IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OHIO
WESTERN DIVISION

UNITED STATES OF AMERICA, STATE OF LOUISIANA, STATE OF OHIO, OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY, Plaintiffs, NORTHERN ARAPAHO TRIBE, Plaintiff-Intervenor, v. CHEMTRADE LOGISTICS (US), INC., CHEMTRADE REFINERY SERVICES INC., MARSULEX, INC., Defendants.	)	Civil Action No.

CONSENT DECREE

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CONSENT DECREE

WHEREAS, Plaintiff the United States of America ("United States"), on behalf of the United States Environmental Protection Agency ("U.S. EPA"), Co-Plaintiff the State of Louisiana ("Louisiana"), on behalf of the Louisiana Department of Environmental Quality ("LDEQ"), Co-Plaintiff the State of Ohio, ("Ohio"), on behalf of the Ohio Environmental Protection Agency ("Ohio EPA"), Co-Plaintiff Oklahoma Department of Environmental Quality ("Oklahoma DEQ"), have filed a complaint concurrently with this Consent Decree, alleging that Defendants Chemtrade Logistics (US), Inc. ("CLI(US)"), Chemtrade Refinery Services Inc. ("Chemtrade Refinery Services") (collectively "Chemtrade"), and Marsulex, Inc. ("Marsulex") violated Sections 111 and 165 of the Clean Air Act ("CAA"), 42 U.S.C. §§ 7401 *et seq.*, and the federally-enforceable State Implementation Plans ("SIPs") for Louisiana, Ohio, and Oklahoma approved by U.S. EPA pursuant to Section 110 of the CAA, 42 U.S.C. § 7410, which incorporate and/or implement the above-listed federal requirements, and that Chemtrade and Marsulex violated the Title V permit requirements of the CAA, 42 U.S.C. §§ 7661 *et seq.*, with respect to emissions of sulfur dioxide and sulfuric acid mist;

WHEREAS, the Complaint alleges that a sulfuric acid manufacturing facility located in or near Cairo, Ohio ("Cairo Facility") was owned and operated by Chemical Company, LP (f/k/a Coulton Chemical Co. LP) ("Coulton") from 1993 to 1996; by Marsulex from 1996 to 2001; and by CLI(US) from 2001 to the present;

WHEREAS, the Complaint alleges that a sulfuric acid manufacturing facility located in Oregon, Ohio ("Oregon Facility") was owned and operated by Coulton from 1993 to 1996; and by Marsulex from 1996 to the present;

WHEREAS, the Complaint alleges that sulfuric acid manufacturing facilities located in or near Beaumont, Texas ("Beaumont Facility"), Shreveport, Louisiana ("Shreveport Facility"), Tulsa, Oklahoma ("Tulsa Facility"), and Riverton, Wyoming ("Riverton Facility") (collectively, the "BSTR Facilities") have been owned and operated by Chemtrade Refinery Services from approximately August 2005 to the present;

WHEREAS, the Complaint alleges that: (i) Marsulex and/or its predecessors in interest with respect to the Oregon Facility, (ii) Chemtrade and/or its predecessors in interest with respect to the BSTR Facilities; and (iii) Marsulex and Chemtrade and/or their predecessors in interest with respect to the Cairo Facility, constructed or modified the above-referenced sulfuric acid manufacturing facilities without obtaining required permits, without installing required control technology, without meeting emission limits, without a valid Title V permit, and without complying with requirements for monitoring, recordkeeping and reporting, as required in the CAA;

WHEREAS, Plaintiff-Intervenor, the Northern Arapaho Tribe, is a federally-recognized tribe located on the Wind River Reservation in the State of Wyoming, and is moving to intervene in this matter and is filing a Complaint in Intervention only asserting claims against Chemtrade Refinery Services involving the Riverton Facility;

WHEREAS, as more specifically described in Section V, Marsulex, with respect to the Cairo and Oregon Facilities, and Chemtrade, with respect to the BSTR Facilities, have agreed to install and/or enhance emission control technology to reduce emissions of sulfur dioxide to levels no greater than emission levels equivalent to those that would result from the application of the

Best Available Control Technology ("BACT"), as defined at 40 C.F.R. § 52.21(b)(12), and to implement best work practices at these Facilities;

WHEREAS, in achieving the air emissions reductions required by this Consent Decree at the Riverton Facility, Chemtrade intends to install equipment to allow Chemtrade to market the scrubbers' effluent, sodium bisulfite, and Chemtrade recognizes that it cannot allow the quality of its wastewater effluent to cause a violation of the terms and conditions of its National Pollutant Discharge Elimination System permit;

WHEREAS, Defendants do not admit any liability to the United States or any of the Co-Plaintiffs arising out of the acts or omissions alleged in the Complaint and Chemtrade Refinery Service does not admit any liability to Plaintiff-Intervenor arising out of the acts or omissions alleged in the Complaint in Intervention and this Consent Decree resolves all allegations stated in the Complaint and Complaint in Intervention. Nothing in the Complaint, the Complaint in Intervention, nor this Consent Decree, nor in the execution and implementation of this Consent Decree, shall be treated as an admission or evidence of any violation of the CAA, its implementing regulations or any state or local equivalent act or implementing regulations cited herein in any litigation or forum whatsoever, except that the terms of this Consent Decree may be used in any action or dispute resolution proceeding to enforce the terms of this Consent Decree;

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

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

I. JURISDICTION AND VENUE

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331, 1345, 1355, 1362, and 1367, and Sections 113(b) and 304(a) of the CAA, 42 U.S.C. §§ 7413(b) and 7604(a), and over the Parties. Venue lies in this District pursuant to Sections 113(b) and 304(c) of the CAA, 42 U.S.C. §§ 7413(b) and 7604(c), and 28 U.S.C. §§ 1391(b) and (c) and 1395(a), because some of the violations alleged in the Complaint are alleged to have occurred in, and two of the three Defendants conduct business in, this judicial district. Defendants consent to this Court's jurisdiction over this Consent Decree and any action to enforce this Consent Decree, and to venue in this judicial district. Solely for the purpose of the Complaint in Intervention filed in this matter and resolved by this Consent Decree, for the purposes of entry and enforcement of this Consent Decree, and for no other purpose, Chemtrade Refinery Service waives any defense or objection based on standing, waives any objection to the motion to intervene filed by the Northern Arapaho Tribe, and consents to the intervention by the Northern Arapaho Tribe as a Plaintiff-Intervenor in this matter. The United States likewise consents to the intervention. No other party to this matter has any interest in nor opposition to the intervention.

2. For purposes of this Consent Decree, Defendants agree that the Complaint states claims upon which relief may be granted pursuant to Sections 111, 165, 304, and 502 of the CAA, 42 U.S.C. §§ 7411, 7475, 7604, and 7661a, and/or pursuant to state law.

3. Notice of the commencement of this action has been given to the States of Louisiana, Ohio, Oklahoma, Texas, and Wyoming as required by Section 113 of the CAA, 42 U.S.C. § 7413.

II. APPLICABILITY

4. The obligations of this Consent Decree apply to and are binding upon the United States, the Co-Plaintiffs, the Plaintiff-Intervenor, and upon Defendants and their officers, employees, agents, subsidiaries, successors, assigns, and other entities or persons otherwise bound by law, except that, notwithstanding any other provision of this Consent Decree, Marsulex shall have no liability, responsibility, duties, or obligations under this Consent Decree to the Plaintiff-Intervenor and this Consent Decree shall not confer any rights to the Plaintiff-Intervenor as to Marsulex.

5. No transfer of ownership or operation of any of the Covered Sulfuric Acid Plants, whether in compliance with the procedures of Paragraphs 5 or 6 or otherwise, shall relieve the Defendants of their respective obligations to ensure that the terms of this Consent Decree are implemented unless and until:

a. The transferee agrees in writing to undertake the obligations required by this Consent Decree with respect to the Facility(ies) being transferred, and to intervene as a Defendant in this action for the purpose of being bound by the applicable terms of this Consent Decree; and

b. The United States and the Applicable Co-Plaintiff after receiving information sufficient to demonstrate that the transferee has the technical and financial means to

comply with the applicable obligations of this Consent Decree, consent in writing to substitute the transferee for the Defendant with respect to such obligations; and

c. The Court approves such substitution.

6. By no later than 10 days prior to the closing date of any transfer of ownership or operation of any of the Covered Sulfuric Acid Plants, the Defendant undertaking the transfer shall provide a copy of this Consent Decree to the proposed transferee. By no later than the closing date of any such transfer, the Defendant undertaking the transfer shall provide written notice of the prospective transfer, together with a copy of a written agreement or acknowledgment by which the transferee agrees to undertake the obligations of this Consent Decree, to the United States and to the Applicable Co-Plaintiff, in the manner set forth in Section XV of this Decree (Notices). Any attempt to transfer ownership or operation of a Covered Sulfuric Acid Plant, or any portion thereof, without complying with the foregoing notice requirements constitutes a violation of this Decree. Defendant may prominently label each page of any written agreement or acknowledgment submitted under this Paragraph as "Confidential Business Information." If so labeled, the United States and the Applicable Co-Plaintiff shall treat the Written Agreement as Confidential Business Information under, respectively, 40 C.F.R. Part 2 and the corollary state laws and regulations applicable to maintaining information in a confidential manner.

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

III. DEFINITIONS

8. Terms used in this Consent Decree that are defined in the CAA or in federal and state regulations promulgated pursuant to the CAA shall have the meaning assigned to them in the CAA or such regulations, unless otherwise provided in this Decree. Whenever the terms set forth below are used in this Consent Decree, the following definitions shall apply:

a. "Acid mist" shall mean the pollutant sulfuric acid mist as measured by Method 8 of 40 C.F.R Part 60, Appendix A consistent with 40 C.F.R. § 60.81(b).

b. "Alternative CEMS Plan" shall mean a plan, as more particularly described in Paragraph 32, for monitoring compliance with the SO_2 emissions limits required in Section V.A of this Consent Decree without the use of a Converter Inlet SO_2 Analyzer.

c. "Applicable Co-Plaintiff or Plaintiff-Intervenor" shall mean: (i) with respect to the Shreveport Facility, the State of Louisiana; (ii) with respect to the Cairo and Oregon Facilities, the State of Ohio; (iii) with respect to the Tulsa Facility, the Oklahoma Department of Environmental Quality; and (iv) with respect to the Riverton Facility, the Northern Arapaho Tribe.

d. "Beaumont Facility" shall mean the facility located at 1400 Olin Road, Beaumont, TX 77705, and currently owned and operated by Chemtrade Refinery Services.

e. "BSTR Facilities" shall mean the Beaumont Facility, the Shreveport Facility, the Tulsa Facility, and the Riverton Facility.

f. "Cairo Facility" shall mean the facility located at 7680 Ottawa Road, P.O. Box 310, Cairo, OH 45820, and currently owned and operated by CLI(US).

g. "CEMS" or "Continuous Emission Monitoring System" shall mean the total equipment, required under the CEMS Plans attached as Appendices A-G to this Consent Decree, used to sample and condition (if applicable), to analyze, and to provide a permanent record of emissions or process parameters.

h. "CEMS Plan" shall mean one of the CEMS Plans for each of the Covered Sulfuric Acid Plants that are attached in the following Appendices:

Appendix A --	Beaumont Sulfuric Acid Plant
Appendix B --	Shreveport Sulfuric Acid Plant
Appendix C --	Tulsa Sulfuric Acid Plant
Appendix D --	Riverton 1 Sulfuric Acid Plant
Appendix E --	Riverton 2 Sulfuric Acid Plant
Appendix F --	Cairo Sulfuric Acid Plant
Appendix G --	Oregon A and B Sulfuric Acid Plants

i. "Chemtrade" shall mean, collectively, CLI(US) and Chemtrade Refinery Services.

j. "Chemtrade Refinery Services" shall mean Chemtrade Refinery Services Inc.

k. "CLI(US)" shall mean Chemtrade Logistics (US), Inc.

l. "Complaint" shall mean the Complaint filed by the United States, the State of Louisiana, the State of Ohio, and the Oklahoma Department of Environmental Quality in this action.

m. "Complaint in Intervention" shall mean the Complaint in Intervention filed by the Northern Arapaho Tribe against Chemtrade Refinery Services.

n. "Consent Decree" or "Decree" shall mean this Consent Decree and all appendices attached hereto, but in the event of any conflict between the text of this Consent Decree and any Appendix, the text of this Consent Decree shall control.

o. "Converter Inlet SO_2 Analyzer" shall mean an analyzer that measures the concentration of SO_2 that is fed into the first bed of the converter at a Sulfuric Acid Plant.

p. "Co-Plaintiffs" shall mean the State of Louisiana, the State of Ohio, and the Oklahoma Department of Environmental Quality.

q. "Coulton" shall mean Chemical Company, LP (f/k/a Coulton Chemical Co., LP).

r. "Covered Sulfuric Acid Plants" shall mean the eight Sulfuric Acid Plants that are subject to this Consent Decree: one at the Beaumont Facility; one at the Shreveport Facility; one at the Tulsa Facility; two (Riverton 1 and Riverton 2) at the Riverton Facility; one at the Cairo Facility; and two (Plants A and B) at the Oregon Facility.

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

t. "Defendants" shall mean Chemtrade Refinery Services, CLI(US), and Marsulex.

u. "Effective Date" shall have the meaning given in Section XVI.

v. "Facility" shall mean a plant site at which one or more Covered Sulfuric Acid Plants are located.

w. "LDEQ" shall mean the Louisiana Department of Environmental Quality and any of its successor departments or agencies.

x. "Long-Term Limit" shall mean a 365-day rolling average sulfur dioxide emission limit expressed as pounds of sulfur dioxide emitted per ton of 100% Sulfuric Acid Produced ("lb/ton"); compliance with the Long-Term Limit shall be calculated in accordance with the CEMS Plans attached to this Consent Decree as Appendices F and G. The Long-Term Limit applies at all times, including during periods of Startup, Shutdown, or Malfunction.

y. "Malfunction" shall mean, consistent with 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, but shall not include failures that are caused in whole or in part by poor maintenance or careless operation.

z. "Marsulex" shall mean Marsulex, Inc.

aa. "Mass Cap" shall mean the maximum amount of SO_2 emissions for a Sulfuric Acid Plant expressed in tons of sulfur dioxide emitted during each 12-month period consisting of the most recently concluded month and the eleven months immediately preceding it. Compliance with the Mass Cap shall be calculated in accordance with the CEMS Plans attached to this Consent Decree as Appendices A-E. In determining compliance with the Mass Cap, all SO_2 emissions from a Covered Sulfuric Acid Plant, including emissions during times of Startup, Shutdown, and Malfunction, shall be counted.

bb. "Month" shall mean calendar month.

cc. "NSR" shall mean a program for New Source Review under the CAA. Specifically, "non-attainment NSR" and "major NSR" as used herein refer to the non-attainment

area New Source Review program within the meaning of Part D of Subchapter I of the CAA, 42 U.S.C. §§ 7501-7515; "minor NSR" as used herein refers to any state, regional or local statutes, ordinances or regulations calling for review and approval of non-major new and modified sources of air pollution.

dd. "NSPS" shall mean the standards of performance for new stationary sources codified at 40 C.F.R. Part 60. General NSPS requirements are codified at 40 C.F.R. Part 60, Subpart A. NSPS requirements specifically for sulfuric acid plants are codified at 40 C.F.R. Part 60, Subpart H.

ee. "Ohio EPA" shall mean the Ohio Environmental Protection Agency and any of its successor departments or agencies.

ff. "Oklahoma DEQ" shall mean the Oklahoma Department of Environmental Quality and any of its successor departments or agencies.

gg. "100% Sulfuric Acid Produced" shall mean the stoichiometric quantity of sulfuric acid that would be produced at a Covered Sulfuric Acid Plant if all sulfur trioxide (SO_3) exiting the converter were used to produce sulfuric acid monohydrate. For purposes of this definition, scrubber byproduct (if any) shall be considered to be included in "100% Sulfuric Acid Produced."

hh. "Operating Periods" shall mean periods during which Sulfur or Sulfur-Bearing Compounds are being fed to the furnace of a Covered Sulfuric Acid Plant.

ii. "Oregon Facility" shall mean the facility located at 1400 Otter Creek Road, Oregon Ohio 43616, which includes two Covered Sulfuric Acid Plants (known as Plant A and Plant B), and which is currently owned and operated by Marsulex.

jj. "Paragraph" shall mean a portion of this Consent Decree identified by an Arabic numeral.

kk. "Parties" shall mean the United States, the State of Louisiana, the State of Ohio, the Oklahoma Department of Environmental Quality, the Northern Arapaho Tribe, Chemtrade Refinery Services, CLI(US), and Marsulex.

ll. "Plaintiff-Intervenor" shall mean the Northern Arapaho Tribe which is a federally-recognized tribe located on the Wind River Reservation in the State of Wyoming.

mm. "PSD" shall mean the attainment area New Source Review program (prevention of significant deterioration) within the meaning of Part C of Subchapter I of the CAA, 42 U.S.C. §§ 7470-7492.

nn. "Riverton Facility" shall mean the facility located at 140 Goes In Lodge Road, Riverton, WY 82501, which includes two Covered Sulfuric Acid Plants (known as Riverton 1 and Riverton 2), and which is currently owned and operated by Chemtrade Refinery Services.

oo. "Section" shall mean a portion of this Consent Decree identified by a roman numeral.

pp. "Short-Term Limit" shall mean a 3-hour rolling average sulfur dioxide emission limit expressed in terms of pounds of sulfur dioxide emitted per ton of 100% Sulfuric Acid Produced ("lb/ton"); compliance with the Short-Term Limit shall be calculated in accordance with the CEMS Plans attached to this Consent Decree as Appendices A-G. The Short-Term Limit does not apply during periods of Startup, Shutdown, or Malfunction.

qq. "Shreveport Facility" shall mean the facility located at 10889 Highway 1 South, Shreveport, LA 71115, and currently owned and operated by Chemtrade Refinery Services.

rr. "Shutdown" shall mean the cessation of operation of a Covered Sulfuric Acid Plant for any reason. Shutdown begins at the time the feed of Sulfur or Sulfur-Bearing Compounds to the furnace ceases and ends at the earlier of three hours later or when the flow rate on the stack volumetric flow rate analyzer falls below 10% of span.

ss. "SO_2" shall mean the pollutant sulfur dioxide.

tt. "Startup" shall mean, with respect to any Covered Sulfuric Acid Plant, the period of time beginning when the feed of Sulfur or Sulfur-Bearing Compounds to the furnace commences and lasting for no more than 24 hours.

uu. "Sulfur or Sulfur-Bearing Compounds" shall mean elemental sulfur, alkylation or other spent sulfuric acids, hydrogen sulfide, organic sulfides, mercaptans, or acid sludge, but they exclude hydrocarbon and conventional fossil fuels such as natural gas or fuel oil.

vv. "Sulfuric Acid Plant" shall mean a process unit engaged in the production of sulfuric acid and related products using the contact process. Marsulex owns and operates two Sulfuric Acid Plants that are subject to this Consent Decree: the A and B Plants at the Oregon Facility. Chemtrade owns and operates the remaining six Sulfuric Acid Plants that are subject to this Consent Decree: one each at the Cairo, Beaumont, Shreveport, and Tulsa Facilities and two (Riverton 1 and 2) at the Riverton Facility.

ww. "Title V Permit" shall mean a permit required by or issued pursuant to the requirements of 42 U.S.C. §§ 7661 - 7661f.

xx. "Ton" or "tons" shall mean short ton or short tons. One Ton equals 2000 pounds.

yy. "Tulsa Facility" shall mean the facility located at 5201 West 21st St., Tulsa, OK 74107, and currently owned and operated by Chemtrade Refinery Services.

zz. "United States" shall mean the United States of America, acting on behalf of U.S. EPA.

aaa. "U.S. EPA" shall mean the United States Environmental Protection Agency and any of its successor departments or agencies.

IV. CIVIL PENALTY

9. Prior to the Lodging of this Consent Decree, Defendants deposited $700,000 into an interest-bearing escrow account as a civil penalty. Within 30 days after the Effective Date of this Consent Decree, Defendants shall transfer to the United States and the Co-Plaintiffs the entire balance in the escrow account, in the following manner:

a. $460,000, plus all accrued interest on the original $700,000, to the United States by FedWire Electronic Funds Transfer ("EFT") to the U.S. Department of Justice in accordance with written instructions to be provided to Defendants, following lodging of the Consent Decree, by the Financial Litigation Unit of the U.S. Attorney's Office for the Northern District of Ohio, 801 W. Superior Ave., Suite 400, Cleveland, OH 44113. At the time of payment, Defendants shall send a copy of the EFT authorization form and the EFT transaction record, together with a transmittal letter, which shall state that the payment is for the civil penalty owed pursuant to the Consent Decree in United States, et al. v. Chemtrade Logistics, et al., and shall reference the civil action number, USAO File Number 2008V02383, DOJ case number

90-5-2-1-06944/1, to the United States in the manner set forth in Section XV of this Decree (Notices); by email to acctsreceivable.CINWD@epa.gov; and by mail to:

EPA Cincinnati Finance Office
26 Martin Luther King Drive
Cincinnati, Ohio 45268

b. $60,000 to the State of Louisiana by bank check made payable to the Louisiana Department of Environmental Quality and sent to Darryl Serio, Fiscal Director, Office of Management and Finance, LDEQ, P.O. Box 4303, Baton Rouge, Louisiana 70821-4303.

c. $120,000 to the State of Ohio by three separate checks in the following manner:

i. $72,000 shall be delivered by bank check payable to the order of "Treasurer, State of Ohio" and delivered to Martha Sexton, Paralegal, or her successor, Office of the Attorney General of Ohio, Environmental Enforcement Section, 30 East Broad Street, 25th Floor, Columbus, Ohio 43215-3400; the memorandum portion of the check, or some other prominent location on the transmittal letter or documentation, shall include reference to "A.G. EAGO No. 363812;"

ii. $24,000 shall be delivered by bank check payable to the order of "Treasurer, State of Ohio" and delivered to Martha Sexton, Paralegal, or her successor, Office of the Attorney General of Ohio, Environmental Enforcement Section, 30 East Broad Street, 25th Floor, Columbus, Ohio 43215-3400, to fund the Clean Diesel School Bus Program established by the Ohio Director of Environmental Protection pursuant to O.R.C. 3704.144 and O.A.C. Chapters 3745-50 through 52, for the purpose of installing, in accordance with Ohio Environmental Protection Agency guidelines, diesel particulate filters for school buses operated by school districts in the State of Ohio, and which is made available to Ohio school districts in accordance with a grant established by the Ohio Director of Environmental Protection; the memorandum portion of the check, or some other prominent location on the transmittal letter or documentation, shall include a reference to "A.G. EAGO No. 363812" and specify that such monies are to be

deposited into the fund established by Ohio Environmental Protection Agency for the Clean Diesel School Bus Program (Fund 5CD0); and

iii. $24,000 shall be delivered by bank check payable to the order of "Treasurer, State of Ohio" and delivered to Martha Sexton, Paralegal, or her successor, Office of the Attorney General of Ohio, Environmental Enforcement Section, 30 East Broad Street, 25th Floor, Columbus, Ohio 43215-3400, to fund the Ohio Department of Natural Resources, Division of Forestry, Urban Forestry Grant Program in order to provide for tree-planting projects in the City of Oregon, Ohio; the memorandum portion of the check, or some other prominent location on the transmittal letter or documentation, shall include a reference to "A.G. EAGO No. 363812" and specify that such monies are to be deposited into the fund established by Ohio Department of Natural Resources for the Urban Forestry Grant Program (Fund 5090).

d. $60,000 to the Oklahoma Department of Environmental Quality by certified check or money order made payable to the Oklahoma Department of Environmental Quality Revolving Fund and delivered to: Accounts Receivable, Financial and Human Resources Management, Department of Environmental Quality, P.O. Box 2036, Oklahoma City, Oklahoma 73101-2036.

10. If any portion of the civil penalty due to the United States or a Co-Plaintiff is not paid when due, Defendants shall pay interest on the amount past due, accruing from the Effective Date through the date of payment, at the rate specified in 28 U.S.C. § 1961. Interest payment under this Paragraph shall be in addition to any stipulated penalty due.

11. In the event that this Consent Decree is not entered by the Court, the entire sum of the money deposited in the escrow account, plus all accrued interest thereon, shall be returned to Defendants.

12. Defendant shall not deduct any penalties paid under this Decree pursuant to this Section or Section IX (Stipulated Penalties) in calculating its federal or state or local income tax.

V. COMPLIANCE REQUIREMENTS

A. SO_2 Emission Limits, Mass Caps, and Schedule of Compliance

13. Beaumont Sulfuric Acid Plant. By no later than July 1, 2011, Chemtrade shall comply with the following SO_2 emission requirements at the Beaumont Sulfuric Acid Plant:

a. Short-Term Limit: 2.2 lb/ton.

b. Emissions During Startup: Set forth in Appendix H. These limits shall be applicable for no more than 26 hours.

c. Mass Cap: 380.0 tons/year. Chemtrade shall commence monitoring by July 1, 2011, but shall have until July 1, 2012, to meet this limit, and until July 15, 2012, to calculate the amount of SO_2 emitted for the first 12-month period. Thereafter, by no later than the 15th day of each month, Chemtrade shall calculate the amount of SO_2 emitted for the immediately preceding 12-month period.

14. Shreveport Sulfuric Acid Plant. By no later than January 1, 2012, Chemtrade shall comply with the following SO_2 emission requirements at the Shreveport Sulfuric Acid Plant:

a. Short-Term Limit: 2.0 lb/ton.

b. Emissions During Startup: Set forth in Appendix H. These limits shall be applicable for no more than 26 hours.

c. Mass Cap: 215.0 tons/year. Chemtrade shall commence monitoring by January 1, 2012, but shall have until January 1, 2013, to meet this limit, and until January 15, 2013, to calculate the amount of SO_2 emitted for the first 12-month period. Thereafter, by no later than the 15th day of each month, Chemtrade shall calculate the amount of SO_2 emitted for the immediately preceding 12-month period.

15. Tulsa Sulfuric Acid Plant. By no later than January 1, 2010, Chemtrade shall comply with the following SO_2 emission requirements at the Tulsa Sulfuric Acid Plant:

a. Short-Term Limit: 1.7 lb/ton.

b. Emissions During Startup: Set forth in Appendix H. These limits shall be applicable for no more than 26 hours.

c. Mass Cap: 92.4 tons/year. Chemtrade shall commence monitoring by January 1, 2010, but shall have until January 1, 2011, to meet this limit, and until January 15, 2011, to calculate the amount of SO_2 emitted for the first 12-month period. Thereafter, by no later than the 15th day of each month, Chemtrade shall calculate the amount of SO_2 emitted for the immediately preceding 12-month period.

16. Riverton 1 Sulfuric Acid Plant. By no later than January 1, 2013, Chemtrade shall comply with the following SO_2 emission requirements at the Riverton 1 Sulfuric Acid Plant:

a. Short-Term Limit: 1.9 lb/ton.

b. Emissions During Startup: Set forth in Appendix H. These limits shall be applicable for no more than 26 hours.

c. Mass Cap: 35.0 tons/year. Chemtrade shall commence monitoring by January 1, 2013, but shall have until January 1, 2014, to meet this limit, and until January 15, 2014, to calculate the amount of SO_2 emitted for the first 12-month period. Thereafter, by no later than the 15th day of each month, Chemtrade shall calculate the amount of SO_2 emitted for the immediately preceding 12-month period.

17. Riverton 2 Sulfuric Acid Plant. By no later than January 1, 2013, Chemtrade shall comply with the following SO_2 emission requirements at the Riverton 2 Sulfuric Acid Plant:

a. Short-Term Limit: 2.1 lb/ton.

b. Emissions During Startup: Set forth in Appendix H. These limits shall be applicable for no more than 26 hours.

c. Mass Cap: 38.0 tons/year. Chemtrade shall commence monitoring by January 1, 2013, but shall have until January 1, 2014, to meet this limit,

and until January 15, 2014, to calculate the amount of SO_2 emitted for the first 12-month period. Thereafter, by no later than the 15th day of each month, Chemtrade shall calculate the amount of SO_2 emitted for the immediately preceding 12-month period.

18. Oregon A Sulfuric Acid Plant. By no later than July 1, 2011, Marsulex shall comply with the following SO_2 emission requirements at the Oregon A Sulfuric Acid Plant:

a. Long-Term Limit: 2.40 lb/ton. Marsulex shall commence monitoring by July 1, 2011, but shall have until June 30, 2012, to demonstrate compliance with this Long-Term Limit.

b. Short-Term Limit: 3.5 lb/ton.

19. Oregon B Sulfuric Acid Plant. By no later than July 1, 2011, Marsulex shall comply with the following SO_2 emission requirements at the Oregon B Sulfuric Acid Plant:

a. Long-Term Limit: 2.50 lb/ton. Marsulex shall commence monitoring by July 1, 2011, but shall have until June 30, 2012, to demonstrate compliance with this Long-Term Limit.

b. Short-Term Limit: 3.5 lb/ton.

20. Cairo Sulfuric Acid Plant. By no later than July 1, 2011, Marsulex shall cause the Cairo Facility to comply with the following SO_2 emission requirements:

a. Long-Term Limit: 1.90 lb/ton. Chemtrade shall be responsible for demonstrating and maintaining compliance with this limit. Monitoring shall commence by July 1, 2011, but demonstration of compliance with this Long-Term Limit shall not commence until June 30, 2012.

b. Short-Term Limit: 3.0 lb/ton.

21. Proposed Increases to a Mass Cap. Any proposal to increase a Mass Cap in this Decree must be agreed to by all of the applicable Parties and submitted to the Court for approval as a modification to this Decree. Until such time as the Court approves such modification, all Mass Caps in this Decree shall remain in full force and effect. Chemtrade shall provide notice to

the United States and the Applicable Co-Plaintiff or Plaintiff-Intervenor, in the manner set forth in Section XV (Notices), prior to submitting or at the time that it submits any permit application that seeks to increase the production capacity or emission limits (including the Mass Cap) for any of Chemtrade's Sulfuric Acid Plants if the proposed increase(s) would be permissible only if the applicable Mass Cap and/or other applicable emission limit(s) in this Decree were relaxed.

B. Scrubber Design

22. In order to achieve compliance with the SO_2 emissions limits in Paragraph 20 for the Cairo Facility, Marsulex shall install a new scrubber. Marsulex shall design the new scrubber to be capable of achieving at least 95% removal efficiency, except during periods of Startup, Shutdown, and Malfunction.

C. Acid Mist Emission Limits

23. Marsulex, with respect to the Oregon and Cairo Facilities, and Chemtrade, with respect to the BSTR Facilities, shall comply with the NSPS, Subpart H sulfuric acid mist emission limitation of 0.15 lb/ton of 100% Sulfuric Acid Produced, as set forth at 40 C.F.R. § 60.83, by no later than the following dates:

a. Beaumont: July 1, 2011

b. Shreveport: Date of Lodging

c. Tulsa: Date of Lodging

d. Riverton 1: January 1, 2013

e. Riverton 2: January 1, 2013

f. Cairo: July 1, 2011

g. Oregon A: Date of Lodging

h. Oregon B: Date of Lodging

Compliance with the acid mist limit shall be demonstrated using the performance test required by Paragraph 34 of this Consent Decree. For all Facilities, the acid mist performance tests required under Paragraph 34 may be undertaken at the same time as the performance tests for the SO_2 limits required under Paragraph 35 and scheduled under Paragraph 33, notwithstanding that the Shreveport, Tulsa, and Oregon Facilities are required to comply with the NSPS acid mist limits as of the Date of Lodging.

24. Ongoing Responsibility for Compliance with the Acid Mist Limits at the Cairo Facility. For the Cairo Facility, Marsulex shall be responsible for timely complying with the limit set forth in Paragraph 23 and shall remain responsible until the date set forth in a Joint Notice from Marsulex and Chemtrade, pursuant to Paragraph 41, that identifies the date on which Chemtrade accepts responsibility for compliance with the acid mist limit. The Joint Notice must include the results of a performance test that demonstrates compliance in order for the transfer to be effective.

D. NSPS Applicability

25. Each Covered Sulfuric Acid Plant shall be considered an affected facility for purposes of the New Source Performance Standards ("NSPS"), 40 C.F.R. Part 60, Subpart H, by no later than the following dates:

a. Beaumont: July 1, 2011

b. Shreveport: Date of Lodging

c. Tulsa: Date of Lodging

d. Riverton 1: January 1, 2013

e. Riverton 2: January 1, 2013

f. Cairo: July 1, 2011

g. Oregon A: Date of Lodging

h. Oregon B: Date of Lodging

After such date, each Sulfuric Acid Plant shall comply with all applicable requirements for affected facilities under the NSPS 40 C.F.R. Part 60, Subparts A and H, or with the requirements of this Consent Decree (if more stringent). A continuous opacity monitoring system ("COMS") may be used for monitoring compliance with the opacity limit found at 40 C.F.R. § 60.83(a)(2) at any of the Facilities. Satisfactory compliance with notice and compliance demonstration obligations set forth in this Consent Decree shall be deemed to satisfy all applicable initial notification and compliance demonstration requirements of NSPS Subparts A and H.

26. Ongoing Responsibility for Compliance with the NSPS at the Cairo Facility. For the Cairo Facility, Marsulex shall be responsible for timely complying with the requirements of the NSPS and shall remain responsible until the date set forth in a Joint Notice from Marsulex and Chemtrade, submitted pursuant to Paragraph 41, that identifies the date on which Chemtrade accepts responsibility for compliance with the NSPS.

27. Best Practices. At all times after the Effective Date of this Consent Decree, including periods of Startup, Shutdown, and Malfunction, Marsulex, with respect to the Oregon Facility, and Chemtrade, with respect to the Cairo and BSTR Facilities, shall to the extent practicable maintain and operate each of their Covered Sulfuric Acid Plants, including associated

air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions.

E. Emissions Monitoring

28. Installation, Certification, and Calibration. By no later than the following dates, Marsulex, with respect to the Oregon and Cairo Facilities, and Chemtrade, with respect to the BSTR Facilities, shall install, certify, and calibrate an SO_2 continuous emissions monitoring system ("CEMS") capable of directly measuring the SO_2 emission rate expressed as lb/ton of 100% Sulfuric Acid Produced:

a. Beaumont: July 1, 2011

b. Shreveport: January 1, 2012

c. Tulsa: January 1, 2010

d. Riverton 1: January 1, 2013

e. Riverton 2: January 1, 2013

f. Cairo: July 1, 2011

g. Oregon A: July 1, 2011

h. Oregon B: July1, 2011

29. Responsibility for Emissions Monitoring. After the dates set forth in Paragraph 28, Marsulex, with respect to the Oregon Facility, and Chemtrade, with respect to the BSTR Facilities, shall operate and maintain the CEMS. For the CEMS at the Cairo Facility, Marsulex shall operate and maintain it from June 30, 2011, until the date set forth in a Joint Notice from Marsulex and Chemtrade, submitted pursuant to Paragraph 41, that identifies the

date on which Chemtrade accepts responsibility for the operation and maintenance of the Cairo CEMS.

30. Continuous Operation of CEMS and Minimization of CEMS Downtime. After the dates set forth in Paragraph 28, and except during CEMS breakdowns, repairs, calibration checks, and zero span adjustments, the CEMS shall be in continuous operation during all Operating Periods and Shutdowns to demonstrate compliance with the SO_2 emission limits established in Subsection V.A of this Consent Decree. The Defendant responsible for operating and maintaining the CEMS shall take all steps necessary to avoid CEMS breakdowns and minimize CEMS downtime. This shall include, but is not limited to, operating and maintaining the CEMS in accordance with best practices and maintaining an on-site inventory of spare parts or other supplies necessary to make rapid repairs to the equipment.

31. SO_2 CEMS Plans. CEMS Plans that describe how Marsulex and Chemtrade shall monitor compliance with the SO_2 emission limits established in Subsection V.A of this Consent Decree, including the methodology that they shall use to demonstrate compliance in the event of CEMS downtime lasting longer than 24 hours, are attached in Appendices A - G. On and after the dates set forth in Subparagraphs 28.a - e, Chemtrade shall implement the CEMS Plans at Appendices A - E for the BSTR Facilities. On and after July 1, 2011, Marsulex shall implement the CEMS Plan at Appendix G for the Oregon Facility. Marsulex also shall implement the CEMS Plan at Appendix F for the Cairo Facility from July 1, 2011, until the date set forth in a Joint Notice from Marsulex and Chemtrade, submitted pursuant to Paragraph 41, that identifies the date on which Chemtrade accepts responsibility for the implementation of the Cairo CEMS

Plan. The monitoring methods specified in the CEMS Plans have been approved as appropriate alternative monitoring methods for purposes of NSPS, pursuant to 40 C.F.R. § 60.13(i).

32. Modified or Alternative CEMS Plans for Beaumont, Shreveport, Riverton 2, Oregon A, and/or Oregon B Sulfuric Acid Plants. Chemtrade, with respect to the Beaumont, Shreveport, and/or Riverton 2 Sulfuric Acid Plants, and Marsulex, with respect to the Oregon A and/or B Sulfuric Acid Plants, may secure relief from the requirement, in the applicable CEMS Plan, to install a Converter Inlet SO_2 Analyzer by complying with the provisions of this Paragraph. A decision to seek relief from the requirement to install a Converter Inlet SO_2 Analyzer is within the discretion of the Applicable Defendant.

a. Basis for Proposing a CEMS Plan that Does not Include the Use of a Converter Inlet SO_2 Analyzer. Either Defendant may propose a CEMS Plan that does not include the use of a Converter Inlet SO_2 Analyzer ("Alternative CEMS Plan") only if all of the following conditions are met:

i. Defendant has undertaken best efforts to use a Converter Inlet SO_2 Analyzer in compliance with the requirements of the applicable CEMS Plan;

ii. Either the use of a Converter Inlet SO_2 Analyzer is technically infeasible or a Converter Inlet SO_2 Analyzer cannot be configured in such a way as to allow Defendant to measure SO_2 converter inlet concentration with sufficient accuracy; and

iii. Modifications to the applicable CEMS Plan and/or Performance Specifications for the Converter Inlet SO_2 Analyzer would not allow Defendant to alleviate the conditions that resulted in technical infeasibility or inaccuracy in measurement.

b. Modified CEMS Plan. If modifications to the applicable CEMS Plan and/or Performance Specifications for the Converter Inlet SO_2 Analyzer will allow Defendant to use a Converter Inlet SO_2 Analyzer to measure converter inlet SO_2 concentration, Defendant shall submit a proposal to U.S. EPA and the Applicable Co-Plaintiff or Plaintiff-Intervenor, in the manner set forth in Section XV (Notices), to modify the applicable CEMS Plan rather than propose an alternative that does not include the use of a Converter Inlet SO_2 Analyzer. U.S. EPA, after consultation with the Applicable Co-Plaintiff or Plaintiff-Intervenor, will either approve or disapprove, in whole or in part, the proposed modification(s). Agreed-upon modifications to the applicable CEMS Plan under this Subparagraph are non-material modifications to this Consent Decree and will be effective when approved by U.S. EPA. Within thirty (30) days after receipt of a U.S. EPA notice disapproving Defendant's proposed modified CEMS Plan or directing Defendant to implement a Modified CEMS Plan with which Defendant disagrees, Defendant will invoke Section XI of this Decree (Dispute Resolution).

c. Technical Infeasibility and Alternative CEMS Plan Report. If all of the conditions in Subparagraph 32.a are satisfied, Defendant may submit a Technical Infeasibility and Alternative CEMS Plan Report, to U.S. EPA and the Applicable Co-Plaintiff or Plaintiff-Intervenor, in the manner set forth in Section XV (Notices), that includes detailed descriptions of the following:

i. The efforts that Defendant undertook to use a Converter Inlet SO_2 Analyzer in compliance with the applicable CEMS Plan, including a detailed description of all of the efforts Defendant and its equipment vendors, contractors, and/or consultants undertook to install, certify, maintain, and/or operate the Converter Inlet SO_2 Analyzer, together with any supporting documentation;

ii. All potential remedies considered by Defendant and/or its equipment vendors, contractors, and/or consultants to install, certify, maintain, and/or operate a Converter Inlet SO_2 Analyzer;

iii. The relevant events and considerations that led Defendant to conclude that either the use of a Converter Inlet SO_2 Analyzer was technically infeasible or a Converter Inlet SO_2 Analyzer could not be configured in such a way to allow Defendant to measure SO_2 converter inlet concentration with sufficient accuracy, including all related correspondence with equipment vendors, contractors, and/or consultants, and any other supporting documentation;

iv. The modifications to the applicable CEMS Plan and/or Performance Specifications that Defendant considered to evaluate whether the conditions that resulted in technical infeasibility or measurement inaccuracy could be alleviated;

v. The alternative plan that Defendant proposes for measuring converter inlet SO_2 concentration or otherwise measuring the emission rate expressed as lb/ton ("Alternative CEMS Plan");

vi. Justifications for the proposed Alternative CEMS Plan;

vii. Procedures that Defendant proposes for verifying the accuracy and performance of the proposed Alternative CEMS Plan; and

viii. Any other information that Defendant deems relevant.

d. U.S. EPA Review and Approval of Alternative CEMS Plans. Defendant shall provide all information requested by U.S. EPA or the Applicable Co-Plaintiff or Plaintiff-Intervenor after Defendant's submission of the Technical Infeasibility and Alternative CEMS Plan Report. U.S. EPA, after consultation with the Applicable Co-Plaintiff or Plaintiff-Intervenor, will either approve or disapprove, in whole or in part, Defendant's proposed Alternative CEMS Plan. If U.S. EPA plans to disapprove all of part of a proposed Alternative CEMS Plan, U.S. EPA first will consult with Defendant to determine if a mutually-agreeable CEMS Plan (whether it be the original CEMS Plan attached to this Decree, a Modified CEMS

Plan, or an Alternative CEMS Plan) can be agreed to. After consultation with Defendant, U.S. EPA will require Defendant to implement either the original CEMS Plan, a U.S. EPA-approved Modified CEMS Plan, or a U.S. EPA-approved Alternative CEMS Plan. In no event will U.S. EPA approve an Alternative CEMS Plan it deems to be inferior to the monitoring procedures specified in 40 C.F.R. Part 60, Subpart H. The basis for any decision by U.S. EPA to disapprove, in whole or in part, any Alternative CEMS Plan will be the failure to satisfy one or more of the conditions in Subparagraph 32.a. Within thirty (30) days after receipt of a U.S. EPA notice disapproving an Alternative CEMS Plan or directing Defendant to implement any CEMS Plan with which Defendant disagrees, Defendant must invoke Section XI of this Decree (Dispute Resolution) or will be deemed to have accepted U.S. EPA's decision.

e. Defendant shall implement any Modified or Alternative CEMS Plans that it proposes under Subparagraphs 32.b or 32.c unless and until: (i) a different Plan is mutually agreed to by Defendant and U.S. EPA (after consultation with the Applicable Co-Plaintiff or Plaintiff-Intervenor) and Defendant consents to implement this Plan; or (ii) Defendant is required, by Court Order issued through dispute resolution proceedings (Section XI), to implement a Plan.

f. Timing for Proposing a Modified or Alternative CEMS Plan. If Defendant seeks to propose a Modified or Alternative CEMS Plan, Defendant shall submit its request to U.S. EPA and the Applicable Co-Plaintiff or Plaintiff-Intervenor, in the manner set forth in Section XV (Notices), by no later than four (4) months prior to the compliance dates for the Short-Term SO_2 Limits in Subsection V.A. In the request, Defendant shall comply with the

requirements of Subparagraph 32.b (for a Modified CEMS Plan) or 32.c (for an Alternative CEMS Plan).

F. Performance Testing

33. Dates. The performance tests required in this Subsection V.F shall be performed at the following Covered Sulfuric Acid Plants by no later than the following dates:

a. Beaumont: July 1, 2011

b. Shreveport: January 1, 2012

c. Tulsa: January 1, 2010

d. Riverton 1: January 1, 2013

e. Riverton 2: January 1, 2013

f. Cairo: July 1, 2011

g. Oregon A: July 1, 2011

h. Oregon B: July 1, 2011

34. Acid Mist. Marsulex, with respect to the Oregon and Cairo Facilities, and Chemtrade, with respect to the BSTR Facilities, shall conduct a performance test measuring the emission rate of acid mist in accordance with the applicable requirements of 40 C.F.R. Part 60, Appendix A, Reference Method 8, or an alternative method approved by U.S. EPA. These performance tests shall be used to demonstrate compliance with the acid mist emission limit established in Paragraph 23 and may serve as the NSPS performance test required under 40 C.F.R. § 60.8. Marsulex and Chemtrade shall take all steps necessary to assure accurate measurements of 100% sulfuric acid production during each test run.

35. SO_2 Emission Limits. Marsulex, with respect to the Oregon and Cairo Facilities, and Chemtrade, with respect to the BSTR Facilities, shall conduct a performance test measuring the emission rate of SO_2 in accordance with the applicable requirements of 40 C.F.R. Part 60, Appendix A, Reference Method 8, and Part 60, Appendix B, Performance Specification 2. This test shall consist of at least nine method test runs and may serve as the CEMS relative accuracy test required under Performance Specification 2. If applicable, this test may also serve as the NSPS performance test required under 40 C.F.R. § 60.8. Marsulex and Chemtrade shall take all steps necessary to assure accurate measurements of 100% sulfuric acid production during each test run.

36. Advance Notification. By no later than 30 days before any performance test required by this Section V.F. is conducted, Marsulex and Chemtrade, as applicable, shall provide notice, in the manner set forth in Section XV (Notices), of its intent to conduct such test to U.S. EPA, the state in which the Covered Sulfuric Acid Plant is located, and, if applicable, the Plaintiff-Intervenor. This notification must include the scheduled date of the test, an emissions test protocol, a description of the planned operating rate and operating conditions, and the procedures that will be used to measure 100% Sulfuric Acid Production. If U.S. EPA or a Co-Plaintiff requires any adjustment of the testing protocol or operating conditions, Defendant shall make such adjustments and conduct the performance test in conformity with U.S. EPA's and/or the Co-Plaintiff's requirements or submit the issue(s) for resolution under the dispute resolution provisions (Section XI) of this Consent Decree.

37. Report of Results. By no later than 60 days after conducting a performance test required under this Subsection V.F., Marsulex, with respect to the Oregon and Cairo Facilities,

and Chemtrade, with respect to the BSTR Facilities, shall submit to U.S. EPA and to the Applicable Co-Plaintiff or Plaintiff-Intervenor, in the manner set forth in Section XV (Notices), a report documenting the results of the performance tests.

G. Operation and Maintenance Plans

38. By no later than the following dates, Marsulex, with respect to the Oregon Facility, Chemtrade, with respect to the BSTR Facilities, and Marsulex and Chemtrade together, with respect to the Cairo Facility, shall prepare and submit to U.S. EPA and the Applicable Co-Plaintiff or Plaintiff-Intervenor, in the manner set forth in Section XV (Notices), an Operation and Maintenance Plan ("O & M Plan") for each Covered Sulfuric Acid Plant:

a. Beaumont: July 1, 2011

b. Shreveport: January 1, 2012

c. Tulsa: January 1, 2010

d. Riverton 1: January 1, 2013

e. Riverton 2: January 1, 2013

f. Cairo: July 1, 2011

g. Oregon A: July 1, 2011

h. Oregon B: July 1, 2011

U.S. EPA and/or the Applicable Co-Plaintiff or Plaintiff-Intervenor may provide comments and/or recommendations with respect to each Plan.

39. Each O & M Plan shall describe the operating and maintenance procedures necessary to: (i) minimize the frequency of Covered Sulfuric Acid Plant Shutdowns (thereby reducing the number of Startups of each Covered Sulfuric Acid Plant); and (ii) at all times,

including during periods of Startup, Shutdown, and Malfunction, maintain and operate each Covered Sulfuric Acid Plant, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions.

40. By no later than the dates set forth in Paragraph 38, Marsulex, with respect to the Oregon Facility, and Chemtrade, with respect to the Cairo and BSTR Facilities, shall implement the O & M Plan. No less frequently than once every three years, Marsulex, with respect to the Oregon Facility, and Chemtrade, with respect to the Cairo and BSTR Facilities shall review, and update as necessary, the O & M Plan for their respective Covered Sulfuric Acid Plants.

H. Joint Notice Regarding the Transfer of Responsibilities for Compliance with Certain Requirements related to the Cairo Facility

41. Joint Notice.

a. Requirements Subject to the Transfer of Responsibility. Marsulex and Chemtrade expect to transfer responsibility for compliance with the following requirements at the Cairo Facility from Marsulex to Chemtrade at some time during the course of this Consent Decree: (i) the SO_2 Short-Term Limit in Subparagraph 20.b; (ii) the acid mist limit in Paragraph 23.f; (iii) the NSPS obligations of Paragraph 25; (iv) the operation and maintenance of the CEMS pursuant to Paragraphs 29 - 30; (v) the implementation of the CEMS Plan pursuant to Paragraph 31 and Appendix F; and (vi) the reporting requirements of Paragraph 55. Marsulex and Chemtrade have entered into a separate agreement (to which neither the United States nor the State of Ohio is a party) that governs, *inter alia,* that transfer of responsibility.

b. Liability for the Requirements of Subparagraph 41.a and Contents of a Joint Notice. Notwithstanding Subparagraph 41.a, for purposes of this Consent Decree,

Marsulex shall remain liable for each of the requirements identified in Subparagraph 41.a unless and until Marsulex and Chemtrade submit a notice, jointly executed by them ("Joint Notice"), to the United States and Ohio, in the manner set forth in Section XV (Notices) and by certified mail, that specifically references this Paragraph and identifies the date on which compliance with the relevant requirement will be transferred. In order for the transfer of responsibility for compliance with the SO_2 Short-Term Limit and the acid mist limit to be effective, the Joint Notice must include the results of a performance test that demonstrates compliance with each of these limits.

c. Multiple Joint Notices Allowed. Separate Joint Notices for separate compliance requirements may be submitted or a Joint Notice or Notices that include the transfer of more than one compliance requirement may be submitted.

42. For those requirements for which responsibility is transferred from Marsulex to Chemtrade pursuant to a Joint Notice under Paragraph 41, Marsulex shall have no further responsibility, liability, or obligation under this Consent Decree on and after the date specified in the Joint Notice for the transfer of responsibility for the requirement(s) of this Consent Decree that is(are) the subject of the Joint Notice; provided however, that nothing in this provision is intended to:

a. Prevent the United States and/or Ohio from seeking stipulated penalties from Marsulex, or otherwise enforcing this Consent Decree against Marsulex, after the transfer of responsibility date specified in a Joint Notice for violations or non-compliance that occurred prior to the transfer of responsibility date in the Joint Notice; or

b. Supersede any separate agreement, made outside of this Consent Decree, related to indemnification as between Chemtrade and Marsulex for stipulated penalties.

43. In no event shall the United States or Ohio be a party to any dispute or dispute resolution process between Marsulex and Chemtrade regarding the transfer of compliance responsibilities at the Cairo Facility, including the date on which a CEMS is capable of being operated and maintained. Such disputes are not governed by this Consent Decree or the dispute resolution provisions herein (Section XI).

VI. PERMITS

44. Permits Prior to Construction or Installation. Marsulex, with respect to the Oregon Facility, and Chemtrade, with respect to the Cairo and BSTR Facilities, shall obtain all required federal, state, and local permits necessary for performing any compliance obligation under this Consent Decree, including without limitation permits for construction of pollution control technology and the installation of equipment at the Covered Sulfuric Acid Plants. Chemtrade and Marsulex may seek relief under the provisions of Section X (Force Majeure) of this Consent Decree for any delay in the performance of any such obligation resulting from a failure to obtain, or a delay in obtaining, any permit or approval required to fulfill such obligation if Chemtrade or Marsulex, as applicable, has submitted timely and complete applications and has taken all other actions necessary to obtain such permit(s) or approval(s).

45. Permit Applications for Permits Incorporating the Limits in Subsection V.A. By no later than the dates set forth in Paragraph 46, Marsulex, with respect to the Oregon Facility, and Chemtrade, with respect to the Cairo and BSTR Facilities, shall submit to the relevant permitting authority a complete application to incorporate the following requirements into federally enforceable minor or major new source review permits or other federally-enforceable permits (other than Title V permits):

a. For each Covered Sulfuric Acid Plant:

i. The limits for SO_2 emissions and Mass Caps established in Section V.A. of this Consent Decree; and

ii. The monitoring requirements established in the CEMS Plans.

b. For the Beaumont, Riverton 1 and 2, and Cairo Sulfuric Acid Plants (which unlike the Tulsa, Shreveport, and Oregon A and B Sulfuric Acid Plants, do not already have these requirements incorporated into their permits):

i. The acid mist emission limit established in Section V.C. of this Consent Decree;

ii. The applicability of 40 C.F.R. Part 60, Subparts A and H, and all requirements therein.

46. Dates for Permit Applications. Marsulex, with respect to the Oregon Facility, and Chemtrade, with respect to the Cairo and BSTR Facilities, shall submit the permit applications required in Paragraph 45 by the following dates:

a. Beaumont: January 1, 2013

b. Shreveport: July 1, 2013

c. Tulsa: July 1, 2011

d. Riverton 1: July 1, 2014

e. Riverton 2: July 1, 2014

f. Oregon A: January 1, 2013

g. Oregon B: January 1, 2013

h. Cairo: 365 days after the date of the Joint Notice from Chemtrade and Marsulex in which Chemtrade accepts responsibility for compliance with the Short-Term Limit set forth in Paragraph 20.

47. Following submission of the complete permit applications, Chemtrade and Marsulex shall cooperate with the applicable federal, state or local agency by promptly submitting to the applicable agency all available information that the applicable agency seeks following its receipt of the permit materials.

48. Title V or Other Operating Permits: Emission Limits and Standards. This Consent Decree shall not terminate until the requirements set forth in this Paragraph are incorporated into: (i) a Title V operating permit for all Facilities except the Tulsa Facility (which, as of the Effective Date of this Consent Decree, is a minor source and does not have a Title V permit); and (ii) the operating permit for the Tulsa Facility. Therefore, during the duration of this Consent Decree, Chemtrade and Marsulex shall file all applications necessary to incorporate the following Consent Decree requirements into the operating permits for each Facility in accordance with state rules, including applicable administrative amendment provisions of such rules:

a. For each Covered Sulfuric Acid Plant:

   i. The limits for SO_2 emissions and Mass Caps established in Section V.A. of this Consent Decree;

   ii. A requirement that the SO_2 and acid mist emission limits shall not be relaxed; and

   iii. The monitoring requirements established in the CEMS Plans.

b. For the Beaumont, Riverton 1 and 2, and Cairo Sulfuric Acid Plants (which unlike the Tulsa, Riverton, and Oregon A and B Sulfuric Acid Plants, do not already have these requirements incorporated into their operating permits):

   i. The acid mist emission limit established in Section V.C. of this Consent Decree;

ii. The applicability of 40 C.F.R. Part 60, Subparts A and H, and all requirements therein.

49. Requirements incorporated into Title V operating permits (for the non-Tulsa Facilities) or other operating permits (for the Tulsa Facility) pursuant to Paragraph 48 shall survive termination of this Consent Decree.

50. For any permit applications required by this Section VI that are filed after the Effective Date of this Consent Decree, Marsulex, with respect to the Oregon Facility, and Chemtrade, with respect to the Cairo and BSTR Facilities, shall submit to U.S. EPA and the Applicable Co-Plaintiff or Plaintiff-Intervenor, in the manner set forth in Section XV (Notices), a copy of each application, as well as a copy of any permit proposed as a result of such application, to allow for timely participation in any public comment opportunity. If, as of the Effective Date, Chemtrade and/or Marsulex, as applicable, already has received any permit necessary to implement the requirements of this Consent Decree, then no later than 30 days after the Effective Date, Chemtrade and/or Marsulex, as applicable, shall submit copies of such permits to U.S. EPA, and, for the Riverton Facility, to the Plaintiff-Intervenor, in the manner set forth in Section XV (Notices). U.S. EPA and/or the Plaintiff-Intervenor may excuse in writing all or part of the latter submissions if copies of such permits have already been submitted prior to the Effective Date.

51. Emission Credit Generation. Chemtrade and Marsulex shall not use any SO_2 or acid mist emission reductions resulting from any projects conducted pursuant to this Consent Decree for the purpose of obtaining netting credits or offsets in any Prevention of Significant

Deterioration (PSD), major NSR, and/or minor NSR permit or permit proceeding; provided however, that nothing in this Consent Decree is intended to prohibit a Defendant from:

a. Using emission reductions from the installation of controls required by this Consent Decree in determining whether a project that includes both the installation of controls under this Consent Decree and other construction or modifications (including construction or modifications that affect the facility's production capacity) that occur at the same time and are permitted as a single project triggers PSD and/or NSR requirements;

b. Using netting reductions or emission offset credits from units that are covered by this Decree to the extent that the proposed netting reductions or emission offset credits represent the difference between the emission limits set forth in this Consent Decree and the more stringent emission limits that the applicable Defendant may elect to accept for these units in a permitting process**;**

c. Using netting reductions or emissions offset credits from units that are not subject to an emission limitation under this Consent Decree;

d. Using netting reductions or emissions offset credits for any pollutants other than sulfur dioxide or sulfuric acid mist.

VII. MODIFICATIONS TO IMPLEMENTATION SCHEDULES RELATED TO THE UNAVAILABILITY OF A QUALIFIED CONTRACTOR/CONSULTANT

52. Modifications to Implementation Schedules related to the Unavailability of Qualified Contractors and/or Consultants for the Defendants.

a. Defendants' General Obligation. Chemtrade and Marsulex, as applicable, shall be solely responsible for compliance with any deadline or the performance of any work described in Section V of this Consent Decree, including work that is conducted using the services of a qualified contractor and/or consultant.

b. Conditions Precedent to Utilizing this Section. Before either Defendant may seek to extend any deadlines set forth in Section V through the use of this Section VII, the applicable Defendant must have: (i) developed and submitted to U.S. EPA and any Applicable

Co-Plaintiff or Plaintiff-Intervenor, in the manner set forth in Section XV (Notices), at the outset of the project, a Gantt chart or similar document identifying the critical path analysis for the project including identifying when contractors and/or consultants first must be consulted and when it/they must be retained; Defendant may submit updates to this chart or document as the project proceeds; (ii) undertaken the steps in the project that could reasonably be undertaken without the retention of a qualified contractor or consultant; (iii) undertaken a good faith effort to identify all contractors or consultants that would be qualified and available to undertake the work in the area of the country where the Covered Sulfuric Acid Plant is located; and (iv) contacted all qualified contractors and consultants about their earliest availability for doing the work.

c. Notification. If it appears that the unavailability of a qualified contractor or consultant may delay a Defendant from meeting the compliance requirements in Section V pursuant to the schedule set forth therein, the Defendant shall notify U.S. EPA and the Applicable Co-Plaintiff or Plaintiff-Intervenor in writing, in the manner set forth in Section XV (Notices), of any such delays as soon as the Defendant reasonably concludes that the delay could affect its ability to comply with the implementation schedule.

d. Contents of the Notice. In the notice due under Paragraph 52.c, the Defendant must include: (i) the original Gantt chart and all updates, if any; (ii) the steps that Defendant undertook in furtherance of the project; (iii) an identification of each qualified contractor/consultant; (iv) a written representation from each qualified contractor/consultant regarding the earliest schedule under which that contractor/consultant could complete the work or an affidavit from the Defendant containing such information; (v) the date(s) that the Defendant contends it will be unable to meet; (vi) proposed revised date(s) for approval by U.S. EPA, after

consultation with any Applicable Co-Plaintiff or Plaintiff-Intervenor; and (vii) the specific efforts Defendant will take to continue to complete the project.

e. Cost Not a Factor. Cost shall not be a consideration in determining the unavailability of a qualified contractor and/or consultant unless the cost is significantly disproportionate to reasonable and customary commercial rates.

f. Dispute Resolution. Section XI ("Dispute Resolution") shall govern the resolution of any dispute respecting any claim by either Defendant that the unavailability of a qualified contractor/consultant will cause a delay, including any disputes about the duration of the delay attributable to the unavailability of a qualified contractor/consultant. U.S. EPA, in consultation with any Applicable Co-Plaintiff or Plaintiff-Intervenor, will not unreasonably withhold its consent to a request for a schedule modification if the requirements of this Paragraph 52 are met.

g. Procedures for Modifying Dates. The provisions of Section XVIII ("Modification") shall govern the manner in which modifications under this Section shall be made.

h. Stipulated Penalties Inapplicable. Stipulated penalties shall not accrue nor be due and owing during any period between an originally scheduled implementation date and an approved modification to such date; provided however, that U.S. EPA and any Applicable Co-Plaintiff will retain the right to seek stipulated penalties if U.S. EPA does not approve a modification to a date or dates.

i. Force Majeure Inapplicable. The unavailability of a qualified contractor or consultant will not constitute a *force majeure* event triggering the requirements of Section X; instead this Section VII will apply.

53. [Reserved.]

VIII. REPORTING REQUIREMENTS

54. Information Documenting how Compliance will be Achieved. By no later than the following dates, Marsulex and Chemtrade, as applicable, shall submit to U.S. EPA and the Applicable Co-Plaintiff or Plaintiff-Intervenor, in the manner set forth in Section XV (Notices), information (including, if applicable, preliminary design specifications) documenting how Marsulex or Chemtrade, as applicable, intends to comply with the emission limitations set forth in Subsection V.A:

Facility	Applicable Defendant	Date Compliance Information is Required
Beaumont	Chemtrade	July 1, 2010
Shreveport	Chemtrade	January 1, 2011
Tulsa	Chemtrade	January 1, 2009
Riverton	Chemtrade	January 1, 2012
Oregon	Marsulex	July 1, 2010
Cairo	Marsulex	July 1, 2010

55. Semi-Annual Reports: Contents. For the time frames and Covered Sulfuric Acid Plants set forth in Paragraph 56, the applicable Defendant named therein shall submit to U.S. EPA and the Co-Plaintiffs and Plaintiff-Intervenor, in the manner set forth in Section XV (Notices), a semi-annual progress report no later than January 31 and July 31 of each year, with

the first semi-annual report due on July 31, 2009. Each semi-annual report shall contain the following information with respect to, respectively, the half-year between July 1 and December 31, or the half-year between January 1 and June 30:

a. Work performed and progress made toward implementing the requirements of Section V;

b. Any significant modifications to previously-submitted design specifications of any pollution control system, or to monitoring equipment, required to comply with the requirements of Section V;

c. Any significant problems encountered or anticipated in complying with the requirements of Section V;

d. A summary of the emissions monitoring and testing data collected to demonstrate compliance with a requirement of this Consent Decree;

e. On and after the compliance dates for Short-Term Limits, a description of all periods of Startup, Shutdown, and Malfunction, including quantity of sulfur dioxide emitted during such periods and the causes of Malfunctions;

f. On and after the compliance dates for Short-Term Limits, all information required to be reported in the applicable CEMS Plan;

g. Status of permit applications and a summary of all permitting activity pertaining to compliance with this Consent Decree;

h. Any reports to State agencies pertaining to compliance with this Consent Decree;

i. For the Cairo Facility, the dates on which, pursuant to the requirements of Section V.H, the responsibility for compliance with each of the requirements that are subject to being transferred is in fact transferred from Marsulex to Chemtrade; and

j. After submission of the O&M Plans specified in Paragraph 38 of this Consent Decree, a description of any changes or updates made to such Plans.

56. Semi-Annual Reports: Responsible Party and Time Frame.

a. BSTR Facilities. Chemtrade shall be responsible for the semi-annual reports required in Paragraph 55 for the BSTR Facilities from the Effective Date of this Consent Decree until termination of the Consent Decree for the Facility being reported upon.

b. Oregon Facility. Marsulex shall be responsible for the semi-annual reports required in Paragraph 55 for the Oregon Facility from the Effective Date of this Consent Decree until termination of the Consent Decree for the Oregon Facility.

c. Cairo Facility.

i. Marsulex shall be responsible for the semi-annual reports (whether they cover a full six months or, for the first and last report, only part of six months) required in Paragraph 55 for the Cairo Facility from the Effective Date of this Consent Decree until the date of the transfer of the last compliance requirement between Marsulex and Chemtrade as specified in a final Joint Notice.

ii. Chemtrade shall be responsible for the semi-annual report (whether it covers a full six months or only part of six months) that is first due after the date of the transfer of the last compliance requirement between Marsulex and Chemtrade as specified in a final Joint Notice. This report shall cover the period of time between the date that Chemtrade accepts responsibility for the last compliance requirement for which responsibility will be transferred and December 31 or June 30, as applicable. Thereafter, Chemtrade shall be responsible for the semi-annual reports at the Cairo Facility until termination of this Consent Decree for the Cairo Facility.

57. Notification of Potential Non-Compliance. If Chemtrade or Marsulex violates, or has reason to believe that it may violate, any requirement of this Consent Decree or of any applicable permit, Chemtrade or Marsulex, as applicable, shall notify the United States and the Applicable Co-Plaintiff or Plaintiff-Intervenor of such violation or potential violation and its

duration or anticipated likely duration, in writing, within 45 calendar days of the day Chemtrade or Marsulex, as applicable, first becomes aware of the violation or potential violation, with an explanation of the violation's likely cause and of the remedial steps taken, or to be taken, to prevent or minimize such violation. If the cause of a violation cannot be fully explained at the time the report is due, Chemtrade or Marsulex, as applicable, shall so state in the report. Chemtrade or Marsulex, as applicable, shall investigate the cause of the violation and shall then submit an amendment to the report, including a full explanation of the cause of the violation, within 30 days of the day Chemtrade or Marsulex, as applicable, becomes aware of the cause of the violation. Nothing in this Paragraph or the following Paragraph relieves Chemtrade or Marsulex, as applicable, of its obligation to provide the notice required by Section X of this Consent Decree (Force Majeure).

58. Imminent Threat. Whenever any violation of this Consent Decree or of any applicable permit or any other event affecting the performance of Marsulex or Chemtrade under this Decree results in a reportable release of a hazardous substance, Chemtrade or Marsulex, as applicable, shall notify U.S. EPA, the state in which the Covered Sulfuric Acid Plant is located, and the Plaintiff-Intervenor, orally or by electronic or facsimile transmission as soon as possible, but no later than 24 hours after Chemtrade or Marsulex, as applicable, first knew of, or should have known of, the violation or event. This procedure is in addition to the requirements set forth in the preceding Paragraph.

59. All reports shall be submitted to the persons and in the manner designated in Section XV of this Consent Decree (Notices).

60. Each report submitted by Chemtrade or Marsulex, as applicable, under this Section shall be signed by a plant manager, a corporate official responsible for environmental management and compliance, or a corporate official responsible for plant engineering management of Chemtrade or Marsulex, as applicable, and shall include the following certification:

> 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 this document and its attachments were prepared either by me personally or under my direction or supervision in a manner designed to ensure that qualified and knowledgeable personnel properly gather and present the information contained therein. I further certify, based on my personal knowledge or on my inquiry of those individuals immediately responsible for obtaining the information, 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 for knowingly and willfully submitting a materially false statement.

61. The reporting requirements of this Consent Decree do not relieve Chemtrade or Marsulex, as applicable, of any reporting obligations required by the CAA or implementing regulations, or by any other federal, state, or local law, regulation, permit, or other requirement. The reporting requirements of this Section are in addition to any other reports, plans, or submissions required by other Sections of this Consent Decree.

62. Any information provided pursuant to this Consent Decree may be used by the United States or the Co-Plaintiffs or the Plaintiff-Intervenor in any proceeding to enforce the provisions of this Consent Decree and as otherwise permitted by law. All information and documents submitted by Defendants to the United States or the Co-Plaintiffs or the Plaintiff-Intervenor pursuant to this Consent Decree shall be subject to public inspection unless identified and supported as confidential business information in accordance with 40 C.F.R. Part 2

and other applicable state law. No confidential business information shall be required to be submitted to the Plaintiff-Intervenor. Under no circumstances shall emissions data be identified or considered confidential business information.

IX. STIPULATED PENALTIES

63. Failure to Pay Civil Penalty. If Defendants fail to pay any portion of the civil penalty required to be paid under Section IV of this Decree (Civil Penalty) when due, Defendants shall be jointly and severally liable for a stipulated penalty of $1,000 per day for each day that the payment is late. Late payment of the civil penalty and any accrued stipulated penalties shall be made in accordance with Paragraph 9. Each stipulated penalty due under this Paragraph shall be paid exclusively to the Party or Parties to whom Defendants failed to make timely payment of the full civil penalty due.

64. Failure to Meet all Other Consent Decree Obligations. Marsulex, with respect to the Oregon Facility, and Chemtrade, with respect to the BSTR Facilities, shall be liable for stipulated penalties to the United States and to the Applicable Co-Plaintiff for violations of this Consent Decree as specified in Paragraphs 65 - 73 unless excused under Section X (Force Majeure). With respect to the Cairo Facility, the following Table identifies the time periods during which each Defendant is liable for stipulated penalties for Consent Decree violations. If no time period is specified, then the listed Defendant shall be exclusively responsible for stipulated penalties under that provision.

CD Requirement	Defendant Liable	Time Period
¶ 20.a: Long-Term SO_2 Limit	Chemtrade	
¶ 20.b: Short-Term SO_2 Limit	Marsulex	Until the date of the transfer of responsibility as specified in a ¶ 41 Joint Notice
¶ 23.f Acid Mist Limit ¶ 25: NSPS, including opacity	Marsulex	Until the date of the transfer of responsibility as specified in a ¶ 41 Joint Notice
	Chemtrade	On and after the date of the transfer of responsibility as specified in a ¶ 41 Joint Notice
¶ 27: Best Practices	Chemtrade	
¶¶ 28: Installation, Certification, and Calibration of a CEMS	Marsulex	
¶¶ 29 - 31: Maintenance and Operation of a CEMS and Implementation of the CEMS Plans in Appendix F	Marsulex	Until the date of the transfer of responsibility as specified in a ¶ 41 Joint Notice
	Chemtrade	On and after the date of the transfer of responsibility as specified in a ¶ 41 Joint Notice
¶ 33 - 37: Performance Testing	Marsulex	
¶¶ 38 - 39: O & M Plan	Marsulex and Chemtrade	Jointly and Severally
¶ 40: O & M Implementation and Updates as necessary	Chemtrade	
¶¶ 44 - 50: Permit Requirements	Chemtrade	

¶¶ 54: Reporting: Information documenting how compliance will be achieved	Marsulex	
¶ 55: Reporting: Semi-Annual Reports	Marsulex	Until the date of the transfer of responsibility as specified in a ¶ 41 Joint Notice
	Chemtrade	On and after the date of the transfer of responsibility as specified in the ¶ 41 Joint Notice

65. Short-Term SO_2 Limits and SO_2 Limits During Startup, as set forth in Paragraphs 13 - 20. For each violation of a Short-Term SO_2 Limit or an SO_2 Limit during Startup, in any non-overlapping 3-hour period:

Percentage Over the Limit	Penalty per Violation
1 - 50%	$250
51 - 100%	$500
Over 100%	$750

An example of the computation of penalties under this Paragraph is set forth in Appendix I. Where a violation of the Short-Term SO_2 Limit also violates the NSPS SO_2 Limit, the provisions of this stipulated penalty paragraph shall apply.

66. Long-Term SO_2 Limits as set forth in Paragraphs 18 - 20. For each violation, per day, of the Long-Term SO_2 Limit:

Period of Noncompliance	Penalty per day
1st - 14th day	$1000
15th - 30th day	$1500
31st day and each day thereafter	$2000

An example of the computation of penalties under this Paragraph is set forth in Appendix I.

67. Mass Cap. For each violation of a Mass Cap identified in Paragraphs 13 - 17, a stipulated penalty of $150,000 per violation shall accrue. A Mass Cap violation may occur only one time per month and only when the sum of the SO_2 emitted in the immediately preceding 12 months exceeds the Mass Cap.

68. Opacity Limits in the NSPS. For each violation of the opacity requirements of 40 C.F.R. § 60.83(a)(2), as demonstrated by a Method 9 reference test, $40 per six (6) minute average reading in excess of the limit, up to a maximum of $2000 per day.

69. Emissions Monitoring. For each violation of any of the requirements of Paragraphs 28 - 31 and the applicable CEMS Plan:

Period of Noncompliance	Penalty per violation per day
1st - 14th day	$1500
15th - 30th day	$2000
31st day and each day thereafter	$2500

70. Performance Testing. For each violation of any of the requirements of Paragraphs 33 - 37:

Period of Noncompliance	Penalty per violation per day
1st - 14th day	$1000
15th - 30th day	$1500
31st day and each day thereafter	$2000

71. Permitting Requirements. For each violation of any of the requirements of Paragraphs 44 - 50:

Period of Noncompliance	Penalty per violation per day
1st - 14th day	$1000
15th - 30th day	$1500
31st day and each day thereafter	$2000

72. Reporting Requirements. For each violation of any of the requirements of Paragraphs 37, 54, 55 and 57:

Period of Noncompliance	Penalty per violation per day
1st - 14th day	$150
15th - 30th day	$250
31st day and each day thereafter	$500

73. All Others. For each failure to comply with any requirement of this Consent Decree not specifically referenced in Paragraphs 65 - 72 or of any plan or schedule approved under this Consent Decree within the specified time established by or approved under this Decree:

Period of Noncompliance	Penalty per violation per day
1st - 14th day	$150
15th - 30th day	$250
31st day and each day thereafter	$500

74. Allocation of Stipulated Penalties Among the United States and the Co-Plaintiffs. Prior to making a written demand for stipulated penalties, the United States and the Applicable Co-Plaintiff will consult with each other to determine if they jointly are making the demand or not. Where both sovereigns seek stipulated penalties for the same violation of this Consent Decree, they each shall receive 50% of the total amount paid. Where only one sovereign demands stipulated penalties for a violation, that sovereign shall make the demand on its own behalf, and, if it has complied with the consultation requirements in this Paragraph, shall be entitled to receipt of the full amount of stipulated penalties paid for the violation. Chemtrade or Marsulex, as applicable, shall not be liable for additional stipulated penalties to any other sovereign if a demand is made by only one sovereign after consultation with the other affected

sovereigns as required above. In such cases, all other sovereigns shall be deemed to have waived the right to seek stipulated penalties.

75. Waiver of Payment. The United States and/or the Applicable Co-Plaintiff may, in its/their unreviewable discretion, waive payment of any portion or all of the stipulated penalties that may be due to it/them under this Consent Decree. The determination by one sovereign not to seek stipulated penalties, or subsequently to waive or reduce the amount it seeks, shall not preclude the other sovereign from seeking stipulated penalties up to the full amount specified for the violation.

76. Demand for Stipulated Penalties. A written demand for the payment of stipulated penalties will identify the particular violation(s) to which the stipulated penalty relates; the stipulated penalty amount that the United States and/or the Applicable Co-Plaintiff is demanding for each violation (as can be best estimated); the calculation method underlying the demand; and the grounds upon which the demand is based.

77. Stipulated Penalties' Accrual. Stipulated penalties will begin to accrue on the day after performance is due or the day a violation occurs, whichever is applicable, and will continue to accrue until performance is satisfactorily completed or the violation ceases. Stipulated penalties shall accrue simultaneously for separate violations of this Consent Decree.

78. Stipulated Penalties Payment Due Date. Stipulated penalties shall be paid no later than sixty (60) days after receipt of a written demand by the United States and/or the Applicable Co-Plaintiff unless the demand is disputed through compliance with the requirements of Paragraph 80 and the dispute resolution provisions of this Decree.

79. Manner of Payment of Stipulated Penalties. Stipulated penalties owing to the United States of under $10,000 will be paid by check and made payable to "U.S. Department of Justice," referencing DOJ Number 90-5-2-1-06944/1 and USAO File Number 2008V02383, and delivered to the U.S. Attorney's Office in the Northern District of Ohio, 801 W. Superior Ave., Suite 400, Cleveland, OH 44113. Stipulated penalties owing to the United States of $10,000 or more and stipulated penalties owing to Co-Plaintiffs will be paid in the manner set forth in Section IV (Civil Penalty) of this Consent Decree. All transmittal correspondence shall state that the payment is for stipulated penalties, shall identify the violations to which the payment relates, and shall include the same identifying information required by Paragraph 9.

80. Disputes over Stipulated Penalties. By no later than 60 days after receiving a demand for stipulated penalties, the applicable Defendant may dispute liability for any or all stipulated penalties demanded by invoking the dispute resolution procedures of Section XI and by placing the disputed amount, if it is greater than $25,000, into an interest-bearing, commercial escrow account. The applicable Defendant shall provide the sovereigns making the demand with a copy of the escrow agreement and the bank statement showing the deposit of the disputed amount into the escrow account. If the dispute thereafter is resolved in the applicable Defendant's favor, the escrowed amount plus accrued interest will be returned to that Defendant; otherwise, U.S. EPA and/or the Applicable Co-Plaintiff will be entitled to the amount that was determined to be due, plus the interest that has accrued in the escrow account on such amount.

81. No amount of the stipulated penalties paid by the Defendants shall be used to reduce their federal or state tax obligations.

82. If any Defendant fails to pay stipulated penalties when due and does not prevail in dispute resolution and is not required to escrow the disputed sum pursuant to Paragraph 80, that Defendant shall be liable for interest at the rate specified in 28 U.S.C. § 1961, accruing as of the date payment became due.

83. Subject to the provisions of Section XIII of this Consent Decree (Effect of Settlement/Reservation of Rights), the stipulated penalties provided for in this Decree shall be in addition to any other rights, remedies, or sanctions available to the United States or the Applicable Co-Plaintiff or Plaintiff-Intervenor for a violation of this Consent Decree or applicable law. If the violations result in excess emissions, then the United States and/or Applicable Co-Plaintiff may elect to seek compensatory emissions reductions equal to or greater than the excess amounts emitted in addition to injunctive relief or stipulated penalties. Where a violation of this Consent Decree also is a violation of Subparts A or H of the NSPS or of the PSD or non-attainment NSR requirements, Chemtrade or Marsulex, as applicable, shall be allowed a credit for any stipulated penalties paid (whether to the United States and/or a Co-Plaintiff) against any statutory penalties imposed for such violation.

X. FORCE MAJEURE

84. As used in this Section X, "Defendant" refers to the particular Defendant – Chemtrade or Marsulex – that raises the Force Majeure claim.

85. A "Force Majeure Event" is any event beyond the control of Defendant, its contractors, or any entity controlled by Defendant that delays the performance of any obligation under this Consent Decree despite Defendant's best efforts to fulfill the obligation. "Best efforts" includes anticipating any potential force majeure event and addressing the effects of any such

event (a) as it is occurring; and (b) after it has occurred, to prevent or minimize any resulting delay to the greatest extent possible.

86. "Force Majeure" does not include Defendant's financial inability to perform any obligation under this Consent Decree. Unanticipated or increased costs or expenses associated with the performance of Defendant's obligations under this Consent Decree, or Defendant's failure to make complete and timely application for any required approval or permit, shall not constitute circumstances beyond Defendant's control nor serve as the basis for an extension of time under this Section X.

87. If any event occurs which causes or may cause a delay or impediment to performance in complying with any provision of this Consent Decree, Defendant shall notify U.S. EPA and any Applicable Co-Plaintiff or Plaintiff-Intervenor: (a) orally or by electronic or facsimile transmission as soon as possible, but not later than 72 hours after the time Defendant first knew of the event or should have known of the event by the exercise of due diligence; and (b) in writing not later than seven days after the time Defendant first knew of the event or should have known of the event by the exercise of due diligence. In this notice, Defendant shall specifically reference this Paragraph 87 of the Consent Decree and shall describe the anticipated length of time the delay may persist, the cause or causes of the delay, the measures taken and/or to be taken by Defendant to prevent or minimize the delay, the schedule by which those measures shall be implemented, and the reasons Defendant attributes the delay to a Force Majeure Event (if Defendant does so). Defendant shall take all necessary measures to avoid or minimize such delays. The written notice required by this Paragraph shall be effective upon the mailing of the

same by overnight mail or by certified mail, return receipt requested, to U.S. EPA and the Applicable Co-Plaintiff or Plaintiff-Intervenor in the manner set forth in Section XV (Notices).

88. Failure by Defendant to comply with the notice requirements specified in Paragraph 87 shall preclude Defendant from asserting any claims of Force Majeure with respect to the particular event involved.

89. Within forty-five (45) days of receipt of the written Force Majeure notice provided under Paragraph 87, the United States, after consultation with any Applicable Co-Plaintiff or Plaintiff-Intervenor, will notify Defendant in writing regarding the United States' position regarding Defendant's claim of a delay or impediment to performance.

90. If the United States, after consultation with any Applicable Co-Plaintiff or Plaintiff-Intervenor, agrees that the delay or impediment to performance has been or will be caused by a Force Majeure Event, the appropriate Parties shall stipulate in writing to an extension of the required deadline(s) for all requirement(s) affected by the Force Majeure Event for a period equivalent to the delay actually caused by the Force Majeure Event. Such stipulation shall be filed as a material modification to the Consent Decree pursuant to the procedures of Section XVIII (Modification). Defendant shall not be liable for stipulated penalties for the period of any such extension.

91. If the United States, after consultation with any Applicable Co-Plaintiff or Plaintiff-Intervenor, does not accept Defendant's claim of Force Majeure, stipulated penalties will accrue as provided in Section IX. No later than forty-five (45) days after receipt of the notice provided under Paragraph 89 above, Defendant may invoke formal dispute resolution with respect to the claim of Force Majeure, pursuant to Paragraph 100, by filing a petition for

determination with the Court. After Defendant has submitted its petition, the United States and any Applicable Co-Plaintiff or Plaintiff-Intervenor shall have forty-five (45) days to file their responses to the petition. If the Court determines that the delay or impediment to performance has been or will be caused by a Force Majeure Event, Defendant shall be excused as to that event(s) and delay (including stipulated penalties) for a period of time equivalent to the delay caused by the Force Majeure Event.

92. Defendant shall bear the burden of proving that any delay in satisfying any requirement(s) of this Consent Decree was caused by or will be caused by a Force Majeure Event. Defendant shall also bear the burden of proving the duration and extent of any delay(s) attributable to such Force Majeure Event. Any extension of one compliance date based on a particular Force Majeure Event may, but shall not necessarily, result in an extension of a subsequent compliance date or dates.

93. Notwithstanding any other provision of this Consent Decree, this Court shall not draw any inferences nor establish any presumptions adverse to either party as a result of a Defendant's serving of a Force Majeure notice or the Parties' inability to reach agreement with respect to the claim of Force Majeure.

94. In appropriate circumstances, as part of the resolution of any matter submitted to this Court under this Section X, the Parties involved in the dispute may agree to, or the Court may order, extension or modification of the schedule for completion of work under the Consent Decree to account for the delay in the work that occurred as a result of any Force Majeure Event claimed by Defendant that is agreed to by the United States or approved by this Court.

Defendant shall be liable for stipulated penalties for its failure thereafter to complete the work in accordance with the extended or modified schedule.

XI. DISPUTE RESOLUTION

95. As used in this Section XI, "Defendant" refers to the particular Defendant – Chemtrade or Marsulex – that invokes the dispute resolution provisions.

96. Unless otherwise expressly provided for in this Consent Decree, the dispute resolution procedures of this Section shall be the exclusive mechanism to resolve disputes arising under or with respect to this Consent Decree. Defendant's failure to seek resolution of a dispute under this Section shall preclude Defendant from raising any such issue as a defense to an action by the United States to enforce any obligation of Defendant arising under this Decree. The procedures set forth in this Section do not apply to actions by the United States or a Co-Plaintiff or the Plaintiff-Intervenor to enforce obligations of the Defendant that have not been disputed in accordance with this Section.

97. Except as otherwise expressly provided in this Consent Decree, the dispute resolution procedures set forth in this Section XI shall be available to resolve any and all disputes arising under this Consent Decree, provided that the Party invoking the procedures has made a good faith attempt to resolve the matter with the other Party or Parties involved.

98. The dispute resolution procedure required herein shall be invoked upon the giving of written notice by one of the Parties to this Consent Decree to another advising the other appropriate Party(ies) of a dispute pursuant to Section XI. The notice shall describe the nature of the dispute and shall state the noticing Party's position with regard to such dispute. The Party or Parties receiving such notice will acknowledge receipt of the notice and the Parties shall

expeditiously schedule a meeting to discuss the dispute as soon as possible after receipt of such notice. In the case of a notice provided by Chemtrade or Marsulex with respect to the Cairo Facility, copies of the notice shall be provided to the other Defendant contemporaneously with the original notice to the United States.

99. Disputes submitted to dispute resolution shall, in the first instance, be the subject of informal negotiations between the Parties. Such period of informal negotiations shall not extend beyond sixty (60) days from the date of the first meeting between representatives of the Parties, unless the Parties involved in the dispute agree that this period should be shortened or extended.

100. In the event that the Parties are unable to reach agreement during such informal negotiations period, the United States and/or the Applicable Co-Plaintiff or Plaintiff-Intervenor shall provide Defendant with a written summary of its/their position regarding the dispute. The position advanced by the United States and/or the Applicable Co-Plaintiff or Plaintiff-Intervenor will be considered binding unless, within forty-five (45) days of Defendant's receipt of the written summary, Defendant invokes formal dispute resolution by filing with the Court a petition which describes the nature of the dispute and Defendant's position on the dispute. The United States and/or the Applicable Co-Plaintiff or Plaintiff-Intervenor shall respond to the petition within forty-five (45) days of filing.

101. In the event that the United States and the Applicable Co-Plaintiff or Plaintiff-Intervenor are unable to reach agreement among themselves with regard to the Defendant's claim, the position of the United States shall be the Plaintiffs' final position. A

dissenting Co-Plaintiff or Plaintiff-Intervenor may file such other pleadings expressing its position as allowed by the Court.

102. In a formal dispute resolution proceeding under this Section, Defendant shall bear the burden of demonstrating that its position complies with this Consent Decree and the CAA. The Court shall decide the dispute based upon applicable principles of law. The United States reserves the right to argue that its position is reviewable only on the administrative record and must be upheld unless arbitrary and capricious or otherwise not in accordance with law.

103. Where the nature of the dispute is such that a more timely resolution of the issue is required, the time periods set forth in this Section XI may be shortened upon motion of one of the Parties to the dispute or by agreement of the Parties to the dispute.

104. The Parties do not intend that the invocation of this Section XI by a Party cause the Court to draw any inferences nor establish any presumptions adverse to either Party as a result of invocation of this Section.

105. In appropriate circumstances, as part of the resolution of any matter submitted to this Court under this Section XI, the Parties involved in the dispute may agree to, or the Court may order, an extension or modification of the schedule for completion of work under the Consent Decree to account for the delay in the work that occurred as a result of dispute resolution. Defendant shall be liable for stipulated penalties for its failure thereafter to complete the work in accordance with the extended or modified schedule. Invocation of dispute resolution with respect to any of Defendant's obligations under this Consent Decree shall not, of itself, excuse or extend the time for performance of any other obligation of Defendant under this Consent Decree.

XII. INFORMATION COLLECTION AND RETENTION

106. The United States, the Co-Plaintiffs, and their representatives, including attorneys, contractors, and consultants, shall have the right of entry into any of the Covered Sulfuric Acid Plants covered by this Consent Decree, at all reasonable times, upon presentation of credentials, to:

a. monitor the progress of activities required under this Consent Decree;

b. verify any data or information submitted to the United States or a Co-Plaintiff or Plaintiff-Intervenor in accordance with the terms of this Consent Decree;

c. obtain samples and, upon request, splits of any samples taken by Defendants or their representatives, contractors, or consultants in connection with their performance under this Consent Decree;

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

e. assess Defendants' compliance with this Consent Decree.

107. Until at least three years after the termination of this Consent Decree, each Defendant shall retain, and shall instruct its contractors and agents to preserve, all non-identical copies of all documents, records, or other information in electronic form in its or its contractors' or agents' possession or control, or that come into it or its contractors' or agents' possession or control, and that directly relates to Defendant's performance of its obligations under this Consent Decree. This information-retention requirement shall apply regardless of any contrary corporate or institutional policies or procedures. At any time during this information-retention period, the United States, a Co-Plaintiff, or Plaintiff-Intervenor may request copies of any documents, records, or other information required to be maintained under this Paragraph.

108. At the conclusion of the information retention period specified in the preceding Paragraph, each Defendant shall notify the United States, the Co-Plaintiffs, and the Plaintiff-Intervenor at least 90 days prior to destroying any document(s), record(s), or other information subject to the requirements of the preceding Paragraph and, upon request by the United States, a Co-Plaintiff, or Plaintiff-Intervenor, the applicable Defendant shall deliver any such document(s), record(s), or other information to the requesting Plaintiff; provided, however, that no privileged information or confidential business information shall be required to be submitted to the Plaintiff-Intervenor. The applicable Defendant may assert that certain documents, records, or other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If the applicable Defendant asserts such a privilege, it shall provide the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of each author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the subject of the document, record, or information; and (6) the privilege asserted by Defendant. However, no documents, records, data, or other information created or generated pursuant to the requirements of this Consent Decree shall be withheld on grounds of privilege.

109. The applicable Defendant may also assert that information required to be provided under this Section is protected as Confidential Business Information (CBI) under 40 C.F.R. Part 2, or any similar state or tribal laws and regulations. As to any information that the applicable Defendant seeks to protect as CBI, the applicable Defendant shall follow the procedures set forth in 40 C.F.R. Part 2.

110. This Consent Decree in no way limits or affects any right of entry and inspection, or any right to obtain information, held by the United States or the States pursuant to applicable federal or state laws, regulations, or permits, nor does it limit or affect any duty or obligation of any Defendant to maintain documents, records, or other information imposed by applicable federal or state laws, regulations, or permits.

XIII. EFFECT OF SETTLEMENT/RESERVATION OF RIGHTS

111. This Consent Decree resolves the civil liability of Defendants to the United States the Co-Plaintiffs, and the Plaintiff-Intervenor for the violations alleged in the Complaint and Complaint in Intervention filed in this action (and any Notices of Violation cited therein) from the date those claims accrued through the Effective Date of this Consent Decree.

112. The United States, the Co-Plaintiffs, and the Plaintiff-Intervenor reserve all legal and equitable remedies available to enforce the provisions of this Consent Decree, except as expressly stated in Paragraph 111. This Consent Decree shall not be construed to limit the rights of the United States, the Co-Plaintiffs, or the Plaintiff-Intervenor to obtain penalties or injunctive relief under the CAA or implementing regulations, or under other federal, state, or tribal laws, regulations, or permit conditions, except as expressly specified in Paragraph 111. The United States, the Co-Plaintiffs, and the Plaintiff-Intervenor further reserve all legal and equitable remedies to address any situation that may present an imminent and substantial endangerment to the public health or welfare or the environment arising at, or posed by, the Covered Sulfuric Acid Plants, whether related to the violations addressed in this Consent Decree or otherwise.

113. This Consent Decree is not a permit, or a modification of any permit, under any federal, state, or local laws or regulations. Defendants are responsible for achieving and

maintaining compliance with all applicable federal, state, and local laws, regulations, and permits and their compliance with this Consent Decree shall be no defense to any action commenced pursuant to any such laws, regulations, or permits. The United States, the Co-Plaintiffs, and the Plaintiff-Intervenor do not, by their consent to the entry of this Consent Decree, warrant or aver in any manner that compliance by Marsulex and/or Chemtrade with any aspect of this Consent Decree will result in compliance with provisions of the CAA, or with any other provisions of federal, state, or local laws, regulations, or permits.

114. This Consent Decree does not limit or affect the rights of Defendants or of the United States, the Co-Plaintiffs, or Plaintiff-Intervenor against any third parties, not party to this Consent Decree, nor does it limit the rights of third parties, not party to this Consent Decree, against Defendants, except as otherwise provided by law.

115. This Consent Decree shall not be construed to create rights in, or grant any cause of action to, any third party that is not a Party to this Consent Decree.

XIV. COSTS

116. The Parties shall bear their own costs of this action, including attorneys' fees, except that the United States, the Co-Plaintiffs, and the Plaintiff-Intervenor shall be entitled to collect the costs (including attorneys' fees), against the applicable Defendant incurred in any action necessary to enforce this Consent Decree or to collect any portion of the civil penalty or any stipulated penalties due but not paid by a Defendant.

XV. NOTICES

117. Unless otherwise specified herein, whenever notifications, submissions, or communications are required by this Consent Decree, they shall be made in writing and

addressed to: (i) the United States Department of Justice; (ii) U.S. EPA Headquarters; (iii) U.S. EPA Region 5; (iv) if different from U.S. EPA Region 5, the U.S. EPA Region where the relevant Plant is located; and (v) the Applicable Co-Plaintiff and Plaintiff-Intervenor. Submission of hard copies is required and shall be sufficient to comply with the notice requirements of this Consent Decree. The email addresses listed below are solely to permit the submission of courtesy copies.

Notice or submission to the United States:

Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
Box 7611 Ben Franklin Station
Washington, DC 20044-7611
Re: DOJ No. 90-5-2-1-06944/1

Notice or submission to U.S. EPA that concerns any or all of the Sulfuric Acid Plants:

Air Enforcement Division Director
U.S. Environmental Protection Agency
Office of Civil Enforcement
Air Enforcement Division
U.S. Environmental Protection Agency
1200 Pennsylvania Ave, NW
Mail Code: 2242A
Washington, DC 20460

and

Charles Garlow
U.S. Environmental Protection Agency
Office of Civil Enforcement
Air Enforcement Division
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Mail Code 2242A
Washington, DC 20460

Including an electronic copy to:

garlow.charlie@epa.gov

Nathan Frank
U.S. Environmental Protection Agency
Region 5
AE-17J
77 West Jackson. Blvd.
Chicago, IL 60604

and

Robert H. Smith
U.S. Environmental Protection Agency
Region 5
C-14J
77 West Jackson. Blvd.
Chicago, IL 60604

Including electronic copies to:

frank.nathan@epa.gov
smith.roberth@epa.gov

Notice or submission to U.S. EPA that concerns the Beaumont, Shreveport, and Tulsa Facilities:

Mark Ford
U.S. Environmental Protection Agency
Region 6
1445 Ross Avenue
Suite 1200
Mailcode 6EN-EA
Dallas, TX 75202

and

Amanda Ferguson
U.S. Environmental Protection Agency
Region 6
1445 Ross Avenue
Suite 1200
Mailcode 6EN-AA
Dallas, TX 75202

Notice or submission to U.S. EPA that concerns the Riverton Facility:

Air Program Director
c/o Scott Whitmore (8ENF-AT)
Office of Enforcement, Compliance & Environmental Justice
EPA Region 8
1595 Wynkoop St.
Denver, CO 80202-1129

Notice or submission to Louisiana concerning the Shreveport Facility:

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

Notice or submission to Ohio concerning either the Cairo or Oregon Facilities:

John Paulian
Supervisor, Compliance Monitoring Unit
Division of Air Pollution Control
Ohio EPA
P.O. Box 1049
Columbus, OH 43216-1049

Notice or submission to Ohio concerning the Oregon Facility:

Karen Granata, Administrator
City of Toledo Department of Environmental Services
348 S. Erie St.
Toledo, OH 43604

Notice or submission to Ohio concerning the Cairo Facility:

Don Waltermeyer, Unit Supervisor
Northwest District Office
Division of Air Pollution Control
Ohio EPA
347 N. Dunbridge Road
Bowling Green, OH 43402

Notice or submission to Oklahoma DEQ concerning the Tulsa Facility:

Eddie Terrill, Director
Oklahoma Department of Environmental Quality
Air Quality Division
P.O. Box 1677
Oklahoma City, Oklahoma 73101-1677

and

Robert D. Singletary
Office of General Counsel
Oklahoma Department of Environmental Quality
P.O. Box 1677
Oklahoma City, Oklahoma 73101-1677

Notice or submission to the Northern Arapaho Tribe concerning the Riverton Facility:

Director
Wind River Environmental Quality Commission
P.O. Box 217
Fort Washakie, Wyoming 82514
Phone: (307) 332-6625

Notice or response to Defendant Chemtrade:

Susan M. Pare
Associate General Counsel
Chemtrade Logistics Inc.
111 Gordon Baker Road, Suite 301
Toronto, Ontario M2H 3R1
Canada

and

Chief Financial Officer
Chemtrade Logistics Inc.
111 Gordon Baker Road, Suite 301
Toronto, Ontario M2H 3R1
Canada

and

Joe Jayroe
Director, Chemtrade Manufacturing Refinery Services & Acid Products
P.O. Box 30
Beaumont, TX 77704-0030
For express mail: 1400 Olin Road, Beaumont, TX 77705

and

David Burroughs
Chemtrade Corporate Environmental Compliance Manager
10889 Hwy 1 South
P.O. Box 52147
Shreveport, LA 71135-2147

Including electronic copies to:

spare@chemtradelogistics.com
rbhardwa@chemtradelogistics.com
jjayroe@chemtradelogistics.com
dburroughs@chemtradelogistics.com

With a copy to each Applicable Covered Facility as follows:

As to the Beaumont Facility:

Nestor Gomez
Plant Manager
Chemtrade
P.O. Box 30
Beaumont, TX 77704-0030
For express mail: 1400 Olin Road, Beaumont, TX 77705

Including an electronic copy to:

ngomez@chemtradelogistics.com

As to the Shreveport Facility:

Chris Pogson
Plant Manager
Chemtrade
10889 Hwy 1 South
P.O. Box 52147
Shreveport, LA 71135-2147

Including an electronic copy to:

cpogson@chemtradelogistics.com

As to the Tulsa Facility:

Fred Boeheim
Plant Manager
Chemtrade
P.O. Box 1068
Glenpool, OK 74022
Express Mail: 5201 West 21st St.
Tulsa, OK 74107

Including an electronic copy to:

fboeheim@chemtradelogistics.com

As to the Riverton Facility:

David Luzmoor
Plant Manager
Chemtrade
140 Goes In Lodge Road
Riverton, WY 82501

Including an electronic copy to:

dluzmoor@chemtradelogistics.com

As to the Cairo Facility:

Tim Haniford
Plant Manager
Chemtrade
7680 Ottawa Road
P.O. Box 310
Cairo, OH 45820

Including an electronic copy to:

thaniford@chemtradelogistics.com

Notice or response to Defendant Marsulex:

Keith D. McLeod
Senior Vice President – Operations
Marsulex Inc.
111 Gordon Baker Road, Suite 300
Toronto, Ontario M2H 3R1
Canada

William Martin
Chief Financial Officer
111 Gordon Baker Road, Suite 300
Toronto, Ontario M2H 3R1
Canada

and

Charles A. Perry
Jones Day
1420 Peachtree St.
Atlanta, GA 30309

Including electronic copies to:

Kmcleod@marsulex.com
Wmartin@marsulex.com
statro@marsulex.com
caperry@jonesday.com

Any Party may, by written notice to the other Parties, change its designated notice recipient(s) or notice address(es) provided above. Notices submitted pursuant to this Section shall be deemed submitted upon mailing, unless otherwise provided in this Consent Decree or by mutual agreement of the Parties in writing.

XVI. EFFECTIVE DATE

118. The Effective Date of this Consent Decree shall be the date upon which this Consent Decree is entered by the Court.

XVII. RETENTION OF JURISDICTION

119. The Court shall retain jurisdiction over this case until termination of this Consent Decree, for the purpose of resolving disputes arising under this Decree, entering orders modifying this Decree, or effectuating or enforcing compliance with the terms of this Decree.

XVIII. MODIFICATION

120. The terms of this Consent Decree may be modified only by a subsequent written agreement signed by the United States, the applicable Defendant(s), and the Applicable Co-Plaintiff or Plaintiff-Intervenor, if any. Where the modification constitutes a material change to any term of this Consent Decree, it shall be effective only upon approval by the Court. The CEMS Plans attached in Appendices A-G may be modified upon written agreement of the Parties without Court approval, unless any such modification effects a material change to the terms of this Consent Decree or materially affects the applicable Defendant's ability to meet the requirements or objectives of this Decree.

XIX. TERMINATION

121. Marsulex and Chemtrade may independently seek termination of this Consent Decree pursuant to Paragraphs 122 - 125 of this Decree.

122. Except with respect to the State of Ohio, after the applicable Defendant has maintained continuous satisfactory compliance with the requirements of the CAA and this Consent Decree for a period of one year after achieving compliance with all of the requirements

of this Consent Decree (including demonstrating one year of compliance with the Short-Term Limits, Long-Term Limits, and Mass Caps in Subsection V.A), has obtained all permits required by this Consent Decree, and has paid the civil penalty and any accrued stipulated penalties as required by this Consent Decree, the applicable Defendant may serve upon the United States, the Co-Plaintiffs, and Plaintiff-Intervenor a Request for Termination, together with all necessary supporting documentation, stating that the applicable Defendant has satisfied those requirements. With respect to the State of Ohio, all of the conditions set forth in this Paragraph for termination apply except that the applicable Defendant must maintain continuous "substantial" compliance (in lieu of "satisfactory" compliance) in order to serve upon Ohio a Request for Termination.

123. Partial Termination as to One Facility. If a Defendant has satisfied its obligations and requirements under this Consent Decree with respect to an individual Facility, and the Defendant can demonstrate satisfactory compliance with the requirements of the CAA and this Consent Decree for a period of one year after achieving compliance (including demonstrating one year of compliance with the Facility's applicable Short-Term Limits, Long-Term Limits, and/or Mass Caps in Subsection V.A), and can show that it has obtained all required permits for that Facility, and that there are no outstanding civil or stipulated penalties for any Facility, then the Defendant may serve upon the United States and the Applicable Co-Plaintiff or Plaintiff-Intervenor a Request for Partial Termination as to the applicable Facility, together with all necessary supporting documentation, stating that the applicable Defendant has satisfied those requirements at the applicable Facility.

124. Following receipt by the United States and the Applicable Co-Plaintiff or Plaintiff-Intervenor of Defendant's Request for Termination or Partial Termination, the

applicable Parties shall confer informally concerning the Request for Termination or Partial Termination and any disagreement that the applicable Parties may have as to whether the applicable Defendant has satisfactorily complied with the requirements for termination of this Consent Decree. If the United States after consultation with the Applicable Co-Plaintiff or Plaintiff-Intervenor agrees that the Decree may be terminated as to the requesting Defendant for a particular Facility or all Defendant's Facilities, the applicable Parties shall submit, for the Court's approval, a joint stipulation terminating the Decree with respect to the Defendant and Facility(ies) involved.

125. If the United States after consultation with the Applicable Co-Plaintiff or Plaintiff-Intervenor does not agree that the Decree may be terminated or partially terminated, or if, with respect to the Cairo and/or Oregon Facility, the State of Ohio does not agree that the applicable Defendant is in "substantial" compliance pursuant to Paragraph 122, then the applicable Defendant may move the Court for termination or partial termination. However, the applicable Defendant shall not file such a motion until 90 days after service of its Request for Termination or Partial Termination. On any such motion, the applicable Defendant shall bear the burden of proving that the conditions necessary for termination or partial termination of the Consent Decree have been satisfied.

XX. PUBLIC PARTICIPATION

126. This Consent Decree shall be lodged with the Court for a period of not less than 30 days for public notice and comment in accordance with 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its consent if the comments regarding the Consent Decree disclose facts or considerations indicating that the Consent Decree is inappropriate,

improper, or inadequate. Defendants consent to entry of this Consent Decree without further notice.

127. The Parties agree and acknowledge that final approval by Co-Plaintiff the State of Louisiana, Department of Environmental Quality, and entry of this Consent Decree are subject to the requirements of La. R.S. 30:2050.7, which provides for public notice of this Consent Decree in newspapers of general circulation and the official journals of the parish in which the Shreveport Facility is located, an opportunity for public comment, consideration of any comments, and concurrence by the State Attorney General. The State of Louisiana reserves the right to withdraw or withhold consent if the comments regarding this Consent Decree disclose facts or considerations which indicate that this Consent Decree is inappropriate, improper or inadequate.

XXI. SIGNATORIES/SERVICE

128. Each undersigned representative of Defendants, each undersigned representative of the Co-Plaintiffs and the Plaintiff-Intervenor, and the Assistant Attorney General for the Environment and Natural Resources Division of the Department of Justice (or his or her designee) certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind the Party he or she represents to this document.

129. This Consent Decree may be signed in counterparts, and its validity shall not be challenged on that basis.

130. Defendants agree not to oppose entry of this Consent Decree by the Court or to challenge any provision of the Decree, unless the United States has notified Defendants in writing that it no longer supports entry of the Decree.

131. Defendants agree to accept service of process by mail with respect to all matters arising under or relating to this Consent Decree and to waive the formal service requirements set forth in Rules 4 and 5 of the Federal Rules of Civil Procedure and any applicable Local Rules of this Court including, but not limited to, service of a summons.

XXII. INTEGRATION

132. This Consent Decree and its Appendices constitute the final, complete, and exclusive agreement and understanding among the Parties with respect to the settlement embodied in this Consent Decree and its Appendices and supersede all prior agreements and understandings, whether oral or written, concerning the settlement embodied herein. No other document, except for any plans or other deliverables that are submitted and approved pursuant to this Decree, nor any representation, inducement, agreement, understanding, or promise, constitutes any part of this Decree or the settlement it represents, and no such extrinsic document or statement of any kind shall be used in construing the terms of this Decree.

XXIII. FINAL JUDGMENT

133. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment of the Court in this action as to the United States, the

Co-Plaintiffs, the Plaintiff-Intervenor, and the Defendants. The Court finds that there is no just reason for delay and therefore enters this judgment as a final judgment under Fed. R. Civ. P. 54 and 58.

DATED this _____ day of _____, 2009.

_____
UNITED STATES DISTRICT JUDGE
NORTHERN DISTRICT OF OHIO

We hereby consent to the entry of the Consent Decree in the matter of United States et al. v. Chemtrade Logistics (US), Inc., et al., subject to public notice and comment.

FOR THE UNITED STATES OF AMERICA

MICHAEL GUZMAN
Principal Deputy Assistant Attorney General
Environment and Natural Resources Division
United States Department of Justice

ANNETTE M. LANG
Environmental Enforcement Section
Environment and Natural Resources Division
P.O. Box 7611
Washington, D.C. 20044-7611
(202) 514-4213
(202) 616-6584 (fax)
annette.lang@usdoj.gov

WILLIAM J. EDWARDS
Acting United States Attorney
Northern District of Ohio

By: s/ Steven J. Paffilas
STEVEN J. PAFFILAS
Assistant U.S. Attorney
Reg. No. 0037376
United States Courthouse
801 West Superior Ave.
Suite 400
Cleveland, OH 44113
(216) 622-3698
(216) 522-2404 (fax)
steven.paffilas@usdoj.gov

We hereby consent to the entry of the Consent Decree in the matter of United State et al. v. Chemtrade Logistics (US), Inc. et al., subject to public notice and comment.

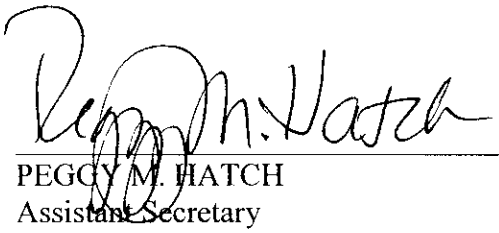
FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

GRANTA Y. NAKAYAMA
Assistant Administrator
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Ave, N.W.
Washington, D.C. 20460

ADAM M. KUSHNER
Division Director, Air Enforcement Division
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Ave, N.W.
Washington, D.C. 20460

We hereby consent to the entry of the Consent Decree in the matter of United States et al. v. Chemtrade Logistics (US), Inc., et al., subject to public notice and comment.

PRELIMINARY APPROVAL BY CO-PLAINTIFF THE STATE OF LOUISIANA, THROUGH THE DEPARTMENT OF ENVIRONMENTAL QUALITY:



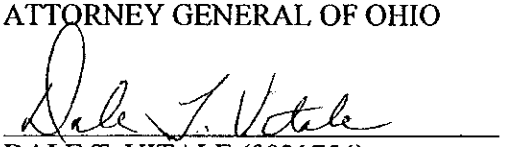
PEGGY M. HATCH
Assistant Secretary
Office of Environmental Compliance
Louisiana Department of Environmental Quality

CLAUDIA RUSH (LA. # 29408)
Attorney
Office of the Secretary
Legal Affairs Division
Louisiana Department of Environmental Quality
Post Office Box 4302
Baton Rouge, Louisiana 70821-4302

We hereby consent to the entry of the Consent Decree in the matter of United States et al. v. Chemtrade Logistics (US), Inc., et al., subject to public notice and comment.

FOR CO-PLAINTIFF THE STATE OF OHIO

NANCY H. ROGERS
ATTORNEY GENERAL OF OHIO



DALE T. VITALE (0021754)
Assistant Attorney General
Environmental Enforcement Section
Public Protection Division
30 East Broad Street, 25th Floor
Columbus, OH 43215-3414
(614) 466-2766
(614) 644-1926 (fax)
dvitale@ag.state.oh.us

We hereby consent to the entry of the Consent Decree in the matter of United States et al. v. Chemtrade Logistics (US), Inc., et al., subject to public notice and comment.

FOR CO-PLAINTIFF, OKLAHOMA
DEPARTMENT OF ENVIRONMENTAL QUALITY

STEVEN A. THOMPSON
Executive Director
Oklahoma Department of Environmental Quality
P.O. Box 1677, 707 N. Robinson
Oklahoma City, Oklahoma 73101-1677

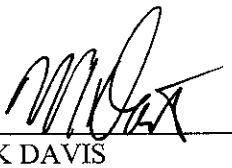
We hereby consent to the entry of the Consent Decree in the matter of United States et al. v. Chemtrade Logistics (US), Inc., et al., subject to public notice and comment.

FOR PLAINTIFF-INTERVENOR
THE NORTHERN ARAPAHO TRIBE

ANTHONY A. ADDISON, SR.
Chairman
Northern Arapaho Tribe
P.O. Box 386
Ft. Washakie, WY 82514

We hereby consent to the entry of the Consent Decree in the matter of United States et al. v. Chemtrade Logistics (US), Inc., et al.

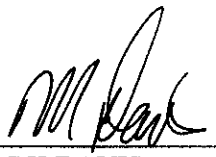
FOR DEFENDANT
CHEMTRADE LOGISTICS (US), INC.



MARK DAVIS
President and Chief Executive Officer
155 Gordon Baker Road, Suite 300
Toronto ON M2H 3N5
Canada

We hereby consent to the entry of the Consent Decree in the matter of United States et al. v. Chemtrade Logistics (US), Inc., et al.

FOR DEFENDANT
CHEMTRADE REFINERY SERVICES INC.



MARK DAVIS
President and Chief Executive Officer
155 Gordon Baker Road, Suite 300
Toronto ON M2H 3N5
Canada

We hereby consent to the entry of the Consent Decree in the matter of United States et al. v. Chemtrade Logistics (US), Inc., et al.

FOR DEFENDANT
MARSULEX, INC.

KEITH D. MCLEOD
Senior Vice President – Operations
Marsulex, Inc.
111 Gordon Baker Road, Suite 300
Toronto, Ontario M2H 3R1
Canada

APPENDIX A

APPENDIX A

BEAUMONT FACILITY

CEMS Plan for SO_2 Emissions
Chemtrade Refinery Services
Single Absorption Sulfuric Acid Regeneration Plant with Scrubber

Principle

This CEMS Plan is the mechanism for determining compliance with all SO_2 emission limits in the Consent Decree for the Beaumont Facility. The methodology described in this CEMS Plan will provide a real-time indication of compliance with the emission limits established in the Consent Decree by determining the emission rate in terms of both pounds of SO_2 emitted per unit of time and pounds of SO_2 emitted per ton of 100% Sulfuric Acid Produced (lb/ton). The system will utilize at least three analyzers: one to measure the converter inlet SO_2 concentration, one to measure stack SO_2 concentration, and one to measure stack volumetric flow rate. From these data, the emission rate, expressed as both pounds per unit of time and lb/ton, will be directly calculated using Equations 1, 2, and 3 below.

Equation 1:

$$M_{SO_2Stack} = Q_{Stack} \cdot B \cdot \frac{64.058\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol}}$$

Equation 2:

$$P_{TonsH_2SO_4} = Q_{Stack} \cdot \left[\frac{A-B}{1-(1.5 \cdot A)}\right] \cdot \frac{98.0734\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol} \cdot 2000\ {}^{lbs}/_{Ton}}$$

Equation 3:

$$E_{lbs/ton} = \frac{M_{SO_2Stack}}{P_{TonsH_2SO_4}} = \frac{Q_{Stack} \cdot B}{Q_{Stack} \cdot \left[\frac{A-B}{1-(1.5 \cdot A)}\right]} \cdot 1306.33\ \frac{lbsSO_2}{TonAcid}$$

Where:

$P_{TonsH_2SO_4}$	= 100% Sulfuric Acid Production, tons per unit of time
M_{SO_2Stack}	= Mass SO_2 stack emission rate, lb per unit of time
Q_{Stack}	= Volumetric flow rate of stack gas, dry standard cubic feet (DSCF) per unit of time
A	= Converter inlet SO_2 concentration, fraction (dry basis)
B	= Stack SO_2 concentration, fraction (dry basis)
$E_{lbs/ton}$	= lb SO_2 per ton 100% Sulfuric Acid Produced
$98.0734\ {}^{lbs}/_{lb-mol}$	= Molecular weight of sulfuric acid
$64.058\ {}^{lbs}/_{lb-mol}$	= Molecular weight of SO_2
$1306.33\ \frac{lbsSO_2}{TonAcid}$	$= \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$

$385.57 \frac{SCF}{lb-mol}$ = Volume of one lb-mole of gas at standard temperature and pressure (68°F and 14.696 psia), cubic feet

The mass emission rate equation (Equation 1) calculates the SO_2 mass emission rate by multiplying the total stack gas flow rate by the stack SO_2 concentration. The 100% Sulfuric Acid Production Rate equation (Equation 2) is based on a material balance of the contact process. The lb/ton equation (Equation 3) is the ratio of the SO_2 emission rate to the 100% Sulfuric Acid Production Rate.

The benefit of using this method is the ability to obtain information regarding the SO_2 mass emission rate, the fact that lb/ton measurements will be "weighted" based on the flow rate during each measurement, and the elimination of errors associated with measuring sulfuric acid flow and using converter inlet Reich testing.

Definitions

Terms used in this CEMS Plan that are defined in the Clean Air Act ("CAA") or in federal or state regulations promulgated pursuant to the CAA shall have the meaning assigned to them in the CAA or such regulations, unless otherwise defined in the Consent Decree. Terms used in this CEMS Plan that are defined in the Consent Decree shall have the meaning assigned to them therein.

Emissions Monitoring

- Emissions monitoring will be done using an SO_2 analyzer at the converter inlet, an SO_2 analyzer at the exit stack, and a stack flow rate analyzer. Except for any analyzer malfunctions, associated repairs, and required quality assurance or control activities (including calibration checks and required zero and span adjustments), Chemtrade will conduct monitoring during all Operating Periods and during Shutdown.

- Once every five minutes, the analyzers will measure the stack SO_2 concentration (fraction, dry basis), the converter inlet SO_2 concentration (fraction, dry basis) and the volumetric flow rate (dry standard cubic feet per minute).

- During routine calibration checks and adjustments of any analyzer, the pre-calibration level will be used to fill in any analyzer data gaps that occur pending completion of the calibration checks and adjustments.

- If any one or more than one analyzer is/are not operating for a period of 24 hours or greater, data gaps in the array involving the non-operational analyzer(s) will be filled in as follows:

    - Exit stack gas will be sampled and analyzed for SO_2 at least once per hour, during all Operating Periods. Sampling will be conducted by Reich test or other established method (*e.g.*, portable analyzer). The most recent hourly reading will be substituted for the 12 five-minute readings that would otherwise have been taken if the analyzer had been operating normally.

    - Converter inlet gas either will be sampled and analyzed for SO_2 using a Reich test or other established method, or the concentration will be estimated using engineering judgment, at least once every four hours during all Operating Periods. The most recent four-hour measurement/estimate will be substituted for the 48 five-minute readings that would otherwise have been taken if the system had been operating normally.

    - Stack volumetric flow rate will be estimated using engineering judgment.

- If any one or more than one analyzer is/are not operating for a period of less than 24 hours, one of the following must be done: (i) the requirements set forth for a 24-hour or greater period of

downtime must be used to fill in the data gaps; or (ii) the data recorded for the five minute reading immediately preceding the affected analyzer's(s') stoppage must be used to fill in the data gap.

- In order to secure data on a "dry basis," Chemtrade may either:

  (i) directly measure the moisture content using a moisture analyzer; or

  (ii) assume the moisture content is the greater of 3% or the highest measured moisture content in any Relative Accuracy Test Audit ("RATA"); or

  (iii) for saturated gas streams only, measure the stack temperature using a stack temperature sensor at the time of each SO_2 measurement and determine the moisture content using a psychrometric chart or standard text water vapor pressure correlation.

Emissions Calculations

3-Hour Rolling Average.

For purposes of calculating a 3-hour rolling average, the system will maintain an array of the 36 most recent measurements of each of the three monitored parameters. Every five minutes, the system will add the most recent readings to the array and exclude the oldest readings.

The 3-hour rolling average lb/ton SO_2 emission rate (E_{3hravg}) will be calculated using Equation 4.

Equation 4:

$$E_{3hravg} = 1306.33 \frac{lbsSO_2}{TonAcid} \cdot \frac{\sum_{i=1}^{36} Q_{Stack\,i} \cdot B_i}{\sum_{i=1}^{36} Q_{Stack\,i} \cdot \left[\frac{A_i - B_i}{1 - 1.5 \cdot A_i} \right]}$$

Where:

A_i = Converter inlet SO_2 concentration, fraction (dry basis) at measurement "i"

B_i = Stack SO_2 concentration, fraction (dry basis) at measurement "i"

$Q_{Stack\,i}$ = Stack volumetric flow rate, dry standard cubic feet per minute (DSCFM) at measurement "i"

$1306.33 \frac{lbsSO_2}{TonAcid} = \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$

E_{3hravg} = 3-hour average lb SO_2 per ton 100% Sulfuric Acid Produced

Daily Mass SO_2 Emissions. The daily mass SO_2 emissions (M_{SO_2Day}) (which are based on a calendar day) will be calculated using Equation 5.

Equation 5:

$$M_{SO_2Day} = \sum_{i=1}^{n} Q_{Stack\,i} \cdot B_i \cdot \frac{64.058\ {}^{lbs}/_{lb-mol}}{385.57 \frac{SCF}{lb-mol}} \cdot 5\,\text{min}$$

Where:

B_i = Stack SO_2 concentration, fraction (dry basis) at measurement "*i*"

$Q_{Stack\ i}$ = Stack volumetric flow rate, dry standard cubic feet per minute (DSCFM) at measurement "*i*"

M_{SO_2Day} = Mass emissions of SO_2 during a calendar day, lb

n = Number of measurements in a given calendar day

12-Month Rolling Sum Mass SO_2 Emissions. The 12-month rolling sum mass SO_2 emissions ($M_{SO_2 12Mo\ Sum}$) for the immediately preceding month will be calculated, by no later than the 15th day of each month, using Equation 6:

Equation 6:

$$M_{SO_2 12Mo\ Sum} = \sum_{j=1}^{d} M_{SO_2 Day\ j}$$

Where:

$M_{SO_2 Day\ j}$ = Mass emissions of SO_2 during calendar day "*j*", lb

d = Number days in the preceding 12 calendar months

$M_{SO_2 12Mo\ Sum}$ = 12-month rolling sum of SO_2 emitted into the atmosphere, lb

Rounding of Numbers resulting from Calculations

Upon completion of the calculations, the final numbers shall be rounded as follows:

E_{3hravg}: Rounded to the nearest tenth.

$M_{SO_2 12Mo\ Sum}$: Rounded to the nearest tenth of a ton (*i.e.*, 200 lb).

The number "5" shall be rounded up (*e.g.*, a short-term rate of 2.05011 shall be rounded to 2.1).

Rounding of Variables A, B, and Q_{Stack}

Rounding of the variables identified as A, B, and Q_{Stack} in the equations set forth in this CEMS Plan shall be done based on the accuracy of the measuring device as provided by the manufacturer of the device.

Compliance with Consent Decree SO_2 Limits

Short-Term SO_2 Limits

The Short-Term Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, Chemtrade will be in compliance with the Short-Term SO_2 Consent Decree Limit if E_{3hravg} does not exceed 2.2 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If Chemtrade contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission

rate(s) in excess of 2.2 lb/ton after the period of the Malfunction(s) end(s), Chemtrade shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

NSPS SO_2 Limits

The NSPS Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, Chemtrade will be in compliance with the NSPS Limit if E_{3hravg} does not exceed 4.0 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If Chemtrade contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 4.0 lb/ton after the period of the Malfunction(s) end(s), Chemtrade shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

Startup SO_2 Emission Limits

Chemtrade will be in compliance with the SO_2 emission limits during Startup if E_{3hravg} during Startup does not exceed the limits for the Beaumont Sulfuric Acid Plant set forth in Appendix H.

Mass Cap for SO_2

Chemtrade will be in compliance with the Mass Cap if the 12-month rolling sum ($M_{SO_2 12Mo\ Sum}$) is 380.0 tons (760,000 lb) of SO_2 or less.

Recordkeeping and Reporting

In addition to any requirements in the Consent Decree, Chemtrade shall maintain records of the date, time, and duration that any of the three analyzers required under this CEMS plan is not operating. In each semi-annual report required under Section IX of the Decree and in each excess emission report required by the NSPS, Chemtrade specifically shall identify all periods of analyzer downtime during the reporting period and all data during the reporting period that is "substitute" data. "Substitute" data means data that is not generated contemporaneously by an analyzer at the same time as the gas flow stack (or duct) emissions are being measured, but rather, is substituted for contemporaneous analyzer measurements consistent with the provisions of the "Emissions Monitoring" section of this CEMS Plan when an analyzer is not operating.

Retention of All CEMS Data, including Data during Startup, Shutdown, and Malfunction

Chemtrade will retain all data generated by its SO_2 analyzers and stack flow analyzer, including all data generated during Startup, Shutdown, and/or Malfunction ("SSM") of the Sulfuric Acid Plant in accordance with the requirements of Section XIII of the Consent Decree.

Analyzer Specifications

The three analyzers will meet the following specifications:

Table 1

Parameter	Location	Range
SO_2, mole fraction, dry basis	Stack	Dual range: Normal: 0 – 500 ppm SO_2 SSM: 0 – 3,600 ppm SO_2
SO_2, mole fraction, dry basis	Converter Inlet	Single range: 0 – 15 % SO_2
Volumetric flow rate, DSCFM	Stack	0 to 125% of the maximum expected volumetric flow rate

The stack SO_2 analyzer will meet all applicable requirements of 40 C.F.R. §§ 60.11, 60.13, 40 C.F.R. Part 60, Appendix B, Performance Specification 2, and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

The Converter Inlet SO_2 Analyzer likewise will meet all applicable requirements of 40 C.F.R. Part 60, Appendix B, Performance Specification 2, and 40 C.F.R. Part 60, Appendix F, Procedure 1, except as follows:

- Chemtrade will select the optimum location to obtain representative SO_2 readings. Turbulence near the blower exit and/or elevated temperatures at the converter inlet may require an analyzer measurement location that differs from the requirements of Performance Specification 2, Section 8.1.

- In lieu of annual Relative Accuracy Test Audits ("RATAs"), as described in Section 5.1.1 of Appendix F, Chemtrade will conduct quarterly cylinder gas audits (i.e., four per year) on the Converter Inlet SO_2 Analyzer.

The volumetric flow rate analyzer will meet 40 C.F.R. Part 60, Appendix B, Performance Specification 6 and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

Compliance with the NSPS: 40 C.F.R. Part 60, Subpart H

In addition to the requirements in this CEMS Plan, Chemtrade also will comply with all of the requirements of the NSPS relating to monitoring provided that, pursuant to 40 C.F.R. §60.13(i), this CEMS Plan will be an approved alternative to the following provisions of 40 C.F.R. Part 60, Subpart H:

- The requirement at 40 C.F.R. § 60.84(a) that the stack SO_2 analyzer have a span value of 1000 ppm. In lieu of this, Chemtrade will utilize the span values specified in Table 1; and

- The procedures specified at 40 C.F.R. § 60.84(b) for converting monitoring data into the units of the applicable standard. In lieu of this, Chemtrade will utilize the procedures specified in this CEMS Plan for calculating compliance with the NSPS 3-hour average limit.

APPENDIX B

APPENDIX B

SHREVEPORT FACILITY

CEMS Plan for SO_2 Emissions
Chemtrade Refinery Services
Single Absorption Sulfuric Acid Regeneration Plant with Scrubber

Principle

This CEMS Plan is the mechanism for determining compliance with all SO_2 emission limits in the Consent Decree for the Shreveport Facility. The methodology described in this CEMS Plan will provide a real-time indication of compliance with the emission limits established in the Consent Decree by determining the emission rate in terms of both pounds of SO_2 emitted per unit of time and pounds of SO_2 emitted per ton of 100% Sulfuric Acid Produced (lb/ton). The system will utilize at least three analyzers: one to measure the converter inlet SO_2 concentration, one to measure stack SO_2 concentration, and one to measure stack volumetric flow rate. From these data, the emission rate, expressed as both pounds per unit of time and lb/ton, will be directly calculated using Equations 1, 2, and 3 below.

Equation 1:

$$M_{SO_2Stack} = Q_{Stack} \cdot B \cdot \frac{64.058\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol}}$$

Equation 2:

$$P_{TonsH_2SO_4} = Q_{Stack} \cdot \left[\frac{A-B}{1-(1.5 \cdot A)}\right] \cdot \frac{98.0734\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol} \cdot 2000\ {}^{lbs}/_{Ton}}$$

Equation 3:

$$E_{lbs/ton} = \frac{M_{SO_2Stack}}{P_{TonsH_2SO_4}} = \frac{Q_{Stack} \cdot B}{Q_{Stack} \cdot \left[\frac{A-B}{1-(1.5 \cdot A)}\right]} \cdot 1306.33\ \frac{lbsSO_2}{TonAcid}$$

Where:

$P_{TonsH_2SO_4}$	= 100% Sulfuric Acid Production, tons per unit of time
M_{SO_2Stack}	= Mass SO_2 stack emission rate, lb per unit of time
Q_{Stack}	= Volumetric flow rate of stack gas, dry standard cubic feet (DSCF) per unit of time
A	= Converter inlet SO_2 concentration, fraction (dry basis)
B	= Stack SO_2 concentration, fraction (dry basis)
$E_{lbs/ton}$	= lb SO_2 per ton 100% Sulfuric Acid Produced
$98.0734\ {}^{lbs}/_{lb-mol}$	= Molecular weight of sulfuric acid
$64.058\ {}^{lbs}/_{lb-mol}$	= Molecular weight of SO_2

$1306.33 \frac{lbsSO_2}{TonAcid}$ $= \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$

$385.57 \frac{SCF}{lb-mol}$ = Volume of one lb-mole of gas at standard temperature and pressure (68°F and 14.696 psia), cubic feet.

The mass emission rate equation (Equation 1) calculates the SO_2 mass emission rate by multiplying the total stack gas flow rate by the stack SO_2 concentration. The 100% Sulfuric Acid Production Rate equation (Equation 2) is based on a material balance of the contact process. The lb/ton equation (Equation 3) is the ratio of the SO_2 emission rate to the 100% Sulfuric Acid Production Rate.

The benefit of using this method is the ability to obtain information regarding the SO_2 mass emission rate, the fact that lb/ton measurements will be "weighted" based on the flow rate during each measurement, and the elimination of errors associated with measuring sulfuric acid flow and using converter inlet Reich testing.

Definitions

Terms used in this CEMS Plan that are defined in the Clean Air Act ("CAA") or in federal or state regulations promulgated pursuant to the CAA shall have the meaning assigned to them in the CAA or such regulations, unless otherwise defined in the Consent Decree. The terms used in this CEMS Plan that are defined in the Consent Decree shall have the meaning assigned to them therein.

Emissions Monitoring

- Emissions monitoring will be done using an SO_2 analyzer at the converter inlet, an SO_2 analyzer at the exit stack, and a stack flow rate analyzer. Except for any analyzer malfunctions, associated repairs, and required quality assurance or control activities (including calibration checks and required zero and span adjustments), Chemtrade will conduct monitoring during all Operating Periods and during Shutdown.

- Once every five minutes, the analyzers will measure the stack SO_2 concentration (fraction, dry basis), the converter inlet SO_2 concentration (fraction, dry basis) and the volumetric flow rate (dry standard cubic feet per minute).

- During routine calibration checks and adjustments of any analyzers, the pre-calibration level will be used to fill in any analyzer data gaps that occur pending completion of the calibration checks and adjustments.

- If any one or more than one analyzer is/are not operating for a period of 24 hours or greater, data gaps in the array involving the non-operational analyzer(s) will be filled in as follows:

  - Exit stack gas will be sampled and analyzed for SO_2 at least once per hour, during all Operating Periods. Sampling will be conducted by Reich test or other established method (*e.g.*, portable analyzer). The most recent hourly reading will be substituted for the 12 five-minute readings that would otherwise have been taken if the analyzer had been operating normally.

  - Converter inlet gas either will be sampled and analyzed for SO_2 using a Reich test or other established method, or the concentration will be estimated using engineering judgment, at least once every four hours during all Operating Periods. The most recent four-hour measurement/estimate will be substituted for the 48 five-minute readings that would otherwise have been taken if the system had been operating normally.

  - Stack volumetric flow rate will be estimated using engineering judgment.

- If any one or more than one analyzer is/are not operating for a period of less than 24 hours, one of the following must be done: (i) the requirements set forth for a 24-hour or greater period of downtime must be used to fill in the data gaps; or (ii) the data recorded for the five minute reading immediately preceding the affected analyzer's(s') stoppage must be used to fill in the data gap.

- In order to secure data on a "dry basis," Chemtrade may either:

  (i) directly measure the moisture content using a moisture analyzer; or

  (ii) assume the moisture content is the greater of 3% or the highest measured moisture content in any Relative Accuracy Test Audit ("RATA"); or

  (iii) for saturated gas streams only, measure the stack temperature using a stack temperature sensor at the time of each SO_2 measurement and determine the moisture content using a psychrometric chart or standard text water vapor pressure correlation.

Emissions Calculations

3-Hour Rolling Average.

For purposes of calculating a 3-hour rolling average, the system will maintain an array of the 36 most recent measurements of each of the three monitored parameters. Every five minutes, the system will add the most recent readings to the array and exclude the oldest readings.

The 3-hour rolling average lb/ton SO_2 emission rate (E_{3hravg}) will be calculated using Equation 4.

Equation 4:

$$E_{3hravg} = 1306.33 \frac{lbsSO_2}{TonAcid} \cdot \frac{\sum_{i=1}^{36} Q_{Stack\ i} \cdot B_i}{\sum_{i=1}^{36} Q_{Stack\ i} \cdot \left[\frac{A_i - B_i}{1 - 1.5 \cdot A_i} \right]}$$

Where:

A_i = Converter inlet SO_2 concentration, fraction (dry basis) at measurement "*i*"

B_i = Stack SO_2 concentration, fraction (dry basis) at measurement "*i*"

$Q_{Stack\ i}$ = Stack volumetric flow rate, dry standard cubic feet per minute (DSCFM) at measurement "*i*"

$1306.33 \frac{lbsSO_2}{TonAcid} = \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$

E_{3hravg} = 3-hour average lb SO_2 per ton 100% Sulfuric Acid Produced

Daily Mass SO_2 Emissions. The daily mass SO_2 emissions (M_{SO_2Day}) (which are based on a calendar day) will be calculated using Equation 5.

Equation 5:

$$M_{SO_2 Day} = \sum_{i=1}^{n} Q_{Stack\ i} \cdot B_i \cdot \frac{64.058\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol}} \cdot 5\,\text{min}$$

Where:

B_i = Stack SO_2 concentration, fraction (dry basis) at measurement "*i*"

$Q_{Stack\ i}$ = Stack volumetric flow rate, dry standard cubic feet per minute (DSCFM) at measurement "*i*"

$M_{SO_2 Day}$ = Mass emissions of SO_2 during a calendar day, lb

n = Number of measurements in a given calendar day

12-Month Rolling Sum Mass SO_2 Emissions. The 12-month rolling sum mass SO_2 emissions ($M_{SO_2 12Mo\ Sum}$) for the immediately preceding month will be calculated, by no later than the 15th day of each month, using Equation 6:

Equation 6:

$$M_{SO_2 12Mo\ Sum} = \sum_{j=1}^{d} M_{SO_2 Day\ j}$$

Where:

$M_{SO_2 Day\ j}$ = Mass emissions of SO_2 during calendar day "*j*", lb

d = Number days in the preceding 12 calendar months

$M_{SO_2 12Mo\ Sum}$ = 12-month rolling sum of SO_2 emitted into the atmosphere, lb

Rounding of Numbers resulting from Calculations

Upon completion of the calculations, the final numbers shall be rounded as follows:

E_{3hravg}: Rounded to the nearest tenth.

$M_{SO_2 12Mo\ Sum}$: Rounded to the nearest tenth of a ton (*i.e.*, 200 lb).

The number "5" shall be rounded up (*e.g.*, a short-term rate of 2.05011 shall be rounded to 2.1).

Rounding of Variables A, B, and Q_{Stack}

Rounding of the variables identified as A, B, and Q_{Stack} in the equations set forth in this CEMS Plan shall be done based on the accuracy of the measuring device as provided by the manufacturer of the device.

Compliance with Consent Decree SO_2 Limits

Short-Term SO_2 Limits

The Short-Term Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, Chemtrade will be in compliance with the Short-Term SO_2 Consent Decree Limit if E_{3hravg} does not exceed 2.0 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If Chemtrade contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 2.0 lb/ton after the period of the Malfunction(s) end(s), Chemtrade shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

NSPS SO_2 Limits

The NSPS Limit does not apply during period of Startup, Shutdown, or Malfunction. During all other Operating Periods, Chemtrade will be in compliance with the NSPS Limit if E_{3hravg} does not exceed 4 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If Chemtrade contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 4.0 lb/ton after the period of the Malfunction(s) end(s), Chemtrade shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

Startup SO_2 Emission Limits

Chemtrade will be in compliance with the SO_2 emission limits during Startup if E_{3hravg} during Startup does not exceed the limits for the Shreveport Sulfuric Acid Plant set forth in Appendix H.

Mass Cap for SO_2

Chemtrade will be in compliance with the Mass Cap if the 12-month rolling sum ($M_{SO_2 12Mo\ Sum}$) is 215.0 tons (430,000 lb) of SO_2 or less.

Recordkeeping and Reporting

In addition to any requirements in the Consent Decree, Chemtrade shall maintain records of the date, time, and duration that any of the three analyzers required under this CEMS plan is not operating. In each semi-annual report required under Section IX of the Decree and in each excess emission report required by the NSPS, Chemtrade specifically shall identify all periods of analyzer downtime during the reporting period and all data during the reporting period that is "substitute" data. "Substitute" data means data that is not generated contemporaneously by an analyzer at the same time as the gas flow stack (or duct) emissions are being measured, but rather, is substituted for contemporaneous analyzer measurements consistent with the provisions of the "Emissions Monitoring" section of this CEMS Plan when an analyzer is not operating.

Retention of All CEMS Data, including Data during Startup, Shutdown, and Malfunction

Chemtrade will retain all data generated by its SO_2 analyzers and stack flow analyzer, including all data generated during Startup, Shutdown, and/or Malfunction ("SSM") of the Sulfuric Acid Plant in accordance with the requirements of Section XIII of the Consent Decree.

Analyzer Specifications

The three analyzers will meet the following specifications:

Table 1

Parameter	Location	Range
SO_2, mole fraction, dry basis	Stack	Dual range: Normal: 0 – 500 ppm SO_2 SSM: 0 – 3,600 ppm SO_2
SO_2, mole fraction, dry basis	Converter Inlet	Single range: 0 – 15 % SO_2
Volumetric flow rate, DSCFM	Stack	0 to 125% of the maximum expected volumetric flow rate

The stack SO_2 analyzer will meet all applicable requirements of 40 C.F.R. §§ 60.11, 60.13, 40 C.F.R. Part 60, Appendix B, Performance Specification 2, and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

The Converter Inlet SO_2 Analyzer likewise will meet all applicable requirements of 40 C.F.R. Part 60, Appendix B, Performance Specification 2, and 40 C.F.R. Part 60, Appendix F, Procedure 1, except as follows:

- Chemtrade will select the optimum location to obtain representative SO_2 readings. Turbulence near the blower exit and/or elevated temperatures at the converter inlet may require an analyzer measurement location that differs from the requirements of Performance Specification 2, Section 8.1.

- In lieu of annual Relative Accuracy Test Audits ("RATAs"), as described in Section 5.1.1 of Appendix F, are not necessary. In lieu of this, Chemtrade will conduct quarterly cylinder gas audits (i.e., four per year) on the Converter Inlet SO_2 Analyzer.

The volumetric flow rate analyzer will meet 40 C.F.R. Part 60, Appendix B, Performance Specification 6 and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1. .

Compliance with the NSPS: 40 C.F.R. Part 60, Subpart H

In addition to the requirements in this CEMS Plan, Chemtrade also will comply with all of the requirements of the NSPS relating to monitoring provided that, pursuant to 40 C.F.R. §60.13(i), this CEMS Plan will be an approved alternative to the following provisions of 40 C.F.R. Part 60, Subpart H:

- The requirement at 40 C.F.R. § 60.84(a) that the stack SO_2 analyzer have a span value of 1000 ppm. In lieu of this, Chemtrade will utilize the span values specified in Table 1; and

- The procedures specified at 40 C.F.R. § 60.84(b) for converting monitoring data into the units of the applicable standard. In lieu of this, Chemtrade will utilize the procedures specified in this CEMS Plan for calculating compliance with the NSPS 3-hour average limit.

APPENDIX C

APPENDIX C

TULSA FACILITY

CEMS Plan for SO_2 Emissions
Chemtrade Refinery Services
Single Absorption Sulfur Burning Plant with Scrubber

Principle

This CEMS Plan is the mechanism for determining compliance with all SO_2 emission limits in the Consent Decree for the Tulsa Facility. The methodology described in this CEMS Plan will provide a real-time indication of compliance with the emission limits established in the Consent Decree by determining the emission rate both in terms of pounds of SO_2 emitted per unit of time and pounds of SO_2 emitted per ton of 100% Sulfuric Acid Produced (lb/ton). The system will utilize at least three analyzers: one to measure stack SO_2 concentration, one to measure stack O_2 concentration, and one to measure stack volumetric flow rate. From these data, the emission rate, expressed as both pounds per unit of time and lb/ton, will be directly calculated using Equations 1, 2, and 3 below.

Equation 1:

$$M_{SO_2Stack} = Q_{Stack} \cdot B \cdot \frac{64.058\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol}}$$

Equation 2:

$$P_{TonsH_2SO_4} = Q_{Stack} \cdot 0.843 \cdot (0.209 - Y - B) \cdot \frac{98.0734\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol} \cdot 2000\ {}^{lbs}/_{Ton}}$$

Equation 3:

$$E_{lbs/ton} = \frac{M_{SO_2Stack}}{P_{TonsH_2SO_4}} = \frac{Q_{Stack} \cdot B}{Q_{Stack} \cdot 0.843 \cdot (0.209 - Y - B)} \cdot 1306.33\ \frac{lbsSO_2}{TonAcid}$$

Where:

$P_{TonsH_2SO_4}$	= 100% Sulfuric Acid Production, tons per unit of time
M_{SO_2Stack}	= Mass SO_2 stack emission rate, lb per unit of time
Q_{Stack}	= Volumetric flow rate of stack gas, dry standard cubic feet (DSCF) per unit of time
Y	= Stack O_2 concentration, fraction (dry basis)
B	= Stack SO_2 concentration, fraction (dry basis)
$E_{lbs/ton}$	= lb SO_2 per ton 100% Sulfuric Acid Produced
$98.0734\ {}^{lbs}/_{lb-mol}$	= Molecular weight of sulfuric acid
$64.058\ {}^{lbs}/_{lb-mol}$	= Molecular weight of SO_2
$1306.33\ \frac{lbsSO_2}{TonAcid}$	$= \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$
$385.57\ \frac{SCF}{lb-mol}$	= Volume of one lb-mole of gas at standard temperature and pressure (68°F and 14.696 psia), cubic feet

The mass emission rate equation (Equation 1) calculates the SO_2 mass emission rate by multiplying the total stack gas flow rate by the stack SO_2 concentration. The 100% Sulfuric Acid Production Rate equation (Equation 2) is based on a material balance of the contact process and the fact that the ratio of oxygen to nitrogen of the incoming air is fixed. The lb/ton equation (Equation 3) is the ratio of the mass SO_2 emission rate to the 100% Sulfuric Acid Production Rate.

The benefit of using this method is the ability to obtain information regarding the SO_2 mass emission rate, the fact that lb/ton measurements will be "weighted" based on the flow rate during each measurement, and the elimination of errors associated with measuring sulfuric acid flow and using converter inlet Reich testing.

Definitions

Terms used in this CEMS Plan that are defined in the Clean Air Act ("CAA") or in federal or state regulations promulgated pursuant to the CAA shall have the meaning assigned to them in the CAA or such regulations, unless otherwise defined in the Consent Decree. Terms used in this CEMS Plan that are defined in the Consent Decree shall have the meaning assigned to them therein.

Emissions Monitoring

- Emissions monitoring will be done using an O_2 analyzer at the exit stack, an SO_2 analyzer at the exit stack, and a stack flow rate analyzer. Except for any analyzer malfunctions, associated repairs, and required quality assurance or control activities (including calibration checks and required zero and span adjustments), Chemtrade will conduct monitoring during all Operating Periods and during Shutdown.

- Once every five minutes, the analyzers will measure the stack SO_2 concentration (fraction, dry basis), the stack O_2 concentration (fraction, dry basis) and the volumetric flow rate (dry standard cubic feet per minute).

- During routine calibration checks and adjustments of any analyzers, the pre-calibration level will be used to fill in any analyzer data gaps that occur pending completion of the calibration checks and adjustments.

- If any one or more than one analyzer is/are not operating for a period of 24 hours or greater, data gaps in the array involving the non-operational analyzer(s) will be filled in as follows:

    - Exit stack gas will be sampled and analyzed for SO_2 at least once per hour, during all Operating Periods. Sampling will be conducted by Reich test or other established method (*e.g.*, portable analyzer). The most recent hourly reading will be substituted for the 12 five-minute readings that would otherwise have been taken if the analyzer had been operating normally.

    - O_2 in the exit stack gas will be sampled and analyzed at least once per hour, during all Operating Periods Sampling will be conducted by Orsat test or other established method (*e.g.*, portable analyzer). The most recent hourly reading will be substituted for the 12 five-minute readings that would otherwise have been taken if the analyzer had been operating normally.

    - Stack volumetric flow rate will be estimated using engineering judgment.

- If any one or more than one analyzer is/are not operating for a period of less than 24 hours, one of the following must be done: (i) the requirements set forth for a 24-hour or greater period of downtime must be used to fill in the data gaps; or (ii) the data recorded for the five minute reading immediately preceding the affected analyzer's(s') stoppage must be used to fill in the data gap.

- In order to secure data on a "dry basis," Chemtrade may either:

  (i) directly measure the moisture content using a moisture analyzer; or

  (ii) assume the moisture content is the greater of 3% or the highest measured moisture content in any Relative Accuracy Test Audit ("RATA"); or

  (iii) for saturated gas streams only, measure the stack temperature using a stack temperature sensor at the time of each SO_2 measurement and determine the moisture content using a psychrometric chart or standard text water vapor pressure correlation.

Emissions Calculations

3-Hour Rolling Average.

For purposes of calculating a 3-hour rolling average, the system will maintain an array of the 36 most recent measurements of each of the three monitored parameters. Every five minutes, the system will add the most recent readings to the array and exclude the oldest readings.

The 3-hour rolling average lb/ton SO_2 emission rate (E_{3hravg}) will be calculated using Equation 4.

Equation 4:

$$E_{3hravg} = 1306.33 \frac{lbsSO_2}{TonAcid} \cdot \frac{\sum_{i=1}^{36} Q_{Stack\,i} \cdot B_i}{\sum_{i=1}^{36} Q_{Stack\,i} \cdot 0.843 \cdot [0.209 - Y_i - B_i]}$$

Where:

Y_i = Stack O_2 concentration, fraction (dry basis) at measurement "*i*"

B_i = Stack SO_2 concentration, fraction (dry basis) at measurement "*i*"

$Q_{Stack\,i}$ = Stack volumetric flow rate, dry standard cubic feet per minute (DSCFM) at measurement "*i*"

$$1306.33 \frac{lbsSO_2}{TonAcid} = \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$$

E_{3hravg} = 3-hour average lb SO_2 per ton 100% Sulfuric Acid Produced

Daily Mass SO2 Emissions. The daily mass SO_2 emissions (M_{SO_2Day}) (which are based on a calendar day) will be calculated using Equation 5.

Equation 5:

$$M_{SO_2Day} = \sum_{i=1}^{n} Q_{Stack\,i} \cdot B_i \cdot \frac{64.058\ {}^{lbs}/_{lb-mol}}{385.57 \frac{SCF}{lb-mol}} \cdot 5\,\text{min}$$

Where:

B_i = Stack SO_2 concentration, fraction (dry basis) at measurement "*i*"

$Q_{Stack\ i}$ = Stack volumetric flow rate, dry standard cubic feet per minute (DSCFM) at measurement "*i*"

M_{SO_2Day} = Mass emissions of SO_2 during a calendar day, lb

n = Number of measurements in a given calendar day

12-Month Rolling Sum Mass SO2 Emissions. The 12-month rolling sum mass SO_2 emissions ($M_{SO_2 12Mo\ Sum}$) for the immediately preceding month will be calculated, by no later than the 15th day of each month, using Equation 6:

Equation 6:

$$M_{SO_2 12Mo\ Sum} = \sum_{j=1}^{d} M_{SO_2Day\ j}$$

Where:

$M_{SO_2Day\ j}$ = Mass emissions of SO_2 during calendar day "*j*", lb

d = Number days in the preceding 12 calendar months

$M_{SO_2 12Mo\ Sum}$ = 12-month rolling sum of SO_2 emitted into the atmosphere, lb

Rounding of Numbers resulting from Calculations

Upon completion of the calculations, the final numbers shall be rounded as follows:

E_{3hravg}: Rounded to the nearest tenth.

$M_{SO_2 12Mo\ Sum}$: Rounded to the nearest tenth of a ton (*i.e.*, 200 lb).

The number "5" shall be rounded up (*e.g.*, a short-term rate of 2.05011 shall be rounded to 2.1).

Rounding of Variables B, Q_{Stack}, and Y

Rounding of the variables identified as B, Q_{Stack}, and Y in the equations set forth in this CEMS Plan shall be done based on the accuracy of the measuring device as provided by the manufacturer of the device.

Compliance with Consent Decree SO_2 Limits

Short-Term SO_2 Limits

The Short-Term Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, Chemtrade will be in compliance with the Short-Term SO_2 Consent Decree Limit if E_{3hravg} does not exceed 1.7 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If Chemtrade contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 1.7 lb/ton after the period of the Malfunction(s) end(s), Chemtrade shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

NSPS SO_2 Limits

The NSPS Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, Chemtrade will be in compliance with the NSPS Limit if E_{3hravg} does not exceed 4 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If Chemtrade contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 4.0 lb/ton after the period of the Malfunction(s) end(s), Chemtrade shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

Startup SO_2 Emission Limits

Chemtrade will be in compliance with the SO_2 emission limits during Startup if E_{3hravg} during Startup does not exceed the limits for the Tulsa Sulfuric Acid Plant set forth in Appendix H.

Mass Cap for SO_2

Chemtrade will be in compliance with the Mass Cap if the 12-month rolling sum ($M_{SO_2 12Mo\ Sum}$) is 92.4 tons (184,800 lb) of SO_2 or less.

Recordkeeping and Reporting

In addition to any requirements in the Consent Decree, Chemtrade shall maintain records of the date, time, and duration that any of the three analyzers required under this CEMS plan is not operating. In each semi-annual report required under Section IX of the Decree and in each excess emission report required by the NSPS, Chemtrade specifically shall identify all periods of analyzer downtime during the reporting period and all data during the reporting period that is "substitute" data. "Substitute" data means data that is not generated contemporaneously by an analyzer at the same time as the gas flow stack (or duct) emissions are being measured, but rather, is substituted for contemporaneous analyzer measurements consistent with the provisions of the "Emissions Monitoring" section of this CEMS Plan when an analyzer is not operating.

Retention of All CEMS Data, including Data during Startup, Shutdown, and Malfunction

Chemtrade will retain all data generated by its SO_2 analyzer, O_2 analyzer, and stack flow analyzer, including all data generated during Startup, Shutdown, and/or Malfunction ("SSM") of the Sulfuric Acid Plant in accordance with the requirements of Section XIII of the Consent Decree.

Analyzer Specifications

The three analyzers will meet the following specifications:

Table 1

Parameter	Location	Range
SO_2, mole fraction, dry basis	Stack	Dual range: Normal: 0 – 500 ppm SO_2 SSM: 0 – 3,600 ppm SO_2
O_2, mole fraction, dry basis	Stack	Single range: 0 – 20.9 % O_2
Volumetric flow rate, DSCFM	Stack	0 to 125% of the maximum expected volumetric flow rate

The stack SO_2 analyzer will meet all applicable requirements of 40 C.F.R. §§ 60.11, 60.13, 40 C.F.R. Part 60, Appendix B, Performance Specification 2, and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

The stack O_2 analyzer will meet 40 C.F.R. Part 60 Appendix B, Performance Specification 3 and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

The volumetric flow rate analyzer will meet 40 C.F.R. Part 60, Appendix B, Performance Specification 6 and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

Compliance with the NSPS: 40 C.F.R. Part 60, Subpart H

In addition to the requirements in this CEMS Plan, Chemtrade also will comply with all of the requirements of the NSPS relating to monitoring provided that, pursuant to 40 C.F.R. §60.13(i), this CEMS Plan will be an approved alternative to the following provisions of 40 C.F.R. Part 60, Subpart H:

- The requirement at 40 C.F.R. § 60.84(a) that the stack SO_2 analyzer have a span value of 1000 ppm. In lieu of this, Chemtrade will utilize the span values specified in Table 1; and
- The procedures specified at 40 C.F.R. § 60.84(b) for converting monitoring data into the units of the applicable standard. In lieu of this, Chemtrade will utilize the procedures specified in this CEMS Plan for calculating compliance with the NSPS 3-hour average limit.

APPENDIX D

APPENDIX D

RIVERTON FACILITY: RIVERTON 1 SULFURIC ACID PLANT

CEMS Plan for SO_2 Emissions
Chemtrade Refinery Services
Single Absorption Sulfur Burning Plant with Scrubber

Principle

This CEMS Plan is the mechanism for determining compliance with all SO_2 emission limits in the Consent Decree for the Riverton 1 Sulfuric Acid Plant at the Riverton Facility. The methodology described in this CEMS Plan will provide a real-time indication of compliance with the emission limits established in the Consent Decree by determining the emission rate both in terms of pounds of SO_2 emitted per unit of time and pounds of SO_2 emitted per ton of 100% Sulfuric Acid Produced (lb/ton). The system will utilize at least three analyzers: one to measure stack SO_2 concentration, one to measure stack O_2 concentration, and one to measure stack volumetric flow rate. From these data, the emission rate, expressed as both pounds per unit of time and lb/ton, will be directly calculated using Equations 1, 2, and 3 below.

Equation 1:

$$M_{SO_2Stack} = Q_{Stack} \cdot B \cdot \frac{64.058\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol}}$$

Equation 2:

$$P_{TonsH_2SO_4} = Q_{Stack} \cdot 0.843 \cdot (0.209 - Y - B) \cdot \frac{98.0734\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol} \cdot 2000\ {}^{lbs}/_{Ton}}$$

Equation 3:

$$E_{lbs/ton} = \frac{M_{SO_2Stack}}{P_{TonsH_2SO_4}} = \frac{Q_{Stack} \cdot B}{Q_{Stack} \cdot 0.843 \cdot (0.209 - Y - B)} \cdot 1306.33\ \frac{lbsSO_2}{TonAcid}$$

Where:

$P_{TonsH_2SO_4}$	= 100% Sulfuric Acid Production, tons per unit of time
M_{SO_2Stack}	= Mass SO_2 stack emission rate, lb per unit of time
Q_{Stack}	= Volumetric flow rate of stack gas, dry standard cubic feet (DSCF) per unit of time
Y	= Stack O_2 concentration, fraction (dry basis)
B	= Stack SO_2 concentration, fraction
$E_{lbs/ton}$	= lb SO_2 per ton 100% Sulfuric Acid Produced
$98.0734\ {}^{lbs}/_{lb-mol}$	= Molecular weight of sulfuric acid
$64.058\ {}^{lbs}/_{lb-mol}$	= Molecular weight of SO_2
$1306.33\ \frac{lbsSO_2}{TonAcid}$	$= \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$
$385.57\ \frac{SCF}{lb-mol}$	= Volume of one lb-mole of gas at standard temperature and pressure (68°F and 14.696 psia), cubic feet

The mass emission rate equation (Equation 1) calculates the SO_2 mass emission rate by multiplying the total stack gas flow rate by the stack SO_2 concentration. The 100% Sulfuric Acid Production Rate equation (Equation 2) is based on a material balance of the contact process and the fact that the ratio of oxygen to nitrogen of the incoming air is fixed. The lb/ton equation (Equation 3) is the ratio of the mass SO_2 emission rate to the 100% Sulfuric Acid Production Rate.

The benefit of using this method is the ability to obtain information regarding the SO_2 mass emission rate, the fact that lb/ton measurements will be "weighted" based on the flow rate during each measurement, and the elimination of errors associated with measuring sulfuric acid flow and using converter inlet Reich testing.

Definitions

Terms used in this CEMS Plan that are defined in the Clean Air Act ("CAA") or in federal or state regulations promulgated pursuant to the CAA shall have the meaning assigned to them in the CAA or such regulations, unless otherwise defined in the Consent Decree. Terms used in this CEMS Plan that are defined in the Consent Decree shall have the meaning assigned to them therein.

Emissions Monitoring

- Emissions monitoring will be done using an O_2 analyzer at the exit stack, an SO_2 analyzer at the exit stack, and a stack flow rate analyzer. Except for any analyzer malfunctions, associated repairs, and required quality assurance or control activities (including calibration checks and required zero and span adjustments), Chemtrade will conduct monitoring during all Operating Periods and during Shutdown.

- Once every five minutes, the analyzers will measure the stack SO_2 concentration (fraction, dry basis), the stack O_2 concentration (fraction, dry basis) and the volumetric flow rate (dry standard cubic feet per minute).

- During routine calibration checks and adjustments of any analyzers, the pre-calibration level will be used to fill in any analyzer data gaps that occur pending completion of the calibration checks and adjustments.

- If any one or more than one analyzer is/are not operating for a period of 24 hours or greater, data gaps in the array involving the non-operational analyzer(s) will be filled in as follows:

    - Exit stack gas will be sampled and analyzed for SO_2 at least once per hour, during all Operating Periods. Sampling will be conducted by Reich test or other established method (*e.g.*, portable analyzer). The most recent hourly reading will be substituted for the 12 five-minute readings that would otherwise have been taken if the analyzer had been operating normally.

    - O_2 in the exit stack gas will be sampled and analyzed at least once per hour, during all Operating Periods Sampling will be conducted by Orsat test or other established method (*e.g.*, portable analyzer). The most recent hourly reading will be substituted for the 12 five-minute readings that would otherwise have been taken if the analyzer had been operating normally.

    - Stack volumetric flow rate will be estimated using engineering judgment.

- If any one or more than one analyzer is/are not operating for a period of less than 24 hours, one of the following must be done: (i) the requirements set forth for a 24-hour or greater period of downtime must be used to fill in the data gaps; or (ii) the data recorded for the five minute reading immediately preceding the affected analyzer's(s') stoppage must be used to fill in the data gap.

- In order to secure data on a "dry basis," Chemtrade may either:

  (i) directly measure the moisture content using a moisture analyzer; or

  (ii) assume the moisture content is the greater of 3% or the highest measured moisture content in any Relative Accuracy Test Audit ("RATA"); or

  (iii) for saturated gas streams only, measure the stack temperature using a stack temperature sensor at the time of each SO_2 measurement and determine the moisture content using a psychrometric chart or standard text water vapor pressure correlation.

Emissions Calculations

3-Hour Rolling Average.

For purposes of calculating a 3-hour rolling average, the system will maintain an array of the 36 most recent measurements of each of the three monitored parameters. Every five minutes, the system will add the most recent readings to the array and exclude the oldest readings.

The 3-rolling hour average lb/ton SO_2 emission rate (E_{3hravg}) will be calculated using Equation 4.

Equation 4:

$$E_{3hravg} = 1306.33 \frac{lbsSO_2}{TonAcid} \cdot \frac{\sum_{i=1}^{36} Q_{Stack\,i} \cdot B_i}{\sum_{i=1}^{36} Q_{Stack\,i} \cdot 0.843 \cdot [0.209 - Y_i - B_i]}$$

Where:

Y_i = Stack O_2 concentration, fraction (dry basis) at measurement "*i*"

B_i = Stack SO_2 concentration, fraction (dry basis) at measurement "*i*"

$Q_{Stack\,i}$ = Stack volumetric flow rate, dry standard cubic feet per minute (DSCFM) at measurement "*i*"

$$1306.33 \frac{lbsSO_2}{TonAcid} = \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$$

E_{3hravg} = 3-hour average lb SO_2 per ton 100% Sulfuric Acid Produced

Daily Mass SO_2 Emissions. The daily mass SO_2 emissions (M_{SO_2Day}) (which are based on a calendar day_ will be calculated using Equation 5.

Equation 5:

$$M_{SO_2Day} = \sum_{i=1}^{n} Q_{Stack\,i} \cdot B_i \cdot \frac{64.058\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol}} \cdot 5\,\text{min}$$

Where:

B_i = Stack SO_2 concentration, fraction (dry basis) at measurement "*i*"

$Q_{Stack\ i}$ = Stack volumetric flow rate, standard cubic feet per minute (DSCFM) at measurement "*i*"

M_{SO_2Day} = Mass emissions of SO_2 during a calendar day, lb

n = Number of measurements in a given calendar day

12-Month Rolling Sum Mass SO_2 Emissions. The 12-month rolling sum mass SO_2 emissions ($M_{SO_2 12Mo\ Sum}$) for the immediately preceding month will be calculated, by no later than the 15th day of each month, using Equation 6:

Equation 6:

$$M_{SO_2 12Mo\ Sum} = \sum_{j=1}^{d} M_{SO_2 Day\ j}$$

Where:

$M_{SO_2Day\ j}$ = Mass emissions of SO_2 during calendar day "*j*", lb

d = Number days in the preceding 12 calendar months

$M_{SO_2 12Mo\ Sum}$ = 12-month rolling sum of SO_2 emitted into the atmosphere, lb

Rounding of Numbers resulting from Calculations

Upon completion of the calculations, the final numbers shall be rounded as follows:

E_{3hravg}: Rounded to the nearest tenth.

$M_{SO_2 12Mo\ Sum}$: Rounded to the nearest tenth of a ton (*i.e.*, 200 lb).

The number "5" shall be rounded up (*e.g.,* a short-term rate of 2.05011 shall be rounded to 2.1).

Rounding of Variables B, Q_{Stack}, and Y

Rounding of the variables identified as B, Q_{Stack}, and Y in the equations set forth in this CEMS Plan shall be done based on the accuracy of the measuring device as provided by the manufacturer of the device.

Compliance with Consent Decree SO_2 Limits

Short-Term SO_2 Limits

The Short-Term Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, Chemtrade will be in compliance with the Short-Term SO_2 Consent Decree Limit if E_{3hravg} does not exceed 1.9 lbs of SO_2 per ton of 100% Sulfuric Acid Produced. If Chemtrade contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 1.9 lb/ton after the period of the Malfunction(s) end(s), Chemtrade shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

NSPS SO_2 Limits

The NSPS Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, Chemtrade will be in compliance with the NSPS Limit if E_{3hravg} does not exceed 4 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If Chemtrade contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 4.0 lb/ton after the period of the Malfunction(s) end(s), Chemtrade shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

Startup SO_2 Emission Limits

Chemtrade will be in compliance with the SO_2 emission limits during Startup if E_{3hravg} during Startup does not exceed the limits for the Riverton 1 Sulfuric Acid Plant set forth in Appendix H.

Mass Cap for SO_2

Chemtrade will be in compliance with the Mass Cap if the 12-month rolling sum ($M_{SO_2 12Mo\ Sum}$) is 35.0 tons (70,000 lb) of SO_2 or less.

Recordkeeping and Reporting

In addition to any requirements in the Consent Decree, Chemtrade shall maintain records of the date, time, and duration that any of the three analyzers required under this CEMS plan is not operating. In each semi-annual report required under Section IX of the Decree and in each excess emission report required by the NSPS, Chemtrade specifically shall identify all periods of analyzer downtime during the reporting period and all data during the reporting period that is "substitute" data. "Substitute" data means data that is not generated contemporaneously by an analyzer at the same time as the gas flow stack (or duct) emissions are being measured, but rather, is substituted for contemporaneous analyzer measurements consistent with the provisions of the "Emissions Monitoring" section of this CEMS Plan when an analyzer is not operating.

Retention of All CEMS Data, including Data during Startup, Shutdown, and Malfunction

Chemtrade will retain all data generated by its SO_2 analyzer, O_2 analyzer, and stack flow analyzer, including all data generated during Startup, Shutdown, and/or Malfunction ("SSM") of the Sulfuric Acid Plant in accordance with the requirements of Section XIII of the Consent Decree.

Analyzer Specifications

The three analyzers will meet the following specifications:

Table 1

Parameter	Location	Range
SO_2, mole fraction, dry basis	Stack	Dual range: Normal: 0 – 500 ppm SO_2 SSM: 0 – 3,600 ppm SO_2
O_2, mole fraction, dry basis	Stack	Single range: 0 – 20.9 % O_2
Volumetric flow rate, DSCFM	Stack	0 to 125% of the maximum expected volumetric flow rate

The stack SO_2 analyzer will meet all applicable requirements of 40 C.F.R. §§ 60.11, 60.13, 40 C.F.R. Part 60, Appendix B, Performance Specification 2, and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

The stack O_2 analyzer will meet 40 C.F.R. Part 60 Appendix B, Performance Specification 3 and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

The volumetric flow rate analyzer will meet 40 C.F.R. Part 60, Appendix B, Performance Specification 6 and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

Compliance with the NSPS: 40 C.F.R. Part 60, Subpart H

In addition to the requirements in this CEMS Plan, Chemtrade also will comply with all of the requirements of the NSPS relating to monitoring provided that, pursuant to 40 C.F.R. §60.13(i), this CEMS Plan will be an approved alternative to the following provisions of 40 C.F.R. Part 60, Subpart H:

- The requirement at 40 C.F.R. § 60.84(a) that the stack SO_2 analyzer have a span value of 1000 ppm. In lieu of this, Chemtrade will utilize the span values specified in Table 1; and

- The procedures specified at 40 C.F.R. § 60.84(b) for converting monitoring data into the units of the applicable standard. In lieu of this, Chemtrade will utilize the procedures specified in this CEMS Plan for calculating compliance with the NSPS 3-hour average limit.

APPENDIX E

APPENDIX E

RIVERTON FACILITY: RIVERTON 2 SULFURIC ACID PLANT

CEMS Plan for SO_2 Emissions
Chemtrade Refinery Services
Single Absorption Sulfuric Acid Regeneration Plant with Air Injection and Scrubber

Principle

This CEMS Plan is the mechanism for determining compliance with all SO_2 emission limits in the Consent Decree for the Riverton 2 Sulfuric Acid Plant at the Riverton Facility. The methodology described in this CEMS Plan will provide a real-time indication of compliance with the emission limits established in the Consent Decree by determining the emission rate in terms of both pounds of SO_2 emitted per unit of time and pounds of SO_2 emitted per ton of 100% Sulfuric Acid Produced (lb/ton). The system will utilize at least three analyzers: one to measure the converter inlet SO_2 concentration, one to measure stack SO_2 concentration, and one to measure stack volumetric flow rate. From these data, the emission rate, expressed as both pounds per unit of time and lb/ton, will be directly calculated using Equations 1, 2, and 3 below.

Equation 1:

$$M_{SO_2Stack} = Q_{Stack} \cdot B \cdot \frac{64.058\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol}}$$

Equation 2:

$$P_{TonsH_2SO_4} = Q_{Stack} \cdot \left[\frac{A - B \cdot (1+R)}{1+R-(1.5 \cdot A)}\right] \cdot \frac{98.0734\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol} \cdot 2000\ {}^{lbs}/_{Ton}}$$

Equation 3:

$$E_{lbs/ton} = \frac{M_{SO_2Stack}}{P_{TonsH_2SO_4}} = \frac{Q_{Stack} \cdot B}{Q_{Stack} \cdot \left[\frac{A - B \cdot (1+R)}{1+R-(1.5 \cdot A)}\right]} \cdot 1306.33\ \frac{lbsSO_2}{TonAcid}$$

Where:

$P_{TonsH_2SO_4}$	= 100% Sulfuric Acid Production, tons per unit of time
M_{SO_2Stack}	= Mass SO_2 stack emission rate, lb per unit of time
Q_{Stack}	= Volumetric flow rate of stack gas, dry standard cubic feet (DSCF) per unit of time
A	= Converter inlet SO_2 concentration, fraction (dry basis)
B	= Stack SO_2 concentration, fraction (dry basis)
R	= Ratio of the flow rate of gas fed into first bed of the converter to the flow rate of dilution air injected into lower beds
$E_{lbs/ton}$	= lb SO_2 per ton 100% Sulfuric Acid Produced
$98.0734\ {}^{lbs}/_{lb-mol}$	= Molecular weight of sulfuric acid
$64.058\ {}^{lbs}/_{lb-mol}$	= Molecular weight of SO_2

$$1306.33\,\frac{lbsSO_2}{TonAcid} = \frac{64.058\,{}^{lbs}/_{lb-mol}\cdot 2000\,{}^{lbs}/_{ton}}{98.0734\,{}^{lbs}/_{lb-mol}}$$

$385.57\,\frac{SCF}{lb-mol}$ = Volume of one lb-mole of gas at standard temperature and pressure (68°F and 14.696 psia), cubic feet

The mass emission rate equation (Equation 1) calculates the SO_2 mass emission rate by multiplying the total stack gas flow rate by the stack SO_2 concentration. The 100% Sulfuric Acid Production Rate equation (Equation 2) is based on a material balance of the contact process. The lb/ton equation (Equation 3) is the ratio of the SO_2 emission rate to the 100% Sulfuric Acid Production Rate. Because the Riverton 2 Sulfuric Acid Plant injects air into the lower passes of its converter, the equations have been adjusted to account for this added air.

The benefit of using this method is the ability to obtain information regarding the SO_2 mass emission rate, the fact that lb/ton measurements will be "weighted" based on the flow rate during each measurement, and the elimination of errors associated with measuring sulfuric acid flow and using converter inlet Reich testing.

Definitions

Terms used in this CEMS Plan that are defined in the Clean Air Act ("CAA") or in federal or state regulations promulgated pursuant to the CAA shall have the meaning assigned to them in the CAA or such regulations, unless otherwise defined in the Consent Decree. Terms used in this CEMS Plan that are defined in the Consent Decree shall have the meaning assigned to them therein.

Emissions Monitoring

- Emissions monitoring will be done using an SO_2 analyzer at the converter inlet, an SO_2 analyzer at the exit stack, and a stack flow rate analyzer. Except for any analyzer malfunctions, associated repairs, and required quality assurance or control activities (including calibration checks and required zero and span adjustments), Chemtrade will conduct monitoring during all Operating Periods and during Shutdown.

- Once every five minutes, the analyzers will measure the stack SO_2 concentration (fraction, dry basis), the converter inlet SO_2 concentration (fraction, dry basis) and the volumetric flow rate (dry standard cubic feet per minute).

- During routine calibration checks and adjustments of any analyzers, the pre-calibration level will be used to fill in any analyzer data gaps that occur pending completion of the calibration checks and adjustments.

- If any one or more than one analyzer is/are not operating for a period of 24 hours or greater, data gaps in the array involving the non-operational analyzer(s) will be filled in as follows:

    - Exit stack gas will be sampled and analyzed for SO_2 at least once per hour, during all Operating Periods. Sampling will be conducted by Reich test or other established method (*e.g.*, portable analyzer). The most recent hourly reading will be substituted for the 12 five-minute readings that would otherwise have been taken if the analyzer had been operating normally.

    - Converter inlet gas either will be sampled and analyzed for SO_2 using a Reich test or other established method, or the concentration will be estimated using engineering judgment, at least once every four hours during all Operating Periods. The most recent four-hour measurement/estimate will be substituted for the 48 five-minute readings that would otherwise have been taken if the system had been operating normally.

- Stack volumetric flow rate will be estimated using engineering judgment.

- If any one or more than one analyzer is/are not operating for a period of less than 24 hours, one of the following must be done: (i) the requirements set forth for a 24-hour or greater period of downtime must be used to fill in the data gaps; or (ii) the data recorded for the five minute reading immediately preceding the affected analyzer's(s') stoppage must be used to fill in the data gap.

- In order to secure data on a "dry basis," Chemtrade may either:

  (i) directly measure the moisture content using a moisture analyzer; or

  (ii) assume the moisture content is the greater of 3% or the highest measured moisture content in any Relative Accuracy Test Audit ("RATA"); or

  (iii) for saturated gas streams only, measure the stack temperature using a stack temperature sensor at the time of each SO_2 measurement and determine the moisture content using a psychrometric chart or standard text water vapor pressure correlation.

Emissions Calculations

3-Hour Rolling Average.

For purposes of calculating a 3-hour rolling average, the system will maintain an array of the 36 most recent measurements of each of the three monitored parameters. Every five minutes, the system will add the most recent readings to the array and exclude the oldest readings.

The 3-hour rolling average lb/ton SO_2 emission rate (E_{3hravg}) will be calculated using Equation 4.

Equation 4:

$$E_{3hravg} = 1306.33 \frac{lbsSO_2}{TonAcid} \cdot \frac{\sum_{i=1}^{36} Q_{Stack\ i} \cdot B_i}{\sum_{i=1}^{36} Q_{Stack\ i} \cdot \left[\frac{A_i - B_i \cdot (1+R)}{1+R-1.5 \cdot A_i} \right]}$$

Where:

A_i = Converter inlet SO_2 concentration, fraction (dry basis) at measurement "i"

B_i = Stack SO_2 concentration, fraction (dry basis) at measurement "i"

$Q_{Stack\ i}$ = Stack volumetric flow rate, dry standard cubic feet per minute (DSCFM) at measurement "i"

R = Average of the three most recent measurements of the ratio of the flow of dilution air to the flow of process gas to the converter

$$1306.33 \frac{lbsSO_2}{TonAcid} = \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$$

E_{3hravg} = 3-hour average lb SO_2 per ton 100% Sulfuric Acid Produced

Daily Mass SO_2 Emissions. The daily mass SO_2 emissions (M_{SO_2Day}) (which are based on a calendar day) will be calculated using Equation 5.

Equation 5:

$$M_{SO_2Day} = \sum_{i=1}^{n} Q_{Stack\,i} \cdot B_i \cdot \frac{64.058\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol}} \cdot 5\,\text{min}$$

Where:

B_i = Stack SO_2 concentration, fraction (dry basis) at measurement "*i*"

$Q_{Stack\,i}$ = Stack volumetric flow rate, dry standard cubic feet per minute (DSCFM) at measurement "*i*"

M_{SO_2Day} = Mass emissions of SO_2 during a calendar day, lb

n = Number of measurements in a given calendar day

12-Month Rolling Sum Mass SO_2 Emissions. The 12-month rolling sum mass SO_2 emissions ($M_{SO_2 12Mo\ Sum}$) for the immediately preceding month will be calculated, by no later than the 15th day of each month, using Equation 6:

Equation 6:

$$M_{SO_2 12Mo\ Sum} = \sum_{j=1}^{d} M_{SO_2Day\,j}$$

Where:

$M_{SO_2Day\,j}$ = Mass emissions of SO_2 during calendar day "*j*", lb

d = Number days in the preceding 12 calendar months

$M_{SO_2 12Mo\ Sum}$ = 12-month rolling sum of SO_2 emitted into the atmosphere, lb

Rounding of Numbers resulting from Calculations

Upon completion of the calculations, the final numbers shall be rounded as follows:

E_{3hravg}: Rounded to the nearest tenth.

$M_{SO_2 12Mo\ Sum}$: Rounded to the nearest tenth of a ton (*i.e.*, 200 lb).

The number "5" shall be rounded up (*e.g.,* a short-term rate of 2.05011 shall be rounded to 2.1).

Rounding of Variables A, B, and Q_{Stack}

Rounding of the variables identified as A, B, and Q_{Stack} in the equations set forth in this CEMS Plan shall be done based on the accuracy of the measuring device as provided by the manufacturer of the device.

Compliance with Consent Decree SO_2 Limits

Short-Term SO_2 Limits

The Short-Term Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, Chemtrade will be in compliance with the Short-Term SO_2 Consent Decree Limit if E_{3hravg} does not exceed 2.1 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If Chemtrade contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 2.1 lb/ton after the period of the Malfunction(s) end(s), Chemtrade shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

NSPS SO_2 Limits

The NSPS Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, Chemtrade will be in compliance with the NSPS Limit if E_{3hravg} does not exceed 4 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If Chemtrade contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 4.0 lb/ton after the period of the Malfunction(s) end(s), Chemtrade shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

Startup SO_2 Emission Limits

Chemtrade will be in compliance with the SO_2 emission limits during Startup if E_{3hravg} during Startup oes not exceed the limits for the Riverton 2 Sulfuric Acid Plant set forth in Appendix H.

Mass Cap for SO_2

Chemtrade will be in compliance with the Mass Cap if the 12-month rolling sum ($M_{SO_2 12Mo\ Sum}$) is 38.0 tons (76,000 lb) of SO_2 or less during each 12-month period.

Recordkeeping and Reporting

In addition to any requirements in the Consent Decree, Chemtrade shall maintain records of the date, time, and duration that any of the three analyzers required under this CEMS plan is not operating. In each semi-annual report required under Section IX of the Decree and in each excess emission report required by the NSPS, Chemtrade specifically shall identify all periods of analyzer downtime during the reporting period and all data during the reporting period that is "substitute" data. "Substitute" data means data that is not generated contemporaneously by an analyzer at the same time as the gas flow stack (or duct) emissions are being measured, but rather, is substituted for contemporaneous analyzer measurements consistent with the provisions of the "Emissions Monitoring" section of this CEMS Plan when an analyzer is not operating.

Retention of All CEMS Data, including Data during Startup, Shutdown, and Malfunction

Chemtrade will retain all data generated by its SO_2 analyzers and stack flow analyzer, including all data generated during Startup, Shutdown, and/or Malfunction ("SSM") of the Sulfuric Acid Plant in accordance with the requirements of Section XIII of the Consent Decree.

Analyzer Specifications

The three analyzers will meet the following specifications:

Table 1

Parameter	Location	Range
SO_2, mole fraction, dry basis	Stack	Dual range: Normal: 0 – 500 ppm SO_2 SSM: 0 – 3,600 ppm SO_2
SO_2, mole fraction, dry basis	Converter Inlet	Single range: 0 – 15 % SO_2
Volumetric flow rate, DSCFM	Stack	0 to 125% of the maximum expected volumetric flow rate

The stack SO_2 analyzer will meet all applicable requirements of 40 C.F.R. §§ 60.11, 60.13, 40 C.F.R. Part 60, Appendix B, Performance Specification 2, and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

The Converter Inlet SO_2 Analyzer likewise will meet all applicable requirements of 40 C.F.R. Part 60, Appendix B, Performance Specification 2, and 40 C.F.R. Part 60, Appendix F, Procedure 1, except as follows:

- Chemtrade will select the optimum location to obtain representative SO_2 readings. Turbulence near the blower exit and/or elevated temperatures at the converter inlet may require an analyzer measurement location that differs from the requirements of Performance Specification 2, Section 8.1.

- In lieu of annual Relative Accuracy Test Audits ("RATAs"), as described in Section 5.1.1 of Appendix F, are not necessary. In lieu of this, Chemtrade will conduct quarterly cylinder gas audits (i.e., four per year) on the Converter Inlet SO_2 Analyzer.

The volumetric flow rate analyzer will meet 40 C.F.R. Part 60, Appendix B, Performance Specification 6 and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

Compliance with the NSPS: 40 C.F.R. Part 60, Subpart H

In addition to the requirements in this CEMS Plan, Chemtrade also will comply with all of the requirements of the NSPS relating to monitoring provided that, pursuant to 40 C.F.R. §60.13(i), this CEMS Plan will be an approved alternative to the following provisions of 40 C.F.R. Part 60, Subpart H:

- The requirement at 40 C.F.R. § 60.84(a) that the stack SO_2 analyzer have a span value of 1000 ppm. In lieu of this, Chemtrade will utilize the span values specified in Table 1; and

- The procedures specified at 40 C.F.R. § 60.84(b) for converting monitoring data into the units of the applicable standard. In lieu of this, Chemtrade will utilize the procedures specified in this CEMS Plan for calculating compliance with the NSPS 3-hour average limit.

APPENDIX F

APPENDIX F

CAIRO FACILITY

CEMS Plan for SO_2 Emissions
Currently Owned by Chemtrade Logistics, Inc.
Single Absorption Sulfur Burning Plant with Scrubber and Front-End Liquid SO_2 Production Plant

Principle

This CEMS Plan is the mechanism for determining compliance with all SO_2 emission limits in the Consent Decree for the Cairo Facility. The methodology described in this CEMS Plan will provide a real-time indication of compliance with the emission limits established in the Consent Decree by determining the emission rate both in terms of pounds of SO_2 emitted per unit of time and pounds of SO_2 emitted per ton of 100% Sulfuric Acid Produced (lb/ton). The system will utilize at least three analyzers: one to measure stack SO_2 concentration, one to measure stack O_2 concentration, and one to measure stack volumetric flow rate. When the front-end liquid SO_2 plant (*i.e.*, the "B" Plant) at the Cairo Facility is in operation, the short-term production rate of liquid SO_2 also will be monitored using a coriolis flow meter. From these data, the emission rate, expressed as both pounds per unit of time and lb/ton, will be directly calculated using Equations 1, 2, and 3 below.

Equation 1:

$$M_{SO_2Stack} = Q_{Stack} \cdot B \cdot \frac{64.058\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol}}$$

Equation 2:

$$P_{TonsH_2SO_4} = \frac{2}{3} \cdot \left[\frac{98.0734\ {}^{lbs}/_{lb-mol} \cdot Q_{Stack}}{385.57\ \frac{SCF}{lb-mol} \cdot 2000\ {}^{lbs}/_{Ton}} \right] \cdot \left[\frac{0.209}{0.791} \cdot (1 - Y - B) - Y - B \right] - \frac{P_{LbsSO_2Plant}}{2000\ {}^{lbs}/_{ton}}$$

Equation 3:

$$E_{lbs/ton} = \frac{M_{SO_2Stack}}{P_{TonsH_2SO_4}} = \frac{Q_{Stack} \cdot B}{Q_{Stack} \cdot \frac{2}{3} \cdot \left[\frac{0.209}{0.791} \cdot (1 - Y - B) - Y - B \right] - \left[P_{LbsSO_2Plant} \cdot \frac{385.57}{64.058} \right]} \cdot 1306.33 \frac{lbsSO_2}{TonAcid}$$

Where:

$P_{TonsH_2SO_4}$	= 100% Sulfuric Acid Production, tons per unit of time
M_{SO_2Stack}	= Mass SO_2 stack emission rate, lb per unit of time
Q_{Stack}	= Volumetric flow rate of stack gas, dry standard cubic feet (DSCF) per unit of time
P_{LbsSO_2Plant}	= Mass production rate of front-end liquid SO_2 plant (B Plant), lb per unit of time
Y	= Stack O_2 concentration, fraction (dry basis)
B	= Stack SO_2 concentration, fraction (dry basis)
$E_{lbs/ton}$	= lb SO_2 per ton 100% Sulfuric Acid Produced
$98.0734\ {}^{lbs}/_{lb-mol}$	= Molecular weight of sulfuric acid
$64.058\ {}^{lbs}/_{lb-mol}$	= Molecular weight of SO_2

$1306.33 \frac{lbsSO_2}{TonAcid} = \frac{64.058 \, {}^{lbs}/_{lb-mol} \cdot 2000 \, {}^{lbs}/_{ton}}{98.0734 \, {}^{lbs}/_{lb-mol}}$

$385.57 \frac{SCF}{lb-mol}$ = Volume of one lb-mole of gas at standard temperature and pressure (68°F and 14.696 psia), cubic feet

The mass emission rate equation (Equation 1) calculates the SO_2 mass emission rate by multiplying the total stack gas flow rate by the stack SO_2 concentration. The 100% Sulfuric Acid Production Rate equation (Equation 2) is based on a material balance of the contact process and the fact that the ratio of oxygen to nitrogen of the incoming air is fixed. The lb/ton equation (Equation 3) is the ratio of the mass SO_2 emission rate to the 100% Sulfuric Acid Production Rate.

The benefit of using this method is the ability to obtain information regarding the SO_2 mass emission rate, the fact that lb/ton measurements will be "weighted" based on the flow rate during each measurement, and the elimination of errors associated with measuring sulfuric acid flow and using converter inlet Reich testing.

Definitions

Terms used in this CEMS Plan that are defined in the Clean Air Act ("CAA") or in federal or state regulations promulgated pursuant to the CAA shall have the meaning assigned to them in the CAA or such regulations, unless otherwise defined in the Consent Decree. Terms used in this CEMS Plan that are defined in the Consent Decree shall have the meaning assigned to them therein.

Emissions Monitoring

- Emissions monitoring will be done using an O_2 analyzer at the exit stack, an SO_2 analyzer at the exit stack, and a stack flow rate analyzer. Except for any analyzer malfunctions, associated repairs, and required quality assurance or control activities (including calibration checks and required zero and span adjustments), monitoring will be conducted during all Operating Periods and during Shutdown.

- Once every five minutes, the analyzers will measure the stack SO_2 concentration (fraction, dry basis), the stack O_2 concentration (fraction, dry basis) and the volumetric flow rate (dry standard cubic feet per minute).

- During routine calibration checks and adjustments of the analyzers, the pre-calibration level will be used to fill in any analyzer data gaps that occur pending completion of the calibration checks and adjustments.

- If any one or more than one analyzer is/are not operating for a period of 24 hours or greater, data gaps in the array involving the non-operational analyzer(s) will be filled in as follows:

  - Exit stack gas will be sampled and analyzed for SO_2 at least once per hour, during all Operating Periods. Sampling will be conducted by Reich test or other established method (*e.g.*, portable analyzer). The most recent hourly reading will be substituted for the 12 five-minute readings that would otherwise have been taken if the analyzer had been operating normally.

  - O_2 in the exit stack gas will be sampled and analyzed at least once per hour, during all Operating Periods Sampling will be conducted by Orsat test or other established method (*e.g.*, portable analyzer). The most recent hourly reading will be substituted for the 12 five-minute readings that would otherwise have been taken if the analyzer had been operating normally.

  - Stack volumetric flow rate will be estimated using engineering judgment.

- B Plant production will be estimated using engineering judgment.

- If any one or more than one analyzer is/are not operating for a period of less than 24 hours, one of the following must be done: (i) the requirements set forth for a 24-hour or greater period of downtime must be used to fill in the data gaps; or (ii) the data recorded for the five minute reading immediately preceding the affected analyzer's(s') stoppage must be used to fill in the data gap.

- In order to secure data on a "dry basis," the Facility may either:

  (i) directly measure the moisture content using a moisture analyzer; or

  (ii) assume the moisture content is the greater of 3% or the highest measured moisture content in any Relative Accuracy Test Audit ("RATA"); or

  (iii) for saturated gas streams only, measure the stack temperature using a stack temperature sensor at the time of each SO_2 measurement and determine the moisture content using a psychrometric chart or standard text water vapor pressure correlation.

Emissions Calculations

3-Hour Rolling Average.

For purposes of calculating a 3-hour rolling average, the system will maintain an array of the 36 most recent measurements of each of the three monitored parameters. Every five minutes, the system will add the most recent readings to the array and exclude the oldest readings.

The 3-hour rolling average lb/ton SO_2 emission rate (E_{3hravg}) will be calculated using Equation 4.

Equation 4:

$$E_{3hravg} = 1306.33 \frac{lbsSO_2}{TonAcid} \cdot \frac{\sum_{i=1}^{36} Q_{Stack\,i} \cdot B_i}{\sum_{i=1}^{36} \left\{ \left[Q_{Stack\,i} \cdot \frac{2}{3} \cdot \left[\frac{0.209}{0.791} \cdot (1 - Y_i - B_i) - Y_i - B_i \right] \right] - \left(P_{LbsSO_2Plant\,i} \cdot \frac{385.57}{64.058} \right) \right\}}$$

Where:

Y_i = Stack O_2 concentration (dry basis), fraction at measurement "*i*"

B_i = Stack SO_2 concentration, fraction (dry basis) at measurement "*i*"

$Q_{Stack\,i}$ = Stack volumetric flow rate, dry standard cubic feet per minute (DSCFM) at measurement "*i*"

$P_{LbsSO_2Plant\,i}$ = Production rate of front-end liquid SO_2 plant (B Plant), lb per minute at measurement "*i*"

$1306.33 \frac{lbsSO_2}{TonAcid} = \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$

E_{3hravg} = 3-hour average lb SO_2 per ton 100% Sulfuric Acid Produced

365-Day Rolling Average.

For the purposes of calculating a 365-day rolling average, the system will maintain an array of all of the measurements of each of the three monitored parameters for 365 days. Every day, the system will add the readings from that day to the array and exclude the readings from the oldest day.

The 365-day rolling average lb/ton SO_2 emission rate ($E_{365-Day\ Avg}$) will be calculated using Equation 5:

$$E_{365-Day\ Avg} = 1306.33 \frac{lbsSO_2}{TonAcid} \cdot \frac{\sum_{i=1}^{n} Q_{Stack\ i} \cdot B_i}{\sum_{i=1}^{n} \left\{ \left[Q_{Stack\ i} \cdot \frac{2}{3} \cdot \left[\frac{0.209}{0.791} \cdot (1 - Y_i - B_i) - Y_i - B_i \right] \right] - \left(P_{LbsSO_2 Plant\ i} \cdot \frac{385.57}{64.058} \right) \right\}}$$

Where:

Y_i = Stack O_2 concentration (dry basis), fraction at measurement "*i*"

B_i = Stack SO_2 concentration, fraction (dry basis) at measurement "*i*"

$Q_{Stack\ i}$ = Stack volumetric flow rate, dry standard cubic feet per minute (DSCFM) at measurement "*i*"

$P_{LbsSO_2 Plant\ i}$ = Production rate of front-end liquid SO_2 plant (B Plant), lb per minute at measurement "*i*"

$1306.33 \frac{lbsSO_2}{TonAcid} = \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$

n = the number of measurements taken at 5-minute intervals over the 365-day period

$E_{365-Day\ Avg}$ = 365-day rolling average lb SO_2 per ton 100% Sulfuric Acid Produced

Rounding of Numbers resulting from Calculations

Upon completion of the calculations, the final numbers shall be rounded as follows:

E_{3hravg}: Rounded to the nearest tenth.

$E_{365-Day\ Avg}$: Rounded to the nearest hundredth.

The number "5" shall be rounded up (*e.g.*, a short-term rate of 2.05011 shall be rounded to 2.1).

Rounding of Variables B, Q_{Stack}, and Y

Rounding of the variables identified as B, Q_{Stack}, and Y in the equations set forth in this CEMS Plan shall be done based on the accuracy of the measuring device as provided by the manufacturer of the device.

Compliance with Consent Decree SO_2 Limits

Short-Term SO_2 Limit

The Short-Term Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, the Facility will be in compliance with the Short-Term SO_2 Consent Decree Limit if E_{3hravg} does not exceed 3.0 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If the Facility contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 3.0 lb/ton after the period of the Malfunction(s) end(s), the Facility shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

NSPS SO_2 Limit

The NSPS Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, the Facility will be in compliance with the NSPS Limit if E_{3hravg} does not exceed 4 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If the Facility contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 4.0 lb/ton after the period of the Malfunction(s) end(s), the Facility shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

Long-Term SO_2 Limits

The Long-Term Limit includes periods of Startup, Shutdown, and Malfunction. The Facility will be in compliance with the Long-Term SO_2 Limit if $E_{365-Day\ Avg}$ does not exceed 1.90 lb of SO_2 per ton of 100% Sulfuric Acid Produced.

Recordkeeping and Reporting

In addition to any requirements in the Consent Decree, the Facility shall maintain records of the date, time, and duration that any of the three analyzers required under this CEMS plan is not operating. In each semi-annual report required under Section IX of the Decree and in each excess emission report required by the NSPS, the Facility specifically shall identify all periods of analyzer downtime during the reporting period and all data during the reporting period that is "substitute" data. "Substitute" data means data that is not generated contemporaneously by an analyzer at the same time as the gas flow stack (or duct) emissions are being measured, but rather, is substituted for contemporaneous analyzer measurements consistent with the provisions of the "Emissions Monitoring" section of this CEMS Plan when an analyzer is not operating.

Retention of All CEMS Data, including Data during Startup, Shutdown, and Malfunction

The Facility will retain all data generated by its SO_2 analyzer, O_2 analyzer, coriolis meter and stack flow analyzer, including all data generated during Startup, Shutdown, and/or Malfunction ("SSM") of the Sulfuric Acid Plant in accordance with the requirements of Section XIII of the Consent Decree.

Analyzer Specifications

The three stack analyzers will meet the following specifications:

Table 1

Parameter	Location	Range
SO_2, mole fraction, dry basis	Stack	Dual range: Normal: 0 – 500 ppm SO_2 SSM: 0 – 3,600 ppm SO_2
O_2, mole fraction, dry basis	Stack	Single range: 0 – 20.9 % O_2
Volumetric flow rate, DSCFM	Stack	0 to 125% of the maximum expected volumetric flow rate

The stack SO_2 analyzer will meet all applicable requirements of 40 C.F.R. §§ 60.11, 60.13, 40 C.F.R. Part 60, Appendix B, Performance Specification 2, and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

The stack O_2 analyzer will meet 40 C.F.R. Part 60 Appendix B, Performance Specification 3 and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

The volumetric flow rate analyzer will meet 40 C.F.R. Part 60, Appendix B, Performance Specification 6 and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

Compliance with the NSPS: 40 C.F.R. Part 60, Subpart H

In addition to the requirements in this CEMS Plan, the Facility also will comply with all of the requirements of the NSPS relating to monitoring provided that, pursuant to 40 C.F.R. §60.13(i), this CEMS Plan will be an approved alternative to the following provisions of 40 C.F.R. Part 60, Subpart H:

- The requirement at 40 C.F.R. § 60.84(a) that the stack SO_2 analyzer have a span value of 1000 ppm. In lieu of this, the Facility will utilize the span values specified in Table 1; and

- The procedures specified at 40 C.F.R. § 60.84(b) for converting monitoring data into the units of the applicable standard. In lieu of this, the Facility will utilize the procedures specified in this CEMS Plan for calculating compliance with the NSPS 3-hour average limit.

APPENDIX G

APPENDIX G

OREGON FACILITY

CEMS Plan for SO_2 Emissions
Marsulex, Inc.
Oregon A and B Double Absorption Sulfuric Acid Regeneration Plants

Principle

This CEMS Plan is the mechanism for determining compliance with all SO_2 emission limits in the Consent Decree for the Oregon A and B Sulfuric Acid Plants at the Oregon Facility. The methodology described in this CEMS Plan will provide a real-time indication of compliance with the emission limits established in the Consent Decree by determining the emission rate in terms of both pounds of SO_2 emitted per unit of time and pounds of SO_2 emitted per ton of 100% Sulfuric Acid Produced (lb/ton). The system will utilize at least three analyzers: one to measure the converter inlet SO_2 concentration, one to measure stack SO_2 concentration, and one to measure stack volumetric flow rate. From these data, the emission rate, expressed as both pounds per unit of time and lb/ton, will be directly calculated using Equations 1, 2, and 3 below.

Equation 1:

$$M_{SO_2Stack} = Q_{Stack} \cdot B \cdot \frac{64.058\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol}}$$

Equation 2:

$$P_{TonsH_2SO_4} = Q_{Stack} \cdot \left[\frac{A-B}{1-(1.5 \cdot A)}\right] \cdot \frac{98.0734\ {}^{lbs}/_{lb-mol}}{385.57\ \frac{SCF}{lb-mol} \cdot 2000\ {}^{lbs}/_{Ton}}$$

Equation 3:

$$E_{lbs/ton} = \frac{M_{SO_2Stack}}{P_{TonsH_2SO_4}} = \frac{Q_{Stack} \cdot B}{Q_{Stack} \cdot \left[\frac{A-B}{1-(1.5 \cdot A)}\right]} \cdot 1306.33\ \frac{lbsSO_2}{TonAcid}$$

Where:

$P_{TonsH_2SO_4}$	= 100% Sulfuric Acid Production, tons per unit of time
M_{SO_2Stack}	= Mass SO_2 stack emission rate, lb per unit of time
Q_{Stack}	= Volumetric flow rate of stack gas, dry standard cubic feet (DSCF) per unit of time
A	= Converter inlet SO_2 concentration, fraction (dry basis)
B	= Stack SO_2 concentration, fraction (dry basis)
$E_{lbs/ton}$	= lb SO_2 per ton 100% Sulfuric Acid Produced
$98.0734\ {}^{lbs}/_{lb-mol}$	= Molecular weight of sulfuric acid
$64.058\ {}^{lbs}/_{lb-mol}$	= Molecular weight of SO_2
$1306.33\ \frac{lbsSO_2}{TonAcid}$	$= \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$

$385.57 \frac{SCF}{lb-mol}$ = Volume of one lb-mole of gas at standard temperature and pressure (68°F and 14.696 psia), cubic feet

The mass emission rate equation (Equation 1) calculates the SO_2 mass emission rate by multiplying the total stack gas flow rate by the stack SO_2 concentration. The 100% Sulfuric Acid Production Rate equation (Equation 2) is based on a material balance of the contact process. The lb/ton equation (Equation 3) is the ratio of the SO_2 emission rate to the 100% Sulfuric Acid Production Rate.

The benefit of using this method is the ability to obtain information regarding the SO_2 mass emission rate, the fact that lb/ton measurements will be "weighted" based on the flow rate during each measurement, and the elimination of errors associated with measuring sulfuric acid flow and using converter inlet Reich testing.

Definitions

Terms used in this CEMS Plan that are defined in the Clean Air Act ("CAA") or in federal or state regulations promulgated pursuant to the CAA shall have the meaning assigned to them in the CAA or such regulations, unless otherwise defined in the Consent Decree. Terms used in this CEMS Plan that are defined in the Consent Decree shall have the meaning assigned to them therein.

Emissions Monitoring

Marsulex will undertake the following monitoring procedures separately at both the Oregon A Plant and the Oregon B Plant:

- Emissions monitoring will be done using an SO_2 analyzer at the converter inlet, an SO_2 analyzer at the exit stack, and a stack flow rate analyzer. Except for any analyzer malfunctions, associated repairs, and required quality assurance or control activities (including calibration checks and required zero and span adjustments), Marsulex will conduct monitoring during all Operating Periods and during Shutdown.

- Once every five minutes, the analyzers will measure the stack SO_2 concentration (fraction, dry basis), the converter inlet SO_2 concentration (fraction, dry basis) and the volumetric flow rate (dry standard cubic feet per minute).

- During routine calibration checks and adjustments of the any analyzers, the pre-calibration will be used to fill in any analyzer data gaps that occur pending completion of the calibration checks and adjustments.

- If any one or more than one analyzer is/are not operating for a period of 24 hours or greater, data gaps in the array involving the non-operational analyzer(s) will be filled in as follows:

    - Exit stack gas will be sampled and analyzed for SO_2 at least once per hour, during all Operating Periods. Sampling will be conducted by Reich test or other established method (*e.g.*, portable analyzer). The most recent hourly reading will be substituted for the 12 five-minute readings that would otherwise have been taken if the analyzer had been operating normally.

    - Converter inlet gas either will be sampled and analyzed for SO_2 using a Reich test or other established method, or the concentration will be estimated using engineering judgment, at least once every four hours during all Operating Periods. The most recent four-hour measurement/estimate will be substituted for the 48 five-minute readings that would otherwise have been taken if the system had been operating normally.

    - Stack volumetric flow rate will be estimated using engineering judgment.

- If any one or more than one analyzer is/are not operating for a period of less than 24 hours, one of the following must be done: (i) the requirements set forth for a 24-hour or greater period of downtime must be used to fill in the data gaps; or (ii) the data recorded for the five minute reading immediately preceding the affected analyzer's(s') stoppage must be used to fill in the data gap.

Emissions Calculations

Marsulex will make the following calculations separately at both the Oregon A Plant and the Oregon B Plant.

3-Hour Rolling Average.

For purposes of calculating a 3-hour rolling average, the system will maintain an array of the 36 most recent measurements of each of the three monitored parameters. Every five minutes, the system will add the most recent readings to the array and exclude the oldest readings.

The 3-hour rolling average lb/ton SO_2 emission rate (E_{3hravg}) will be calculated using Equation 4.

Equation 4:

$$E_{3hravg} = 1306.33 \frac{lbsSO_2}{TonAcid} \cdot \frac{\sum_{i=1}^{36} Q_{Stack\ i} \cdot B_i}{\sum_{i=1}^{36} Q_{Stack\ i} \cdot \left[\frac{A_i - B_i}{1 - 1.5 \cdot A_i} \right]}$$

Where:

A_i = Converter inlet SO_2 concentration, fraction (dry basis) at measurement "*i*"

B_i = Stack SO_2 concentration, fraction (dry basis) at measurement "*i*"

$Q_{Stack\ i}$ = Stack volumetric flow rate, dry standard cubic feet per minute (DSCFM) at measurement "*i*"

$1306.33 \frac{lbsSO_2}{TonAcid} = \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$

E_{3hravg} = 3-hour average lb SO_2 per ton 100% Sulfuric Acid Produced

365-Day Rolling Average.

For the purposes of calculating a 365-day rolling average, the system will maintain an array of all of the measurements of each of the three monitored parameters for 365 days. Every day, the system will add the readings from that day to the array and exclude the readings from the oldest day.

The 365-day rolling average lb/ton SO_2 emission rate ($E_{365-Day\ Avg}$) will be calculated using Equation 5.

Equation 5:

$$E_{365-Day\ Avg} = 1306.33\ \frac{lbsSO_2}{TonAcid} \cdot \frac{\sum_{j=1}^{n} Q_{Stack\ j} \cdot B_j}{\sum_{i=1}^{n} Q_{Stack\ j} \cdot \left[\frac{A_j - B_j}{1 - 1.5 \cdot A_j}\right]}$$

Where:

A_j = Converter inlet SO_2 concentration, fraction (dry basis) at measurement "*j*"

B_j = Stack SO_2 concentration, fraction (dry basis) at measurement "*j*"

$Q_{Stack\ j}$ = Stack volumetric flow rate, dry standard cubic feet per minute (DSCFM) at measurement "*j*"

$1306.33\ \frac{lbsSO_2}{TonAcid} = \frac{64.058\ {}^{lbs}/_{lb-mol} \cdot 2000\ {}^{lbs}/_{ton}}{98.0734\ {}^{lbs}/_{lb-mol}}$

n = the number of measurements taken at 5-minute intervals over the 365-day period

$E_{365-Day\ Avg}$ = 365-day rolling average lb SO_2 per ton 100% Sulfuric Acid Produced

Rounding of Numbers resulting from Calculations

Upon completion of the calculations, the final numbers shall be rounded as follows:

E_{3hravg}: Rounded to the nearest tenth.

$E_{365-Day\ Avg}$: Rounded to the nearest hundredth.

The number "5" shall be rounded up (*e.g.*, a short-term rate of 2.05011 shall be rounded to 2.1).

Rounding of Variables A, B, and Q_{Stack}

Rounding of the variables identified as A, B, and Q_{Stack} in the equations set forth in this CEMS Plan shall be done based on the accuracy of the measuring device as provided by the manufacturer of the device.

Compliance with Consent Decree SO_2 Limits

Short-Term SO_2 Limits

The Short-Term Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, Marsulex will be in compliance with the Short-Term SO_2 Consent Decree Limit if E_{3hravg} does not exceed 3.5 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If Marsulex contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 3.5 lb/ton after the period of the Malfunction(s) end(s), Marsulex shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

NSPS SO_2 Limits

The NSPS Limit does not apply during periods of Startup, Shutdown, or Malfunction. During all other Operating Periods, Marsulex will be in compliance with the NSPS Limit if E_{3hravg} does not exceed 4.0 lb of SO_2 per ton of 100% Sulfuric Acid Produced. If Marsulex contends that emissions during a Malfunction(s) resulted in a calculated 3-hour rolling average emission rate(s) in excess of 4.0 lb/ton after the period of the Malfunction(s) end(s), Marsulex shall recalculate E_{3hravg} to exclude measurements recorded during the period(s) of the claimed Malfunction(s).

Long-Term SO_2 Limits

The Long-Term Limits include periods of Startup, Shutdown, and Malfunction. Marsulex will be in compliance with the Long-Term SO_2 Limit if $E_{365-Day\ Avg}$ does not exceed the rates specified in Table 1 below:

Table 1

Plant	Limit (lb of SO_2 per ton of 100% sulfuric acid produced)
Oregon A	2.40
Oregon B	2.50

Recordkeeping and Reporting

In addition to any requirements in the Consent Decree, Marsulex shall maintain records of the date, time, and duration that any of the three analyzers required under this CEMS plan is not operating. In each semi-annual report required under Section IX of the Decree and in each excess emission report required by the NSPS, Marsulex specifically shall identify all periods of analyzer downtime during the reporting period and all data during the reporting period that is "substitute" data. "Substitute" data means data that is not generated contemporaneously by an analyzer at the same time as the gas flow stack (or duct) emissions are being measured, but rather, is substituted for contemporaneous analyzer measurements consistent with the provisions of the "Emissions Monitoring" section of this CEMS Plan when an analyzer is not operating.

Retention of All CEMS Data, including Data during Startup, Shutdown, and Malfunction

Marsulex will retain all data generated by its SO_2 analyzers and stack flow analyzer, including all data generated during Startup, Shutdown, and/or Malfunction ("SSM") of either the A Plant or the B Plant in accordance with the requirements of Section XIII of the Consent Decree.

Analyzer Specifications

The three analyzers will meet the following specifications:

Table 2

Parameter	Location	Range
SO_2, mole fraction, dry basis	Stack	Dual range: Normal: 0 – 500 ppm SO_2 SSM: 0 – 3,600 ppm SO_2
SO_2, mole fraction, dry basis	Converter Inlet	Single range: 0 – 15 % SO_2
Volumetric flow rate, DSCFM	Stack	0 to 125% of the maximum expected volumetric flow rate

The stack SO_2 analyzer will meet all applicable requirements of 40 C.F.R. §§ 60.11, 60.13, 40 C.F.R. Part 60, Appendix B, Performance Specification 2, and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

The Converter Inlet SO_2 Analyzer likewise will meet all applicable requirements of 40 C.F.R. Part 60, Appendix B, Performance Specification 2, and 40 C.F.R. Part 60, Appendix F, Procedure 1, except as follows:

- Marsulex will select the optimum location to obtain representative SO_2 readings. Turbulence near the blower exit and/or elevated temperatures at the converter inlet may require an analyzer measurement location that differs from the requirements of Performance Specification 2, Section 8.1.

- In lieu of annual Relative Accuracy Test Audits ("RATAs"), as described in Section 5.1.1 of Appendix F, Marsulex will conduct quarterly cylinder gas audits (*i.e.*, four per year) on the Converter Inlet SO_2 Analyzer.

The volumetric flow rate analyzer will meet 40 C.F.R. Part 60, Appendix B, Performance Specification 6 and the Quality Assurance and Quality Control Procedures in 40 C.F.R. Part 60, Appendix F, Procedure 1.

Compliance with the NSPS: 40 C.F.R. Part 60, Subpart H

In addition to the requirements in this CEMS Plan, Marsulex also will comply with all of the requirements of the NSPS relating to monitoring provided that, pursuant to 40 C.F.R. §60.13(i), this CEMS Plan will be an approved alternative to the following provisions of 40 C.F.R. Part 60, Subpart H:

- The requirement at 40 C.F.R. § 60.84(a) that the stack SO_2 analyzer have a span value of 1000 ppm. In lieu of this, Marsulex will utilize the span values specified in Table 1; and

- The procedures specified at 40 C.F.R. § 60.84(b) for converting monitoring data into the units of the applicable standard. In lieu of this, Marsulex will utilize the procedures specified in this CEMS Plan for calculating compliance with the NSPS 3-hour average limit.

APPENDIX H

APPENDIX H

SHORT TERM EMISSION LIMITS DURING STARTUP

3-hour Time period (Hours after Startup commences)	Short-Term Sulfur Dioxide Emission Limit, lbs/ton, applicable to:				
	Beaumont	Shreveport	Riverton #1	Riverton #2	Tulsa
1st through the 3rd hour	15.00	15.00	15.00	15.00	15.00
2nd through the 4th hour	15.00	15.00	15.00	15.00	15.00
3rd through the 5th hour	15.00	15.00	15.00	15.00	15.00
4th through the 6th hour	15.00	15.00	15.00	15.00	15.00
5th through the 7th hour	15.00	15.00	15.00	15.00	15.00
6th through the 8th hour	15.00	15.00	15.00	15.00	15.00
7th through the 9th hour	15.00	15.00	15.00	15.00	15.00
8th through the 10th hour	15.00	15.00	15.00	15.00	15.00
9th through the 11th hour	15.00	15.00	15.00	15.00	15.00
10th through the 12th hour	15.00	15.00	15.00	15.00	15.00
11th through the 13th hour	15.00	15.00	15.00	15.00	15.00
12th through the 14th hour	15.00	15.00	15.00	15.00	15.00
13th through the 15th hour	12.00	12.00	12.00	12.00	12.00
14th through the 16th hour	9.00	9.00	9.00	9.00	9.00
15th through the 17th hour	6.00	6.00	6.00	6.00	6.00
16th through the 18th hour	6.00	6.00	6.00	6.00	6.00
17th through the 19th hour	6.00	6.00	6.00	6.00	6.00
18th through the 20th hour	6.00	6.00	6.00	6.00	6.00
19th through the 21st hour	6.00	6.00	6.00	6.00	6.00
20th through the 22nd hour	6.00	6.00	6.00	6.00	6.00
21st through the 23rd hour	6.00	6.00	6.00	6.00	6.00
22nd through the 24th hour	6.00	6.00	6.00	6.00	6.00
23rd through the 25th hour	4.73	4.67	4.63	4.70	4.57
24th through the 26th hour	3.47	3.33	3.27	3.40	3.13

Notes: Short-Term Limits for the 11 through 13 hour and 12 through 14 hour are weighted averages of 15.0 and 6.0 lbs/ton. Emission limits for the 23rd through 25th hour and 24th through 26th hour are weighted averages of 6.0 lbs/ton and the Short-Term Limit for each Sulfuric Acid Plant as specified in the Consent Decree. Beginning with the 3-hour period consisting of the 25th through 27th hour after Startup commences, the Short-Term Limits specified in the Consent Decree apply

APPENDIX I

APPENDIX I

Calculation of Stipulated Penalties for Violations of the Short-Term Limits, Limits During Start-up, and Long-Term Limits

I. Calculating Stipulated Penalties for Violations of the Short-Term Limits and Limits during Startup

A. Background on CEMS' Recording of SO2, 3-Hour Rolling Average Rates

The Short-Term SO2 Limits and the SO2 Limits during Startup required by the Consent Decree are based on 3-hour rolling averages. During normal operations, the analyzers required by the CEMS Plans in Appendices A-G will record readings every 5 minutes. To calculate the 3-hour rolling average SO2 rates, the system will maintain an array of 36 readings [(60 ÷ 5) x 3], and, at every five-minute interval, it will add the most recent reading to the calculation and discard the oldest reading. Thus, under normal operations, there will 36, 3-hour rolling average rates in a three hour period, and 288 3-hour rolling average rates in a 24 hour period. [1]

The example data on pages 3 – 4 illustrates how data generally will be recorded under the CEMS Plans.

B. Calculating Stipulated Penalties For Violations of the 3-Hour Rolling Average Limits

Stipulated penalties will accrue for any violation of the 3-hour rolling average limit in any non-overlapping three hour period based on how much the recorded rate is above the limit:

Percentage Over the Limit	Penalty per Violation
1 - 50%	$250
51 - 100%	$500
Over 100%	$750

Assume that the Short-Term SO2 Limit is 2.2. Using the data from pages 3- 4, stipulated penalties would accrue as follows:

(1) The first stipulated penalty that would accrue would occur at 14:00, when the 3-hour rolling average rate first exceeded the 2.2 limit. Because the recorded rate of 2.6 is between 1 - 50% above the limit, $250 would be the penalty.

(2) No stipulated penalties would accrue for the 3-hour rolling average rate exceedances that are recorded between 14:05 and 16:55 because one or more of the readings used to calculate the rolling averages in each of these five-minute intervals overlap with one or more of the readings used to calculate the rate at 14:00.

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[1] During system maintenance and/or analyzer malfunctions, there may be fewer than 36 readings in a three-hour period, but the CEMS Plans describe how to calculate the rolling, 3-hour averages under these circumstances. The use of a different method to fill in the data gaps when an analyzer is being maintained or has malfunctioned will not change the method of calculating stipulated penalties.

(3) The second stipulated penalty that would accrue would occur at 17:00 because this is the first time since 14:00 that no readings overlap with the readings that were used to calculate the rate the first time a stipulated penalty accrued at 14:00. Because the recorded rate of 3.4 is between 51 and 100% over the limit, $500 would be the appropriate penalty.

(4) No stipulated penalties would accrue for the 3-hour rolling average rates exceedances that are recorded between 17:05 and 17:15 because one or more of the readings used to calculate the rolling averages in each of these five-minute intervals overlap with one or more of the readings used to calculate the rate at 17:00.

(5) The final stipulated penalty would be $ 750 (*i.e.*, $250 + $500).

EXAMPLE DATA PURSUANT TO THE CEMS PLANS

Time	SO2 In	SO2 Stack	Stack Flow (SCFM)	SO2 Stack (SCFM)	SO3 Out Converter (SCFM)	3-Hr Rolling Average (lb/ton)	Mass (lb)
10:05	11.00%	0.0230%	40000	9.2	5258.4	--	8
10:10	11.20%	0.0230%	40000	9.2	5373.6	--	15
10:15	11.10%	0.0230%	40000	9.2	5315.9	--	23
10:20	11.20%	0.0230%	40000	9.2	5373.6	--	31
10:25	11.00%	0.0230%	40000	9.2	5258.4	--	38
10:30	11.00%	0.0230%	40000	9.2	5258.4	--	46
10:35	11.00%	0.0230%	40000	9.2	5258.4	--	53
10:40	11.00%	0.0230%	40000	9.2	5258.4	--	61
10:45	11.00%	0.0230%	40000	9.2	5258.4	--	69
10:50	11.00%	0.0230%	40000	9.2	5258.4	--	76
10:55	11.00%	0.0210%	40000	8.4	5259.4	--	83
11:00	11.00%	0.0190%	40000	7.6	5260.4	--	90
11:05	11.20%	0.0250%	35000	8.8	4701.0	--	97
11:10	11.20%	0.0250%	35000	8.8	4701.0	--	104
11:15	11.20%	0.0250%	35000	8.8	4701.0	--	112
11:20	11.20%	0.0250%	35000	8.8	4701.0	--	119
11:25	11.20%	0.0250%	35000	8.8	4701.0	--	126
11:30	11.20%	0.0250%	35000	8.8	4701.0	--	133
11:35	11.20%	0.0250%	35000	8.8	4701.0	--	141
11:40	11.20%	0.0250%	35000	8.8	4701.0	--	148
11:45	11.20%	0.0250%	35000	8.8	4701.0	--	155
11:50	11.10%	0.0250%	35000	8.8	4650.6	--	162
11:55	11.10%	0.0250%	38000	9.5	5049.2	--	170
12:00	11.10%	0.0250%	38000	9.5	5049.2	--	178
12:05	11.10%	0.0250%	38000	9.5	5049.2	--	186
12:10	11.10%	0.0250%	38000	9.5	5049.2	--	194
12:15	11.10%	0.0250%	38000	9.5	5049.2	--	202
12:20	11.10%	0.0190%	38000	7.2	5051.9	--	208
12:25	11.10%	0.0190%	38000	7.2	5051.9	--	214
12:30	11.10%	0.0190%	38000	7.2	5051.9	--	220
12:35	11.10%	0.0190%	38000	7.2	5051.9	--	226
12:40	11.10%	0.0190%	38000	7.2	5051.9	--	232
12:45	11.10%	0.0190%	38000	7.2	5051.9	--	238
12:50	11.10%	0.0190%	38000	7.2	5051.9	--	244
12:55	11.20%	0.0190%	38000	7.2	5106.7	--	250
13:00	11.20%	0.0190%	38000	7.2	5106.7	2.2	256
13:05	11.20%	0.0190%	38000	7.2	5106.7	2.2	262
13:10	11.20%	0.0190%	38000	7.2	5106.7	2.2	268
13:15	11.20%	0.0190%	41000	7.8	5509.9	2.2	274
13:20	11.20%	0.0190%	41000	7.8	5509.9	2.2	281
13:25	11.20%	0.0190%	41000	7.8	5509.9	2.2	287
13:30	11.20%	0.0190%	41000	7.8	5509.9	2.1	294
13:35	11.20%	0.0190%	41000	7.8	5509.9	2.1	300
13:40	11.20%	0.0190%	41000	7.8	5509.9	2.1	307
13:45	11.00%	0.0190%	40000	7.6	5260.4	2.1	313

13:50	11.20%	0.0190%	40000
13:55	11.10%	0.0190%	40000
14:00	11.00%	0.1800%	40000
14:05	11.00%	0.3000%	30000
14:10	11.00%	0.1000%	30000
14:15	11.00%	0.1000%	28000
14:20	11.00%	0.1000%	28000
14:25	11.00%	0.1000%	28000
14:30	11.00%	0.1000%	28000
14:35	11.00%	0.0190%	28000
14:40	11.00%	0.0190%	40000
14:45	11.20%	0.0190%	40000
14:50	11.20%	0.0190%	40000
14:55	11.20%	0.0190%	40000
15:00	11.20%	0.0190%	40000
15:05	11.20%	0.0190%	40000
15:10	11.20%	0.0190%	40000
15:15	11.20%	0.0190%	40000
15:20	11.20%	0.0190%	40000
15:25	11.20%	0.0190%	40000
15:30	11.10%	0.0190%	40000
15:35	11.10%	0.0250%	40000
15:40	11.10%	0.0250%	40000
15:45	11.10%	0.0250%	40000
15:50	11.10%	0.0190%	40000
15:55	11.10%	0.0190%	40000
16:00	11.10%	0.0190%	40000
16:05	11.10%	0.0190%	40000
16:10	11.10%	0.0190%	40000
16:15	11.10%	0.0190%	40000
16:20	11.10%	0.0190%	40000
16:25	11.10%	0.0190%	40000
16:30	11.10%	0.0190%	40000
16:35	11.20%	0.0190%	40000
16:40	11.20%	0.0190%	41000
16:45	11.20%	0.0190%	41000
16:50	11.20%	0.0190%	41000
16:55	11.20%	0.0190%	41000
17:00	11.20%	0.0200%	41000
17:05	11.20%	0.0200%	41000
17:10	11.20%	0.0200%	41000
17:15	11.20%	0.0200%	41000
17:20	11.20%	0.0200%	41000
17:25	11.20%	0.0200%	41000
17:30	11.20%	0.0200%	41000
17:35	11.00%	0.0200%	41000
17:40	11.00%	0.0200%	41000
17:45	11.00%	0.0200%	41000
17:50	11.00%	0.0200%	41000

7.6	5375.5
7.6	5317.8
72.0	5183.2
90.0	3844.3
30.0	3916.2
28.0	3655.1
28.0	3655.1
28.0	3655.1
28.0	3655.1
5.3	3682.3
7.6	5260.4
7.6	5375.5
7.6	5375.5
7.6	5375.5
7.6	5375.5
7.6	5375.5
7.6	5375.5
7.6	5375.5
7.6	5375.5
7.6	5375.5
7.6	5375.5
7.6	5317.8
10.0	5314.9
10.0	5314.9
10.0	5314.9
7.6	5317.8
7.6	5317.8
7.6	5317.8
7.6	5317.8
7.6	5317.8
7.6	5317.8
7.6	5317.8
7.6	5317.8
7.6	5317.8
7.6	5375.5
7.8	5509.9
7.8	5509.9
7.8	5509.9
7.8	5509.9
8.2	5509.4
8.2	5509.4
8.2	5509.4
8.2	5509.4
8.2	5509.4
8.2	5509.4
8.2	5509.4
8.2	5391.4
8.2	5391.4
8.2	5391.4
8.2	5391.4

2.1	319
2.1	326
2.6	385
3.1	460
3.3	485
3.5	508
3.6	532
3.8	555
4.0	578
4.0	583
3.9	589
3.9	595
3.9	601
3.9	608
3.9	614
3.8	620
3.8	627
3.8	633
3.8	639
3.8	646
3.8	652
3.8	660
3.8	669
3.8	677
3.8	683
3.8	690
3.8	696
3.8	702
3.8	708
3.8	715
3.8	721
3.8	727
3.8	734
3.8	740
3.8	747
3.8	753
3.8	759
3.8	766
3.4	773
2.7	780
2.6	786
2.4	793
2.2	800
2.1	807
1.9	814
1.9	820
1.9	827
1.9	834
1.9	841

II. Calculating Stipulated Penalties for Violations of the Long-Term Limits

The Long-Term SO2 Limits required by the Consent Decree are based on 365-day rolling averages. For each day, there will be only one 365-day rolling average.

The Consent Decree provides that for each violation, per day, of the Long-Term Limit, the following stipulated penalties will apply:

Period of Noncompliance	Penalty per day
1st - 14th day	$1000
15th - 30th day	$1500
31st day and each day thereafter	$2000

If the 365-day rolling average limit is exceeded on consecutive days, then the penalties are scaled up after the 14th day and after the 30th day. Thus, for example, a violation of the Long-Term Limit for 40 consecutive days will result in $58,000 in stipulated penalties (*i.e.*, (14 x 1000) + (16 x 1500) + (10 x 2000). When the violations are not consecutive or are not consecutive for more than 14 days, then the penalties do not scale up. Thus, for example, 10 days of consecutive or non-consecutive days of violations in January; 10 days of consecutive or non-consecutive violations in March; 10 days of consecutive or non-consecutive violations in May; and 10 days of consecutive or non-consecutive violations in July will result in $40,000 in stipulated penalties (*i.e.*, 40 x 1000).