



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

1 1 AUG 2016

CERTIFIED MAIL - RETURN RECEIPT REQUESTED: 7006 0810 0005 9535 8946

Brett Sago
Director, HSE Legal Services
Eastman Chemical Company
P.O. Box 431
Kingsport, Tennessee 37660

RE: Complaint and Consent Agreement and Final Order - Docket Number CAA-06-2016-3396

Dear Mr. Sago,

Please find enclosed the above referenced finalized Consent Agreement and Final Order (CAFO) regarding Eastman Chemical Texas City, Inc.'s (ECTC) facility in Texas City, Texas.

ECTC will have thirty (30) calendar days from the effective date of the CAFO to pay the civil penalty of twenty eight thousand five hundred dollars (\$28,500).

If you have any questions, please feel free to contact me at (214) 665-7166. Thank you for your assistance with this matter.

Sincerely,

A handwritten signature in black ink, appearing to read "Leonard E. Schilling Jr.", written over a horizontal line.

Leonard E. Schilling Jr.
Office of Regional Counsel
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, Texas 75202
(214) 665-7166

Enclosure

3. Respondent Eastman Chemical Texas City, Inc. (“ECTC”) is a corporation doing business in the state of Texas. Respondent is a “person” as defined in Section 302(e) of the Act, 42 U.S.C. § 7602(e).

4. As described more fully herein, Complainant alleges that Respondent violated 40 C.F.R. §§ 60.11(d), 60.18(c)(3)(ii), 60.18 (d), 63.6(e), 63.11(b)(1), and 63.11(b)(6)(ii) at its acetic acid manufacturing plant flare 50Z501 (the “Acetic Acid Flare”) located at 201 Bay Street South, Texas City, Texas 77592 (the “Facility”).

5. 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.

6. Respondent fully cooperated with EPA in this matter and has been proactive in improving the monitoring and operation of the Acetic Acid Flare. In 2013, and prior to Complainant initiating in the fourth quarter of 2014 the enforcement giving rise to this CAFO, ECTC prepared a flare management plan that, among other things, outlines the operating parameters necessary for the Acetic Acid Flare to meet the flare requirements in 40 C.F.R. §§ 60.18 and 63.11, and the visible emissions requirements in 30 T.A.C. §111.111. That same year, ECTC began engineering improvements to the Acetic Acid Flare.

7. In the second quarter of 2014, ECTC completed a flare training course regarding, among other things, the operation of steam-assisted flares, the effect of steam on flare combustion efficiency and how to recognize when steam-assisted flares are over- or under-assisted. The ECTC representatives responsible for operating the Acetic Acid Flare were required to complete this training in 2014 and 2015.

8. In May and December 2014, Respondent installed, and thereafter operated, the following capital improvements at the Acetic Acid Flare costing approximately \$1 million:

- a. Minimum steam flow controller and low-range steam flow meter;
- b. Assist steam flow controller and 500 pounds per hour steam flow meter;
- c. Insulated steam lines;
- d. Larger natural gas piping and control valve;
- e. British Thermal Unit (“Btu”) analyzer on vent gas;
- f. Ultrasonic flow meter on vent gas;
- g. Btu Combustion Zone Control, including:
 - i. Adjustable natural gas flow to meet the Btu set point, and
 - ii. Calculation of combustion zone Btu based on the analyzed flare header Btu, measured flare flow, and measured steam flow; and an
 - iii. Automated system to link the addition of steam and natural gas to real-time vent gas Btu/flow data.

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 the general public has access.

14. "Assist Steam" shall mean all steam that intentionally is introduced prior to or at the Acetic Acid Flare tip through nozzles or other hardware conveyance for the purposes including, but not limited to, protecting the design of the Acetic Acid 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.

15. "Center Steam" shall mean the portion of Assist Steam introduced into the stack of the Acetic Acid Flare to reduce burnback.

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

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

18. "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, ECTC 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 (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;
- 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.

19. "Net Heating Value" shall mean the energy released as heat when a compound undergoes complete combustion with oxygen to form gaseous carbon dioxide and gaseous water.

20. "Net Heating Value of Combustion Zone Gas" or " NHV_{cz} " shall mean the Net Heating Value, in BTU/scf, of the Combustion Zone Gas in the Acetic Acid Flare. The NHV_{cz} shall be calculated in accordance with Step 3 of Appendix A of this CAFO.

21. “Net Heating Value of Vent Gas” or NHV_{vg} shall mean the Net Heating Value, in BTU/scf, of the Vent Gas directed to the Acetic Acid Flare. NHV_{vg} shall be calculated in accordance with Step 1 (which includes Steps 1.a. and 1.b.) of Appendix A of this CAFO.

22. “Pilot Gas” shall mean gas introduced into the Acetic Acid Flare tip that provides a flame to ignite the Vent Gas.

23. “Supplemental Gas” shall mean all gas introduced to the Acetic Acid Flare in order to improve the combustible characteristics of Combustion Zone Gas.

24. “Sweep Gas” shall mean the minimum amount of gas introduced into the Acetic Acid 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 Acetic Acid Flare tip.

25. “Total Steam” shall mean the total of all steam that is supplied to the Acetic Acid Flare and includes, but is not limited to, Lower Steam, Center Steam, and Upper Steam.

26. “Upper Steam” shall mean the portion of Assist Steam introduced via nozzles located on the exterior perimeter of the upper end of the Acetic Acid Flare tip.

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

28. “Waste Gas” shall mean the mixture of all gases from the facility operations that is directed to the Acetic Acid Flare for the purpose of disposing of the gas. “Waste Gas” does not include gas introduced to the Acetic Acid 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 that is necessary to perform the functions of Sweep Gas. "Waste Gas" also does not include the minimum amount of gas introduced to the Acetic Acid 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

29. 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.

30. 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.

31. The New Source Performance Standards are located in Part 60 of Title 40 of the Code of Federal Regulations.

32. Pursuant to Section 111(b)(1)(B) of the CAA, 42 U.S.C. § 7411(b)(1)(B), EPA 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").

33. 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.

34. 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).

35. NSPS Subpart A requires that “[o]wners or operators of flares used to comply with the provision of this subpart shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs.” 40 C.F.R. § 60.18(d).

36. 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

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

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

39. Congress further directed EPA to promulgate regulations establishing emission standards for each category or subcategory of, *inter alia*, major sources of HAPs. 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. 42 U.S.C. § 7412(d)(2).

40. 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. 42 U.S.C. § 7412(h).

41. 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.

42. 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).

43. Pursuant to Section 112 of the CAA, 42 U.S.C. § 7412, EPA 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”).

44. 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).

45. NESHAPs Subpart A requires that “[o]wners or operators using flares to comply with the provisions of this part shall monitor these control devices to assure that they are operated and maintained in conformance with their designs.” 40 C.F.R. § 63.11(b)(1).

46. 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

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

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

49. At all times relevant to this proceeding, Respondent owned and/or operated units that emit methanol at the Facility.

50. 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), 7412(a)(3), and 40 C.F.R. §§ 60.2 and 63.2.

51. 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).

52. The Facility is subject to the CAA Title V Federal Operating Permit program. On or about October 17, 2008, the Texas Commission on Environmental Quality (“TCEQ”) issued Respondent Permit No. O1400 (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 Acetic Acid Flare. The TCEQ renewed ECTC’s Title V permit on February 19, 2014.

53. At the Facility, the Respondent utilizes the Acetic Acid Flare to, under certain circumstances, control the emission of waste gas from Respondent’s acetic acid manufacturing operation. The Facility’s Title V Permit requires, *inter alia*, that the Respondent operate the Acetic Acid 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).

54. In 2009, EPA issued an information request to ECTC’s predecessor in interest, Sterling Chemicals, Inc. (“Sterling”), under Section 114 of the Act, 42 U.S.C. § 7414. In 2013, EPA issued an information request to ECTC under this same section. As part of their responses, Sterling and then ECTC, provided various information regarding the Facility’s flaring operations, including but not limited to vent gas and assist steam flow rates, and vent gas net heating value. In 2011, ECTC’s parent company purchased Sterling and thereafter changed the entity’s name to ECTC. For the purposes of this CAFO, Sterling and ECTC are collectively referred to as ECTC.

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

F. ALLEGED VIOLATIONS

Good Air Pollution Control Practices/Operation and Maintenance in Conformance with Design

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

57. The Acetic Acid Flare is subject to 40 C.F.R. §§ 60.18(d) and 63.11(b)(1) under which ECTC was and is required to monitor the Acetic Acid Flare to assure it is operated and maintained in conformance with its design.

58. On information and belief, at various times during the period reflected in the data ECTC produced to EPA described in Section E, above, ECTC operated the Acetic Acid Flare without a sufficient Net Heating Value ("NHV") in the Combustion Zone Gas. Upon information and belief, this insufficient NHV reduced flare combustion efficiency.

59. On information and belief, at various times during the period reflected in the data ECTC produced to EPA described in Section E, above, ECTC operated the Acetic Acid Flare with a high Total Steam to Vent Gas ratio ("S/VG"). Upon information and belief, this high S/VG increased the likelihood of flame quenching and reduced combustion efficiency.

60. On information and belief, during the period reflected in the data ECTC produced to EPA described in Section E, above, ECTC did not have installed a Btu analyzer or have in place other methods that would enable ECTC to accurately calculate the NHV in the Combustion Zone Gas at the Acetic Acid Flare. In addition, ECTC did not have sufficient supplemental gas available to compensate for the available steam flows to the Acetic Acid Flare.

61. On information and belief, during the period reflected in the data ECTC produced to EPA described in Section E, above, ECTC did not have installed a Vent Gas flow monitor and accurate steam monitor; did not calculate S/VG; and did not have sufficient controls on steam flow to maintain an S/VG that minimized emissions.

62. As referenced above, ECTC's operation of the Acetic Acid Flare:

- a. with an insufficient NHV in the Combustion Zone Gas,
- b. with high S/VG,
- c. without a Btu analyzer or other method to accurately calculate NHV in the Combustion Zone Gas,
- d. without sufficient supplemental gas available,
- e. without monitors to measure and/or calculate S/VG, and
- f. without sufficient controls on its steam to optimize the steam injection rate

violated the requirement to operate the Acetic Acid Flare in a manner consistent with good air pollution control practices for minimizing emissions in 40 C.F.R. §§ 60.11(d) and 63.6(e).

63. ECTC's operation of the Acetic Acid Flare as described above also violated the requirement to monitor the Acetic Acid Flare to assure it is operated and maintained in conformance with its design in 40 C.F.R. §§ 60.18(d) and 63.11(b)(1).

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

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

65. On information and belief, on the following dates ECTC operated the Acetic Acid Flare while the gas being combusted had a net heating value of less than 11.2 MJ/scm (300 Btu/scf):

Date/Time	Approximate Btu/scf
12/13/2011 19:00	294
9/20/2012 15:00	273
2/20/2013 2:00	228
2/20/2013 3:00	233
2/20/2013 4:00	287
2/20/2013 5:00	176

66. ECTC's operation of the Acetic Acid Flare with the gas being combusted having a net heating value of less than 11.2 MJ/scm (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

67. 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

¹ 40 C.F.R. § 22.18(b)(2) requires that all of the items in section 67 be included in a CAFO. However sub-bullets d and f are not applicable to this case.

- 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.

68. 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 Clean Air Act, 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;
- 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 the United States District Court for the Southern District of Texas to compel compliance with this

² See previous footnote.

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

69. 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 the violator 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, including Respondent's agreement to perform the additional conditions of settlement and Supplemental Environmental Project ("SEP") set forth below, EPA has assessed a civil penalty in the amount of **Twenty Eight Thousand Five Hundred Dollars (\$28,500)** ("EPA Penalty"). The EPA Penalty has been determined in accordance with Section 113 of the

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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.

70. 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) On Line 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), 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"

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

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 On Line 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-06-2016-3396 should be clearly typed on the check to ensure proper credit. The payment shall also be accompanied by a transmittal letter that shall reference ECTC's name and address, the case name, and docket number CAA-06-2016-3396. ECTC's adherence to this request will ensure proper credit is given when penalties are received for the Region.

71. ECTC 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:

Margaret Osborne
Chief, Air Toxics Section (6EN-AT)
Compliance Assurance and Enforcement Division
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

72. 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.

73. 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.

74. 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

75. Respondent agrees that, no later than one hundred twenty (120) days after the Effective Date of this CAFO, Respondent shall comply with the following requirements at the Acetic Acid Flare:

- a. Net Heating Value of Combustion Zone Gas (NHV_{cz}). ECTC shall operate the Acetic Acid Flare to maintain the NHV_{cz} at or above 270 Btu/scf determined on a 15-minute block period basis at all times when waste gas is vented to the Acetic Acid Flare. ECTC shall utilize the equations and directives set forth in Appendix A to meet the requirements of this Subparagraph 75.a.
- b. Hydrogen Monitoring System. ECTC may, in its sole discretion, install, operate and maintain a monitoring system capable of continuously (i.e. at least once every 15 minutes) measuring, calculating, and recording the hydrogen concentration in the flare vent gas.

- c. Monitoring System Malfunction. Except for periods of Monitoring System Malfunctions, repairs associated with Monitoring System Malfunctions, required maintenance, and required monitoring system quality assurance or quality control activities (QA/QC activities) (including, as applicable, calibration checks and required zero and span adjustments), ECTC shall operate the steam flow meters, vent gas flow meter, BTU analyzer, and hydrogen monitoring system described in Paragraphs 8 and 75.b. and collect data on a continuous basis at all times when the Acetic Acid Flare is receiving Waste Gas. The periods described above shall not exceed 5% of the time that the Acetic Acid Flare is in operation and receiving Waste Gas averaged over a rolling 12 month period.
- d. Permits Needed to Meet Compliance Obligations. If any compliance obligation under this CAFO requires ECTC to obtain federal, state, or local permit or approval, ECTC shall submit timely and complete applications and take all other actions necessary to obtain all such permit or approvals.
- e. Permits to Ensure Survival of CAFO Limits and Standards. By no later than ninety (90) days after the effective date of this CAFO, ECTC shall submit a complete application to the TCEQ requesting to incorporate the limits and standards in Paragraphs 75.a.-c. into a non-Title V, federally enforceable permit.

76. At such time as the Respondent believes that it has complied with the requirements of Paragraphs 69-74 (payment of EPA Penalty), that it has achieved initial compliance with the requirements of Paragraph 75 (Conditions of Settlement), and that it has satisfactorily completed the Supplemental Environmental Project in Paragraphs 85-86 and Appendix B, 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:

Margaret Osborne
Chief, Air Toxics Section (6EN-AT)
Compliance Assurance and Enforcement Division
U.S. EPA, Region 6
1445 Ross Avenue Suite 1200
Dallas, TX 75202-2733

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

77. The time period from the Effective Date of this CAFO until initial compliance with the conditions specified in Paragraph 75 and the Supplemental Environmental Project in Paragraphs 85-86 and Appendix B is 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 the running of any statute of limitations or the passage of time during the Tolling Period in any action brought on the Tolled Claims.

78. The provisions of this CAFO shall apply to and be binding upon Respondent and its officers, directors, employees, agents, authorized representatives, successors and assigns. From the Effective Date of this CAFO until the end of the Tolling Period, as set out in Paragraph 77, 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.

79. 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.

80. 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.

81. By signing this CAFO, both parties agree that each party's obligations under this CAFO constitute sufficient consideration for the other party's obligations. Additionally, both parties agree that Complainant's covenant not to sue Respondent (stated in Paragraph 96)

during the time period between the issuance of the attached Final Order and the deadline stated in Paragraph 88 constitutes sufficient consideration for Respondent's obligation to completely perform the Conditions of Settlement described in Paragraph 75 and the Supplemental Environmental Project described in Paragraphs 85-86 and Appendix B, regardless of whether the covenant not to sue subsequently terminates.

82. 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.

83. 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 73, each party shall bear its own attorney's fees, costs, and disbursements incurred in this proceeding.

H. SUPPLEMENTAL ENVIRONMENTAL PROJECT

84. Respondent shall undertake the following SEP, which the parties agree is intended to secure significant environmental or public health protection and improvements.

85. Within three hundred sixty five (365) days from the effective date of this CAFO, Respondent will complete construction of the alternate acetic acid scrubber feed at the Facility as described in the SEP Scope of Work in Appendix B.

86. Respondent's total expenditure for the SEP shall be no less than Sixty-Four Thousand, One Hundred Dollars (\$64,100).

87. Respondent hereby certifies based on information and belief formed after reasonable inquiry that:

- a. All cost information provided to the EPA in connection with EPA's approval of the SEP is complete and accurate and that Respondent in good faith estimates that its cost to implement the SEP is Sixty-Four Thousand, One Hundred Dollars (\$64,100).
- b. As of the effective date of this CAFO, Respondent is not required to perform or develop the SEP by any federal, state, or local law or regulation and is not required to perform or develop the SEP by agreement, grant, or as injunctive relief awarded in any other action in any forum;
- c. The SEP is not a project that Respondent was planning or intending to construct, perform, or implement other than in settlement of the claims resolved in this CAFO;
- d. Respondent has not received and will not receive credit for the SEP in any other enforcement action;
- e. Respondent will not receive reimbursement for its portion of the SEP from another person or entity;
- f. For federal income tax purposes, Respondent agrees that it will neither capitalize into inventory or basis nor deduct any costs or expenditures incurred in performing the SEP;
- g. Respondent is not a party to any open federal financial assistance transaction that is funding or could fund the same activity as the SEP; and

h. Respondent has inquired of the SEP recipient and/or SEP implementer (if applicable) whether either is a party to an open federal financial assistance transaction that is funding or could fund the same activity as the SEP and has been informed by the recipient and/or the implementer (if applicable) that neither is a party to such a transaction.

88. No later than sixty (60) days after it has completed construction of the alternate acid scrubber feed as described in Paragraphs 85-86 above and Appendix B of this CAFO, Respondent shall submit a Final SEP Completion Report. The Final SEP Completion Report shall contain the following information: (i) a detailed description of the SEP as implemented, (ii) a certification that the SEP has been fully implemented pursuant to the provisions of this CAFO with itemized final costs and copies of receipts for all expenditures, (iii) a certification upon completion of the SEP that the Respondent has not deducted the SEP from its income taxes, and (iv) a description of the environmental, emergency preparedness, and/or public health benefits resulting from implementation of the SEP.

89. In itemizing its costs in the Final SEP Completion Report, Respondent shall clearly identify and provide acceptable documentation for all eligible costs. For purposes of this Paragraph, "acceptable documentation" includes invoices, purchase orders, or other documentation that specifically identifies and itemizes the individual costs of the goods and/or services for which payment is being made. Canceled drafts do not constitute acceptable documentation unless such drafts specifically identify and itemize the individual costs of the goods and/or services for which payment is being made.

90. Respondent shall, by its representative who is fully authorized by Respondent to legally commit and bind Respondent, sign and certify under penalty of law that the information

contained in the Final SEP Completion Report is true, accurate, and complete, by signing the following statement:

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

The Final SEP Completion Report shall be sent to:

Margaret Osborne
Chief, Air Toxics Section (6EN-AT)
Compliance Assurance and Enforcement Division
U.S. EPA, Region 6
1445 Ross Avenue Suite 1200
Dallas, TX 75202-2733

91. After receipt of the Final SEP Completion Report described above, EPA will notify Respondent, in writing within ninety (90) days, regarding: (a) any deficiencies in the SEP Completion Report itself along with a grant of an additional thirty (30) days, from receipt of that notification, for Respondent to correct any deficiencies in the SEP Completion Report; or (b) indicate that EPA concludes that the project has been completed satisfactorily; or (c) determine that the project has not been completed satisfactorily.

92. If Respondent fails to comply with any of the terms or provisions of this CAFO relating to performance of the SEP and/or to the extent ECTC's actual expenditures for the SEP do not equal or exceed its estimated cost for the SEP, Respondent shall be liable for stipulated penalties according to the provisions set forth below:

- a. Except as provided in subparagraphs (b)-(f) below, for a SEP which has not been completed satisfactorily pursuant to this CAFO, Respondent shall pay a stipulated penalty to the United States in the amount of \$79,500.

- b.If the SEP is not completed in accordance with Paragraphs 85-86 and Appendix B, but the Complainant determines that the Respondent: a) made good faith and timely efforts to complete the project; and b) certifies, with supporting documentation, that at least 90 percent of the amount of money which was required to be spent was expended on the SEP, Respondent shall not be liable for any stipulated penalty.
- c.If the SEP is completed in accordance with Paragraphs 85-86 and Appendix B, but the Respondent spent less than 90 percent of the amount of money required to be spent for the project, Respondent shall pay a stipulated penalty to the United States in the amount of the difference between \$57,690 (i.e. 90% of \$64,100) and the amount spent on the SEP.
- d.If the SEP is completed in accordance with Paragraphs 85-86 and Appendix B, and the Respondent spent at least 90 percent of the amount of money required to be spent for the project, Respondent shall not be liable for any stipulated penalty.
- e.If the Respondent fails to timely complete the SEP for any reason, the respondent shall pay the stipulated penalties shown below. Respondent's stipulated penalties for failure to timely complete the SEP shall not exceed \$79,500.

<u>Penalty Per Day</u>	<u>Period of Noncompliance</u>
\$250	1st through 14th day
\$500	15th through 30th day
\$750	31st day and beyond

f. For failure to timely submit the SEP Final Completion Report required by Paragraphs 88-90 above, Respondent shall pay stipulated penalties as follows:

<u>Penalty Per Day</u>	<u>Period of Noncompliance</u>
\$100	1st through 14th day
\$250	15th through 30th day
\$500	31st day and beyond

93. The determination of whether the SEP has been satisfactorily completed and whether Respondent has made a good faith, timely effort to implement the SEP shall be at the sole, reasonable discretion of EPA.

94. Nothing herein shall obligate Respondent to publicize its involvement in the SEP; however, any public statement, oral or written, made by Respondent to publicize its participation in SEP activities shall include the following language: "This project was undertaken in connection with the settlement of an enforcement action taken by the U.S. Environmental Protection Agency for violations of the Clean Air Act and the regulations promulgated thereunder."

I. EFFECT OF CONSENT AGREEMENT AND FINAL ORDER

95. In accordance with 40 C.F.R. § 22.18(c), this CAFO resolves only Respondent's liability for federal civil penalties for the violations alleged in Section F and the facts that form the basis for those alleged violations.

96. Complainant covenants not to sue Respondent for injunctive or other equitable relief for the violations and facts alleged in this matter, but such covenant terminates if and when Respondent fails to timely and satisfactorily complete every condition stated in Paragraph

75 and the Supplemental Environmental Project described in Paragraphs 85-86 and Appendix B (including payment of any stipulated penalties owed). The covenant not to sue becomes permanent upon satisfactory performance of the conditions of this CAFO. If and when the covenant terminates, Complainant may compel Respondent to perform the conditions in Paragraph 75, seek civil penalties that accrue from the Effective Date of this CAFO until compliance is achieved, and seek other relief in a civil judicial action pursuant to the Clean Air Act, pursuant to contract law, or both.

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

98. 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.

99. The material 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. The correction of errors and other non-substantive changes are not material terms and may be modified by written agreement of the parties.

100. 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.

101. 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.

102. 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 may present an imminent and substantial endangerment to the public health, welfare, or the environment

J. EFFECTIVE DATE

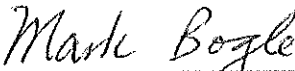
103. Respondent and Complainant agree to the issuance of the included Final Order. Upon filing the EPA will transmit a copy of the filed CAFO to the Respondent. This CAFO shall become effective after execution of the Final Order by the Regional Judicial Officer on the date of filing with the Hearing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

Re: Eastman Chemical
CAA-06-2016-3396

The foregoing Consent Agreement In the Matter of Eastman Chemical Texas City, Inc., Docket No. CAA-06-2016-3396, is Hereby Stipulated, Agreed, and Approved for Entry.

FOR RESPONDENT:

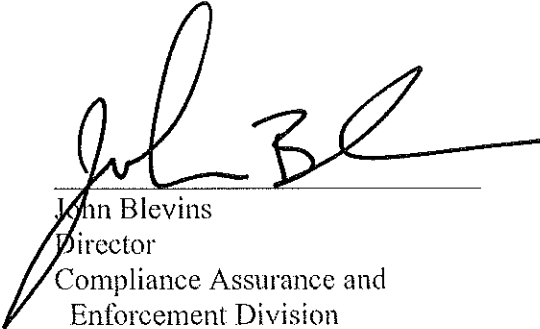
Date: 8/1/16



Mark Bogle, Vice President
Eastman Chemical Texas City, Inc.
P.O. Box 7444
Longview, Texas 75607-7444

FOR COMPLAINANT:

Date: 8.2.16



John Blevins
Director
Compliance Assurance and
Enforcement Division

CERTIFICATE OF SERVICE

I hereby certify that on the 11th day of August, 2016, 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 7006 0810 0005 9535 8939

Mark Bogle, Vice President
Eastman Chemical Texas City, Inc.
P.O. Box 7444
Longview, Texas 75607-7444

CERTIFIED MAIL - RETURN RECEIPT REQUESTED 7006 0810 0005 9535 8946

Brett Sago, Director, HSE Legal Services
Eastman Chemical Company
P.O. Box 511
Kingsport, Tennessee 37662

Sandra Hardy

U.S. EPA, Region 6
Dallas, Texas

APPENDIX A

Calculating Net Heating Value of the Combustion Zone Gas

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

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

ECTC 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 ECTC monitors separate gas streams that combine to comprise the total vent gas flow to the Acetic Acid 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 ECTC operates 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: Equation 1 shall be used to determine the NHV_{vg} of a specific sample by summing the Net Heating Value for each individual component by individual component volume fractions. Individual component Net Heating Values are listed in Table 1 of this Appendix.

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

For any gas stream for which ECTC operates a calorimeter capable of continuously measuring, calculating, and recording the NHV_{vg} at standard conditions 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 ECTC operates a calorimeter capable of continuously measuring, calculating, and recording the NHV_{vg} at standard conditions 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 Agreement, a Net Heating Value of 1,212 Btu/scf may be used (1,212 – 274 = 938 BTU/scf).

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

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

- (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 flare 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 flare 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 flare Vent Gas steams. 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.

Note: ECTC is required to use the NHV_{vg} going into the flare in one 15-minute period to adjust the assist media (i.e., steam) and/or supplemental gas in the next 15-minute period, as necessary for the equation to calculate an NHV_{cz} limit of 270 Btu/scf or greater. In the event that an instantaneous NHV_{cz} based on the compositional analysis and the flow rates is below 270 Btu/scf, that is not a deviation of the operating limit. Rather, ECTC is only required to make operational adjustments based on that information to achieve, at a minimum, the net hearing value limit for the subsequent 15-minute block average.

- (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

ECTC 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 ECTC uses 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 ECTC uses 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 ECTC elects to use a mass flow monitor to determine volumetric flow rate of Vent Gas, ECTC must collect compositional analysis data for such Vent Gas. 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.

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

For gas streams for which the molecular weight of the gas is known and for which ECTC uses 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.

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

ECTC shall determine the net heating value of the combustion zone gas (NHV_{cz}) as specified below either using method (1) or (2), as applicable from Step 1b.

- (1) Should ECTC choose to use the direct calculation methodology in Step 1b, Equation 4 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}.

$$NHV_{cz} = \frac{Q_{vg} * NHV_{vg}}{Q_{vg} + Q_s + Q_{a,premix}} \quad \text{Equation 4}$$

- (2) Should ECTC choose to use the feed-forward calculation methodology in Step 1b, Equation 5 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. For periods when there is no Assist Steam flow or Premix Assist Air flow, $NHV_{cz} = NHV_{vg}$.

$$NHV_{cz} = \frac{(Q_{vg} - Q_{NG2} + Q_{NG1}) \times NHV_{vg} + (Q_{NG2} - Q_{NG1}) \times NHV_{NG}}{(Q_{vg} + Q_s + Q_{a,premix})} \quad \text{Equation 5}$$

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.

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 Waste Gas is routed to the Acetic Acid Flare for at least 15-minutes. Equation 6 shows this relationship.

$$NHV_{cz} \geq 270 \text{ BTU/scf} \quad \text{Equation 6}$$

Key to the Abbreviations:

385.3 = conversion factor (scf/lb-mol)

i = individual component in Vent Gas (unitless)

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

^A The theoretical Net Heating Value for hydrogen is 274 Btu/scf, but for the purposes of this Consent 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 heat 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 Vent Gas water in the gaseous state, but the standard temperature for determining the volume corresponding to one mole of Vent Gas is 20 °C.

APPENDIX B

ECTC's Supplemental Environmental Project Scope of Work

Project Description

The ECTC acetic acid unit is designed to efficiently recover and reprocess as many of the organics and iodides streams as possible. During acetic acid manufacturing unit shutdowns or maintenance, ECTC uses an enclosed liquids recovery system (Scavenger System) to collect and recover liquid from process equipment with high VOC and iodide content. The Scavenger System vents through an acetic acid scrubber that removes organics and iodides thereby minimizing venting to the steam-assisted flare. The 50Z501 steam assisted flare controls air emissions from small process vent streams on a continuous basis and a larger stream when diverted from the boilers.

The 50K504 scrubber uses acetic acid from the feed to the Light Ends Recovery System as the scrubbing media to recover VOCs and iodides and directs them back to the process. During shutdowns, the amount of acetic acid required to recover light ends from the normal process streams is reduced and the recovered stream must be stored until the unit is restarted so it can be reprocessed. This limits the amount of fresh acetic acid feed available to the 50K504 scrubber and causes an increase of VOC and iodides levels to the flare. During times when higher iodide levels are detected in the flare header, a larger steam flow is added to the flare to prevent visible emissions. Reducing periods of high iodides to the flare will reduce the need to increase steam addition to ensure no visible emissions and reduce the amount of natural gas added to maintain an appropriate S/VG ratio.

The project involves installation of a pump and associated piping to maintain flowrates to the 50K504 scrubber by recycling acetic acid through the light ends recovery system with minimal acetic acid addition and buildup during shutdowns. This project will also allow continued recovery of VOCs and iodides for reprocessing rather than venting to the flare.

ECTC's Project Cost Estimate:

The total project costs are estimated to be \$173,000. ECTC will pay \$64,100 and a third party will pay the balance of \$108,900. ECTC is seeking SEP credit for only its portion of the costs.

Description	ECTC's Estimated Cost
Site Prep and Installation	\$ 19,087.80
Piping	\$ 11,298.30
Mechanical	\$ 3,182.90
Instrumentation & Electrical	\$ 18,492.90
Contract Engineering	\$ 9,030.00
Plant Engineering	\$ 2,450.00
Demolition	\$ 558.00
ECTC TOTAL PROJECT ESTIMATE:	\$ 64,100