U.S.FISH&WILDLIFE SERVICE
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FACSIMILE COVER SHEET

Date: 5/28/98

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To: Cleve Holladay

From: Ellen Porter

Subject: Cargill No 7 Comments

Number of Pages:
(Including this cover sheet) 15

Office Location: 7333 West Jefferson Ave, Suite 450, Lakewood, CO 80235

Re: PSD-FL-250

Mr. C. H. Fancy
Chief, Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road, MS 48
Tallahassee, Florida 32399-2400

Dear Mr. Fancy:

Our Air Quality Branch has reviewed the Prevention of Significant Deterioration Application for Cargill Fertilizer, Inc.'s, proposal to modify its No. 7 Sulfuric Acid Plant in Riverview, Florida. The facility is located 86 km south-southeast of Chassahowitzka Wilderness, a Class I air quality area administered by the U.S. Fish and Wildlife Service. The technical review comments from our Air Quality Branch are enclosed. Specifically, we recommend that your department require Cargill to meet lower limits than proposed for sulfuric acid mist emissions.

Thank you for giving us the opportunity to comment on this permit application. We appreciate your cooperation in notifying us of proposed projects with the potential to impact the air quality and related resources of our Class I air quality areas. If you have questions, please contact Ellen Porter of our Air Quality Branch in Denver at (303) 969-2617.

Sincerely,

Sam D. Hamilton
Regional Director

Enclosures

cc: Doug Neeley, Chief
Air and Radiation Branch
U.S. EPA, Region IV
100 Alabama St., SW
Atlanta, Georgia 30303

bcc: FWS-REG. 4: AQC

CHAS: Refuge Manager
AQD-DEN: Ellen Porter
National Park Service - AIR
P.O. Box 25287
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Technical Review of Prevention of Significant Deterioration Permit Application
For the Modification of the No. 7 Sulfuric Acid Plant
Cargill Fertilizer Plant
Riverview, Florida
PSD-FL-250

by

Air Quality Branch, Fish and Wildlife Service – Denver
May 27, 1998

Cargill Fertilizer, Inc. (Cargill), is proposing to modify the existing No. 7 Sulfuric Acid (H_2SO_4) plant at its phosphate fertilizer manufacturing facility located in Riverview, Florida. The modification will allow an increase in the maximum H_2SO_4 production rate from 2,200 tons per day (TPD) to 3,200 TPD of 100 percent H_2SO_4. The facility is located 86 km south-southeast of Chassahowitzka Wilderness, a Class I air quality area administered by the U.S. Fish and Wildlife Service (FWS). This project will result in PSD-significant increases in emissions of sulfur dioxide (SO_2) and sulfuric acid mist (SAM). Emissions (in tons per year – TPY) are summarized below.

POLLUTANT	EMISSIONS INCREASE (TPY)
SO2	793
SAM	74.6

Best Available Control Technology (BACT) Analysis

Sulfur Dioxide (SO_2): The control technology proposed by Cargill, double absorption, has been the industry standard for the past three decades. For this application, Cargill has proposed to expand the capacity of the existing catalytic converters that transform SO_2 from the sulfur burners to sulfur trioxide. The sulfur trioxide is subsequently absorbed by water to form H_2SO_4. The converters will be expanded more than needed to provide the added acid production; the extra converter volume will allow lower SO_2 emissions relative to the amount of acid produced. Expansion of the converters will require significant physical modification to the existing plant.

Although the 3.5 lb SO_2 per ton of acid produced (lb/ton) limit proposed is lower than the federal New Source Performance Standard (NSPS) of 4.0 lb/ton that applies to this type of facility, it does not necessarily represent BACT. BACT must be at least as stringent as the NSPS. In contrast, Mississippi Phosphate proposed a SO_2 limit of 3.16 lb/ton in 1997 for its Pascagoula Plant, a facility that also employs double absorption.

Cargill also found other control technologies to be technically feasible, including the use of alternative scrubbing reagents, more frequent catalyst replacement, or molecular sieves. However, the applicant dismissed these technologies as being too expensive, but did not provide supporting documentation for that conclusion. A complete BACT analysis would present the economic and environmental consequences of applying those technologies.

Sulfuric Acid Mist (SAM): Cargill proposes to replace the existing "conventional" mist eliminators with Monsanto CS (Cost Saver) or equivalent impaction-type mist eliminators capable of removing 100% of particles larger than 3 microns and 50 to 95% of 0.5 to 3 micron particles. Although Cargill notes that a competitor, Piney Point Phosphates, has committed to installation of more efficient mist eliminators that employ Brownian diffusion to achieve higher removal efficiencies, Cargill eliminates this technology from further consideration, citing its extra cost. In addition, Cargill claims that it would have to replace its tower if the more efficient mist eliminators were used. However, Cargill does not provide any supporting cost/benefit calculations to justify the dismissal of this technology from consideration.

Although the mist eliminators currently in use on the No. 7 plant are capable of lower SAM emissions, Cargill is proposing that the emission limit for the new and improved mist eliminators be set at 0.15 lb SAM/ton, the same as the NSPS established in 1979. This rate is 50% above the worst performance of the old units. Cargill attempts to justify this limit by citing fluctuations in its own stack test data and the common reliance upon the NSPS by permitting authorities.

Examination of the NSPS indicates that the standard for SAM emissions was likely based on skewed data results. The data presented in the attached Table 2.a is taken from EPA's 1992 Sulfuric Acid Background Report (for its *AP-42, Compilation of Air Pollutant Emission Factors*). At first glance, the raw data appears to support the 0.15 lb/ton limit. The average emission rate is 0.108 lb/ton, the standard deviation is 0.141, and a 95% confidence interval would place emissions between 0.073 and 0.144 lb/ton. Thus, the casual observer would conclude that, in order to be confident that the emission limit could be met by 95% of the tests, it should be set between 0.14 to 0.15 lb/ton. However, graphing the data reveals certain trends and outliers (values that indicate some unusual condition or error in the test). Figure 2.a is a scatter plot of the EPA test data and shows that the majority of the test results fall between 0.01 and 0.18 lb/ton; it also shows that the group of results on the far right end of the graph are much higher than the other results. Further inspection of the raw data in Table 2.a reveals that all of the high values came from tests at one facility, and that the median value is less than half of the average. This indicates that the data are being skewed to the high side by a few exceptionally high values.

Because a NSPS should be representative of the capabilities of modern control technology operating in a typically well-maintained mode, it should not be allowed to be unduly influenced by a few extraordinary test results. If the very high data from the one facility is excluded, the remaining data in Table 2.b show better convergence of the mean and the median, and yield a 95% confidence interval of 0.045 to 0.078 lb SAM/ton. From this data, one could suggest that the NSPS should have been set at around 0.08 lb/ton, slightly more than half the 20-year old (and current) NSPS.

If we look at only the Table 2.c data from the tests performed by Cargill, we find that their graph (Figure 2.b) is reasonably consistent. The median and mean are similar and the significant fluctuations cited by Cargill as justification for a high limit are non-existent. In fact, the standard deviation is only 0.033 (much less than the EPA data) and the 95%

confidence interval is 0.028 to 0.087 lb SAM/ton, not much higher than the EPA data in Table 2.b.

Table 2.d combines the EPA data, minus the outliers, and the Cargill data. The Table 2.d data is shown graphically in Figure 2.c. Most test results are below 0.04 lb/ton and 95% of the test results fall in the range between 0.046 and 0.074 lb SAM/ton of acid produced.

Conclusions and Recommendations

SO_2: Cargill is proposing a lower SO_2/ton limit (3.5 lb/ton, 24 hr average) than any found to date in the RACT/BACT/LAER Clearinghouse (Note: Piney Point Phosphate's limit of 3.5 lb/ton is based on a 48 hr average). However, this limit is not as low as that proposed by Mississippi Phosphates (3.16 lb/ton).

SAM: Cargill is proposing the out-of-date and technically flawed NSPS of 0.15 lb/ton for SAM emissions. Cargill's own test results indicate that a much lower limit can be achieved by its current mist eliminators. The Florida Department of Environmental Protection, in its comments on the permit issued to Piney Point Phosphates, notes that mist eliminator technology is capable of meeting much lower limits than 0.15 lb/ton.

In addition, the BACT analysis is not complete. Cargill eliminated from consideration potentially more efficient control technologies for SO_2 and SAM emissions without demonstrating their economic infeasibility

However, if SAM emissions from the Cargill No. 7 acid plant are limited to not more than 0.10 lb SAM/ton of acid produced (i.e., the highest rate recorded at this facility and likely to be met more than 99.9999% of the time), FWS will not challenge the lack of a complete BACT analysis for this permit application.

Air Quality Related Values (AQRV) Analysis

The air quality and visibility analyses were performed appropriately.

The air quality modeling results indicated that the proposed project would not cause or significantly contribute to the PSD Class I SO_2 increment exceedance that was predicted for the 24-hour and 3-hour averaging times. It is not clear if the cumulative increment analysis was done using actual or allowable emissions. If the analysis was done using actual emissions then the State should mitigate the increment exceedance.

The visibility analysis predicts that there would be low potential for the proposed project to cause visibility impairment due to increased haze in Chassahowitzka Wilderness. Other air quality related values at Chassahowitzka are not expected to be affected by the project.

Contact: Ellen Porter, Air Quality Branch (303) 969-2617.

Table 1

STATISTICAL ANALYSIS OF ACID PLANT SO2 EMISSIONS

Cargill #7 Acid Plant SO2 Test Results

Test Date	Factor (lb/T)
4/15/93	3.4
3/10/94	3.2
4/11/95	3.9
2/19/96	3.9
5/8/97	3.7

Count =	5		
Average =	3.620		
Median =	3.700		
Mode =	3.900		
S.D. =	0.311		
95% CI =	0.273 +/-	3.620	
Emission Factor (EF) @ 95%		3.347 <EF<	3.893

FIGURE 1. CARGILL SO2 DATA

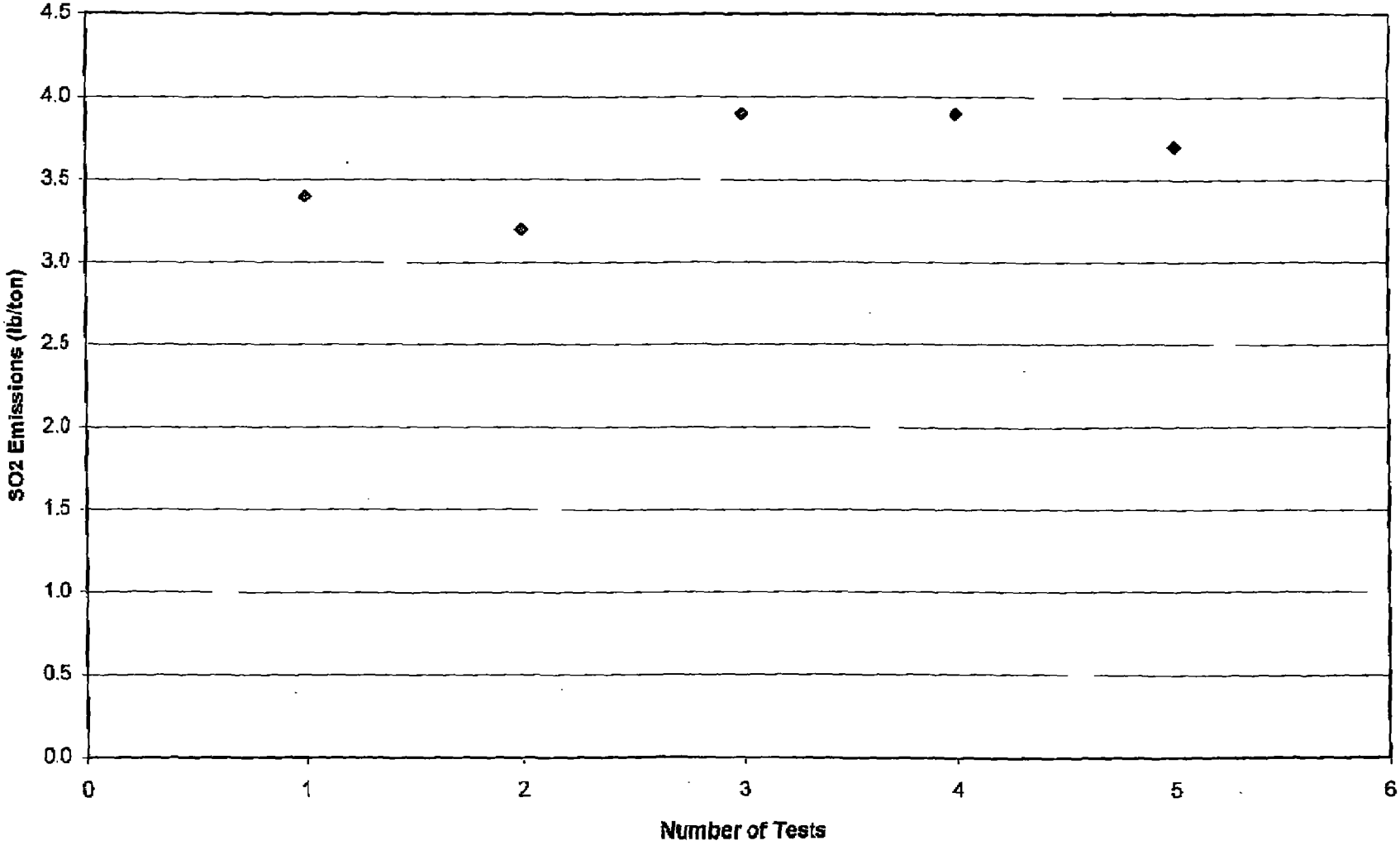

Table 2

STATISTICAL ANALYSIS OF ACID PLANT MIST EMISSIONS

Table 2.a. EPA HZSO4 Test Results

	Source	Test	Factor (lb/T)
1	1	1	0.129
2		2	0.153
3		3	0.132
4	2	1	0.140
5		2	0.082
6		3	0.101
7	3	1	0.124
8		2	0.005
9		3	0.033
10		4	0.036
11		5	0.031
12	4	1	0.119
13		2	0.097
14		3	0.237
15	5	1	0.032
16		2	0.045
17		3	0.048
18	6	1	0.076
19		2	0.138
20		3	0.153
21	7	1	0.037
22		2	0.047
23		3	0.044
24	8	1	0.017
25		2	0.161
26		3	0.130
27	9	1	0.043
28		2	0.010
29		3	0.010
30	10	1	0.017
31		2	0.020
32		3	0.020
33	14	1	0.014
34		2	0.024
35		3	0.054
36		4	0.026
37		5	0.168
38		6	0.093
39		7	0.107
40		8	0.023
41		9	0.032
42		10	0.022
43	15	1	0.014
44		2	0.014
45		3	0.018
46		4	0.013
47		5	0.008
48		6	0.014
49		7	0.016
50		8	0.008
51		9	0.008
52		10	0.008
53	16	1	0.494
54		2	0.301
55		3	0.417
56		4	0.541
57		5	0.358
58		6	0.609
59		7	0.419
60		8	0.201

Count =	60	
Average =	0.108	
Median =	0.045	
Mode =	0.014	
S.D. =	0.141	
95% CI =	0.036 +/-	0.108
Emission Factor @ 95%	0.073 <EF<	0.144

FIGURE 2.a. EPA ACID MIST DATA

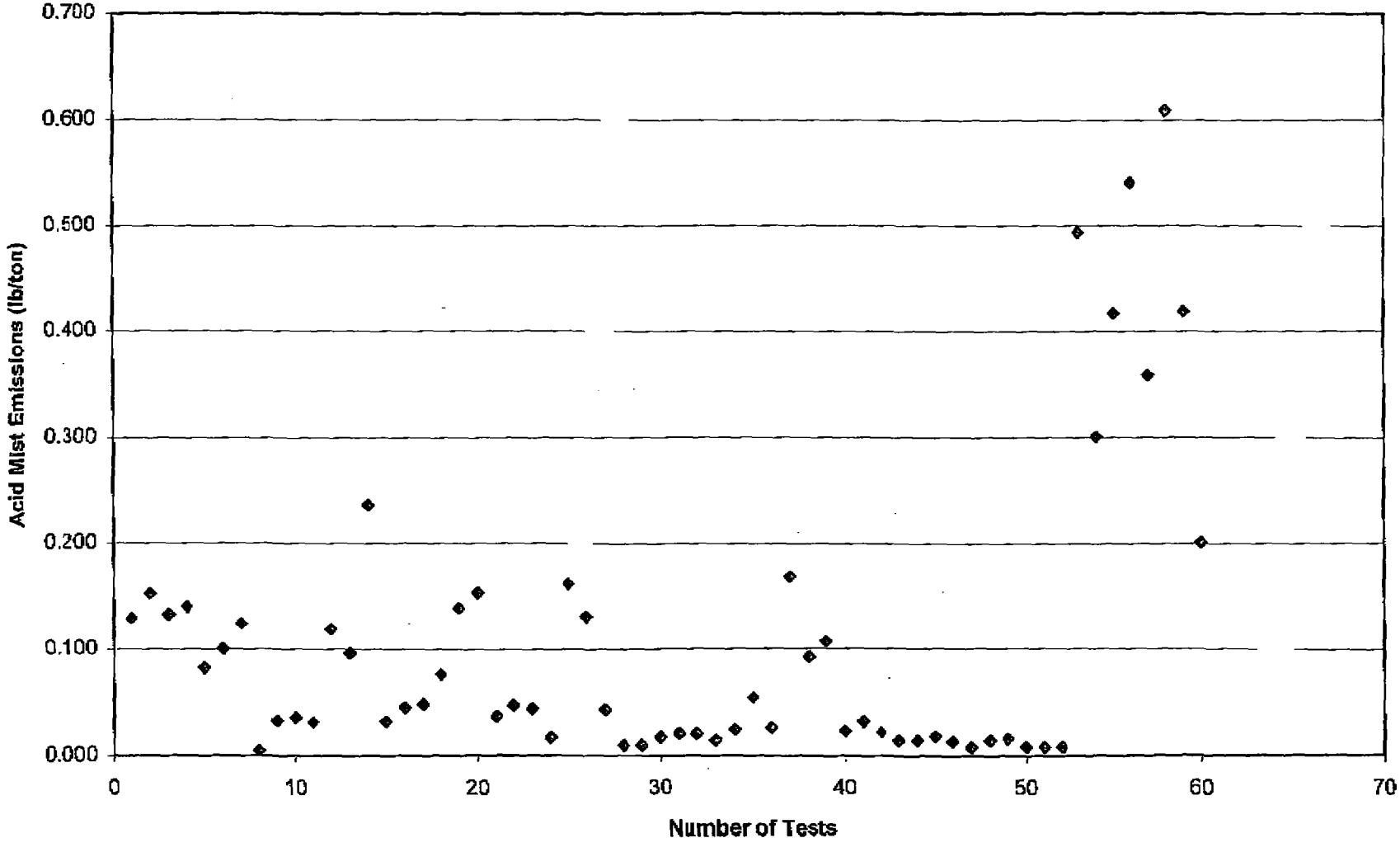

Table 2 (cont)

STATISTICAL ANALYSIS OF ACID PLANT MIST EMISSIONS

Table 2.b. EPA H2SO4 Tests Minus Outliers

	Source	Test	Factor (lb/T)
1	1	1	0.129
2		2	0.153
3		3	0.132
4	2	1	0.140
5		2	0.082
6		3	0.101
7	3	1	0.124
8		2	0.005
9		3	0.033
10		4	0.036
11		5	0.031
12	4	1	0.119
13		2	0.097
14		3	0.237
15	5	1	0.032
16		2	0.045
17		3	0.048
18	6	1	0.076
19		2	0.138
20		3	0.153
21	7	1	0.037
22		2	0.047
23		3	0.044
24	8	1	0.017
25		2	0.161
26		3	0.130
27	9	1	0.043
28		2	0.010
29		3	0.010
30	10	1	0.017
31		2	0.020
32		3	0.020
33	14	1	0.014
34		2	0.024
35		3	0.054
36		4	0.026
37		5	0.168
38		6	0.093
39		7	0.107
40		8	0.023
41		9	0.032
42		10	0.022
43	15	1	0.014
44		2	0.014
45		3	0.016
46		4	0.013
47		5	0.008
48		6	0.014
49		7	0.016
50		8	0.008
51		9	0.008
52		10	0.008

Count = 52
Average = 0.061
Median = 0.034
Mode = 0.014
S.D. = 0.057
95% CI = 0.015 +/- 0.061

Emission Factor @ 95% 0.045 <EF< 0.076

Table 2.c. Cargill #7 Acid Plant H2SO4 Test Results

Test Date	Factor (lb/T)
4/15/93	0.083
3/10/94	0.100
4/11/95	0.026
2/19/96	0.026
6/8/97	0.053

Count = 5
Average = 0.058
Median = 0.053
Mode = 0.026
S.D. = 0.033
95% CI = 0.029 +/- 0.058

Emission Factor (EF) @ 95% 0.028 <EF< 0.087

FIGURE 2.b. CARGILL H2SO4 DATA

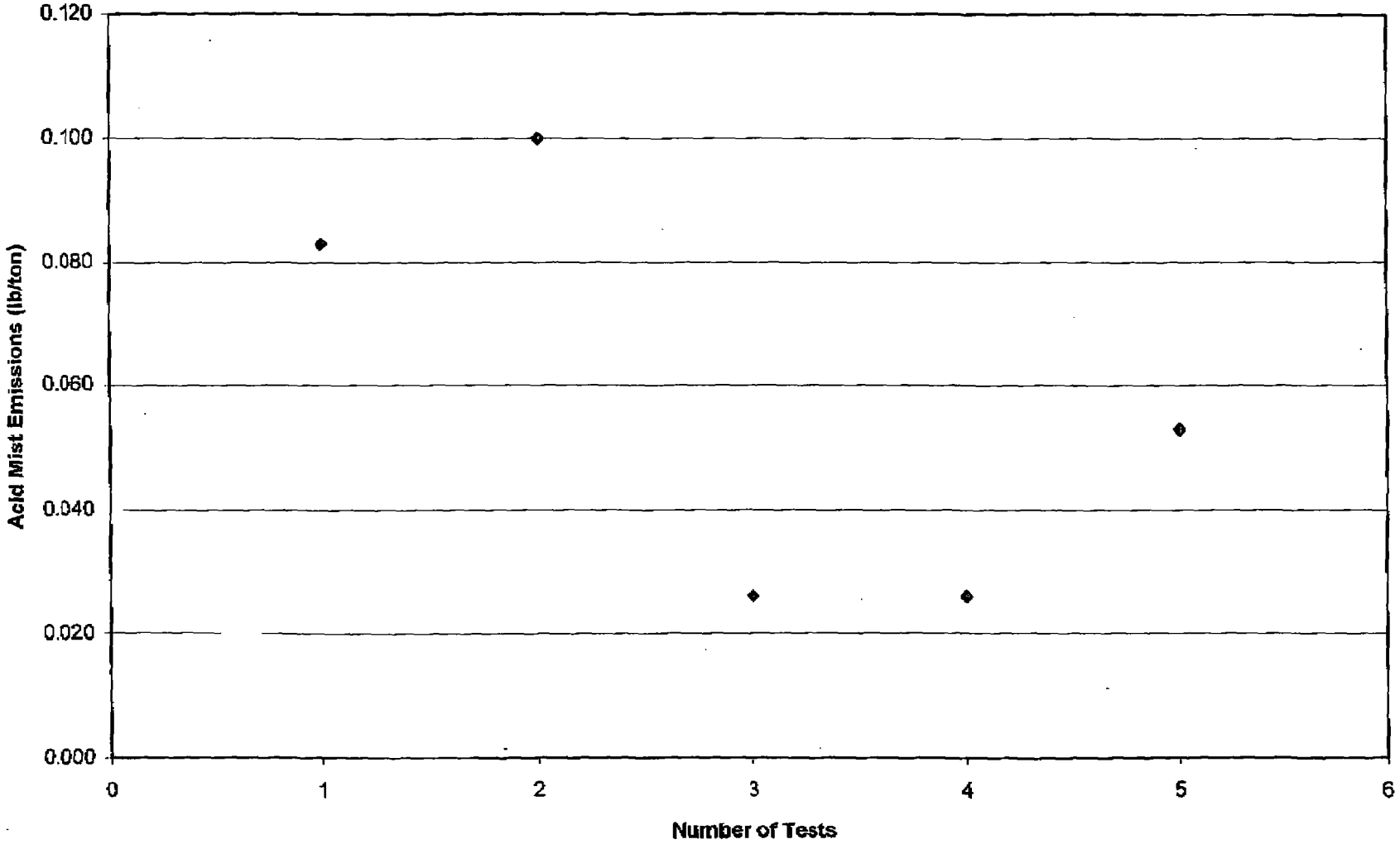

Table 2 (cont)

STATISTICAL ANALYSIS OF ACID PLANT MIST EMISSIONS

Table 2.d. EPA H2SO4 Tests Minus Outliers
Plus Table 2.c. Cargill #7 Acid Plant H2SO4 Test Results

	Source	Test	Factor (lb/T)
1	1	1	0.129
2		2	0.153
3		3	0.132
4	2	1	0.140
5		2	0.082
6		3	0.101
7	3	1	0.124
8		2	0.005
9		3	0.033
10		4	0.036
11		5	0.031
12	4	1	0.119
13		2	0.097
14		3	0.237
15	5	1	0.032
16		2	0.045
17		3	0.048
18	6	1	0.076
19		2	0.138
20		3	0.153
21	7	1	0.037
22		2	0.047
23		3	0.044
24	8	1	0.017
25		2	0.161
26		3	0.130
27	9	1	0.043
28		2	0.010
29		3	0.010
30	10	1	0.017
31		2	0.020
32		3	0.020
33	14	1	0.014
34		2	0.024
35		3	0.054
36		4	0.026
37		5	0.188
38		6	0.093
39		7	0.107
40		8	0.023
41		9	0.032
42		10	0.022
43	15	1	0.014
44		2	0.014
45		3	0.018
46		4	0.013
47		5	0.008
48		6	0.014
49		7	0.016
50		8	0.008
51		9	0.008
52		10	0.008
53		4/15/93	0.083
54		3/10/94	0.100
55		4/11/95	0.026
56		2/19/96	0.026
57		5/8/97	0.053

Count =	57		
Average =	0.060		
Median =	0.036		
Mode =	1.000		
S.D. =	0.055		
95% CI =	0.014	+/-	0.060
Emission Factor @ 95%	0.046	<EF<	0.074
99.9999% CI =	0.037	+/-	0.060
Emission Factor @ 99.999%	0.024	<EF<	0.097

FIGURE 2.c. COMBINED/EDITED H2SO4 DATA