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

97. If the United States, after a reasonable opportunity for review and comment by LDEQ, does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, the United States will notify Defendant in writing of its decision.

98. If Defendant elects to invoke the dispute resolution procedures set forth in Section XII (Dispute Resolution), it must do so no later than 15 Days after receipt of the United States' notice. In any such proceeding, Defendant will have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure event, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Defendant complied with the requirements of Paragraphs 94 and 95. If Defendant carries this burden, the delay at issue will be deemed not to be a violation by Defendant of the affected obligation of this Consent Decree identified to EPA and the Court.

XII. DISPUTE RESOLUTION

99. 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. Defendant's failure to seek resolution of a dispute

under this Section will preclude Defendant from raising any such issue as a defense to an action by the United States or LDEQ to enforce any obligation of Defendant arising under this Decree.

100. Informal Dispute Resolution. Any dispute subject to Dispute Resolution under this Consent Decree must first be the subject of informal negotiations. The dispute will be considered to have arisen when Defendant sends the United States and LDEQ a written Notice of Dispute. Such Notice of Dispute must state clearly the matter in dispute. The period of informal negotiations will not exceed twenty (20) 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 or LDEQ will be considered binding unless, within thirty (30) Days after the conclusion of the informal negotiation period, Defendant invokes formal dispute resolution procedures as set forth below.

101. Formal Dispute Resolution. Defendant must invoke formal dispute resolution procedures, within the time period provided in the preceding Paragraph, by serving on the United States and 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 Defendant's position and any supporting documentation relied upon by Defendant.

102. The United States or LDEQ must serve its Statement of Position within forty-five (45) Days of receipt of Defendant's Statement of Position. The United States' or LDEQ's 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 or LDEQ. The United States' or LDEQ's Statement of Position will be binding on

Defendant, unless Defendant files a motion for judicial review of the dispute in accordance with the following Paragraph.

103. Defendant may seek judicial review of the dispute by filing with the Court and serving on the United States and LDEQ, in accordance with Section XVI (Notices), a motion requesting judicial resolution of the dispute. The motion must be filed within ten (10) Days of receipt of the United States' or LDEQ's Statement of Position pursuant to the preceding Paragraph. The motion must contain a written statement of Defendant'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 Consent Decree.

104. The United States and LDEQ must respond to Defendant's motion within the time period allowed by the Local Rules of this Court. Defendant may file a reply memorandum, to the extent permitted by the Local Rules.

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

106. The invocation of dispute resolution procedures under this Section will not, by itself, extend, postpone, or affect in any way any obligation of Defendant 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 will be stayed pending resolution of the dispute as provided in Paragraph 89. If Defendant does 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

107. The United States, LDEQ, and their representatives, including attorneys, contractors, and consultants, will have the right of entry into the 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 samples and, upon request, splits of any samples taken by Defendant or its representatives, contractors, or consultants;

d. Obtain documentary evidence, including photographs and similar data, relevant to compliance with the terms of this Consent Decree; and

e. Assess Defendant's compliance with this Consent Decree.

108. Except for data recorded by any video camera that is required pursuant to Paragraph 25 or 33, and notwithstanding Section XX (Termination), until three (3) years after the termination of this Consent Decree, Defendant must retain, and must instruct its 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 its or its contractors' or agents' possession or control, or that come into its or its contractors' or agents' possession or control, and that relate in any manner to Defendant'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, Defendant must provide copies of any documents, records, or other information required to be maintained under this Paragraph. Defendant will retain the data recorded by any video camera required pursuant to Paragraph 25 or 33 for one (1) year from the date of recording.

109. At the conclusion of the information-retention period provided in the preceding Paragraph, Defendant must notify the United States and LDEQ at least ninety (90) Days prior to the destruction of any documents, records, or other information subject to the requirements of the preceding Paragraph and, upon request by the United States or LDEQ, Defendant must deliver any such documents, records, or other information to EPA or LDEQ. Defendant may assert that certain documents, records, or other information is privileged under the attorney-client privilege or any other privilege recognized by federal law. If Defendant asserts such a privilege, it must provide the following: (a) the title of the document, record, or information; (b) the date of the document, record, or information; (c) the name and title of each author of the document, record, or information; (d) the name and title of each addressee and recipient; (e) a description of the subject of the document, record, or information; and (f) the privilege asserted by Defendant.

However, no document, record, or other information created or generated pursuant to the requirements of this Consent Decree may be withheld on grounds of privilege.

110. Except for emissions data, Defendant 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 Defendant seeks to protect as CBI, Defendant must follow the procedures set forth in 40 C.F.R. Part 2.

111. 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 Defendant to maintain documents, records, or other information imposed by applicable federal or state laws, regulations, or permits.

XIV. EFFECT OF SETTLEMENT/RESERVATION OF RIGHTS

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

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

i. 40 C.F.R. § 60.18(c)(3)(ii);

ii. 40 C.F.R. § 63.11(b)(6)(ii); and

iii. 40 C.F.R. § 60.482-10a(d) (Part 60, Subpart VVa), but only to the extent that this provision requires compliance with 40 C.F.R. § 60.18(c)(3)(ii);

iv. 40 C.F.R. § 60.662(b) (Part 60, Subpart NNN), but only to the extent that this provision requires compliance with 40 C.F.R. § 60.18(c)(3)(ii);

v. 40 C.F.R. § 61.349(a)(2)(iii) (Part 61, Subpart FF), but only to the extent that this provision requires compliance with 40 C.F.R. § 60.18(c)(3)(ii);

vi. 40 C.F.R. § 63.113(a)(1)(i) (Part 63, hazardous organics NESHAP ("HON") process vent provision), but only to the extent that this provision requires compliance with 40 C.F.R. § 63.11(b)(6)(ii);

vii. 40 C.F.R. § 63.1103(e)(3) and Table 7 at (d) (Part 63, Subpart YY process vent provision), but only to the extent that these provisions: (1) relate to Flares; and (2) require compliance with 40 C.F.R. § 63.982(b) (Part 63, Subpart SS) (requiring compliance with 40 C.F.R. § 63.987(a) (Part 63, Subpart SS), requiring compliance with 40 C.F.R. § 63.11(b)(6)(ii);

viii. 40 C.F.R. § 63.987(a) (Part 63, Subpart SS), but only to the extent that this provision requires compliance with 40 C.F.R. § 63.11(b)(6)(ii); and

b. "General Flare Requirements" means the requirements found in the following regulations:

i. 40 C.F.R. § 60.18(c)(1), 40 C.F.R. § 63.11(b)(4), and LAC 33:III.Chapter 11 (regarding the prohibition on visible emissions);

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

iii. 40 C.F.R. § 60.18(c)(4) and 40 C.F.R. § 63.11(b)(7) (both relate to exit velocity requirements for Flares); and

iv. 40 C.F.R. § 60.18(e) and 40 C.F.R. § 63.11(b)(3) (both relate to operations during emissions venting).

c. "Good Air Pollution Control Practice Requirements" means the requirements found in the following regulations:

i. 40 C.F.R. § 60.11(d);

ii. 40 C.F.R. § 61.12(c); and

iii. 40 C.F.R. § 63.6(e)(1)(i).

d. "PSD Requirements" means the Prevention of Significant Deterioration requirements found in the following:

i. 42 U.S.C. § 7475;

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

iii. Any applicable, federally enforceable state or local regulation that implements, adopts, or incorporates the federal provisions cited in Subparagraphs 112.d.i-ii; and

iv. Any applicable, Title V permit requirement that implements, adopts, or incorporates the federal provisions or federally enforceable provisions cited in Subparagraphs 112.d.i-ii.

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

i. 40 C.F.R. § 60.18(d);

ii. 40 C.F.R. § 63.11(b)(1); and

iii. 40 C.F.R. § 60.482-10a(e) (Part 60, Subpart VVa), but only to the extent that this provision requires compliance with 40 C.F.R. § 60.18(d);

iv. 40 C.F.R. § 60.662(b) (Part 60, Subpart NNN), but only to the extent that this provision requires compliance with 40 C.F.R. § 60.18(d);

v. 40 C.F.R. § 61.349(a)(2)(iii) (Part 61, Subpart FF), but only to the extent that this provision requires compliance with 40 C.F.R. § 60.18(d);

vi. 40 C.F.R. § 63.113(a)(1)(i) (Part 63 HON process vent provision), but only to the extent that this provision requires compliance with 40 C.F.R. § 63.11(b)(1);

vii. 40 C.F.R. § 63.1103(e)(3) and Table 7 at (d) (Part 63, Subpart YY process vent provision), but only to the extent that these

provisions: (1) relate to Flares; and (2) require compliance with 40 C.F.R. § 63.982(b) (Part 63, Subpart SS) (requiring compliance with 40 C.F.R. § 63.987(a) (Part 63, Subpart SS provision), requiring compliance with 40 C.F.R. § 63.11(b)(6)(ii)); and

viii. 40 C.F.R. § 63.987(a) (Part 63, Subpart SS), but only to the extent that this provision requires compliance with 40 C.F.R. § 63.11(b)(1).

113. 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 through the Date of Lodging.

114. Resolution of Claims for Violating PSD Requirements at the Facility. With respect to emissions of VOCs, NOx, CO, CO_2e, SO_2, PM, $PM_{2.5}$, and PM_{10} from the Covered Flares, entry of this Consent Decree resolves the civil claims of the United States and LDEQ against Defendant for violations of the PSD Requirements resulting from pre-Lodging construction or modification through the Effective Date.

115. Resolution of Pre-Lodging Claims at the Covered Flares for Failure 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 Defendant 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.

116. Resolution of Claims Continuing Post-Lodging for Failure 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 Defendant for post-lodging violations of Requirements Related to Monitoring, Operation, and Maintenance According to Flare Design, that occur before the Effective Date, but only to the extent that the claims are based on Defendant's use of too much steam in relation to Vent Gas flow.

117. Resolution of Title V Violations. Entry of this Consent Decree resolves the civil claims of the United States and LDEQ against Defendant for the violations of Sections 502(a), 503(c), and 504(a) of the CAA, 42 U.S.C. §§ 7661a(a), 7661b(c), and 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 114 through 116 for the time frames set forth in those Paragraphs.

118. Reservation of Rights – Resolution of Liability in Paragraph 116 Can be Rendered Void. Notwithstanding the resolution of liability in Paragraph 116, for the period of time between the Date of Lodging and the Effective Date, those resolutions of liability will be rendered void if Defendant materially fails to comply with any of the obligations and

requirements of Sections VI (Compliance Requirements) or Section VIII (Emission Credit Generation). The resolutions of liability in Paragraph 116 will not be rendered void if Defendant, as expeditiously as practicable, remedies such material failure and pays all stipulated penalties due as a result of such material failure.

119. 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 Act or implementing regulations, or under other federal or state laws, regulations, or permit conditions except as expressly specified in Paragraphs 113-117. 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 Facility, whether related to the violations addressed in this Consent Decree or otherwise.

120. In any subsequent administrative or judicial proceeding initiated by the United States or LDEQ for injunctive relief, civil penalties, other appropriate relief relating to the Facility or Defendant's violations, Defendant may 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 113-117.

121. This Consent Decree is not a permit, or a modification of any permit, under any federal, state, or local laws or regulations. Defendant is responsible for achieving and maintaining complete compliance with all applicable federal, state, and local laws, regulations, and permits; and Defendant's compliance with this Consent Decree will be 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 Defendant's compliance with any aspect of this Consent Decree will result in compliance with provisions of the Act, 42 U.S.C. § 7401 *et seq*., or with any other provisions of federal, state, or local laws, regulations, or permits.

122. This Consent Decree does not limit or affect the rights of Defendant 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 Defendant, except as otherwise provided by law.

123. 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

124. The Parties will 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 Defendant.

XVI. NOTICES

125. 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:

As to the United States:

As to the Department of Justice:

By email: eescdcopy.enrd@usdoj.gov
Re: DJ #90-5-2-1-11603

By mail: EES Case Management Unit
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Washington, D.C. 20044-7611
Re: DJ #90-5-2-1-11603

As to the United States Attorney for the Eastern District of Louisiana:

United States Attorney for the
Eastern District of Louisiana
650 Poydras Street, Suite 1600
New Orleans, LA 70130
Phone: (504) 680-3000

And as to EPA:

By email: parrish.robert@epa.gov
foley.patrick@epa.gov

By mail (Regular or Express): Director, Air Enforcement Division
Office of Civil Enforcement
U.S. Environmental Protection Agency
Mail Code 2242-A
1200 Pennsylvania Avenue, N.W.

Ariel Rios Building
Room 1119
Washington, DC 20460-0001

As to LDEQ:

By email:
celena.cage@la.gov
dwana.king@la.gov

By mail:
Celena Cage
Enforcement Administrator
Office of Environmental Compliance
Louisiana Department of Environmental Quality
P.O. Box 4312
Baton Rouge, LA 70821-4312

And:
Dwana C. King
Deputy General Counsel
Legal Division
Louisiana Department of Environmental Quality
P.O. Box 4302
Baton Rouge, LA 70821-4302

As to Defendant:

Chrystal Landgraf, CSP
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15536 River Rd.
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Pierre Espejo
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Global Safety & Environment
Shell Legal Services – P&T
Building E-3, Office E0344J
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Houston, TX 77079
(832) 337-4611
Pierre.Espejo@Shell.com

126. Submission by U.S. 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, Defendant must submit the data in electronic form (e.g., a disk or hard drive). The email addresses above are provided to allow for submission of additional electronic courtesy copies.

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

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

XVII. EFFECTIVE DATE

129. The Effective Date of this Consent Decree is the date upon which this Consent Decree is entered by the Court or a motion to enter the Consent Decree is granted, whichever occurs first, as recorded on the Court's docket.

XVIII. RETENTION OF JURISDICTION

130. The Court retains jurisdiction over this case until termination of this Consent Decree, for the purpose of resolving disputes arising under this Decree or entering orders modifying this Decree, pursuant to Sections XII (Dispute Resolution) and XIX (Modification), or effectuating or enforcing compliance with the terms of this Decree.

XIX. MODIFICATION

131. Except as allowed in Paragraphs 14 and 125 (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.

132. Any disputes concerning modification of this Decree must be resolved pursuant to Section XII (Dispute Resolution), provided, however, that, instead of the burden of proof provided by Paragraph 105, the Party seeking the modification bears the burden of demonstrating that it is entitled to the requested modification in accordance with Federal Rule of Civil Procedure 60(b).

XX. TERMINATION

133. Before seeking termination of the Consent Decree, Defendant must:

a. Pay the civil penalties and any accrued stipulated penalties required under this Consent Decree;

b. Satisfactorily comply with all provisions of Section VI (Compliance Requirements) applicable to the Facility;

c. Operate for at least one year in compliance with the limitations and standards set forth in Paragraphs 46 (FGRS Availability and Operation), 58 (Net Heating Value Standards), and 59 (Combustion Efficiency) for all of the Covered Flares;

d. Apply for and receive permits issued pursuant to LDEQ's consolidated preconstruction and Title V CAA permitting program that are necessary to ensure that the

Consent Decree limits and standards specified in Paragraph 65 are permanently incorporated into the Facility's Title V, Part 70 CAA operating permits and survive termination of the Consent Decree.

134. After Defendant believes that it has satisfied the conditions for termination set forth in the preceding Paragraph, Defendant may submit a request for termination to the United States and LDEQ by certifying such compliance in accordance with the certification language in Paragraph 76. In the Request for Termination, Defendant must demonstrate that it has satisfied the conditions for termination set forth in the preceding Paragraph, as well as submit all necessary supporting documentation.

135. Following receipt by the United States and LDEQ of Defendant's Request for Termination, the Parties will confer informally concerning the request and any disagreement that the Parties may have as to whether Defendant has satisfactorily complied with the requirements for termination of this Consent Decree. If the United States after consultation with LDEQ agrees that the Decree may be terminated, the Parties will submit, for the Court's approval, a joint stipulation terminating the Decree.

136. If the United States after consultation with LDEQ does not agree that the Decree may be terminated, Defendant may invoke Dispute Resolution under Section XII. However, Defendant must not seek Dispute Resolution of any dispute regarding termination until ninety (90) Days after service of its Request for Termination.

XXI. PUBLIC PARTICIPATION

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

138. The Parties agree and acknowledge that final approval by LDEQ and entry of this Consent Decree is subject to the requirements of La. R.S. 30:2050.7, which provides for public notice of the Consent Decree in newspapers of general circulation and the official journals of parishes in which the Defendant's facilities are located, an opportunity for public comment of not less than forty-five (45) Days, consideration of any comments, and concurrence by the State Attorney General. Evidence of final approval of this Consent Decree by LDEQ shall be LDEQ's execution of a Motion to Enter the Consent Decree, and LDEQ reserves the right to withdraw or withhold consent based on information provided during the public comment period. In the event public comments raise issues over the content or terms of the Consent Decree, the LDEQ may withdraw from this Consent Decree and will not join in the filing of a Motion to Enter the Consent Decree.

XXII. SIGNATORIES/SERVICE

139. Each undersigned representative of Defendant, 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 he or she represents to this document.

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

XXIII. INTEGRATION

141. 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 that there are no representations, agreements, or understandings relating to the settlement other than those expressly contained in this Consent Decree.

XXIV. FINAL JUDGMENT

142. Upon approval and entry of this Consent Decree by the Court, this Consent Decree will constitute a final judgment of the Court as to the United States, LDEQ, and Defendant.

APPENDICES

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

"Appendix 1.1: Covered Flares and Applicability Dates for Certain Consent Decree Requirements"

"Appendix 1.2: Calculating Combustion Efficiency, NHV_{cz}, and Flare Tip Velocity"

"Appendix 1.3: Calculating the Unobstructed Cross Sectional Area of Various Types of Flare Tips"

"Appendix 1.4: Depiction of Gases Associated with Steam-Assisted Flares"

"Appendix 1.5: Outline of Requirements for the Flare Data and Initial Monitoring Systems Report"

"Appendix 1.6: List of Compounds a Gas Chromatograph Must be Capable of Speciating"

"Appendix 1.7: Waste Gas Mapping: Level of Detail Needed to Show Main Headers and Process Unit Headers"

"Appendix 1.8: Fenceline Monitoring Program"

"Appendix 1.9: Gas Chromatograph Quality Assurance/Quality Control Requirements"

Dated and entered this _day of _____, 2018

_____
UNITED STATES DISTRICT JUDGE
EASTERN DISTRICT OF LOUISIANA

Signature Page for Consent Decree in
United States and Louisiana Department of Environmental Quality v. Shell Chemical LP

FOR THE UNITED STATES OF AMERICA:

Date: 1/29/18

[redacted]

JEFFREY H. WOOD
Acting Assistant Attorney General
Environment and Natural Resources Division
U.S. Department of Justice

Date: 1/31/18

[redacted]

EMILY C. POWERS
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Signature Page for Consent Decree in
United States and Louisiana Department of Environmental Quality v. Shell Chemical LP

DUANE A. EVANS
Acting United States Attorney
Eastern District of Louisiana

[redacted]

JASON M. BIGELOW
Assistant U.S. Attorney
Eastern District of Louisiana
650 Poydras Street, Suite 1600
New Orleans, LA 70130
Phone: (504) 680-3025
Fax: (504) 680-3184

FOR THE U.S. ENVIRONMENTAL PROTECTION AGENCY:

Date: 1/26/2018

[redacted]

SUSAN PARKER BODINE
Assistant Administrator
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Date: 1/26/18

[redacted]

ROSEMARIE A. KELLEY
Acting Director, Office of Civil Enforcement
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Date: 1/24/2018

[redacted]

PHILLIP A. BROOKS
Director, Air Enforcement Division
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., N.W.
Washington, DC 20460

Signature Page for Consent Decree in
United States and Louisiana Department of Environmental Quality v. Shell Chemical LP

FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION 6:

Date: 1/31/2018

[redacted]

CHERYL SEAGER
Director - Compliance Assurance and Enforcement Division
U.S. Environmental Protection Agency, Region 6
1445 Ross Ave.
Dallas, TX 75202-2733

Signature Page for Consent Decree in
United States and Louisiana Department of Environmental Quality v. Shell Chemical LP

FOR THE LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY:

Date: 1-3-18

[redacted]

LOURDES ITURRALDE
Assistant Secretary
Office of Environmental Compliance

DWANA C. KING, La Bar #20590
Deputy General Counsel

OSCAR MAGEE, La Bar #32302
Office of the Secretary, Legal Division
Louisiana Department of Environmental Quality
P.O. Box 4302
Baton Rouge, Louisiana 70821-4302

Signature Page for Consent Decree in
United States and Louisiana Department of Environmental Quality v. Shell Chemical LP

FOR SHELL CHEMICAL LP:

12/21/17
Dated

[redacted]
Brett Woltjen
General Manager Norco Manufacturing Complex
Shell Chemical LP
15536 River Road
Norco, LA 70079

Agent Authorized to Accept Service on Behalf of Above-signed Party:

Name: CT Corporation System

Title: Registered Agent for Shell Chemical LP

Address: 3867 Plaza Tower Dr., Baton Rouge, LA 78016-4378

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APPENDICES TO CONSENT DECREE

Appendix 1.1 Covered Flares and Applicability Dates for Certain Consent Decree Requirements							
FLARE	GENERAL EMISSION STANDARDS FOR COVERED FLARES	INITIAL WASTE GAS MINIMIZATION PLAN	FLARE GAS RECOVERY AVAILABILITY	FLARE DATA AND MONITORING SYSTEMS PROTOCOL REPORT	INSTALLATION AND OPERATION OF MONITORING SYSTEMS	SPECIFIC EMISSION STANDARDS FOR COVERED FLARES	VISIBLE EMISSIONS MONITORING
A	B	C	D	E	F	G	H
Referenced Paragraphs							
	51.a, b; 52-54	37	45-50	21	22-24, 26-30	55, 57, 58.a, b, c, 59, 60, 62	25, 51.c
OL-5 Ground Flare	Effective Date	Effective Date + 540 Days	Effective Date + 365 Days	12/31/2018	Effective Date	12/31/2018	Effective Date + 365 Days
OL-5 Elevated Flare	Effective Date	Effective Date + 540 Days	Effective Date + 365 Days	6/30/2021	12/31/2020	6/30/2021	
GO-1 Elevated Flare	Effective Date	Effective Date + 540 Days	N/A	6/30/2020	12/31/2019	6/30/2020	
West Ops Elevated Flare	Effective Date	Effective Date + 540 Days	N/A	6/30/2021	12/31/2020	6/30/2021	

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APPENDICES TO CONSENT DECREE

APPENDIX 1.2

Calculating Combustion Efficiency, Net Heating Value of the Combustion Zone Gas (NHV_{cz}), 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})

Defendant 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 defendant monitors separate gas streams that combine to comprise the total vent gas flow to a Covered Flare, the 15-minute block average Net Heating Value shall be determined separately for each measurement location according to the following requirements, and a flow-weighted average of the gas stream Net Heating Values shall be used to determine the 15-minute block average Net Heating Value of the cumulative Vent Gas. The NHV_{vg} 15-minute block averages shall be calculated for set 15-minute time periods starting at 12 midnight to 12:15 AM, 12:15 AM to 12:30 AM and so on, concluding at 11:45 PM to midnight.

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

For any gas stream for which Defendant complies with Paragraph 26 by collecting compositional analysis data in accordance with the method set forth in 26.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 Defendant complies with Paragraph 26 by collecting direct Net Heating Value monitoring data in accordance with the method set forth in 26.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 Defendant complies with Paragraph 26 by collecting direct Net Heating Value monitoring data in accordance with the method set forth in 26.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 Defendant complies with Paragraph 26 by using a continuous monitoring system in accordance with the method set forth in 26.a or 26.b: Defendant 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). Defendant need not elect to use the same methodology at all Covered Flares with a continuous monitoring system; however, for each such Covered Flare, Defendant 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 Defendant intends to change the calculation method that applies to a Covered Flare, Defendant must notify the EPA 30 days in advance of such a change.

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

1. Use the results from the first sample collected during an event (for periodic Vent Gas flow events) for the first 15-minute block associated with that event.
2. If the results from the first sample collected during an event (for periodic Vent Gas flow events) are not available until after the second 15-minute block starts, use the results from the first sample collected during an event for the second 15-minute block associated with that event.

3. For all other cases, use the results that are available from the most recent sample prior to the 15-minute block period for that 15-minute block period for all Vent Gas streams. For the purpose of this requirement, use the time that the results become available rather than the time the sample was collected. For example, if a sample is collected at 12:25 AM and the analysis is completed at 12:38 AM, the results are available at 12:38 AM and these results would be used to determine compliance during the 15-minute block period from 12:45 AM to 1:00 AM.

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

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

Step 2: Determine Volumetric Flow Rates of Gas Streams

Defendant 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 Defendant complies with Paragraph 23 by using a monitoring system that directly records volumetric flow rate: Use the direct output (measured value) of the monitoring system(s) (in scf), as corrected for the temperature and pressure of the system to standard conditions (i.e., a temperature of 20 °C (68 °F) and a pressure of 1 atmosphere) to then calculate the average volumetric flow rate of that gas stream for the 15-minute block period.

For Vent Gas, Assist Steam, or Premix Assist Air gas streams for which Defendant complies with Paragraph 23 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 Defendant elects to use a mass flow monitor to determine volumetric flow rate of Vent Gas, Defendant must collect compositional analysis data for such Vent Gas in accordance with the method set forth in 26.a.

For assist steam, use a molecular weight of 18 pounds per pound-mole. For assist air, use a molecular weight of 29 pounds per pound-mole. The converted volumetric flow rates at standard conditions from Equation 3 shall then be used to calculate the average volumetric flow rate of that gas stream for the 15-minute block period.

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

For gas streams for which the molecular weight of the gas is known and for which Defendant complies with Paragraph 23 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 26.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, Defendant 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, Defendant 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.

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

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 Supplemental, Sweep, and/or Waste Gas is routed to a Covered Flare for at least 15-minutes. Equation 8 shows this relationship.

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

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

Defendant shall determine V_{tip} on a 15-minute Block Average basis according to the following requirements:

(a) Defendant 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) Defendant 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 23 according to the requirements in Step 2 above.

(c) The 15-minute Block Average V_{tip} shall be calculated using Equation 10.

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

(d) If Defendant chooses to comply with Paragraph 55.b, Defendant 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.

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

Key to the Abbreviations:

$385.3 = conversion\ factor\ (scf/lb\text{-}mol)$
850 = Constant
900 = Conversion factor, (seconds / 15-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-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)
$x_i = concentration\ of\ component\ i\ in\ Vent\ Gas\ (vol\ fraction)$
$x_{H2} = concentration\ of\ H2\ in\ Vent\ Gas\ at\ time\ sample\ was\ input\ into\ NHV\ monitoring\ system\ (vol\ fraction)$

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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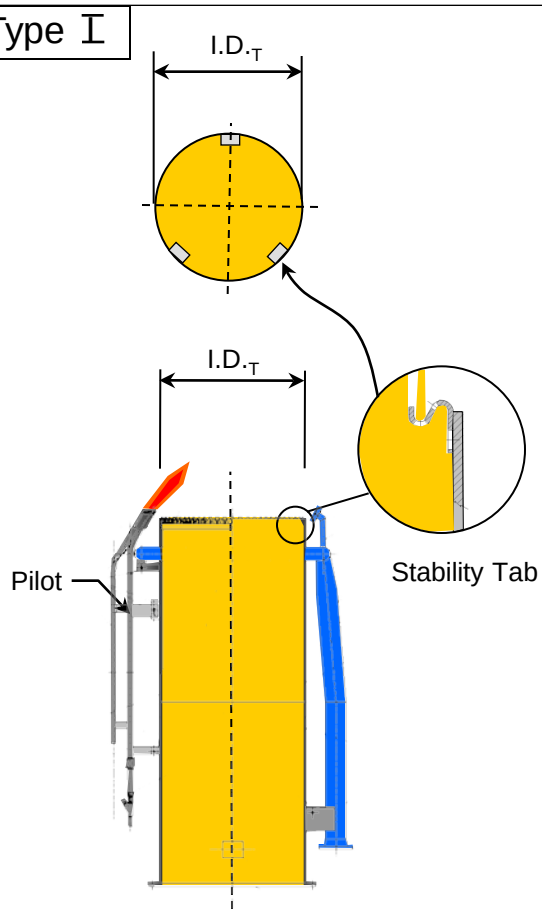
APPENDICES TO CONSENT DECREE

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

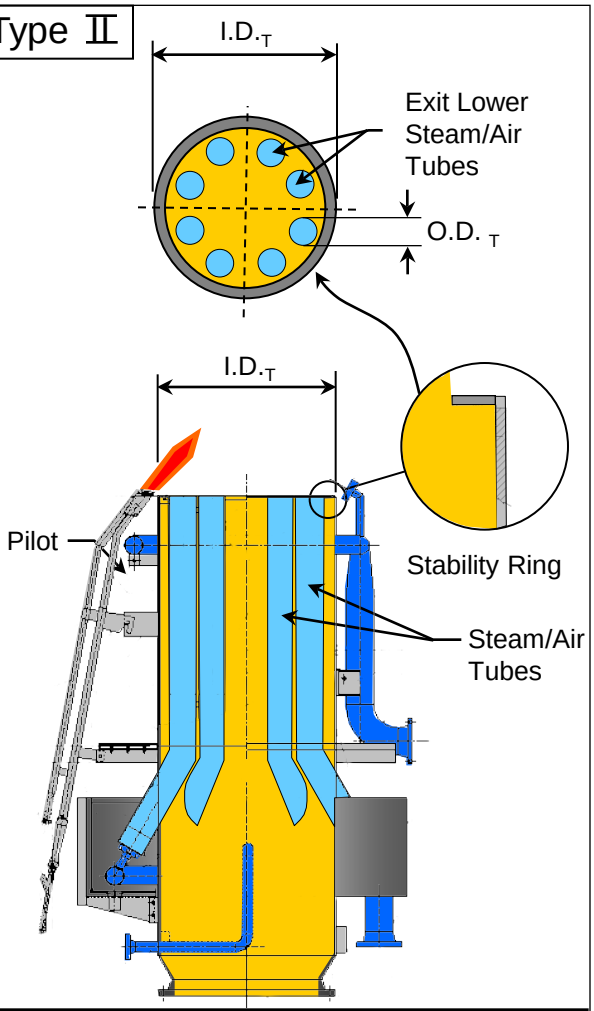
Example:

- $I.D._T$ = 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:

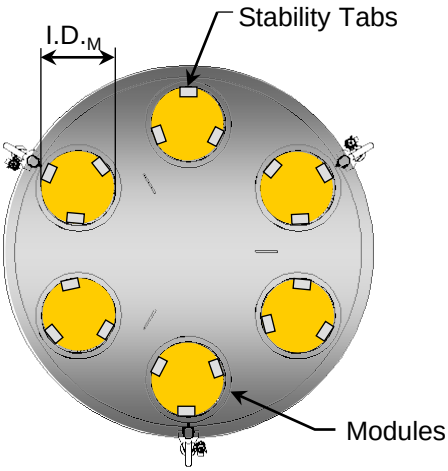
- $I.D._T$ = 47.5 inches
- A_{ST} = 100 Sq. inches
- $O.D._T$ = 6.5 inches
- N_T = 8

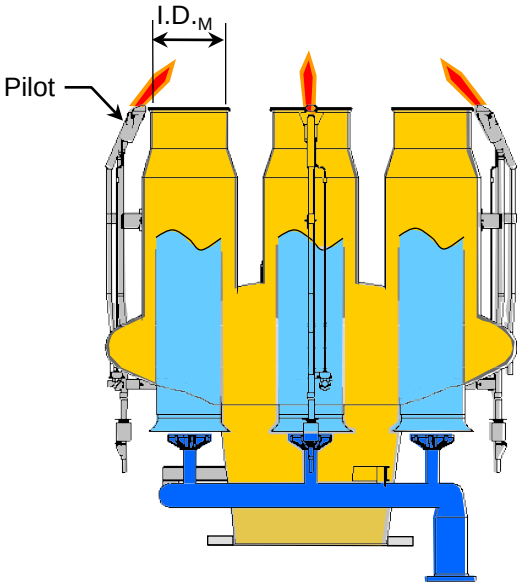
$A_{tip\text{-}unob} = \pi\ (47.5)^2/4 - 100 - 8 * \pi * (6.5)^2/4$

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

APPENDIX 1.3

Type III





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

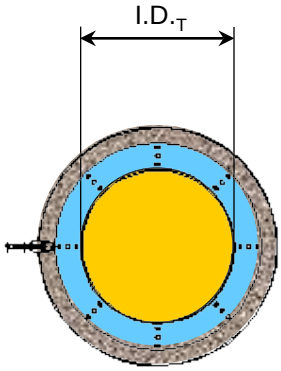
Where:
- $A_{tip\text{-}unob}$ = Unobstructed Cross Sectional Area of Flare Tip
- $I.D._M$ = Inside Diameter of One Tip Module
- N_M = Number of Modules
- X_T = Number of Stability Tabs per Module
- A_{ST} = Area of a Stability Tab

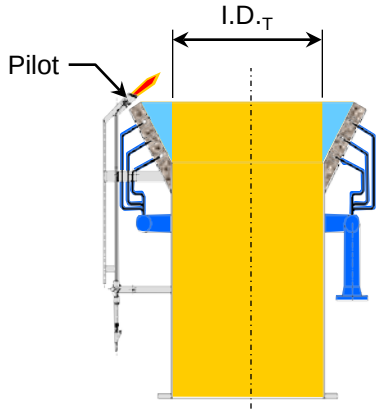
Example:
- $I.D._M$ = 17 inches
- N_M = 6
- X_T = 3
- A_{ST} = 3 Sq. inches

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

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

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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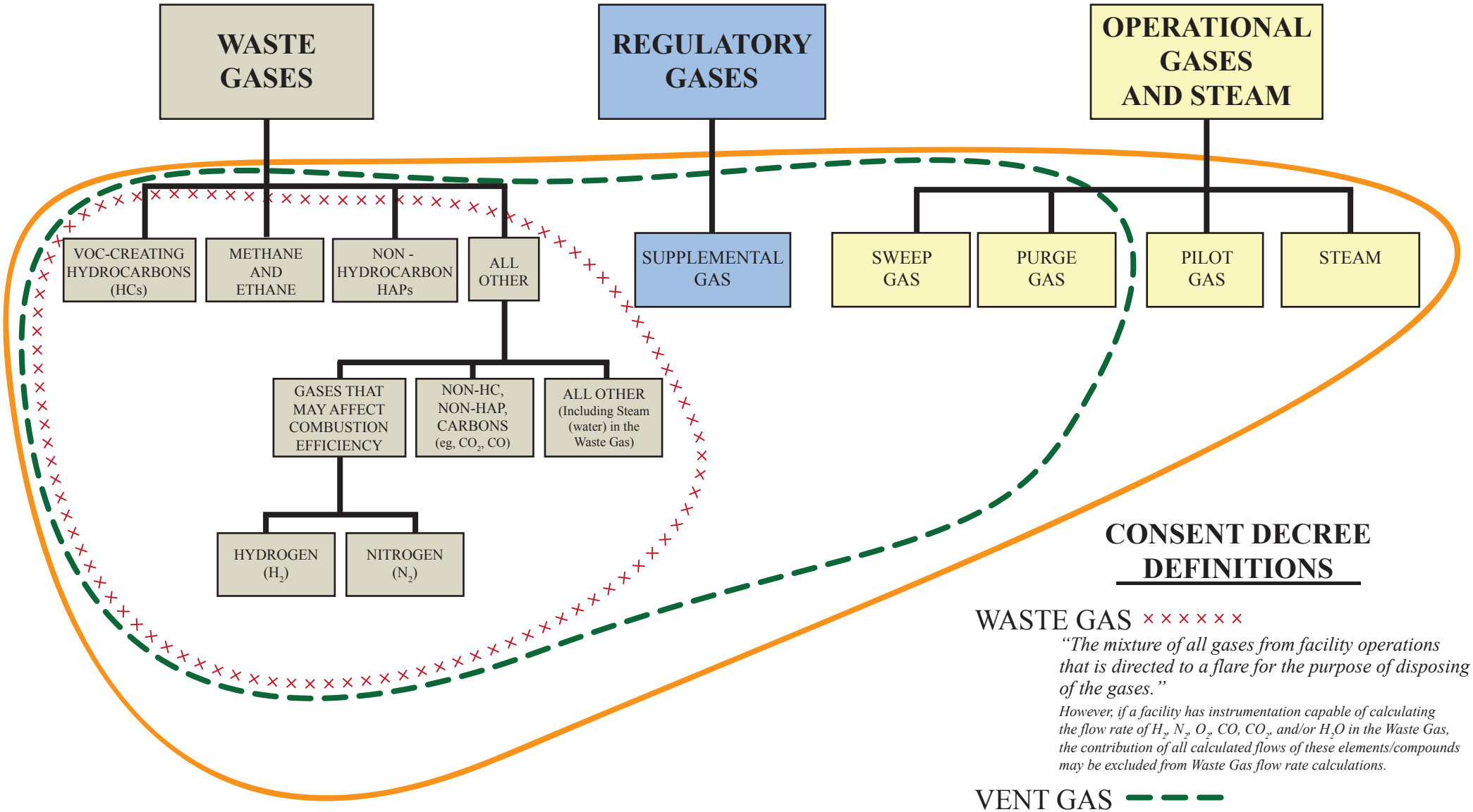
APPENDIX 1.4

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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APPENDIX 1.5

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

OUTLINE OF REQUIREMENTS FOR THE
FLARE DATA AND INITIAL MONITORING SYSTEMS REPORT

1. Facility-Wide

    1.1 Facility plot plan showing the location of each Flare in relation to the general plant layout

2. General Description of Flare

    2.1 Ground or elevated
    2.2 Type of assist system
    2.3 Simple or integrated (*e.g.*, sequential, staged)
    2.4 Date first installed
    2.5 History of any physical changes to the Flare
    2.6 Whether the Flare is a Temporary-Use Flare, and if so, the duration and time periods of use
    2.7 Flare Gas Recovery System ("FGRS"), if any, and date first installed

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

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

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

5. Existing Flare Gas Recovery System ("FGRS")

- 5.1 Complete description of each major component, including but not limited to:
  - 5.1.1 Compressor(s), including design capacities
  - 5.1.2 Water seal(s), rupture disk, or similar device to divert the flow
- 5.2 Maximum actual past flow on an scfm basis and the annual average flow in scfm for the five years preceding Date of Lodging
- 5.3 Simplified schematic showing the FGRS
- 5.4 Process Flow Diagram that adds the FGRS to the PDF(s) in Part 4

6. Flare Design Parameters

- 6.1 Maximum Vent Gas Flow Rate and/or Mass Rate
- 6.2 Maximum Sweep Gas Flow Rate and/or Mass Rate
- 6.3 Maximum Purge Gas Flow and/or Mass Rate, if applicable
- 6.4 Maximum Pilot Gas Flow and/or Mass Rate
- 6.5 Maximum Supplemental Gas Flow Rate and/or Mass Rate
- 6.6 If steam-assisted, Minimum Total Steam Rate, including all available information on how that Rate was derived

7. Gases Venting to Flare

- 7.1. Sweep Gas
  - 7.1.1 Type of gas used
  - 7.1.2 Actual set operating flow rate (in scfm)
  - 7.1.3 Average lower heating value expected for each type of gas used
- 7.2 Purge Gas, if applicable
  - 7.2.1 Type of gas used
  - 7.2.2 Actual set operating flow rate (in scfm)
  - 7.2.3 Average lower heating value expected for each type of gas used
- 7.3 Pilot Gas
  - 7.3.1 Type of gas used
  - 7.3.2 Actual set operating flow rate (in scfm)
  - 7.3.3 Average lower heating value expected for each type of gas used
- 7.4 Supplemental Gas
  - 7.4.1 Type of gas used
  - 7.4.2 Average lower heating value expected for each type of gas used
- 7.5 Steam (if applicable)
  - 7.5.1 Drawing showing points of introduction of Lower, Center, Upper, and any other steam
- 7.6 Simplified flow diagram that depicts the points of introduction of all gases, including Waste Gases, at the Flare (in this diagram, the detailed drawings of 7.5.1 may be simplified; in addition, detailed Waste Gas mapping is not required; a simple identification of the header(s) that carries(y) the Waste Gas to the Flare

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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APPENDICES TO CONSENT DECREE

APPENDIX 1.6

List of Compounds Gas Chromatographs Must be Capable of Speciating

APPENDIX 1.6

LIST OF COMPOUNDS GAS CHROMATOGRAPHS MUST BE CAPABLE OF SPECIATING

Gas Chromatographs used to comply with this Consent Decree must be capable of speciating the Vent Gas into the following:

1. Hydrogen
2. Nitrogen
3. Carbon Dioxide
4. Methane
5. Ethane
6. Ethene (aka: Ethylene)
7. Propane
8. Propene (aka: Propylene)
9. 2-Methylpropane (aka: iso-Butane)
10. Butane (aka: n-Butane)
11. But-1-ene (aka: butene, alpha-butylene) and 2-methylpropene (aka: iso-butylene, iso-butene) (these two constituents will be measured on the same column and the reported result will be one value: the sum of the two constituents)
12. E-but-2-ene (aka: beta-butylene, trans-butene)
13. Z-but-2-ene (aka: beta-butylene, cis-butene)
14. 1,3 butadiene
15. Pentane plus (aka: C_5 plus) (*i.e.*, all HCs with five Cs or more)

Outputs from all Gas Chromatographs shall be on a mole percent basis.

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APPENDIX 1.7

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

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.

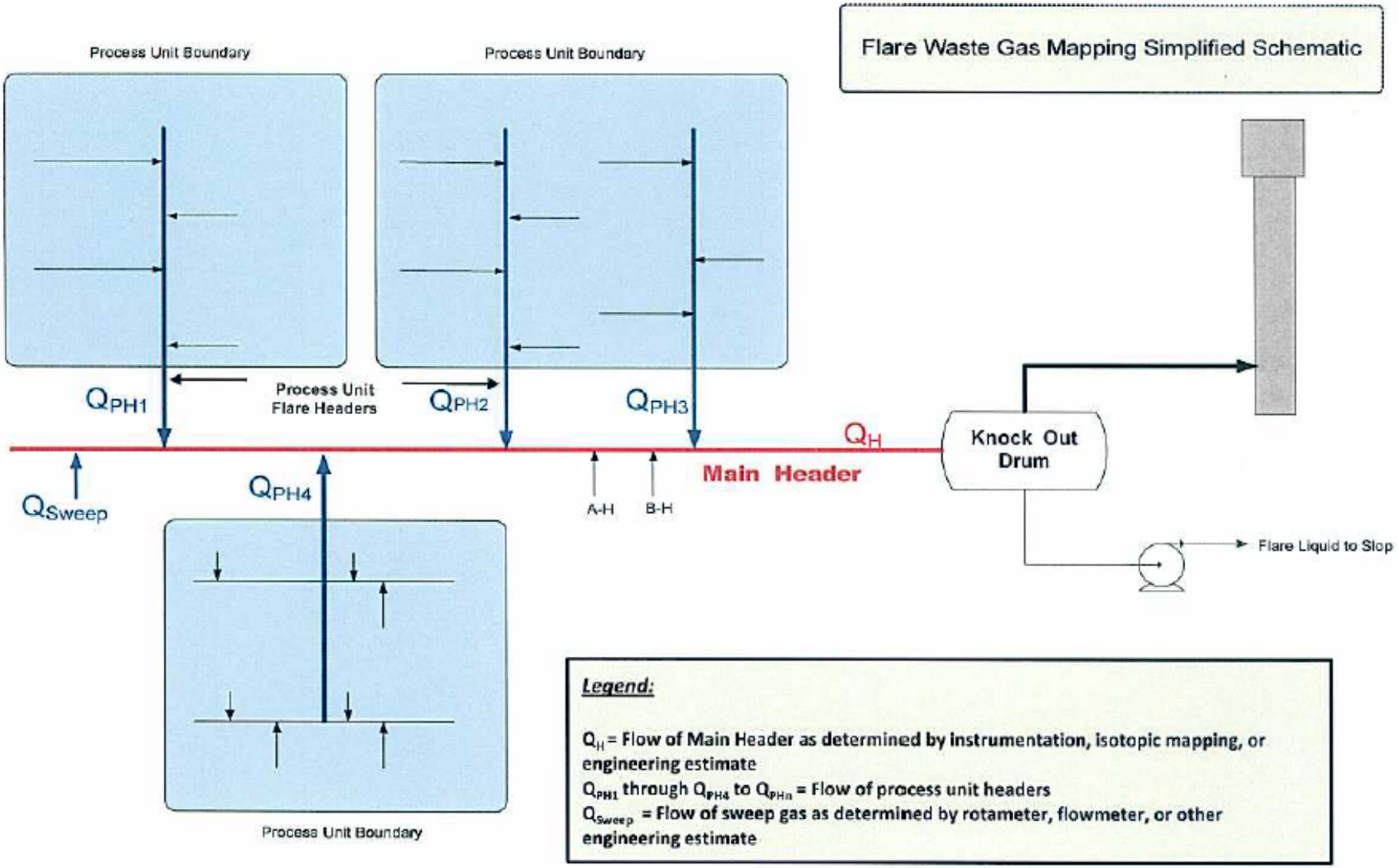
Flare Waste Gas Mapping Simplified Schematic
Process Unit Boundary
Process Unit Boundary
QPH1
Process Unit
Flare Headers
QPH2
QPH3
QH
Main Header
Knock Out
Drum
QSweep
QPH4
A-H
B-H
Flare Liquid to Slop
Process Unit Boundary
Legend:
QH = Flow of Main Header as determined by instrumentation, isotopic mapping, or engineering estimate
QPH1 through QPH4 to QPHn = Flow of process unit headers
QSweep = Flow of sweep gas as determined by rotameter, flowmeter, or other engineering estimate

Table 1: Example of Flare Source Description Table

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

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APPENDICES TO CONSENT DECREE

APPENDIX 1.8

Scope of Work for the Fenceline Monitoring Project

APPENDIX 1.8

SCOPE OF WORK FOR THE FENCELINE MONITORING PROJECT

1. **Applicability.** The requirements of this Fenceline Monitoring Project apply to the Shell Chemical Plant that is owned and/or operated by the Defendant ("Subject Facility").

2. **Timing and Public Transparency.** No later than 270 Days after the Effective Date, the Defendant must submit in writing to EPA a report: a) showing the location of all monitors at each Subject Facility that will be utilized to comply with the Monitoring Requirements of Paragraph 3 below and b) providing a URL to a mockup of the publically available website to be used to report monitoring data pursuant to this Fenceline Monitoring Project.

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

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

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

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

(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 control according to the requirements of any state or federal air permit applicable to the Subject Facility, including marine vessel loading operations. For marine loading operations that are located offshore, one passive monitor should be sited on the shoreline adjacent to the dock.

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

(3) The Defendant 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 Defendant must collect and record meteorological data according to the applicable requirements in subParagraphs 3(d)(1) and 3(d)(2).

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

(2) If an on-site meteorological station is used, the Defendant 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 Defendant must use a sampling period and sampling frequency as specified in this sub-Paragraph 3(e).

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

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

(3) *Alternative sampling frequency for burden reduction*. When an individual monitor consistently, as defined in sub-Paragraph 3(e)(3)(i) through (v), yields results at or below 0.9 $\mu g/m^3$, the Defendant 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 will occur approximately once per month.

(ii) If every sample at an individual monitoring site that is monitored at the frequency specified in Paragraph 3(e)(3)(i) is at or below 0.9 $\mu g/m^3$ 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 Defendant 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 during 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 Defendant must determine whether the results are above or below the action level as follows:

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

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

(2) The Defendant must calculate the annual average Δc based on the average of the 26 most recent 14-Day sampling periods. The Defendant 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 Defendant 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 Defendant must initiate a root cause analysis to determine the cause of such exceedance and to determine appropriate corrective action, such as those described in Paragraphs 3(g)(1) through (4). The root cause analysis and initial corrective action analysis must be completed and initial corrective actions taken no later than 45 Days after determining there is an exceedance. Root cause analysis and corrective action may include, but is not limited to:

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

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

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

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

(h) If, after completing the corrective action analysis and corrective actions such as those described in Paragraph 3(g), the Δc value for the next 14-Day sampling period for which the sampling start time begins after the completion of the corrective actions is greater than 9 $\mu g/m^3$ or if all corrective action measures identified require more than 45 Days to implement, the Defendant must develop a corrective action plan that describes the corrective action(s) completed to date, additional measures that the Defendant proposes to employ to reduce fenceline concentrations below the action level, and a schedule for completion of these measures. The Defendant 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).

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APPENDICES TO CONSENT DECREE

APPENDIX 1.9

Gas Chromatograph Quality Assurance/Quality Control Requirements

APPENDIX 1.9

Gas Chromatograph Calibration Standards

1. Net Heating Value and Analyte Measurements. For the Net Heating Value and Analyte measurements, the GC shall be operated and maintained in accordance with Performance Specification 9 ("PS9") of Appendix B of 40 C.F.R. Part 60 except:

    a. Daily Validation Procedure. Instead of the daily mid-level validation procedure in Section 10.2 of PS9, a daily low-level validation procedure shall be conducted on the calculated Net Heating Value of a certified calibration gas mixture that is developed using the concentration of each analyte specified in Column 1 of Table 1 below. The average instrument response shall not vary by more than 10 percent from the Net Heating Value of the certified calibration gas mixture.

    b. Quarterly Validation Procedure. The multi-point calibration error check procedure in Section 10.1 of PS9 shall be conducted quarterly for the analytes listed in Subparagraph c below. No calibrations will be required after routine maintenance or repair where such activities do not have the potential to alter the sampling or analysis of the gas. The GC must meet the calibration performance criteria in Sections 13.1 and 13.2 of PS9 for the listed analytes, such that: (i) the average instrument response must not differ by more than 10 percent of each analyte calibration gas value; and (ii) the precision and linearity check of each analyte listed below shall not deviate by more than 5 percent from the average concentration measured.

    c. The analytes to be used are:
        i. Hydrogen
        ii. Nitrogen
        iii. Methane
        iv. Ethane
        v. Propane
        vi. Propylene
        vii. Ethylene

d. The calibration gas mixtures may be set by the procedures identified in Section 7.1 of PS9 or may be within 10 percent of the concentration values listed in Table 1. The gases must be certified to ± 2 percent.

Table 1: Calibration Gas Mixtures for Net Heating Value Calibrations/Validations(1)

Component	Daily Mid-Level (Col. 1)	Quarterly Low-Level (Col. 2)	Quarterly Mid-Level (Col. 3)	Quarterly High-Level (Col. 4)
Hydrogen	30	8	30	12
Nitrogen	8	65	8	5
Methane	48	22	48	30
Ethane	3	2	3	30
Propane	2	1	2	15
Propylene	8	1	8	5
Ethylene	1	1	1	3
NHV (Btu/scf) Unadjusted for H2)	793	310	793	1273

(1) The individual analytes are in volume percent.