UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

20 JAN 2017

Jane E. Schilmoeller
Associate General Counsel
Flint Hills Resources Houston Chemical, LLC
4111 East 37th Street North - T6L
P.O. Box 2917
Wichita KS, 67220

RE: In the Matter of Flint Hills Resources Houston Chemical, LLC
CAA-06-2017-3326

Dear Ms. Schilmoeller,

Please find enclosed a copy of the fully-executed Consent Agreement and Final Order ("CAFO") that was filed today with the Regional Hearing Clerk in EPA, Region 6. Flint Hills Resources Houston Chemical, LLC ("FHR") will have thirty (30) days from the effective date of the CAFO to pay the civil penalty of eighty-nine thousand dollars ($89,000.00). FHR will have one year from the Effective Date of the CAFO to comply with the conditions of settlement.

If you have any questions, please contact me at 214-665-8181 or via email at Tanimura.Erin@epa.gov.

Sincerely,

Erin Tanimura
Office of Regional Counsel
U.S. EPA, Region 6

Enclosure (1)

cc: Denzel W. Wiseman, Jr.
Vice President Operations – Olefins
Flint Hills Resources Houston Chemical, LLC
1330 Lake Robbins Drive, Suite 400
The Woodlands, TX 77380

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 6
DALLAS, TEXAS

IN THE MATTER OF: FLINT HILLS RESOURCES HOUSTON CHEMICAL, LLC HOUSTON, TEXAS, 77017 RESPONDENT.	(	DOCKET NO. CAA-06-2017-3326

CONSENT AGREEMENT

A. PRELIMINARY STATEMENT

1. This is an administrative penalty assessment proceeding brought under Section 113(d) of the Clean Air Act (the "CAA" or "Act"), 42 U.S.C. § 7413(d), and Sections 22.13, 22.18, and 22.34 of the Consolidated Rules of Practice Governing the Administrative Assessment of Civil Penalties and the Revocation/Termination or Suspension of Permit ("Consolidated Rules"), as codified at 40 C.F.R. Part 22.

2. Complainant is the United States Environmental Protection Agency, Region 6 (the "EPA"). On the EPA's behalf, the Director of the Compliance Assurance and Enforcement Division has been delegated the authority to settle civil administrative penalty proceedings under Section 113(d) of the Act.

3. Flint Hills Resources Houston Chemical, LLC ("FHR" or "Respondent") is a limited liability company organized in the state of Delaware. Respondent is a "person" as defined in Section 302(e) of the Act, 42 U.S.C. § 7602(e).

4. FHR acquired the propylene manufacturing plant located at 9822 La Porte Freeway, Houston, Texas, 77017 (the "Facility") from its predecessor-in-interest, PL Propylene, LLC, on July 16, 2014.

5. As described more fully herein, Complainant alleges that Respondent and/or its predecessor-in-interest violated 40 C.F.R. §§ 60.11(d), 60.18(c)(3)(ii), 63.6(e), and 63.11(b)(6)(ii) at Flare EPN 1-105A (the "Flare"), located at the Facility, at various times from July 1, 2011, to August 4, 2014.

6. Complainant and Respondent, having agreed that settlement of this action is in the public interest, consent to the entry of this Consent Agreement along with the corresponding Final Order, hereinafter known together as the "CAFO," without adjudication of any issues of law or fact herein, and Respondent agrees to comply with the terms of this CAFO.

7. After initiation of this enforcement action and prior to entry of this CAFO, Respondent completed several flare minimization projects intended to improve flare reliability and operating time. The flare minimization projects have decreased vent gas volume to the Flare and, accordingly, have decreased emissions from the Flare. The flare minimization projects include, but are not limited to, the following:

a. In April of 2015, Respondent implemented the 109 Pre-Splitter project to remove heavier components from the propane vaporizer unit feed. The project improved feed quality to the process heaters, increased unit reliability, and decreased the frequency of venting the propane vaporizers to the flare.

b. Between October of 2014 and April of 2016, Respondent undertook the following projects at the Facility to increase on-stream time, decrease Startup and Shutdown events, and reduce unplanned events:

i. Improved Regeneration Air Heater Burners and burner supports by upgrading the metallurgy and altering the perforated wings, thus increasing unit reliability and decreasing unit outages (implemented October of 2014; February of 2016);

ii. Replaced heat exchangers with a more reliable design to minimize fouling and unit outages for exchanger cleaning (implemented October of 2014);

iii. Modified the refractory inside the reactors to prevent catalyst from migrating out of the reactors, which in turn reduces unit shutdown for cleaning of the CO/VOC emissions control device (implemented December of 2014; December of 2015; April of 2016).

c. Respondent has implemented operational procedures and practices designed to decrease vent gas volume to the flare and minimize flaring.

8. By entering into this CAFO, FHR has indicated that it is committed to continuing to proactively monitor and reduce emissions from the Flare.

B. JURISDICTION

9. This CAFO is entered into under Section 113(d) of the Act, as amended, 42 U.S.C. § 7413(d), and the Consolidated Rules, 40 C.F.R. Part 22. The alleged violations in this CAFO are pursuant to Section 113(a)(3)(A).

10. The EPA and the United States Department of Justice jointly determined that this matter, although it involves alleged violations that occurred more than a year before the initiation of this proceeding, is appropriate for an administrative penalty assessment. 42 U.S.C. § 7413(d); 40 C.F.R. § 19.4.

11. The Regional Judicial Officer is authorized to ratify this CAFO which memorializes a settlement between Complainant and Respondent. 40 C.F.R. § 22.4(b) and 22.18(b).

12. The issuance of this CAFO simultaneously commences and concludes this proceeding. 40 C.F.R. § 22.13(b).

C. DEFINITIONS

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

14. "Assist Air" shall mean all air that intentionally is introduced prior to or at the flare tip through nozzles or other hardware conveyances for the purposes including, but not limited to, protecting the design of the flare tip, promoting turbulence for mixing or inducing air into the flame. Assist Air includes Premix Assist Air and Perimeter Assist Air. Assist Air does not include Ambient Air.

15. "Assist Steam" shall mean steam that intentionally is introduced prior to or at the flare tip through nozzles or other hardware conveyance for the purposes including, but not limited to, protecting the design of the flare tip, promoting turbulence for mixing, or inducing air into the flame. Assist Steam includes, but is not necessarily limited to, Center Steam, Lower Steam, and Upper Steam.

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

17. "Center Steam" shall mean the portion of Assist Steam introduced into the stack of the flare to reduce burnback.

18. "Combustion Zone" shall mean the area of the Flare flame where the Combustion Zone Gas combines for combustion.

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

20. "Lower Heating Value" or "*LHV*" shall mean 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.

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

22. "Lower Steam" shall mean the portion of Assist Steam piped to an exterior annular ring near the lower part of the flare tip, which then flows through tubes to the flare tip, and ultimately exits the tubes at the flare tip.

23. "Malfunction" shall mean, 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 CAFO involving this definition, FHR shall have the burden of proving all of the following:

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

b. The excess emissions (1) did not stem from any activity or event that could have been foreseen and avoided, or planned for, and (2) could not have been avoided by better operation and maintenance practices;

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

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

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

f. All possible steps were taken to minimize the impact of the excess emissions on ambient air quality;

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

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

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

j. The owner or operator properly and promptly notified the appropriate regulatory authority.

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

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

b. The instrument or monitoring system downtime (1) did not stem from any activity or event that could have been foreseen and avoided, or planned for, and (2) could not have been avoided by better operation and maintenance practices;

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

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

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

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

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

25. "Net Heating Value" shall mean the Lower Heating Value.

26. "Net Heating Value of Combustion Zone Gas" or "NHV_{CZ}" shall mean the Lower Heating Value, in BTU/scf, of the Combustion Zone Gas in the Flare. The NHV_{CZ} shall be calculated in accordance with Step 3 of Appendix D of this CAFO.

27. "Net Heating Value of Vent Gas" or NHV_{VG} shall mean the Lower Heating Value, in BTU/scf, of the Vent Gas directed to the Flare. NHV_{VG} shall be calculated in accordance with Step 1 of Appendix D of this CAFO.

28. "New source" is defined as any stationary source, the construction or modification of which is commenced after the publication of the NSPS regulations or proposed NSPS regulations applicable to such sources. 42 U.S.C. § 7411(a)(2).

29. "Perimeter Assist Air" shall mean the portion of Assist Air introduced at the perimeter of the flare tip or above the flare tip. Perimeter Assist Air includes air intentionally entrained in lower and upper steam. Perimeter Assist Air includes all Assist Air except Premix Assist Air.

30. "Pilot Gas" shall mean gas introduced into the flare tip that provides a flame to ignite the Vent Gas.

31. "Premix Assist Air" shall mean the portion of Assist Air that is introduced to the Vent Gas, whether injected or induced, prior to the flare tip. Premix Assist Air also includes any air intentionally entrained in Center Steam.

32. "Purge Gas" shall mean the minimum amount of gas introduced between the flare water seal and the flare tip to prevent oxygen infiltration (backflow) into the flare tip.

33. "Stationary source" is defined as a building, structure, facility, or installation which emits or may emit any air pollutant. 42 U.S.C. §§ 7411(a)(3), 7412(a)(3).

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

35. "Supplemental Gas" shall mean all gas introduced to the Flare in order to improve the combustible characteristics of the Combustion Zone Gas.

36. "Sweep Gas" shall mean the minimum amount of gas introduced into the Flare header to (a) prevent oxygen buildup, corrosion, and/or freezing in the header; (b) maintain a safe flow of gas through the header; including a higher flow during hot taps; and (c) prevent oxygen infiltration (backflow) into the Flare tip.

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

38. "Upper Steam" shall mean the portion of Assist Steam introduced via nozzles located on the exterior perimeter of the upper end of the flare tip.

39. "Vent Gas" shall mean all gas found just prior to the Flare tip. This gas includes all Waste Gas (i.e., gas from facility operations that is directed to the Flare for the purpose of disposing of the gas), that portion of Sweep Gas that is not recovered, Purge Gas, and Supplemental Gas, but it does not include Pilot Gas, Total Steam, or Assist Air.

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

D. GOVERNING LAW

New Source Performance Standards

41. Section 111(b)(1)(A) of the CAA, 42 U.S.C. § 7411(b)(1)(A), requires EPA to publish and periodically revise a list of categories of stationary sources including those categories that, in EPA's judgment, cause or contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare.

42. Once a category is included on the list, Section 111(b)(1)(B) of the CAA, 42 U.S.C. § 7411(b)(1)(B), requires EPA to promulgate a federal standard of performance for new sources within the category, also known as a New Source Performance Standard ("NSPS"). Section 111(e) of the CAA, 42 U.S.C. § 7411(e), prohibits an owner or operator of a new source from operating that source in violation of an NSPS after the effective date of the NSPS applicable to such source.

43. The NSPS are located in Part 60 of Title 40 of the Code of Federal Regulations.

44. Pursuant to Section 111(b)(1)(B) of the CAA, 42 U.S.C. § 7411(b)(1)(B), EPA has promulgated regulations that contain general provision applicable to all NSPS sources. 40 C.F.R. Part 60, Subpart A, §§ 60.1–60.19 ("NSPS Subpart A").

45. Under NSPS Subpart A, the provisions of 40 C.F.R. Part 60 "apply to the owner or operator of any stationary source which contains an affected facility, the construction or modification of which is commenced after publication [in Part 60] of any standard (or, if earlier, the date of publication of any proposed standard) applicable to that facility." 40 C.F.R. § 60.1(a).

46. NSPS Subpart A requires that "[a]t all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions." 40 C.F.R. § 60.11(d).

47. NSPS Subpart A also requires that "[f]lares shall be used only with the net heating value of the gas being combusted being 11.2 MJ/scm (300 Btu/scf) or greater if the flare is steam-assisted . . . ." 40 C.F.R. § 60.18(c)(3)(ii).

National Emission Standards for Hazardous Air Pollutants

48. Section 112 of the CAA, 42 U.S.C. § 7412, sets forth a national program for the control of hazardous air pollutants ("HAPs"). Under Section 112(b), Congress listed 188 HAPs believed to cause adverse health or environmental effects. 42 U.S.C. § 7412(b)(1).

49. Congress directed EPA to publish a list of all categories and subcategories of, *inter alia*, major sources of HAPs. CAA § 112(c); 42 U.S.C. § 7412(c).

50. Congress directed EPA to promulgate regulations establishing emission standards for each category or subcategory of, *inter alia*, major sources of HAPs. CAA § 112(d)(1); 42 U.S.C. § 7412(d)(1). These emission standards must require the maximum degree of reduction in emissions of HAPs that the Administrator, taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy

requirements, determines is achievable for the new or existing sources in the category or subcategory to which the emission standard applies. CAA § 112(d)(2); 42 U.S.C. § 7412(d)(2).

51. To the extent that it is not feasible to prescribe or enforce an emission standard for the control of a HAP, Congress authorized EPA to promulgate "design, equipment, work practice, or operational" standards, which are to be treated as emission standards. CAA § 112(h); 42 U.S.C. § 7412(h).

52. The emission standards promulgated under Section 112 of the 1990 Amendments of the CAA, 42 U.S.C. § 7412, are known as the National Emission Standards for Hazardous Air Pollutants ("NESHAPs") for Source Categories or "MACT" ("maximum achievable control technology") standards. These emission standards are found in Part 63 of Title 40 of the Code of Federal Regulations.

53. After the effective date of any emission standard, limitation, or regulation promulgated pursuant to Section 112 of the CAA, no person may operate a source in violation of such standard, limitation, or regulation. 42 U.S.C. § 7412(i)(3).

54. Pursuant to Section 112 of the CAA, 42 U.S.C. § 7412, EPA has promulgated regulations that contain general provisions applicable to sources that are subject to the MACT standards. 40 C.F.R. Part 63, Subpart A, §§ 63.1–63.16 ("NESHAPs Subpart A").

55. NESHAPs Subpart A requires that "[a]t all times, including periods of startup, shutdown, and malfunction, the owner or operator must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions." 40 C.F.R. § 63.6(e).

56. NESHAPs Subpart A also requires that "[f]lares shall be used only with the net heating value of the gas being combusted at 11.2 MJ/scm (300 Btu/scf) or greater if the flare is steam-assisted . . . ." 40 C.F.R. § 63.11(b)(6)(ii).

E. FINDINGS OF FACT AND CONCLUSIONS OF LAW

57. At all times relevant to this proceeding, Respondent or its predecessor-in-interest has owned and/or operated the Facility.

58. Respondent is the owner and/or operator of the Facility within the meaning of Sections 111(a)(5) and 112(a)(9), 42 U.S.C. §§ 7411(a)(5) and 7412(a)(9), of the Act and 40 C.F.R. §§ 60.2 and 63.2.

59. At all times relevant to this proceeding, Respondent owned and/or operated units that emit ethylene, propylene, butane, butadiene, and benzene at the Facility.

60. The Facility is a "stationary source" as that term is defined in Sections 111(a)(3) and 112(a)(3) of the Act, 42 U.S.C. §§ 7411(a)(3) and 7412(a)(3), and 40 C.F.R. §§ 60.2 and 63.2.

61. At all times relevant to this proceeding, the Facility was a "major source" within the meaning of the Act's Title V program, Section 501(2) of the Act, 42 U.S.C. § 7661(2), 40 C.F.R § 70.2, and 30 TEX. ADMIN. CODE § 122.10(14).

62. Currently, Harris County, Texas, is classified as a marginal non-attainment zone for the eight-hour ozone standard. *See* 40 C.F.R. § 81.344.

63. The Facility is subject to the CAA Title V Federal Operating Permit program. On or about August 8, 2013, the Texas Commission on Environmental Quality ("TCEQ") issued Respondent Permit No. O1251 (the "Title V Permit"), an air permit issued under the Texas Operating Permit program. This Title V Permit covers various emissions units at the Facility, including the Flare.

64. At the Facility, Respondent utilizes the Flare to control the emission of waste gas from Respondent's propylene manufacturing operation. The Facility's Title V Permit requires, *inter alia*, that Respondent operate the Flare in compliance with certain provisions of NSPS Subpart A (40 C.F.R. Part 60, Subpart A) and NESHAPs Subpart A (40 C.F.R. Part 63, Subpart A).

65. On July 29, 2014, EPA issued an information request regarding the Facility under Section 114 of the Act, 42 U.S.C. § 7414. As part of its response, FHR provided various information regarding the Facility's flaring operations, including but not limited to vent gas and assist steam flow rates, Steam-to-Vent Gas ratio, and vent gas net heating value.

66. Based on its review of the above information and other disclosures made by FHR, EPA identified alleged violations of the CAA at the Flare as described in Section F of this CAFO.

F. ALLEGED VIOLATIONS

Good Air Pollution Control Practices

67. The Flare is subject to 40 C.F.R. §§ 60.11(d) and 63.6(e). Under these regulations, Respondent was and is required, at all times, including periods of startup, shutdown, and malfunction, to the extent practicable, to maintain and operate the Flare in a manner consistent with good air pollution control practice for minimizing emissions.

68. On information and belief, at various times from July 1, 2011, to August 4, 2014, as reflected in the data FHR produced to EPA described in Section E, above, the Flare was operated with an excessively high steam-to-Vent Gas ratio. Upon information and belief, this excessively high steam-to-Vent Gas ratio increased the likelihood of flame quenching and reduced combustion efficiency.

69. On information and belief, at various times from July 1, 2011, to August 4, 2014, as reflected in the data FHR produced to EPA described in Section E, above, the Flare was operated

without a sufficient NHV_{CZ}. Upon information and belief, this insufficient NHV reduced flare combustion efficiency.

70. As referenced above, operation of the Flare by FHR or its predecessor-in-interest with high steam-to-Vent Gas ratios and with an insufficient NHV_{CZ} violated the requirement to operate the Flare in a manner consistent with good air pollution control practices for minimizing emissions, as required by 40 C.F.R. §§ 60.11(d) and 63.6(e).

Combusting Gas with a Net Heating Value of Less than 300 Btu/scf

71. The Flare is subject to 40 C.F.R. §§ 60.18(c)(3)(ii) and 63.11(b)(6)(ii), under which Respondent was and is required to operate the Flare, which is steam-assisted, with the NHV of the gas being combusted at 11.2 MJ/scm (300 Btu/scf) or greater.

72. On information and belief, at various times from July 1, 2011, to August 4, 2014, as reflected in the data FHR produced to EPA described in Section E, Respondent and/or its predecessor-in-interest operated the Flare with the gas being combusted having an NHV of less than 300 BTU/scf.

73. Operation of the Flare with the gas being combusted having an NHV of less than 300 Btu/scf during the periods specified violated 40 C.F.R. §§ 60.18(c)(3)(ii) and 63.11(b)(6)(ii).

G. CIVIL PENALTY AND CONDITIONS OF SETTLEMENT

General

74. For the purpose of this proceeding, as required by 40 C.F.R. § 22.18(b)(2), Respondent:

a. admits that the EPA has jurisdiction over the subject matter alleged in this CAFO;

b. neither admits nor denies the specific factual allegations contained in the CAFO;

c. consents to the assessment of a civil penalty as stated below;

d. consents to the issuance of any specified compliance or corrective action order[1];

e. consents to the conditions specified in this CAFO;

f. consents to any stated Permit Action[2];

g. waives any right to contest the alleged violations set forth in Section F of this CAFO; and

h. waives its rights to appeal the Final Order included in this CAFO.

75. For the purpose of this proceeding, Respondent:

a. agrees that this CAFO states a claim upon which relief may be granted against Respondent;

b. acknowledges that this CAFO constitutes an enforcement action for purposes of considering Respondent's compliance history in any subsequent enforcement actions;

c. waives any and all remedies, claims for relief and otherwise available rights to judicial or administrative review that Respondent may have with respect to any issue of fact or law set forth in this CAFO, including any right of judicial review under Section 307(b)(1) of the CAA, 42 U.S.C. § 7607(b)(1);

d. consents to personal jurisdiction in any action to enforce this CAFO in the United States District Court for the Southern District of Texas;

[1] 40 C.F.R. § 22.18(b)(2) requires that all of the items in Paragraph 75 be included in a CAFO. However sub-bullets d. and f. are not applicable to this case.
[2] *See* previous footnote.

e. waives any right it may possess at law or in equity to challenge the authority of the EPA to bring a civil action in a United States District Court to compel compliance with this CAFO and to seek an additional penalty for such noncompliance, and agrees that federal law shall govern in any such civil action; and

f. agrees that in any subsequent administrative or judicial proceeding initiated by the Complainant or the United States for injunctive relief, civil penalties, or other relief relating to this Facility, Respondent shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim preclusion, claim splitting, or other defenses based on any contention that the claims raised by the Complainant or the United States were or should have been brought in the instant case, except with respect to claims that have been specifically resolved pursuant to this CAFO.

Penalty Assessment and Collection

76. Upon consideration of the entire record herein, including the Findings of Fact and Conclusions of Law, which are hereby adopted and made a part hereof, and upon consideration of the size of the business, the economic impact of the penalty on the business, the Respondent's full compliance history and good faith efforts to comply, the duration of the violation, payment by Respondent of penalties previously assessed for the same violation, the economic benefit of noncompliance, the seriousness of the violation, and other factors as justice may require, EPA has assessed a civil penalty in the amount of **eighty-nine thousand dollars ($89,000)** ("EPA Penalty"). The EPA Penalty has been determined in accordance with the Section 113 of the Act,

42 U.S.C. § 7413, and at no time exceeded EPA's statutory authority. Respondent agrees to pay the EPA Penalty within 30 calendar days of the Effective Date of this CAFO.

77. Respondent agrees to pay the EPA Penalty by cashier's check, certified check, or wire transfer made payable to "Treasurer, United States of America, EPA – Region 6." Payment shall be remitted in one of five (5) ways: (1) regular U.S. Postal Service mail including certified mail; (2) overnight mail; (3) wire transfer; (4) Automated Clearinghouse for receiving US currency; or (5) Online Payment. For regular U.S. Postal Service mail, U.S. Postal Service certified mail, or U.S. Postal Service express mail, payment should be remitted to:

U.S. Environmental Protection Agency
Fines and Penalties
Cincinnati Finance Center
PO Box 979077
St. Louis, MO 63197-9000

For overnight mail (non-U.S. Postal Service, e.g. FedEx), payment should be remitted to:

U.S. Bank
Government Lockbox 979077
U.S. EPA Fines & Penalties
1005 Convention Plaza
SL-MO-C2-GL
St. Louis, MO 63101

Contact: Natalie Pearson
(314) 418-4087

For wire transfer, payment should be remitted to:

Federal Reserve Bank of New York
ABA: 021030004
Account Number: 68010727
SWIFT address: FRNYUS33
33 Liberty Street
New York, NY 10045

Field Tag 4200 of the Fedwire message should read:
"D 68010727 Environmental Protection Agency"

For Automated Clearinghouse (also known as remittance express, or "REX"):

U.S. Treasury REX / Cashlink ACH Receiver
ABA: 051036706
Account Number: 310006, Environmental Protection Agency
CTX Format Transaction Code 22 – checking
Physical location of U.S. Treasury facility:
5700 Rivertech Court
Riverdale, MD 20737

Contact: Jesse White
(301) 887-6548

For Online Payment:

https://www.pay.gov/paygov/
Enter sfo 1.1 in search field
Open form and complete required fields.

PLEASE NOTE: The docket number "CAA-06-2017-3326" should be clearly typed on the check to ensure proper credit. The payment shall also be accompanied by a transmittal letter that shall reference FHR's name and address, the case name, and docket number "CAA-06-2017-3326." FHR's adherence to this request will ensure proper credit is given when penalties are received for the Region.

78. FHR shall also send a simultaneous notice of its payment of the EPA Penalty, including a copy of the money order, or check, and the transmittal letter to the following addresses:

Justin Chen (6EN-AT)
U.S. EPA Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

And

Region 6 Hearing Clerk (6RC-D)
U.S. EPA Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

79. Respondent shall pay the following on any overdue EPA Penalty:

a. Interest. Pursuant to Section 113(d)(5) of the Act, 42 U.S.C. § 7413(d)(5), any unpaid portion of a civil penalty must bear interest at the rates established pursuant to 26 U.S.C. § 6621(a)(2).

b. Nonpayment Penalty. On any portion of a civil penalty more than 90 calendar days delinquent, Respondent must pay a nonpayment penalty, pursuant to Section 113(d)(5) of the Act, 42 U.S.C. § 7413(d)(5), which shall accrue from the date the penalty payment became delinquent, and which shall be in addition to the interest which accrues under subparagraph a. of this paragraph.

80. Respondent shall pay a charge to cover the cost of processing and handling any delinquent penalty claim, pursuant to 42 U.S.C. § 7413(d)(5), including but not limited to attorneys' fees incurred by the United States for collection proceedings.

81. If Respondent fails to timely pay any portion of the penalty assessed under this CAFO, the EPA may:

a. refer the debt to a credit reporting agency, a collection agency, or to the Department of Justice for filing of a collection action in the appropriate United States District Court (in which the validity, amount, and appropriateness of the assessed penalty and of this CAFO shall not be subject to review) to secure payment of the debt, which may include the original penalty, enforcement and collection expenses, nonpayment penalty and interest, 42 U.S.C. § 7413(d)(5) and 40 C.F.R. §§ 13.13, 13.14, and 13.33;

b. collect the above-referenced debt by administrative offset (i.e., the withholding of money payable by the United States to, or held by the United States for, a person to satisfy the debt the person owes the Government), which includes, but is not limited to, referral to the Internal Revenue Service for offset against income tax refunds, 40 C.F.R. Part 13, Subparts C and H; and

c. suspend or revoke Respondent's licenses or other privileges, or suspend or disqualify Respondent from doing business with the EPA or engaging in programs the EPA sponsors or funds, 40 C.F.R. § 13.17.

Conditions of Settlement

82. As Conditions of Settlement, Respondent agrees to the following:

a. Unless a timetable is otherwise specified, FHR shall have completed the installation and commenced operation of the instrumentation, controls, and monitoring systems set forth in Appendix A for the Flare and operate the Flare as required in Appendix A no later than one year from the effective date of this CAFO.

b. Permits Needed to Meet Compliance Obligations. If any compliance obligation under this CAFO requires FHR to obtain federal, state, or local permit or approval, FHR shall submit timely and complete applications and take all other actions necessary to obtain all such permit or approvals.

c. Permits to Ensure Survival of CAFO Limits and Standards. By no later than ninety (90) days after the effective date of this CAFO, FHR shall submit a complete application to the Texas Commission on Environmental Quality ("TCEQ") to incorporate the limits and standards in Appendix A into a non-Title V, federally enforceable permit.

83. At such time as the Respondent believes that it has complied with the requirements of Paragraph 76–78 (payment of EPA Penalty) and that it has achieved compliance with the requirements of Paragraph 82 (Conditions of Settlement), Respondent shall certify to EPA completion of these items and provide any necessary documentation. Respondent represents that

the signing representative will be fully authorized by Respondent to certify that the terms and conditions of this CAFO have been met. The certification should include the following statement:

> "I certify under penalty of law that I have examined and am familiar with the information submitted in this document and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is, to the best of my knowledge, true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fines and imprisonment."

The certification required above shall be sent to:

> Justin Chen
> Enforcement Officer (6EN-AT)
> Air Enforcement Section
> Compliance Assurance and Enforcement Division
> U.S. EPA, Region 6
> 1445 Ross Avenue, Suite 1200
> Dallas, Texas 75202-2733
> Chen.Justin@epa.gov

EPA has 90 days to respond in writing with questions or disagreement that the conditions of the CAFO have been satisfied.

84. The time period from the Effective Date of this CAFO until compliance with the conditions specified in Paragraph 82 and Appendix A have been completed (the "Tolling Period") shall not be included in computing the running of any statute of limitations potentially applicable to any action brought by Complainant on any claims set forth in Section F of this CAFO (the "Tolled Claims"). Respondent shall not assert, plead, or raise in any fashion, whether by answer, motion or otherwise, any defense of laches, estoppel, or waiver, or other similar equitable defense based on – a) the running of any statute of limitations during the Tolling Period; or b) the passage of time during the Tolling Period – in any action brought on the Tolled Claims.

85. The provisions of this CAFO shall apply to and be binding upon Respondent and its officers, directors, employees, agents, trustees, servants, authorized representatives, successors

and assigns. From the Effective Date of this CAFO until the end of the Tolling Period, as set out in Paragraph 84, Respondent must give written notice and a copy of this CAFO to any successors in interest prior to transfer of ownership or control of any portion or interest in the Facility. Simultaneously with such notice, Respondent shall provide written notice of such transfer, assignment, or delegation to the EPA. In the event of any such transfer, assignment or delegation, Respondent shall continue to be bound by the obligations or liabilities of this CAFO until the EPA has provided written approval.

86. By signing this CAFO, Respondent acknowledges that this CAFO will be available to the public and agrees that this CAFO does not contain any confidential business information.

87. By signing this CAFO, the undersigned representative of Complainant and the undersigned representative of Respondent each certify that he or she is fully authorized to execute and enter into the terms and conditions of this CAFO and has legal capacity to bind the party he or she represents to this CAFO.

88. By signing this CAFO, Respondent certifies based on information and belief that the information it has supplied concerning this matter was at the time of submission, and is at the time of signing, true, accurate, and complete for each submission, response, and statement. Respondent acknowledges that there are significant penalties for submitting false or misleading information, including the possibility of fines and imprisonment for knowing submission of such information, under 18 U.S.C. § 1001.

89. Respondent specifically waives its right to seek reimbursement of its costs and attorney's fees under 5 U.S.C. § 504 and 40 C.F.R. Part 17. Except as qualified by Paragraph 80, each party shall bear its own attorney's fees, costs, and disbursements incurred in this proceeding.

H. EFFECT OF CONSENT AGREEMENT AND FINAL ORDER

90. In accordance with 40 C.F.R. § 22.18(c), completion of the terms of this CAFO resolves only Respondent's liability for federal civil penalties for the violations and facts specifically alleged above.

91. Penalties paid pursuant to this CAFO shall not be deductible for purposes of federal taxes.

92. This CAFO constitutes the entire agreement and understanding of the parties and supersedes any prior agreements or understandings, whether written or oral, among the parties with respect to the subject matter hereof.

93. The terms, conditions, and compliance requirements of this CAFO may not be modified or amended except upon the written agreement of both parties and approval of the Regional Judicial Officer.

94. Any violation of the included Final Order may result in a civil judicial action for an injunction or civil penalties of up to $37,500 per day of violation, or both, as provided in Section 113(b)(2) of the Act, 42 U.S.C. § 7413(b)(2), as well as criminal sanctions as provided in Section 113(c) of the Act, 42 U.S.C. § 7413(c). The EPA may use any information submitted under this CAFO in an administrative, civil judicial, or criminal action.

95. Nothing in this CAFO shall relieve Respondent of the duty to comply with all applicable provisions of the Act and other federal, state, or local laws or statutes, nor shall it restrict the EPA's authority to seek compliance with any applicable laws or regulations, nor shall it be construed to be a ruling on, or a determination of, any issue related to any federal, state, or local permit.

96. Nothing herein shall be construed to limit the power of the EPA to undertake any action against Respondent or any person in response to conditions that my present an imminent and substantial endangerment to the public health, welfare, or the environment.

I. EFFECTIVE DATE

97. Respondent and Complainant agree to the issuance of the included Final Order. Upon filing, the EPA will transmit a copy of the filed CAFO to the Respondent. This CAFO shall become effective after execution of the Final Order by the Regional Judicial Officer on the date of filing with the Hearing Clerk.

The foregoing Consent Agreement In the Matter of Flint Hills Resources Houston Chemical, LLC, Docket No. CAA-06-2017-3326, is Hereby Stipulated, Agreed, and Approved for Entry.

FOR RESPONDENT:

Date: 1/16/2017

Denzel W. Wiseman, Jr.
Vice President Operations – Olefins
Flint Hills Resources Houston Chemical, LLC

FOR COMPLAINANT:

Date: 01/18/2017

Stacey B. Dwyer
Acting Director
Compliance Assurance and
Enforcement Division

The foregoing Consent Agreement In the Matter of Flint Hills Resources Houston Chemical, LLC, Docket No. CAA-06-2017-3326, is Hereby Stipulated, Agreed, and Approved for Entry.

FOR RESPONDENT:

Date: 1/16/2017

Denzel W. Wiseman, Jr.
Vice President Operations – Olefins
Flint Hills Resources Houston Chemical, LLC

FOR COMPLAINANT:

Date: _____

Stacey B. Dwyer
Acting Director
Compliance Assurance and
Enforcement Division

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 6
DALLAS, TEXAS

IN THE MATTER OF:	(	DOCKET NO. CAA-06-2017-3326
FLINT HILLS RESOURCES HOUSTON CHEMICAL, LLC	(	
RESPONDENT.	(	

FINAL ORDER

Pursuant to Section 113(d) of the Clean Air Act ("CAA" or the "Act"), 42 U.S.C. §7413(d), and the Consolidated Rules of Practice Governing the Administrative Assessment of Civil Penalties, 40 C.F.R. Part 22, the attached Consent Agreement resolving this matter is incorporated by reference into this Final Order and is hereby ratified.

Respondent is ORDERED to comply with all terms of the Consent Agreement. In accordance with 40 C.F.R. §22.31(b), this Final Order shall become effective upon filing with the Regional Hearing Clerk.

Dated 1/23/17

Regional Judicial Officer
U.S. EPA, Region 6
Thomas Rucki

CERTIFICATE OF SERVICE

I hereby certify that on the 23rd day of January, 2017, the original and one copy of the foregoing Consent Agreement and Final Order was hand-delivered to the Regional Hearing Clerk, U.S. EPA - Region 6, 1445 Ross Avenue, Suite 1200, Dallas, Texas 75202-2733, and a true and correct copy was delivered to the following individual(s) by the method indicated below:

CERTIFIED MAIL - RETURN RECEIPT REQUESTED 70073020000251022186

Denzel W. Wiseman, Jr.
Vice President Operations – Olefins
Flint Hills Resources Houston Chemical, LLC
1330 Lake Robbins Drive, Suite 400
The Woodlands, TX 77380

CERTIFIED MAIL - RETURN RECEIPT REQUESTED 70073020000251022179

Jane E. Schilmoeller
Associate General Counsel
Flint Hills Resources Houston Chemical, LLC
4111 East 37th Street North - T6L
P.O. Box 2917
Wichita KS, 67220

Sandra Hardy

U.S. EPA, Region 6
Dallas, Texas

APPENDIX A

INSTRUMENTATION AND MONITORING SYSTEMS AND FLARE COMBUSTION EFFICIENCY

A1. Flare Data and Monitoring Systems and Protocol Report ("Flare Data and Monitoring Systems and Protocol Report"). For the Flare, by no later than 90 days from the Effective Date of the CAFO, FHR shall submit a report to EPA that includes the following:

a. A detailed description of each instrument and piece of monitoring equipment, including the specific model and manufacturer, that has been or will be installed at the Flare in compliance with Paragraphs A3, A4, and A5 of this Appendix; and

b. A narrative description of the monitoring methods and calculations that FHR shall use to comply with the requirements of Paragraph A10 and the NHV_{CZ} Requirements in this CAFO.

A2. Installation and Operation of Monitoring Systems. By no later than one year from the effective date of this CAFO, FHR shall have completed the installation and commenced the operation of the instrumentation, controls, and monitoring systems set forth in Paragraphs A3–A5 for the Flare.

A3. Vent Gas and Assist Steam Monitoring Systems.

a. FHR shall install, operate, calibrate, and maintain a monitoring system capable of continuously measuring, calculating, and recording the volumetric flow rate of Vent Gas (which includes Waste, Sweep, Purge, and any Supplemental Gas used) in the header or headers that feed the Flare. Different flow monitoring methods may be used to measure different gaseous streams that make up the Vent Gas, provided that the flow rates of all gas streams that contribute to the Vent Gas are determined.

b. FHR shall install, operate, calibrate, and maintain a monitoring system capable of continuously measuring, calculating, and recording the volumetric flow rate of Assist Steam used with the Flare.

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 (i.e., a temperature of 20 °C (68 °F) and a pressure of 1 atmosphere).

d. In lieu of a monitoring system that directly measures volumetric flow rate, FHR 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 FHR converts the mass flow rates to

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

ii. Mass flow monitors may be used for determining the volumetric flow rate of Vent Gas, provided FHR determines the molecular weight of such Vent Gas using compositional analysis data collected pursuant to the monitoring method specified in Paragraph A4.a or A4.b and provided that FHR converts the mass flow rates to volumetric flow rates pursuant to the methodology in Step 2 of Appendix D; 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 FHR complies with the methodology in Step 2 of Appendix D for calculating volumetric flow rates. For Vent Gas, FHR must determine molecular weight using compositional analysis data collected pursuant to the monitoring method specified in Paragraph A4.a or A4.b.

A4. Vent Gas Compositional Monitoring or Direct Monitoring of Net Heating Value of Vent Gas. For the Flare, FHR shall determine the concentration of individual components in the Vent Gas or shall directly monitor the Net Heating Value of the Vent Gas (NHV_{VG}) in compliance with one of the methods specified in Subparagraphs A4.a–A4.c. FHR may elect to use different monitoring methods (of the methods provided in Subparagraphs A4.a–A4.c) for different gaseous 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.

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

b. Install, operate, calibrate, and maintain a calorimeter capable of continuously measuring, calculating, and recording the NHV_{VG} at standard conditions. If FHR elects this method, FHR may, at its discretion, install, operate, calibrate, and maintain a monitoring system capable of continuously measuring, calculating, and recording the hydrogen concentration in the Vent Gas; or

c. 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.

A5. Automated Equipment Controls.

a. Steam Control. FHR shall install, operate, calibrate, and maintain equipment, including main and trim control valves and piping, that enables FHR to control Assist Steam flow in a manner sufficient to ensure compliance with this CAFO.

i. FHR shall install and operate automated controls to automatically adjust the steam flow rates with changes to the Vent Gas flow rates to maintain the steam-to-Vent-Gas mass ratio.

b. Supplemental Gas Control. FHR shall install and operate automated controls of the supplemental gas rate in relation to the vent gas flow rate to ensure compliance with the NHV_{VG} requirement and NHV_{CZ} standard.

A6. Instrumentation and Monitoring Systems: Specifications, Calibration, Quality Control, and Maintenance.

a. The instrumentation and monitoring systems identified in Paragraphs A3 and A4 of this Appendix A shall:

i. Meet or exceed all applicable minimum accuracy, calibration, and quality control requirements specified in Appendix B;

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

iii. Be capable of measuring the appropriate parameter over the range of values expected for that measurement location; and

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

b. FHR shall operate, maintain, and calibrate each instrumentation and monitoring system identified in Paragraphs A3 and A4 according to a continuous parametric monitoring system ("CPMS") monitoring plan that contains the information listed in Appendix C, Paragraph C1.

c. All monitoring systems that fall under the monitoring method in Paragraph A4.a must also meet the requirements of Appendix C, Paragraph C2.

d. For each instrumentation and monitoring system identified in Paragraphs A3 and A4, FHR shall comply with the out-of-control procedures described in Appendix C, Paragraph C3.

e. For each instrumentation and monitoring system identified in Paragraphs A3 and A4, FHR shall comply with the data reduction requirements specified in Appendix C, Paragraph C4.

A7. Instrumentation and Monitoring Systems: Recording and Averaging Times. The instrumentation and monitoring systems identified in Paragraphs A3 and A4 shall be able to produce and record data measurements and calculations for each parameter at the following time intervals.

Instrumentation and Monitoring System	Recording and Averaging Times
Vent Gas (including Waste, Sweep, Purge, and Supplemental) and Assist Steam Flow Monitoring Systems	Measure continuously and record 15-minute block averages
Vent Gas Compositional Monitoring (if using the methodology in Paragraph A4.a)	Measure no less than once every 15 minutes and record that value
Vent Gas Net Heating Value Analyzer (if using the methodology in Paragraph A4.b)	Measure continuously and record 15 minute block averages

Nothing in this Paragraph is intended to prohibit FHR 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 CAFO.

A8. Instrumentation and Monitoring Systems: Operation. Except for periods of Monitoring System Malfunctions, repairs associated with Monitoring System Malfunctions, and required monitoring system quality assurance or quality control activities (including, as applicable, calibration checks and required zero and span adjustments), FHR shall operate each of the instruments and monitoring systems required in Paragraphs A3 and A4 and collect data on a continuous basis at all times the Flare is capable of receiving Sweep, Supplemental, and/or Waste Gas.

A9. General Emission Standards Applicable to Flares. By the Effective Date of the CAFO, FHR shall comply with the requirements set forth in this Paragraph at all times when the Flare is In Operation.

a. Operation during Vent Gas Venting. FHR shall operate the Flare at all times when Vent Gas may be vented to it.

b. Pilot Flame Presence. FHR shall comply with the requirements of the Facility's Title V permit and 40 C.F.R. §§ 60.18(c)(2) and 63.11(b)(5).

c. No Visible Emissions. FHR shall comply with the requirements of the Facility's Title V permit and 40 C.F.R. §§ 60.18(c)(1) and 63.11(b)(4).

d. Flare Tip Velocity. FHR shall comply with the requirements of the Facility's Title V permit and 40 C.F.R. §§ 60.18(c)(3) and 63.11(b)(7).

e. Monitoring According to Applicable Provisions. FHR shall comply with all applicable Subparts of 40 C.F.R. Parts 60, 61, and 63 which state how a particular flare must be monitored.

f. Good Air Pollution Control Practices. At all times, including during periods of Startup, Shutdown, and/or Malfunction, FHR shall implement good air pollution control practices to minimize emissions from each flare.

A10. Net Heating Value of Combustion Zone Gas (NHV_{CZ}). By no later than one year from the effective date of this CAFO, at any time that the Flare is In Operation for at least 15 minutes, FHR shall operate the Flare to maintain the NHV_{CZ} at or above 270 BTU/scf determined on a 15-minute block period basis. FHR shall monitor and calculate NHV_{CZ} in accordance with Appendix D.

A11. Recordkeeping: Timing and Substance. At all times that Paragraph A10 applies, Respondent shall comply with the recordkeeping requirements to calculate and record each of the following parameters:

a. Volumetric flow rates of all gas streams that contribute to the Vent Gas volumetric flow rate (in scfm) (in 15-minute block averages and in accordance with any calculation requirements of Paragraph A4 and Step 2 of Appendix D);

b. Assist Steam volumetric flow rate (in scfm) (in 15-minute block averages and in accordance with any calculation requirements of Paragraph A4 and Step 2 of Appendix D);

c. NHV_{VG} (in BTU/scf) (in 15-minute block averages in accordance with Step 1 of Appendix D);

d. NHV_{CZ} (in BTU/scf) (in 15-minute block averages in accordance with Step 3 of Appendix D).

APPENDIX B

TABLE 1: CALIBRATION AND QUALITY CONTROL REQUIREMENTS FOR CONTINUOUS PARAMETRIC MONITORING SYSTEMS ("CPMS")

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 CPMS 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 280 liters per minute (10 cubic feet per minute), whichever is greater, for gas flow	At least quarterly, inspect all components for leakage, unless the CPMS has a redundant flow sensor.
	±5 percent over the normal range measured for mass flow	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.

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 feet per second) ±5 percent of flow rate at velocities greater than 0.3 meters per second (1 feet 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 CPMS 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 straightline (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.
		At least quarterly, inspect all components for integrity, all electrical connections for continuity, and all mechanical connections for leakage, unless the CPMS 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 your site-specific CPMS monitoring plan. Calibration requirements should follow manufacturer's recommendations at a minimum. Temperature control (heated and/or cooled 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 can be used (rather than triplicate analysis), the multi-point calibration can be conducted quarterly (rather than monthly), and the sampling line 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 your site specific CPMS monitoring plan. Calibration requirements should follow manufacturer's recommendations at a minimum.
		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.

APPENDIX C

ADDITIONAL CPMS REQUIREMENTS

C1. Continuous Parametric Monitoring System ("CPMS") Monitoring Plan. FHR shall develop and implement a CPMS quality control program documented in a CPMS monitoring plan that covers the Flare and each CPMS installed to comply with the provisions of this settlement. FHR shall have the CPMS monitoring plan readily available on-site at all times and shall submit a copy of the CPMS monitoring plan to the Administrator upon request by the Administrator. The CPMS monitoring plan must contain the information listed in Subparagraphs C1.a–d below.

a. Identification of the parameter to be monitored by the CPMS and the expected parameter range, including worst case and normal operation.

b. Description of the monitoring equipment, including the information specified in Subparagraphs C1.b.i–vii below.

   i. Manufacturer and model number for all monitoring equipment components installed in compliance with applicable provisions of this CAFO.

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

   iii. The location of the CPMS sampling probe or other interface and a justification of how the location meets the requirements of Appendix B, Table 1.

   iv. Placement of the CPMS readout, or other indication of parameter values, indicating how the location is readily accessible onsite for operational control or inspection.

   v. Span of the CPMS. The span of the CPMS sensor and analyzer must encompass the full range of all expected values.

   vi. How data outside of the span of the CPMS will be handled and the corrective action that will be taken to reduce and eliminate such occurrences in the future.

   vii. 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.

c. Description of the data collection and reduction systems, including the information specified in Subparagraphs C1.c.i–iii below.

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 CPMS 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 CPMS 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 when the averages calculated as specified in paragraph C2 of this section are determined.

d. Routine quality control and assurance procedures, including descriptions of the procedures listed in Subparagraphs C1.d.i–vi and a schedule for conducting these procedures. The routine procedures must provide an assessment of CPMS performance.

i. Initial and subsequent calibration of the CPMS and acceptance criteria.

ii. Determination and adjustment of the calibration drift of the CPMS.

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

iv. Preventive maintenance of the CPMS, including spare parts inventory.

v. Data recording, calculations and reporting.

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

C2. Flare Monitoring System Requirements: Additional Requirements for Gas Chromatographs. For monitors used to determine compositional analysis for net heating value, the gas chromatograph must also meet the requirements of Subparagraphs C2.a–c below.

a. The quality assurance requirements are in Appendix B, Table 1.

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

i. FHR must use a calibration gas or multiple gases that include all of compounds listed in Subparagraphs C2.b.i.(A)–(K) below that may be reasonably expected to exist in the flare gas stream and optionally include any of the compounds listed in Subparagraphs C2.b.i.(L)–(O) below. All of the calibration gases may be combined in one cylinder. If multiple calibration gases are necessary to cover all compounds, FHR must calibrate the instrument on all of the gases.

(A) Hydrogen.

(B) Methane.

(C) Ethane.

(D) Ethylene.

(E) Propane.

(F) Propylene.

(G) n-Butane.

(H) iso-Butane.

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

(J) 1,3-Butadiene. It is not necessary to separately speciate butadiene isomers, but you must use the response factor and net heating value of 1,3-butadiene for co-eluting butadiene isomers.

(K) n-Pentane. Use the response factor for n-pentane to quantify all C5+ hydrocarbons.

(L) Acetylene (optional).

(M) Carbon monoxide (optional).

(N) Propadiene (optional).

(O) Hydrogen sulfide (optional).

ii. FHR 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, FHR must calibrate the instrument on all of the gases.

c. If FHR chooses to use a surrogate calibration gas under Subparagraph C2.b.ii, FHR must comply with Subparagraphs C2.c.i–ii below.

i. 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.

ii. Use the response factor for n-pentane to quantify unknown components detected in the analysis that elute after n-pentane.

C3. Out-of-Control Periods. For each CPMS installed and operated to comply with the provisions set forth in Appendix A, FHR shall comply with the out-of-control procedures described in Subparagraphs C3.a–b below.

a. A CPMS 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 Appendix B.

b. When the CPMS is out of control, FHR shall take the necessary corrective action and repeat all necessary tests that indicate the system is out of control. FHR shall take corrective action and conduct retesting until 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. FHR shall not use data recorded during periods the CPMS is out of control in data averages and calculations, used to report emissions or operating levels, as specified in Subparagraph C4.c below.

C4. CPMS Data Reduction. FHR shall reduce data from a CPMS installed and/or operated to comply with this CAFO as specified in Subparagraphs C4.a–c below.

a. FHR may round the data to the same number of significant digits used in that 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 must not be included in the 15-minute block averages.

c. Periods when the CPMS is out of control must not be included in the 15-minute block averages.

APPENDIX D

CALCULATING NET HEATING VALUE OF THE COMBUSTION ZONE GAS (NHV_{CZ})

All abbreviations, constants, and variables are defined in the Key on Page 5 of this Appendix D.

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

FHR 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 FHR monitors separate gas streams that combine to comprise the total vent gas flow to the 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 FHR complies with Paragraph A4 of Appendix A by collecting compositional analysis data in accordance with the method set forth in A4.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 D.

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

For any gas stream for which FHR complies with Paragraph A4 of Appendix A by collecting direct Net Heating Value monitoring data in accordance with the method set forth in Paragraph A4.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 FHR complies with Paragraph A4 of Appendix A by collecting direct Net Heating Value monitoring data in accordance with the method set forth in Paragraph A4.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 the Flare, if FHR complies with Paragraph A4 by using a continuous monitoring system in accordance with the method set forth in A4.a or A4.b: FHR 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). For the Flare, FHR must elect one calculation method that will apply at all times, and use that method for all continuously monitored flare vent streams associated with the Flare. If FHR intends to change the calculation method that applies to the Flare, FHR must notify the EPA 30 days in advance of such a change.

(1) Feed-Forward Calculation Method. When calculating NHV_{VG} for a specific 15-minute block:

A. 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.

B. 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.

C. 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.

(2) Direct Calculation Method. When calculating NHV_{VG} for a specific 15-minute block:

A. 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.

B. 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

FHR 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 FHR complies with Paragraph A3 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 FHR complies with Paragraph A3 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, premix 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 FHR elects to use a mass flow monitor to determine volumetric flow rate of Vent Gas, FHR must collect compositional analysis data for such Vent Gas in accordance with the method set forth in A4.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 FHR complies with Paragraph A3 by using a 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 A7.a.

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

If, at the Flare: 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, the Company may elect to either: a) use annual or more frequent grab sampling at any one representative location; or b) assume a Net Heating Value of 920 BTU/scf.

If Equation 4 is not used: 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: 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 6 shows this relationship.

$$NHV_{CZ} \geq 270\ BTU/scf \qquad \textit{Equation 6}$$

Key to the Abbreviations:

385.3 = *conversion factor (scf/lb-mol)*
i = *individual component in Vent Gas (unitless)*
MWt = *molecular weight of the gas at the flow monitoring location (lb/lb−mol)*
n = *number of components in Vent Gas (unitless)*
NHV_{CZ} = *Net Heating Value of Combustion Zone Gas (BTU/scf)*
NHV_i = *Net Heating Value of component i according to Table 1 of this Appendix (BTU/scf)*
$NHV_{measured}$ = *Net Heating Value of Vent Gas stream as measured by monitoring system (BTU/scf)*
NHV_{NG} = *Net Heating Value of Supplemental Gas to flare during the 15 – minute block period (BTU/scf)*
NHV_{VG} = *Net Heating Value of Vent Gas (BTU/scf)*
$Q_{a,premix}$ = *cumulative vol flow of premix assist air during the 15 – minute block period (scf)*
Q_{mass} = *massflow rate (pounds per second)*
Q_{NG1} =
cumulative vol flow of Supplemental Gas (measured as total natural gas flow to the flare) to flare during previous 15 – minute block period (scf)
Q_{NG2} =
cumulative vol flow of Supplemental Gas (measured as total natural gas flow to the flare) 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)*
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 Agreement, 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 vent gas 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.