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SULFUR DIOXIDE EMISSIONS TESTS

PHOSPHORIC ACID PLANT
AND
SUPER PHOSPHORIC ACID PLANT

TEXASGULF CHEMICALS
AURORA, NORTH CAROLINA

EEl 5956

AUGUST 1988

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TEXASGULF CHEMICALS
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AUGUST 1988

Prepared by:

CEM/Engineering Division
Entropy Environmentalists, Inc.
Research Triangle Park, North Carolina

Prepared for:

Texasgulf Chemicals
Aurora, North Carolina

REPORT CERTIFICATION

I participated in the sampling and analysis performed for this project, and I hereby certify that the test report is authentic and accurate.

Date 8/31/88

Signature Todd Pasley
Todd Pasley
CEM/Engineering Division

I have reviewed the testing details and results in this report, and hereby certify that the test report is authentic and accurate to the best of my knowledge.

Date 8/31/88

Signature J. Ron Jernigan
J. Ron Jernigan, P.E.
Manager, Industrial Testing Services
CEM/Engineering Division



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1. INTRODUCTION

The Texasgulf Chemicals Company facility located in Aurora, North Carolina operates phosphoric acid and super phosphoric acid processes that have the potential to emit sulfur dioxide (SO₂) to the atmosphere. Accordingly, the Texasgulf Chemicals Company contracted Entropy Environmentalists, Inc. to conduct an emissions testing program to quantify the SO₂ emissions from seven of these sources. The SO₂ emission tests were conducted on August 9-15, 1988.

The testing program was coordinated by Texasgulf Environmental Supervisor Wayne Powell. Keith Hazel and Todd Pasley of Entropy conducted the sampling and analysis for SO₂. Texasgulf Environmental Laboratory personnel performed moisture and velocity testing and collected process information during the testing program. The testing was observed by Robert Wooten (August 9-11) and Arthur Smoot (August 12-15) of the North Carolina Department of Natural Resources and Community Development.

The test results are summarized in Section 2 of this document. Descriptions of the testing and quality assurance procedures used during the test program are presented in Section 3. The appendices to this report contain the field test program data worksheets and quality assurance information.

2. SUMMARY AND DISCUSSION OF RESULTS

Entropy personnel conducted emissions tests at the seven locations listed in Table 1. The SO₂ results from the tests performed at the four phosphoric acid plant locations and the three super phosphoric acid plant locations are summarized in Tables 2 and 3, respectively. All sampling and analysis data sheets are included in Appendix A.

The SO₂ concentration values presented in Tables 2 and 3 were obtained using EPA Method 6 sampling and analysis procedures. These values were calculated using the titration results and the dry basis gas sample volumes corrected to standard temperature and pressure conditions. Each value represents the mean concentration of SO₂ in the effluent stream during the sampling period.

The SO₂ samples were collected during 1-hour sampling runs. Sampling was interrupted twice during Run 2 at the cross-flow scrubber stack No. 2 location due to process problems which caused two temporary plant shutdowns. The total sampling time for this run was 61.5 minutes. Also, the impinger train used for Run 2 at evaporator #1 stack was inadvertently used again for Run 3 prior to recovering the Run 2 sample. The result from the analysis of this sample was used in conjunction with the gas volume for both runs to compute the SO₂ concentration value listed for Runs 2 and 3. This value represents the mean effluent SO₂ concentration over the total 2 hour total sampling period.

Texasgulf personnel collected process data and performed moisture and velocity testing to determine flue gas volumetric flow rates in conjunction with the SO₂ emissions testing performed by Entropy personnel. Test results and process data were obtained in order to determine SO₂ emission rates in terms of lb SO₂/hr or lb SO₂/lb process input.

TABLE 1.
EMISSIONS TESTING LOCATIONS
TEXASGULF CHEMICAL COMPANY
AURORA, NORTH CAROLINA

<u>Phosphoric Acid Plant</u>	<u>Test Date</u>
Cross-flow Scrubber #1 Stack	8/10/88
Cross-flow Scrubber #2 Stack	8/09/88
Cross-flow Scrubber #3 Stack	8/11/88
Cross-flow Scrubber #4 Stack	8/12/88

<u>Super Phosphoric Acid Plant</u>	
Evaporator #1 Stack	8/14/88
Evaporator #2 Stack	8/15/88
Evaporator #3 and #4 Stack	8/13/88

TABLE 2.

TEXASGULF CHEMICALS COMPANY
AURORA, NORTH CAROLINA

SULFUR DIOXIDE EMISSIONS
PHOSPHORIC ACID PLANT
AUGUST 1988

Unit No.	Date	Run No.	Run Time	SO ₂ (ppm _d)
		1	11:05 - 12:05	53 ✓
1	08/10/88	2	12:50 - 13:50	47 ✓
		3	14:30 - 15:30	45 ✓
		1	12:45 - 13:45	48 ✓
2	08/09/88	2	15:50 - 17:23	36 ✓
		3	19:15 - 20:15	35 ✓
		1	11:25 - 12:25	72 ✓
3	08/11/88	2	13:00 - 14:00	50 ✓
		3	14:40 - 15:40	53 ✓
		1	10:30 - 11:30	42 ✓
4	08/12/88	2	13:00 - 14:00	42 ✓
		3	14:30 - 15:30	45 ✓

TABLE 3.

TEXASGULF CHEMICALS COMPANY
AURORA, NORTH CAROLINA

SULFUR DIOXIDE EMISSIONS
SUPER PHOSPHORIC ACID PLANT
AUGUST 1988

Unit No.	Date	Run No.	Run Time	SO ₂ (ppm _d)
		1	08:50 - 09:05	*
1	08/14/88	2 & 3	10:40 - 11:40 12:05 - 13:05	320** 317
		4	13:35 - 14:35	358 355
		5	15:20 - 16:20	343 340
		1	09:45 - 10:45	777 769
2	08/15/88	2	11:20 - 12:20	687 671
		3	12:50 - 13:50	535 520
		1	08:40 - 09:40	2362 2243
3 & 4	08/13/88	2	13:00 - 14:00	***
		3	11:45 - 12:45	2678 2650
		4	13:20 - 14:20	1966

* Sample spilled during clean up.

** Impinger solution not recovered after Run 2; inadvertently used again during Run 3

*** Failed final leak check due to broken impinger.