

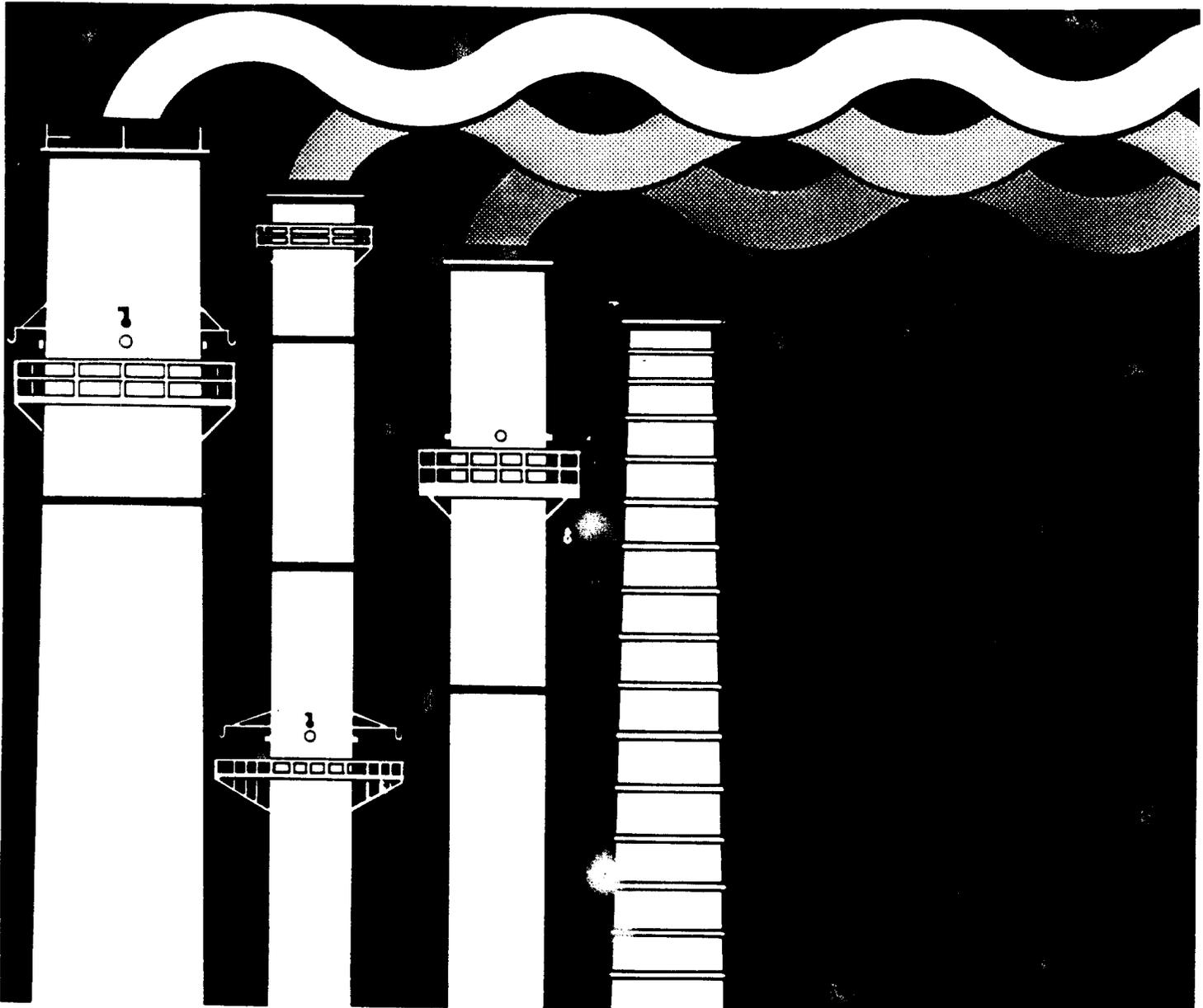
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SOURCE EMISSIONS COMPLIANCE
TEST REPORT
SULFURIC ACID STACK

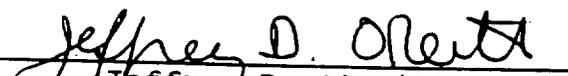
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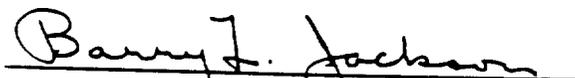


SOURCE EMISSIONS COMPLIANCE
TEST REPORT
SULFURIC ACID STACK

10-003-00037

GENERAL CHEMICAL CORPORATION
CLAYMONT, DELAWARE


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WESTON Project Number
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SECTION 1
SUMMARY

General Chemical Corporation retained Roy F. Weston, Inc. (WESTON) to perform a source compliance testing and analysis program at its sulfuric acid production facility in Claymont, Delaware.

The objective of the program was to determine the compliance status of the sulfuric acid stack relevant to sulfuric acid mist and sulfur dioxide emissions in accordance with the permit issued by the State of Delaware Department of Natural Resources and Environmental Control (DNREC). Also, additional SO₂ measurements were obtained to demonstrate the relative accuracy of the sulfuric acid stack SO₂ continuous emission monitor (CEM) and to verify the concentration of the SO₂ CEM calibration gas cylinder.

Testing and analytical procedures specified by the U.S. Environmental Protection Agency (EPA), as approved by the DNREC, were used throughout the test program. A total of three (3) EPA Method 8 and seven (7) EPA Method 6 tests were conducted on the sulfuric acid stack during the program.

An additional six (6) EPA Method 6 tests were performed on the SO₂ CEM calibration gas cylinder. Representatives of DNREC were present during all EPA Method 8 test periods.

A summary of the sulfuric acid mist and sulfur dioxide test results is presented in Table 1. A summary of the CEM relative accuracy for SO₂ is presented in Table 2. Table 3 presents a summary of the analysis of the standard gas cylinder and Table 4 presents a summary of EPA Method 6 and 8 SO₂ test results. Detailed test data and test results summaries are included in Tables 5 through 7 of the test results and discussion section.

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TABLE 1

SUMMARY OF EPA METHOD 8 SULFURIC ACID MIST
AND SULFUR DIOXIDE TEST RESULTS
SULFURIC ACID PLANT
DELAWARE VALLEY WORKS

TEST #	CALCULATED H ₂ SO ₄ PRODUCTION TON/HR (1)	EMISSION TEST RESULTS SULFURIC ACID MIST		SO ₂ MASS EMISSIONS RATE FROM RECORDING MONITOR LB/HR PLANT DATA		
		LB/TON H ₂ SO ₄ PRODUCED PLANT DATA	GM/KG H ₂ SO ₄ PRODUCED PLANT DATA			
1	45.9	5.9	0.13	0.06	221	188.5
2	45.9	7.0	0.15	0.08	235	194.9
3	45.8	6.05	0.13	0.07	212	166.7
AVG.	45.9	6.28	0.14	0.07	222.3	183.4

(1) A summary of production rates is provided in Appendix C.

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TABLE 2

RELATIVE ACCURACY OF THE SO₂ MONITOR

RUN #	DATE	TIME	RM ⁽¹⁾	M ⁽²⁾	DIFFERENCE	
			PPM	PPM	(D)	(D) ²
1	6-20-89	0840-1003	454	412	42	1764
2	6-20-89	1145-1309	473	426	47	2209
3	6-20-89	1444-1603	428	365	63	3969
4	6-21-89	0833-0853	412	356	56	3136
5	6-21-89	0930-0950	449	378	71	5041
6	6-21-89	1030-1050	382	344	38	1444
7	6-21-89	1130-1150	403	323	80	6400
8	6-21-89	1230-1250	466	395	71	5041
9	6-21-89	1330-1350	391	321	70	4900
10	6-21-89	1430-1450	407	335	72	5184
TOTALS			-	4265	610	39088
AVERAGE			-	427	61	3909

Standard Deviation⁽³⁾ = 14.4

Confidence Coefficient = 10.3

Monitor Relative Accuracy (percent) = 16.7

- (1) RM = Measured sulfur dioxide concentration by Method 6 and 8 test train (ppm/v)
- (2) M = Average concentration measured by SO₂ monitor during test period (ppm/v)
- (3) See Appendix C for example calculation

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TABLE 3

ANALYSIS OF STANDARD GAS CYLINDER

<u>METHOD 6 TEST NUMBER</u>	<u>MEASURED SO₂ CONCENTRATION (PPM)</u>	<u>CERTIFIED VALUE (PPM)</u>
1	656	-
2	667	-
3	659	-
4	667	-
5	674	-
6	653	-
AVERAGE	<hr/> 663	690

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CLAYMONT DELAWARE
TABLE 4

SUMMARY OF EPA METHOD 6 AND METHOD 8
SULFUR DIOXIDE TEST RESULTS

TEST RUN NO.	TEST LOCATION	TEST DATE	TEST PERIOD	MEASURED SULFUR DIOXIDE CONCENTRATION ¹ (PPM/V)
One	Stack	6-20-89	0840-1003	454
Two	Stack	6-20-89	1145-1309	473
Three	Stack	6-20-89	1444-1603	428
Four	Stack	6-21-89	0833-0853	412
Five	Stack	6-21-89	0930-0950	449
Six	Stack	6-21-89	1030-1050	382
Seven	Stack	6-21-89	1130-1150	403
Eight	Stack	6-21-89	1230-1250	466
Nine	Stack	6-21-89	1330-1350	391
Ten	Stack	6-21-89	1430-1450	407
Series Average	--	--	--	427
One	Cylinder Gas	6-21-89	0947-1007	656
Two	Cylinder Gas	6-21-89	1021-1041	667
Three	Cylinder Gas	6-21-89	1050-1110	659
Four	Cylinder Gas	6-21-89	1151-1211	667
Five	Cylinder Gas	6-21-89	1220-1240	674
Six	Cylinder Gas	6-21-89	1248-1308	653
Series Average ²	--	--	--	663

¹ ppm/v = parts per million by volume dry basis at standard conditions of 68°F and 29.92 inches Hg.

SECTION 2
INTRODUCTION

General Chemical Corporation retained WESTON to conduct a source testing and analysis program at its Claymont, Delaware sulfuric acid production facility.

The primary objective of the survey was to determine the sulfuric acid mist and sulfur dioxide compliance status of the sulfuric acid stack with DNREC limits. Additional SO₂ test runs were performed on the sulfuric acid stack and SO₂ calibration gas cylinder for the purpose of determining the relative accuracy of the SO₂ CEM. These results are summarized in Tables 1 through 4 of the summary section.

State of Delaware approved test methods were used throughout the program. All tests were performed during the period of June 19-21, 1989 by WESTON Air Quality Testing Services personnel.

Detailed test data and test result summaries are presented in Tables 5 through 7 of this report. Descriptions of the test location, test equipment, test procedures, sample recovery techniques and analytical methods used during the survey are also included herein. Raw test data, laboratory reports, process conditions and sample calculations, equipment calibration records and a list of WESTON project participants are provided in Appendices A through E, respectively.