KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
352/377-5822 • FAX/377-7158

KA 123-97-02

April 22, 1998

RECEIVED
APR 24 1998
BUREAU OF
AIR REGULATION

Mr. Syed Arif
Florida Department of
Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Additional Information
Farmland Sulfuric Acid Plant No. 6
FDEP File No. 1050053-019-AC (PSD-FL-243)

Dear Mr. Arif:

This is in response to FDEP's letter dated 3-26-98, concerning the Best Available Control Technology determination for the above project.

After further discussions with FDEP and Monsanto staff, Farmland proposes design changes to the proposed No. 6 sulfuric acid plant in order to reduce the potential sulfur dioxide emissions. The design changes include an increase in the size of the converters; increase in catalyst loading; increase in plant operating pressure to overcome the additional pressure drop; increase in heat exchange capacity to accommodate the increase in heat of reaction; and, increase in the horsepower of the main compressor turbine drive to accommodate the higher discharge pressure. The resulting maximum sulfur dioxide emissions, of 3.5 pounds per ton of 100 percent acid, constitutes BACT for the proposed project.

It is our understanding that FDEP will be able to complete the technical evaluation and preliminary determination of the above project with this additional information.

If you have any questions, please call Pradeep Raval or me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler, Ph.D., P.E.

JBK:par

c: C. Jenkins, Farmland

cc: File
EPA
SWD
Polk Co.

Department of
Environmental Prote

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

March 26, 1998

P 265 659 323
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Post Office, State, & ZIP Code Bartow FL	
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Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date 1050053-019-AC PSD-FL-243 #6	3/27/98

PS Form 3800, April 1995

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Charles W. Jenkins, Manager
Environmental and Safety Services
Farmland Hydro, L. P.
Post Office Box 960
Bartow, Florida 33831

Re: DEP File No. 1050053-019-AC (PSD-FL-243)
Green Bay Sulfuric Acid Plant No. 6

Dear Mr. Jenkins:

We received a letter dated March 12 from Koogler & Associates in response to our incompleteness letter to Farmland dated February 11. We are reviewing the project for completeness, but wanted to advise you of some initial comments regarding the information submitted for our review.

We appreciate the information from Monsanto regarding the sulfur dioxide emissions guarantee if cesium-promoted catalyst were to be used as a direct substitute for potassium-promoted catalyst in the fourth pass of the plant. Their response was couched within the assumption that there is no consideration to be given to either: optimizing the plant with the final pass at a lower temperature; optimizing the plant to achieve lower emissions using cesium catalyst; or optimizing the plant to achieve lower emissions by other available means at the present phase of design. With a "clean sheet and a new plant," it should be possible for Monsanto to describe the least expensive manner to achieve lower emissions and provide a cost estimate on how to accomplish it.

We acknowledge that if the final pass must be maintained at 425 degrees Celsius (°C), that the cesium advantage might not be realized with Monsanto's catalyst. The activity of Monsanto's cesium catalyst is greater than its non-cesium alternative only at lower temperatures. Figure 1 qualitatively depicts our understanding of the relative activity relationship between the two product lines. Above 425 °C the activity of the cesium catalyst is equal to that of the non-cesium catalyst.

In contrast to Monsanto Enviro-Chem, Haldor-Topsoe states that its cesium catalyst (VK-69) has an advantage over its non-cesium equivalent at temperatures both below and above 425°C. This is shown quantitatively in Figure 2 which was developed by the Department from information provided by Haldor-Topsoe. This implies that the plant can still be operated at 425°C

while achieving higher activity at the final pass. There is even a range of temperatures less than 425°C within which the activity of the catalyst is greater than or equal to the activity of non-cesium catalyst at 425°C. The theoretical implications for lower SO_2 emissions, based on the articles published by both Monsanto and Haldor-Topsoe's experts, are obvious. Perhaps some upstream modifications may still be needed to gain the full benefit of the cesium catalyst.

We request that Farmland facilitate a meeting or teleconference between Department and Monsanto's specialists. This will allow Department specialists to reconcile the sulfur dioxide reduction capabilities attributed by both company literature and papers to their cesium product with the apparent non-feasibility we infer from the statement about cesium catalyst performance on this project. We also want to discuss details about the air pollution control methods available for this project. Monsanto advised during the permitting of a project by another company that they would be agreeable to such a meeting with the approval of the affected client.

We acknowledge receipt of the revised draft permit for the Mississippi Phosphate project. Initially the company had *proposed* a lower limit of 3.25 pounds SO_2 per ton of acid produced (lb SO_2/ton) to avoid PSD while increasing production by switching from pelletized to ring-shaped cattiest. A way was found to accomplish the same objective by limiting future annual emissions in tons per year at the future higher production rates to the historical actual tons per year at the previous lower production rate. This means that if the plants continuously emit 4 lb SO_2/ton, they will not even be able to produce as much acid as they did before their project. For Mississippi Phosphate to operate the plants at the higher future rates of 1750 and 1825 tons per day (TPD), the average emissions will in fact need to be maintained at 3.25 lb SO_2/ton.

Although the Department is still reviewing this application for completeness, we have begun to write the evaluations and intent based on the information submitted and the sources of information we have developed in the course of our review. If you have any questions regarding this matter, please call Mr. Syed Arif, P.E. at (850) 921-8968.

Sincerely,

A. A. Linero, P.E. Administrator
New Source Review Section

AAL/sa/t

cc: Brian Beals, EPA
John Bunyak, NPS
Bill Thomas, SWD
Joe King, Polk County
John Koogler, P.E.
John Horne, Monsanto Enviro-Chem
Atis Vavere, Monsanto Enviro-Chem

FIGURE 1

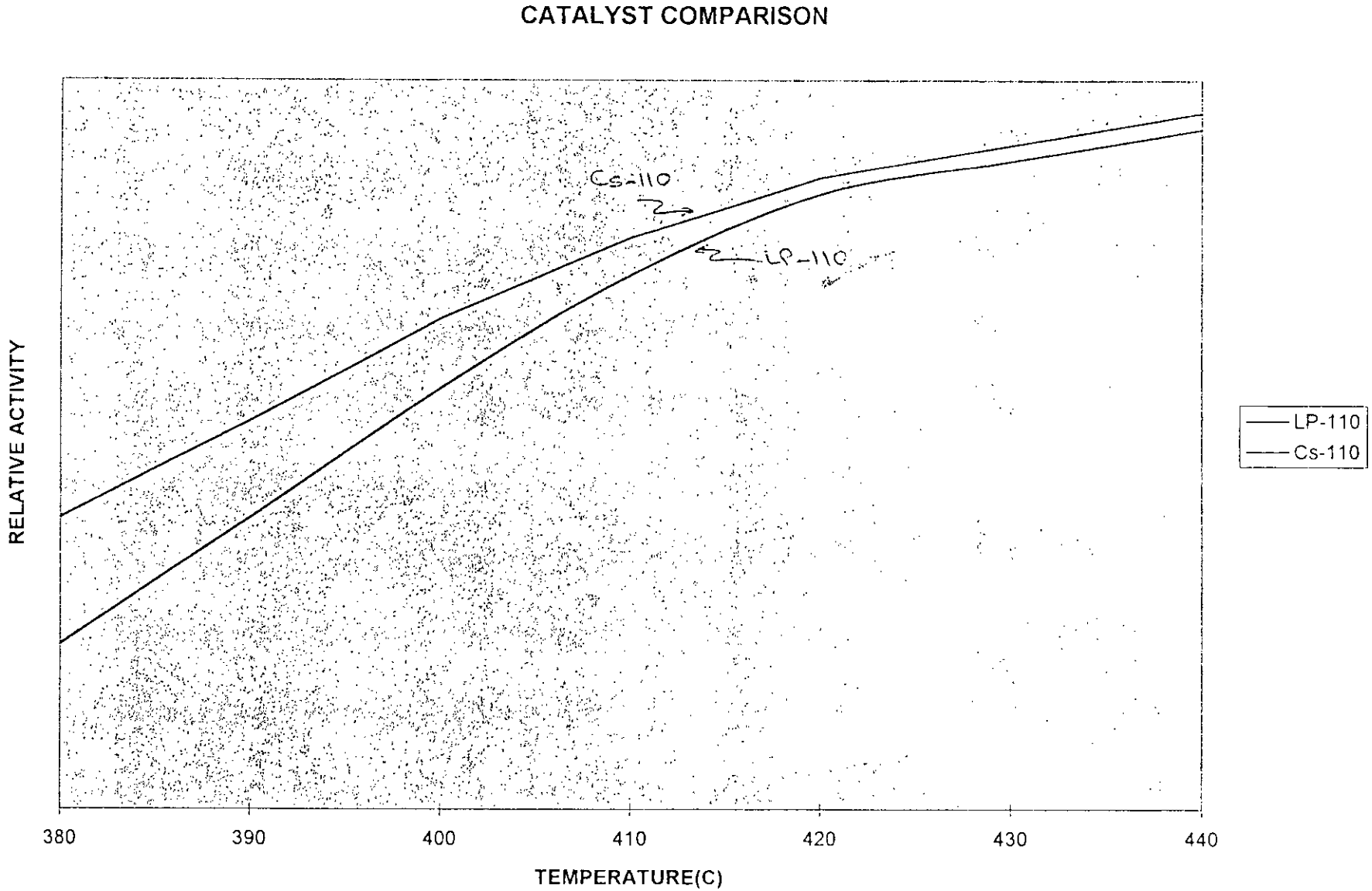
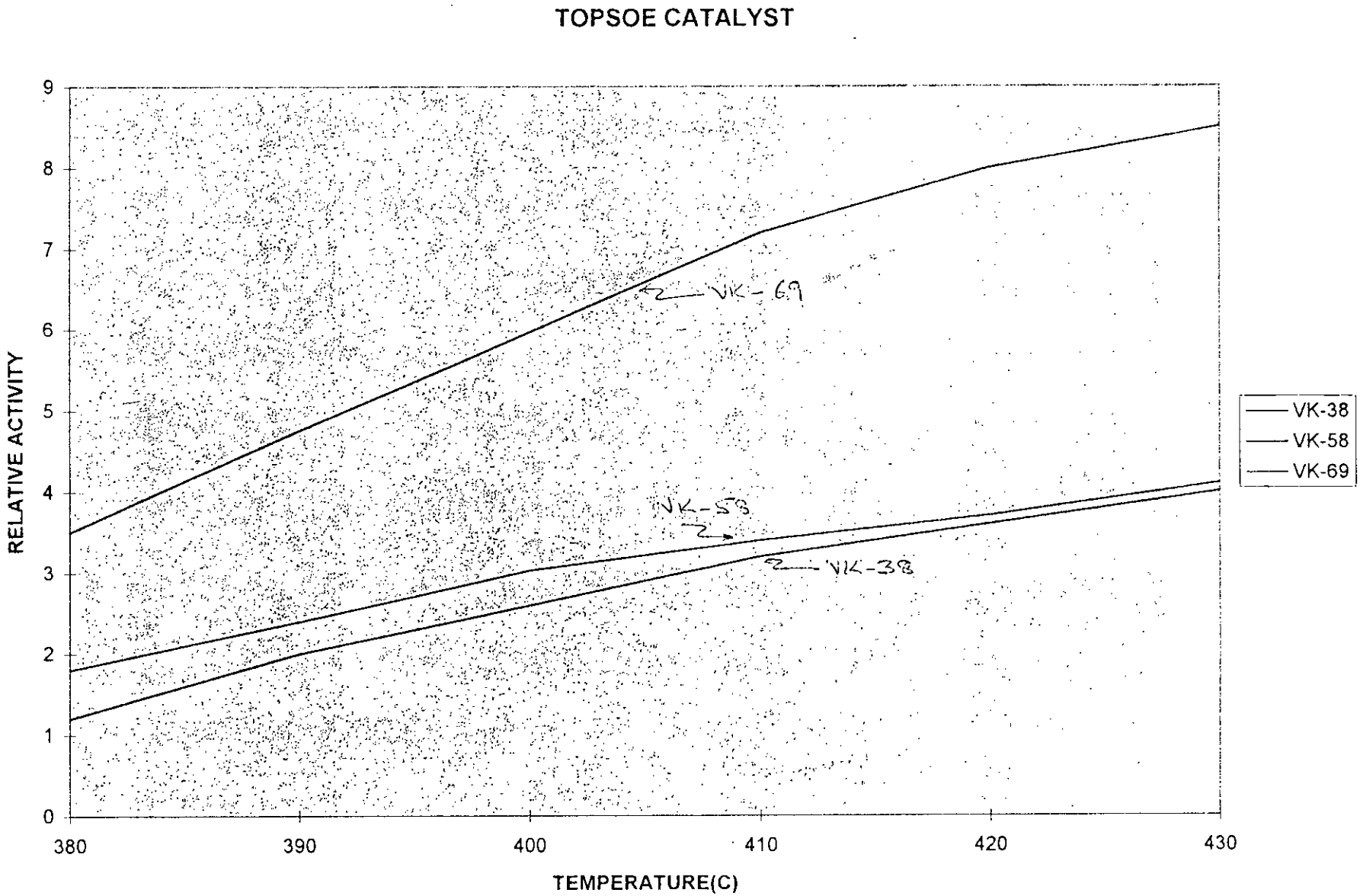

CATALYST COMPARISON
Cs-110
LP-110
RELATIVE ACTIVITY
380
390
400
410
420
430
440
TEMPERATURE(C)
LP-110
Cs-110

FIGURE 2


TOPSOE CATALYST
RELATIVE ACTIVITY
TEMPERATURE(C)
0
1
2
3
4
5
6
7
8
9
380
390
400
410
420
430
VK-69
VK-58
VK-38
VK-38
VK-38
VK-58
VK-69

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
352/377-5822 • FAX/377-7158

KA 123-97-02

March 12, 1998

Mr. A. A. Linero
Florida Department of
Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Polk County-AP
Farmland Hydro, L.P.
Additional Information
Sulfuric Acid Plant Replacement
FDEP File No. 1050053-019-AC (PSD-FL-243)

Dear Mr. Linero:

This letter is in response to the two issues raised in your letter dated 2-11-98 on the above referenced project and a third issue related to public access.

First, however, we would like to take this opportunity to thank Mr. Howard Rhodes and the Department staff for meeting with Farmland and the Florida Phosphate Council representatives to discuss the concerns of the entire phosphate industry regarding the current trend in FDEP's approach to BACT analyses.

1. **The response given for Item 3 states that the use of cesium promoted catalyst has no effect on the SO2 emissions. In view of information obtained from the manufacturer to the contrary, please provide the manufacturer's guaranteed best performance for SO2 emissions using cesium promoted catalyst in the final pass and provide the technical and cost evaluations requested on November 20, 1997.**

RESPONSE:

The response provided to the Department, dated 1-14-98, was based on information provided to Farmland by the manufacturer. The above question raised by FDEP, on the use of cesium promoted catalyst in place of the conventional catalyst in the final pass of the proposed plant, is specifically addressed by the manufacturer (see Attachment 1). Regarding the proposed sulfuric acid plant, the manufacturer confirms that no reduction in sulfur dioxide emissions are expected from the use of cesium promoted catalyst in the final pass in place of the conventional catalyst.

A plant design, different from that proposed for Farmland, can achieve lower sulfur dioxide emission rates. However, as addressed in the correspondence to FDEP dated 1-14-98, the incremental emissions reduction costs, of around $3900 and $4000 per ton of sulfur dioxide removed, associated with plants designed to achieve sulfur dioxide emissions rates of 3.0 and 3.5 lb/ton of 100% sulfuric acid, respectively, are well above the BACT cost criteria and, therefore, are rejected as BACT.

It should also be noted that the draft permit for Mississippi Phosphates' sulfuric acid plants, reflects a sulfur dioxide emission limit of 4.0 pounds per ton of 100 percent sulfuric acid (see Attachment 2). A lower emission limit in an earlier draft, cited by FDEP, has been revised by the state agency.

2. Pursuant to Koogler & Associates' letter dated January 23, identify specifically which plant will be shut down (No. 3 or No. 4).

RESPONSE:

Farmland will shut down sulfuric acid plant No. 3 once the proposed plant is operational.

3. Public access relative to air dispersion modeling.

RESPONSE:

Farmland's property is fenced along the boundary to the south and west. The boundary to the north and east, in common with IMC-Agrico, is not fenced. A question had come up regarding public access onto Farmland property from the IMC-Agrico property. Based on available information, most of the IMC-Agrico property is fenced. Most of the reclaimed mining areas, leased for cattle grazing, are also fenced. However, there are some unfenced sections in the unreclaimed mined-out areas. These areas consist of alternating mine cuts (around 100 feet across and almost as deep) and high debris piles (around 50 feet across and about as tall). The mine cuts are generally water-filled. Fencing in such rough mined-out terrain, especially in areas under water, is impractical. The combination of deep mine cuts and high debris piles, however, forms a physical barrier far more formidable than a typical boundary fence.

Farmland's common boundary with IMC-Agrico has "No Trespassing" signs at approximately 200-foot intervals and backs up to the rough mined out terrain described above. In this particular instance, public access onto Farmland property via the IMC-Agrico property is highly unlikely; and, the remaining Farmland property boundary is fenced.

If you have any questions, please call Pradeep Raval or me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler, Ph.D., P.E.

JBK:par
Enc.

c: Howard Rhodes, FDEP
Clair Fancy, FDEP
Charles Jenkins, Farmland Hydro, L.P.

cc: EPA
NPS
SWD
Polk CO
J. Arif, BAR

ATTACHMENT 1

LETTER FROM PLANT MANUFACTURER

ENVIRO-CHEM SYSTEMS

ENVIRO-CHEM SYSTEMS
A MONSANTO COMPANY
14522 SOUTH OUTER FORTY ROAD
CHESTERFIELD, MISSOURI 63017
P.O. BOX 14547
ST. LOUIS, MISSOURI 63178
PHONE (314) 275-5700
FAX (314) 275-5701
enviroch@monsanto.com
www.enviro-chem.com

5 March 1998

Mr. Chuck Jenkins
Farmland Hydro, LP
P. O. Box 960
Bartow, FL 33830

Dear Mr. Jenkins:

The following statements are made in response to the FDEP's question regarding the sulfur dioxide emissions guarantee for the proposed sulfuric acid plant:

The Department should be made aware that the optimum fourth pass inlet temperature, based on the design for Farmland's new sulfuric acid plant, is 425°C. At this inlet temperature, Farmland Hydro would not realize any emissions reduction benefits by simply using the cesium-promoted catalyst as a direct substitute for the proposed conventional potassium-promoted catalyst in the fourth pass of the plant; the sulfur dioxide emissions would basically remain unchanged at a cost penalty to Farmland. Monsanto's performance guarantee for the proposed plant is 4.0 pounds of sulfur dioxide per ton of 100 percent sulfuric acid produced.

Sincerely yours,

John R. Horne
Sales Director
Monsanto Enviro-Chem

Atis Vavere
Business and Technology Manager
Monsanto Enviro-Chem

ATTACHMENT 2

DRAFT PERMIT FOR MISSISSIPPI PHOSPHATES' PLANTS

STATE OF MISSISSIPPI
AIR POLLUTION CONTROL PERMIT
AND PREVENTION OF SIGNIFICANT DETERIORATION AUTHORITY TO CONSTRUCT AIR EMISSIONS EQUIPMENT THIS CERTIFIES THAT

Mississippi Phosphates Corporation
601 Highway 611
Pascagoula, Mississippi

has been granted permission to construct air emissions equipment to comply with emission limitations, monitoring requirements and other conditions set forth herein. This permit is issued in accordance with the provisions of the Mississippi Air and Water Pollution Control Law (Section 49-17-1 et. seq., Mississippi Code of 1972), and the regulations and standards adopted and promulgated thereunder and under authority granted by the Environmental Protection Agency under 40 CFR 52.01 and 52.21.

Issuance Date: _____

MISSISSIPPI ENVIRONMENTAL QUALITY PERMIT BOARD

_____

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY

Permit No. 1280-00044

SR-539.c4.1

DRAFT

PART II
EMISSION LIMITATIONS AND MONITORING REQUIREMENTS

Beginning ISSUANCE DATE, the permittee is authorized to construct air emissions equipment for the emission of air contaminants from Emission Point AA-001, the No. 2 Sulfuric Acid Plant.

The air emissions equipment shall be constructed to comply with the emission limitations and monitoring requirements specified below.

EMISSION LIMITATIONS

Sulfur Dioxide	4.00 lbs/ton, as determined by EPA Reference Method 8, 40 CFR 60, Appendix A.
Sulfuric Acid Mist	0.15 lbs/ton, not to exceed 11.16 lbs/hr and 48.88 tons/year, as determined by EPA Reference Method 8, 40 CFR 60, Appendix A.
Opacity	10% as determined by EPA Reference Method 9, 40 CFR 60, Appendix A.

All test methods specified above shall be those versions, or their approved equivalents, which are in effect ISSUANCE DATE.

MONITORING REQUIREMENTS

The permittee shall comply with the applicable emissions monitoring requirements of 40 CFR Part 60, Section 60.13 and 60.84. A continuous monitoring system shall be installed, calibrated and maintained for the measurement of sulfur dioxide and oxygen.

PART II
EMISSION LIMITATIONS AND MONITORING REQUIREMENTS

Beginning ISSUANCE DATE, the permittee is authorized to construct air emissions equipment for the emission of air contaminants from Emission Point AA-017, the No. 3 Sulfuric Acid Plant.

The air emissions equipment shall be constructed to comply with the emission limitations and monitoring requirements specified below.

EMISSION LIMITATIONS

Sulfur Dioxide	4.00 lbs/ton, as determined by EPA Test Method 8, 40 CFR 60, Appendix A.
Sulfuric Acid Mist	0.15 lbs/ton, not to exceed 11.16 lbs/hr and 48.88 tons/year, as determined by EPA Test Method 8, 40 CFR 60, Appendix A.
Opacity	10% as determined by EPA Test Method 9, 40 CFR 60, Appendix A.

All test methods specified above shall be those versions, or their approved equivalents, which are in effect ISSUANCE DATE.

MONITORING REQUIREMENTS

The permittee shall comply with the applicable emissions monitoring requirements of 40 CFR Part 60, Section 60.13 and 60.84. A continuous monitoring system shall be installed, calibrated and maintained for the measurement of sulfur dioxide and oxygen.

DRAFT

PART III
OTHER REQUIREMENTS

1) The permittee is limited to 1,992 Tons of SO_2 per rolling 365 day average.

2) The permittee shall maintain records showing the total SO_2 emissions for each day and for each consecutive 365-day period. The data from the continuous emissions monitor shall be converted daily from parts per million SO_2 to pounds of SO_2 per ton of Sulfuric Acid. All records shall be maintained on site by the permittee for a period of five (5) years following the date of such record.

3) During periods of continous emissions monitor downtime, the permittee shall calculate the SO_2 emissions based on 4.0 pounds per ton.

4) The permittee shall submit semi-annual reports summarizing the total SO_2 emissions for both sulfuric acid plant No. 2 and plant No. 3 for each consecutive 365-day period. The report shall be submitted no later than 30 days from the semi-annual periods ending June 30 and December 31.

5) For Emission Points AA-001 and AA-017, within 60 days of achieving the maximum production rate but no later than 180 days after the modifications, the permittee shall demonstrate compliance with the SO_2 and Sulfuric Acid Mist emission limitations by stack testing in accordance with EPA Reference Method 8 and submittal of a stack test report.

   A pretest conference at least thirty (30) days prior to the scheduled test date is needed to ensure that all test methods and procedures are acceptable to the Office of Pollution Control. Also, the Office of Pollution Control must be notified prior to the scheduled test date. At least TEN (10) DAYS notice should be given so that an observer can be scheduled to witness the test.

6) The permittee shall submit excess emissions and monitoring systems performance reports and/or summary report form on a quarterly basis.

7) Emission Points AA-001 and AA-017, the No.2 and No. 3 Sulfuric Acid Plants, are subject to the New Source Performance Standards for Sulfuric Acid Plants as described in 40 CFR 60, Subpart H and the General Provisions as described in 40 CFR 60, Subpart A.

DRAFT

8) The permittee must provide in writing the date that the maximum production rates are reached. The dates must be provided no later than ten days after the actual date.

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

February 11, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Charles W. Jenkins, Manager
Environmental and Safety Services
Farmland Hydro, L. P.
Post Office Box 960
Bartow, Florida 33831

Re: DEP File No. 1050053-019-AC (PSD-FL-243)
Green Bay Sulfuric Acid Plant No. 6

Dear Mr. Jenkins:

The following additional information is required pursuant to the letter from Koogler & Associates received on January 16, 1998:

1. The response given for Item 3 states that use of cesium promoted catalyst has no effect on SO2 emissions. In view of information obtained from the catalyst manufacturer to the contrary, please provide the manufacturer's guaranteed best performance for SO2 emissions using cesium promoted catalyst in the final pass and provide the technical and cost evaluations requested on November 20, 1997.
2. Pursuant to Koogler & Associates' letter dated January 23, identify specifically which plant will be shut down (No. 3 or No. 4).

The Department will resume processing this application after receipt of the requested information. If you have any questions regarding this matter, please call me, Syed Arif or John Reynolds at (850)488-1344.

Sincerely,

for A. A. Linero, P.E. Administrator
New Source Review Section

AAL/jr

cc: Brian Beals, EPA
John Bunyak, NPS
Bill Thomas, SWD
Joe King, Polk County
John Koogler, P.E.

[redacted]

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "*Return Receipt Requested*" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

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3. Article Addressed to:
Charles W. Jenkins, Mgr.
Env. & Safety Services
Farmland Hydro
P O Box 960
Bartow, FL 33831

4a. Article Number
P 265 659 291

4b. Service Type
☐ Registered ☑ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery
2-16-95

5. Received By: *(Print Name)*

8. Addressee's Address *(Only if requested and fee is paid)*

6. Signature: *(Addressee or Agent)*
X [signature]

PS Form **3811**, December 1994 Domestic Return Receipt

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Post Office, State, & ZIP Code: Bartow, FL	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date: 105EC53-19-C PO. FL-243	2-11-95

PS Form **3800**, April 1995

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
352/377-5822 ▪ FAX/377-7158

KA 123-97-02

January 23, 1998

RECEIVED
JAN 26 1998
BUREAU OF
AIR REGULATION

Mr. A. A. Linero
Florida Department of
Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Polk County-AP
Farmland Hydro, L.P.
Additional Information
Sulfuric Acid Plant Replacement
FDEP File No. 1050053-019-AC (PSD-FL-243)

Dear Mr. Linero:

This is a follow up to our letter dated 1-14-98 providing additional information on the above referenced project.

Farmland would like to amend the application to allow for the shutdown of either SAP 3 or SAP 4, when SAP 6 commences operation. As you are aware, SAP 3 and SAP 4 are identical plants, with identical permit conditions, and located in close proximity. Consequently, the analysis previously submitted to FDEP, based on the shut down of SAP 3, will remain virtually unchanged.

However, we would like to address the two aspects of the PSD review which could be affected by this proposal. The first is PSD applicability and the second is the air impact analysis.

PSD Applicability

An updated PSD applicability analysis indicated that there would be a difference in the net emissions changes of sulfur dioxide (SO2), sulfuric acid mist (SAM) and nitrogen oxides (NOx), if SAP 4 were shutdown instead of SAP 3. The analysis, presented in Attachment 1 (updated Appendix A), projects a decrease in the net SO2 emissions of 237.5 tons per year (tpy), an increase in SAM emissions of 13.7 tpy and an increase in NOx emissions of 2 tpy. The updated analysis demonstrates that the PSD applicability for the proposed project is not affected by this proposal.

Air Impact Analysis

In order to determine the change in air impacts from this proposal, the Significant Impact Analysis (SIA) was conducted for the SO2 and NOx emissions changes associated with SAP 4 and SAP 6.

The results of the SIA analysis, summarized in Attachment 2, indicate that there will be virtually no change in the Class I area impacts. The changes in the Class II area impacts are relatively small and do not affect the outcome of the SIA. The maximum predicted Class II area impacts as a result of this proposal have been estimated by adding the difference in the SIAs to the previously determined maximum predicted impacts. The results indicate very little difference in predicted air impacts from the proposed project, as expected. A disk containing the updated modeling output is enclosed.

If you have any questions, please call Pradeep Raval or me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler, Ph.D., P.E.

JBK:par
Enc.

c: Charles Jenkins, Farmland Hydro, L.P.

CC: S. Arif, BAR
J. Reynolds, BAR
EPA
NPS
SWD
Polk Co.

KOOGLER & ASSOCIATES

ATTACHMENT 1

UPDATED EMISSION RATE CALCULATIONS

APPENDIX A - EMISSION RATE CALCULATIONS
(Updated 1/98)

The following are emissions estimates for a scenario where SAP 4 is shutdown, instead of SAP 3, when SAP 6 commences operation.

1.0 PERMITTED SAP 4 EMISSION RATES

SO2 = 350 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 1533 TPY

ACID MIST (SAM) = 13.1 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 57.5 TPY

The estimated emissions from the sulfur system, projected for PSD inventory purposes:

PM = 9.7 tpy

SO2 = 17.9 tpy

H2S = 11.9 tpy

VOC = 17.7 tpy

2.0 ACTUAL SAP 4 EMISSION RATES

Actual SAP 4 emissions were estimated using December 29, 1996 compliance test results and 8,760 as the representative annual hours of operation.

SO_2 = 330.3 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 1446.9 TPY

SAM = 6.0 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 26.2 TPY

NOx emissions based on the nominal permitted production rate and a NOx emission factor used previously by FDEP of 0.12 lb/ton:

NOx = 1997 tpd x 1 day/24 hrs x 0.12 lb/ton
= 10.0 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 37.2 TPY

3.0 PROPOSED SAP 6 EMISSION RATE CALCULATIONS:

SO2 = 2750 tons/day x day/24 hrs x 4.0 lbs/ton
= 458.3 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 2007.5 TPY

SAM = 2750 tons/day x day/24 hrs x 0.15 lb/ton
= 17.2 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 75.3 TPY

NOx = 2750 tons/day x day/24 hrs x 0.12 lb/ton
= 13.8 lbs/hr
x 8760 hrs/yr x ton/2000 lbs
= 60.2 TPY

The estimated emissions from the sulfur system, projected for PSD inventory purposes, are based on a 10 percent increase in facility-wide H2SO4 production rates:

PM = 9.7 tpy x 1.1 = 10.7 tpy

SO2 = 17.9 tpy x 1.1 = 19.7 tpy

H2S = 11.9 tpy x 1.1 = 13.1 tpy

VOC = 17.7 tpy x 1.1 = 19.5 tpy

The net estimated emissions increase from the molten sulfur system:

PM = 9.7 tpy x 0.1 = 1 tpy

SO2 = 17.9 tpy x 0.1 = 1.8 tpy

H2S = 11.9 tpy x 0.1 = 1.2 tpy

VOC = 17.7 tpy x 0.1 = 1.8 tpy

4.0 NET ANNUAL EMISSION CHANGES

Net Emissions = Proposed + Contemporaneous - Actual

POLLUTANT	ESTIMATED EMISSIONS (TPY)				
	SAP 4 (Actuals)	SAP 6 (Proposed)	SULFUR SYSTEM (Net)	CONTEMPORANEOUS	NET
SO2	1446.9	2007.5	1.8	0	562.4
SAM	26.2	75.3	0	0	49.1
NOx	37.2	60.2	0	38.7	61.7
H2S	0	0	1.2	2.4	3.6
PM/PM10	0	0	1.0	2.0	3.0
VOC	0	0	1.8	3.7	5.5

It should be noted that the difference in net emissions between shutdown of SAP 4, instead of SAP 3, would be a decrease in SO2 emissions of 237.5 tpy; an increase in SAM emissions of 13.7 tpy; and, an increase in NOx emissions of 2 tpy. None of these emissions changes affects PSD applicability.

ATTACHMENT 2

UPDATED SUMMARY OF AIR IMPACT ANALYSIS

KOOGLER & ASSOCIATES

TABLE 5-2a

SUMMARY OF SULFUR DIOXIDE AND NITROGEN OXIDES
SIGNIFICANT IMPACT ANALYSIS
BASED ON SHUT-DOWN OF SAP 4 AND CONSTRUCTION OF NEW SAP 6

FARMLAND HYDRO, L.P.
POLK COUNTY, FLORIDA

MET. DATA	CLASS I AREA IMPACTS (1)(2)				CLASS II AREA IMPACTS (1)(2)			
	SO2			NOx	SO2			NOx
	ANNUAL	3-HR	24-HR	ANNUAL	ANNUAL	3-HR	24-HR	ANNUAL
1987	0.001	*0.55(4)*	0.08	0	1.59	192.5	47.7	0.05
1988	0	0.72	0.09	0	2.86	*167.4(4)*	62.3	*0.09(4)*
1989	0	0.66	0.09	0	*2.60(4)*	169.9	68.8	0.08
1990	0	0.56	0.07	0	0.90	154.2	44.6	0.03
1991	0.003	0.59	0.10	0	1.75	157.6	*43.9(4)*	0.05
Maximum Difference(3)	0	*0.01(4)*	0	0	*0.22(4)*	*0.2(4)*	*1.1(4)*	*0.019(4)*
Sig. Impact (Proposed for Class I)	0.03	1.0	0.2	0.1	1	25	5	1

NOTES:
(1) The impacts represent the highest-high impact.
(2) The impacts are based on the difference between the existing and proposed SO2 emissions from the sulfuric acid plants.
(3) The maximum difference is the difference in the maximum predicted impacts between those previously submitted to FDEP (based on SAP 3 shutdown) and those associated with this proposal (based on SAP 4 shutdown).
(4) Impacts associated with the Maximum Difference(3). For comparison of impacts, see Table 5-2 as previously submitted (see following page).

TABLE 5-2 (PREVIOUSLY SUBMITTED)

SUMMARY OF SULFUR DIOXIDE AND NITROGEN OXIDES
SIGNIFICANT IMPACT ANALYSIS

FARMLAND HYDRO, L.P.
POLK COUNTY, FLORIDA

MET. DATA	CLASS I AREA IMPACTS (1)				CLASS II AREA IMPACTS (1)			
	SO2			NOx	SO2			NOx
	ANNUAL	3-HR	24-HR	ANNUAL	ANNUAL	3-HR	24-HR	ANNUAL
1987	0.001	0.54	0.08	0	1.55	192.5	47.7	0.05
1988	0	0.72	0.09	0	2.73	167.2	62.4	0.08
1989	0	0.66	0.09	0	2.38	169.9	68.7	0.07
1990	0	0.56	0.07	0	0.82	154.2	44.6	0.02
1991	0.003	0.59	0.10	0	1.69	157.6	42.8	0.05
Sig. Impact (Proposed for Class I)	0.03	1.0	0.2	0.1	1	25	5	1

NOTE:

(1) The impacts represent the highest-high impact.

(2) The impacts are based on the difference between the existing and proposed SO2 emissions from the sulfuric acid plants (see Table 5-1).

TABLE 5-6a
SUMMARY OF CLASS II AREA SULFUR DIOXIDE IMPACTS ANALYSIS
BASED ON SHUT-DOWN OF SAP 4 AND CONSTRUCTION OF NEW SAP 6

FARMLAND HYDRO, L.P.
POLK COUNTY, FLORIDA

MET DATA	SULFUR DIOXIDE IMPACT ($\mu g/m^3$)					
	PSD			AAQS		
	ANNUAL(1)	3-HOUR(2)	24-HOUR(2)	ANNUAL(1)	3-HOUR(2)	24-HOUR(2)
1987	0	132.1	35.7	43.6	552.4	189.1
1988	0	146.1	56.1	41.3	560.2	182.4
1989	0	172.1	49.7	42.6	524.0	206.4
1990	0	150.4	28.7	45.1	554.4	202.0
1991	0	176.2	33.4	43.6	486.8	175.9
MAX. INCL. BACKGROUND (3)	0	176.2	56.1	56.1	571.2	217.4
MAX. INCL. PROPOSAL(4)	0	176.4	57.2	56.3	571.4	218.5
INCREMENT & STD.	20	512	91	60	1300	260
STD. EXCEEDED	NO	NO	NO	NO	NO	NO

NOTES:
(1) The impact represents the highest-high impact.
(2) The impact represents the highest second-high impact.
(3) These impacts are based on the shut-down of SAP 4 and the construction of new SAP 6. A background concentration of 11 ug/m3 was included in the AAQS analysis to account for any minor sources not modeled.
(4) "Maximum Including Proposal" includes the maximum predicted increases associated with shutdown of SAP 4, instead of SAP 3, and the construction of new SAP 6.

TABLE 5-6 (PREVIOUSLY SUBMITTED)
SUMMARY OF CLASS II AREA SULFUR DIOXIDE IMPACTS ANALYSIS

FARMLAND HYDRO, L.P.
POLK COUNTY, FLORIDA

MET DATA	SULFUR DIOXIDE IMPACT ($\mu g/m^3$)					
	PSD			AAQS		
	ANNUAL(1)	3-HOUR(2)	24-HOUR(2)	ANNUAL(1)	3-HOUR(2)	24-HOUR(2)
1987	0	132.1	35.7	43.6	552.4	189.1
1988	0	146.1	56.1	41.3	560.2	182.4
1989	0	172.1	49.7	42.6	524.0	206.4
1990	0	150.4	28.7	45.1	554.4	202.0
1991	0	176.2	33.4	43.6	486.8	175.9
MAX. INCL. BACKGROUND (3)	0	176.2	56.1	56.1	571.2	217.4
INCREMENT & STD.	20	512	91	60	1300	260
STD. EXCEEDED	NO	NO	NO	NO	NO	NO

NOTE:

(1) The impact represents the highest-high impact.

(2) The impact represents the highest second-high impact.

(3) A background concentration of 11 ug/m3 was included in the AAQS analysis to account for any minor sources not modeled.

THIS DISK CONTAINS SULFUR DIOXIDE (SO2) AND NITROGEN OXIDES (NOX) MODELING FILES FOR THE FARMLAND HYDRO, L.P. FACILITY IN GREEN BAY, FLORIDA. THE FOLLOWING ARE OUTPUT FILES ARE IN SELF EXTRACTING ARCHIVE FORMAT.

THE FOLLOWING FILES CONTAIN ISCST3 MODELING OF:
SIGNIFICANT IMPACT ANALYSIS (SIA) FOR

SO2 ASI ANALYSIS OF CHASSAHOWITZKA NWR PSD CLASS I & CLASS 2 AREA:

SO2ASI	EXE	194,616	01-21-98	

NOX ASI ANALYSIS OF CLASS 1 AND CLASS 2 AREAS:

NX-3	EXE	105,554	01-21-98	
BPIP-DW	EXE	20,828	11-11-97	BUILDING DOWNWASH CALCULATIONS
AND:	READ.ME		THIS FILE	

TO UNARCHIVE THESE FILES COPY THEM TO A HARD DISK DRIVE AND TYPE THE FILE NAME. FOR EXAMPLE TO UNARCHIVE THE SO2 ASI CLASS 1 & 2 ISCST3 OUTPUT FILES, TYPE "SO2-ASI" AND PRESS ENTER. THE FILES WILL AUTOMATICALLY UNARCHIVE TO THE HARD DISK DRIVE. THESE ARCHIVED FILES CONTAIN THE MODELING AND ANALYSIS FILES IN ASCII FORMAT DESCRIBED AS FOLLOWS;

MODELING OF SIGNIFICANT IMPACT ANALYSIS (SIA) FOR CHASSAHOWITZKA NWR PSD CLASS 1 AREAS ARE PROVIDED IN THE FOLLOWING FILES;

F1ASI87	OUT	49,804	01-21-98	SO2 CLASS 1 SIA FOR 1987
F1ASI88	OUT	49,819	01-21-98	SO2 CLASS 1 SIA FOR 1988
F1ASI89	OUT	49,729	01-21-98	SO2 CLASS 1 SIA FOR 1989
F1ASI90	OUT	49,729	01-21-98	SO2 CLASS 1 SIA FOR 1990
F1ASI91	OUT	49,819	01-21-98	SO2 CLASS 1 SIA FOR 1991
C1NX87	OUT	33,380	01-21-98	NOX CLASS 1 AND FAAQS SIA FOR 1987
C1NX88	OUT	33,395	01-21-98	NOX CLASS 1 AND FAAQS SIA FOR 1988
C1NX89	OUT	33,305	01-21-98	NOX CLASS 1 AND FAAQS SIA FOR 1989
C1NX90	OUT	33,305	01-21-98	NOX CLASS 1 AND FAAQS SIA FOR 1990
C1NX91	OUT	33,395	01-21-98	NOX CLASS 1 AND FAAQS SIA FOR 1991

MODELING OF SIGNIFICANT IMPACT ANALYSIS FOR CLASS 2 AREAS ARE PROVIDED IN THE FOLLOWING FILES. POLAR RECEPTORS ARE CENTERED AT UTMS X=410,330 METERS EAST Y=3074,655 METERS NORTH ON SULFURIC ACID PLANT NUMBER 5.

F2ASI87	OUT	200,809	01-21-98	SO2 CLASS 2 SIA FOR 1987
F2ASI88	OUT	200,809	01-21-98	SO2 CLASS 2 SIA FOR 1988
F2ASI89	OUT	200,809	01-21-98	SO2 CLASS 2 SIA FOR 1989
F2ASI90	OUT	200,809	01-21-98	SO2 CLASS 2 SIA FOR 1990
F2ASI91	OUT	200,809	01-21-98	SO2 CLASS 2 SIA FOR 1991
C2NX87	OUT	114,765	01-21-98	NOX CLASS 2 AND FAAQS SIA FOR 1987
C2NX88	OUT	114,765	01-21-98	NOX CLASS 2 AND FAAQS SIA FOR 1988
C2NX89	OUT	114,765	01-21-98	NOX CLASS 2 AND FAAQS SIA FOR 1989
C2NX90	OUT	114,765	01-21-98	NOX CLASS 2 AND FAAQS SIA FOR 1990
C2NX91	OUT	114,765	01-21-98	NOX CLASS 2 AND FAAQS SIA FOR 1991

BUILDING INPUT PROFILE PROGRAM (BPIP) FILES ARE PROVIDED IN BPIP-DW.EXE.
BUILDING DOWNWASH CALCULATIONS ARE USED IN ALL MODELING. THE FOLLOWING BPIP
FILES ARE PROVIDED:

FRM	INP	2,812	09-06-97	INPUT FOR SO2 SOURCES
FRM	OUT	5,836	09-06-97	OUTPUT FOR SO2 SOURCES
FRM	SUM	93,651	09-06-97	SUMMARY FOR SO2 SOURCES

IF THERE ARE ANY QUESTIONS OR IF I MAY PROVIDE ADDITIONAL FILES, OR
CLARIFICATION PLEASE CALL ME.

JANUARY 21, 1998
MARK KOLETZKE, P.E.
KOOGLER AND ASSOCIATES
(352) 377-5822
KOOGLER@WORLDNET.ATT.NET

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 NW THIRTEENTH STREET
GAINESVILLE, FLORIDA 32609
352/377-5822 • FAX/377-7158

KA 123-97-02

January 14, 1998

Mr. A. A. Linero
Florida Department of
Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Polk County-AP
Farmland Hydro, L.P.
Additional Information
Sulfuric Acid Plant Replacement
FDEP File No. 1050053-019-AC (PSD-FL-243)

Dear Mr. Linero:

This is in response to your letters dated 11-20-97 and 12-18-97, requesting additional information on the above referenced project. The following responses are in the order of the issues raised.

1. Please confirm if the process will be as depicted in Figure 3-1. There have been developments in recent years incorporating more efficient technology which deletes the need for a drying tower, incorporates power generation and utilizes heat recovery towers. We simply want to confirm the chosen technology and obtain more details on your plans.

RESPONSE:

A more detailed and accurate process flow diagram is provided in Attachment 1.

2. The Best Available Control Technology should include a review and cost analysis for the "Centaur SO2 Removal Process" developed by Monsanto in conjunction with Calgon Carbon. Basically, Converter 2 can be replaced with a reactor containing highly activated carbon catalyst/adsorbent. Wet conversion occurs in the bed which retains the acid. The acid is released by sequential back-washing of bed sections. The catalyst can operate at very low temperatures. This can result in reduced pressure drop across the plant as well as lower heat waste, lower emissions, and possibly increased production. Besides elimination of the second converter and its catalyst, it would also eliminate the need for a final tower and some other equipment. Attached is a recent joint press release from

Monsanto Enviro-Chem and Calgon Carbon regarding the first commercial sale.

RESPONSE:

Based on a telephone conversation with the manufacturer, it is our understanding that the Centaur process is economically viable only for small sulfuric acid plants, of around 1000 tons per day. It has also been recommended by the manufacturer as an add-on to reduce SO2 emissions from small single absorption plants. For plants over 2000 tons per day, as in the case of Farmland, the Centaur process would be more expensive than the double absorption process. It should be noted that the Centaur process has not been demonstrated in commercial operation. Furthermore, the SO2 emissions guarantee provided by the manufacturer is identical to that provided for the double absorption process.

3. **Please advise what kind of catalyst will be used in the various passes. Will it be pelletized or ring (or star) catalyst? Please include a technical and cost evaluation for using cesium promoted vanadium-containing catalyst in the final pass. This allows significant reduction of the operating temperature in the final pass. Monsanto Enviro-Chem introduced such a line of catalyst in 1989 and it has been demonstrated at several double absorption plants. We believe Topsoe and BASF market similar products. This provides and opportunity for reduced emissions, higher steam production, and possibly increased production despite the higher cost.**

RESPONSE:

Farmland will be using Monsanto LP120 ring type catalyst for the first and second passes and type LP110 for the third and forth passes. Given the Monsanto design parameters, the use of cesium promoted catalyst in the proposed plant would not change the SO2 emission rate or the plant production rate, as discussed in the permit application.

The cost of cesium promoted catalyst is more than double the cost of conventional catalyst. It should be recognized that the information FDEP has on cesium promoted catalyst is from the catalyst suppliers who aim to sell as much of the higher priced product as possible. FDEP has been presented with evidence, by experts during the technical review of another double absorption sulfuric acid plant in Florida (see PSD-FL-242), which shows that the use of Cesium promoted catalyst does not reduce SO2 emissions. As no SO2 reduction or production enhancements are expected for the proposed project from the use of cesium promoted catalyst, it is not a consideration.

4. **Please advise how long your plants have historically operated between turnarounds such as those which include catalyst screening and replacement. Provide some information regarding sulfur dioxide emissions and acid production over time following such turnarounds.**

RESPONSE:

The major turnaround periods vary from 16-22 months. It is not possible to have a precise schedule as the turnaround cycle depends on many independent variables.

The requested information, on SO2 emissions over time, is presented in Attachment 2. Although only the No. 3 SAP is part of this review, information on Nos. 4 and 5 SAPs is also submitted. No. 5 SAP was built most recently and is about the same size as the proposed unit and demonstrates the level of operation reliability expected from a new plant. The existing plant Nos. 3 and 4 SAP are older units, less reliable and smaller in size. The air emissions from the proposed plant are expected to be in line with those from No. 5 SAP. As evident in the attached graphs, fluctuation in emissions occur during normal operations.

It can be seen that while the No. 5 SAP SO2 emissions range from 3.5 to 4.0 lb/ton, averaging around 3.8 lb/ton, the emissions periodically reach the emissions limit of 4 lb/ton. Of particular interest to FDEP is the fact that the emissions data indicate no correlation between the SO2 emissions and turnaround cycle. Similarly, there is little correlation between the production rate and turnaround cycle, until a month before the turnaround when the production drops. It appears that the production rate is more dependent upon production demands/schedules.

5. **Please submit cost/technical analyses of scenarios wherein certain plant components (such as the blower or catalyst) are designed (or "overdesigned") such that present production objectives are met and emission levels are lower than projected in the application. Please evaluate scenarios wherein emission limits of 3.5, 3.0, and 2.5 pounds of sulfur dioxide per ton of sulfuric acid (averaged for periods longer than one day but less than thirty days) are maintained throughout the turn-around cycle of the plant.**

RESPONSE:

When plants are optimally designed, there are numerous plant components which have to be overdesigned to accommodate higher plant operations. It is not simply a matter of oversizing a few vessels. The plant capacity at the lower emissions rates, as opposed to 4 lb/ton of acid, cannot be

readily estimated without a detailed analysis of contact time, plant temperatures and SO2/SO3 vapor pressure equilibrium. This analysis is beyond the scope of this response. However, based on past conversations with experts from Monsanto and Acid Engineering & Consulting, a plant can be designed for higher air flow capacity and lower emissions, within certain tolerances. The costs associated with such derating can at least be estimated for the 3.0 and 3.5 lb/ton scenarios. The result of these analyses, presented in Attachment 3, indicate that the costs associated with plant derating to achieve lower SO2 emissions are well above the BACT criteria.

6. **Please provide emissions data for SO2 in lb/ton of 100% H2SO4 for the last two years (monthly CEM averages) of operation for the No. 3 SAP. In providing this data, please present it in a graphical representation against time. On the same graph, indicate the production rate for the plant (monthly averages) and indicate the turn-around date on the time axis.**

RESPONSE:

The requested information is presented in Attachment 2. However, the information is presented on separate graphs to facilitate filing and increase visual clarity.

7. **Please indicate the turn-around cycle time for the No. 3 SAP. When was the last turnaround conducted for the plant? Indicate what modifications were done to the plant during the turn-around. If catalysts were screened or replaced, indicate which conversion passes were selected for catalyst screening and/or replacement. Indicate the amount of catalyst replaced, if any. Provide the same information for the other two existing Sulfuric Acid Plants.**

RESPONSE:

The turnaround cycle for No. 3 and 4 SAPs range from 16-22 months. The last turnaround on No. 3 SAP was conducted December, 1996 (shown in Attachment 2 for both plants). No process modifications were done to the plants during turnarounds. During a typical major turnaround, catalyst does get screened and replaced, as necessary. Most recently, No. 3 SAP conducted screening and replacement on the first couple of passes. Stating specific amounts is not meaningful for this evaluation as the quantity of catalyst screened and replaced varies over time depending on many factors. However, it should be noted that only a fraction of the catalyst is typically replaced in a given pass.

8. Please provide the same information as required in Item 1 (6 herein) for the other two existing Sulfuric Acid Plants.

RESPONSE:

Please refer to Item 6 and Attachment 2.

9. NPS comments...(address essentially the same issues raised by FDEP).

RESPONSE:

Please refer to response to FDEP on the same issues.

10. Public access relative to air dispersion modeling.

RESPONSE:

A question had also come up regarding public access to the plant for the purposes of the ambient air impact analysis. The existing Farmland property boundary is fenced on the southern boundary, along County Road 640, which provides road and rail access to the site. The western boundary is also fenced along Bonnie Mine Road. The northern and eastern boundaries back up to private property owned by IMC-Agrico, where "No Trespassing" signs are posted at approximately 200-foot intervals. Additionally, Farmland maintains on-site security and any unauthorized persons entering the premises are escorted off the property. It should be noted that IMC-Agrico also maintains fencing on its other boundaries and security, thus complimenting that of Farmland. Consequently, public access is more than adequately precluded by the combined fencing and security of the two sites.

If you have any questions, please call Pradeep Raval or me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler, Ph.D., P.E.

JBK:par
Enc.

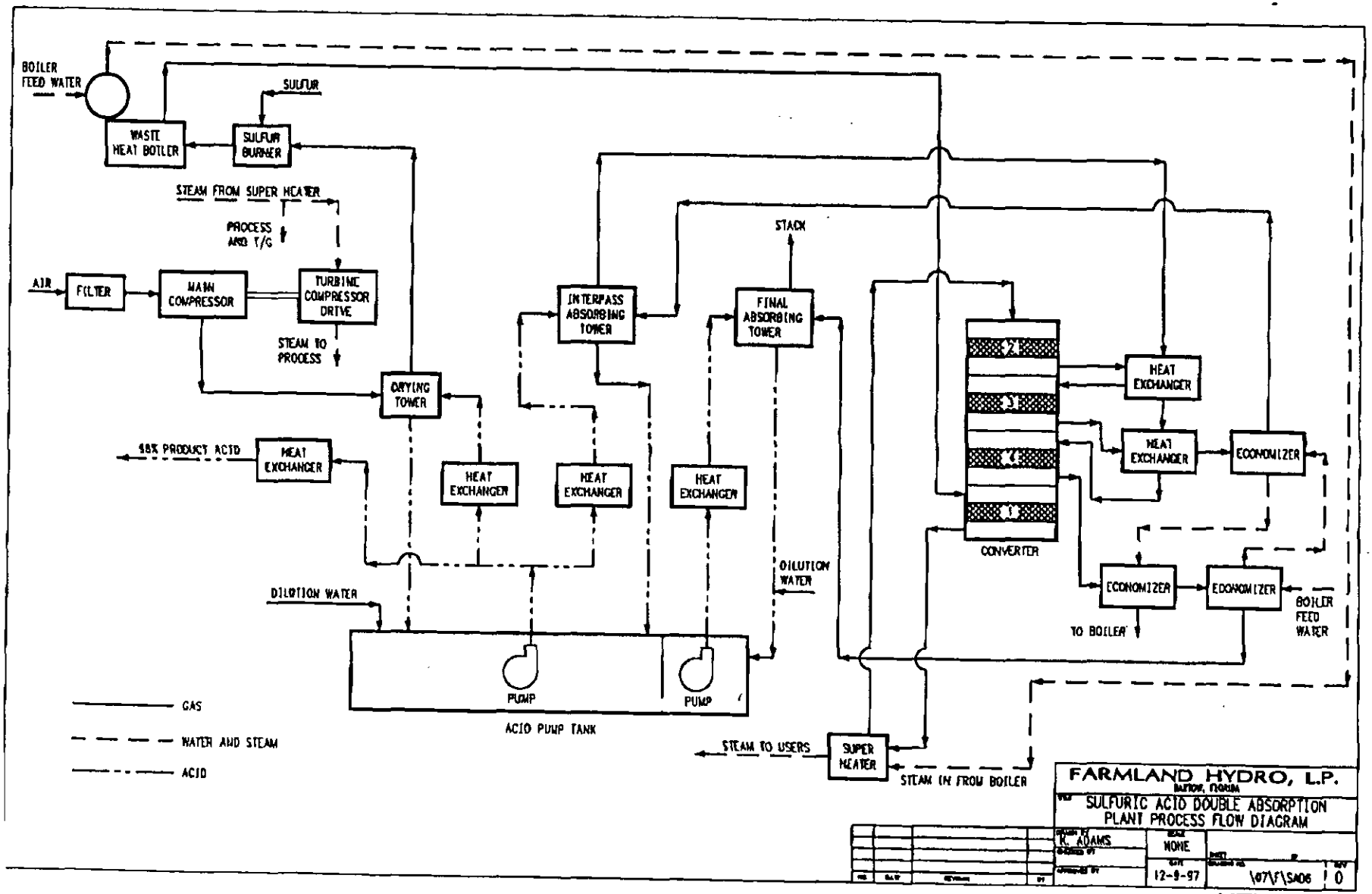
c: Charles Jenkins, Farmland Hydro, L.P.
cc: S. Arif, BAR
SWD
EPA
Polk Co.

KOOGLER & ASSOCIATES

ATTACHMENT 1

PROCESS FLOW DIAGRAM

KOOGLER & ASSOCIATES


BOILER FEED WATER
SULFUR
WASTE HEAT BOILER
SULFUR BURNER
STEAM FROM SUPER HEATER
PROCESS AND T/G
AIR
FILTER
MAIN COMPRESSOR
TURBINE COMPRESSOR DRIVE
STEAM TO PROCESS
DRYING TOWER
98% PRODUCT ACID
HEAT EXCHANGER
HEAT EXCHANGER
HEAT EXCHANGER
HEAT EXCHANGER
INTERPASS ABSORBING TOWER
FINAL ABSORBING TOWER
STACK
HEAT EXCHANGER
HEAT EXCHANGER
ECONOMIZER
CONVERTER
ECONOMIZER
ECONOMIZER
BOILER FEED WATER
TO BOILER
DILUTION WATER
DILUTION WATER
PUMP
PUMP
ACID PUMP TANK
STEAM TO USERS
SUPER HEATER
STEAM IN FROM BOILER
GAS
WATER AND STEAM
ACID
FARMLAND HYDRO, L.P.
BARTOW, FLORIDA
SULFURIC ACID DOUBLE ABSORPTION
PLANT PROCESS FLOW DIAGRAM
DRAWN BY
R. ADAMS
SCALE
NONE
DATE
12-9-97
\07\F\SA06
0
PLOTTED: 12-9-97

ATTACHMENT 2

EMISSIONS, PRODUCTION AND TURNAROUND INFORMATION

FIGURE 1
Sulfuric Acid Plant # 3

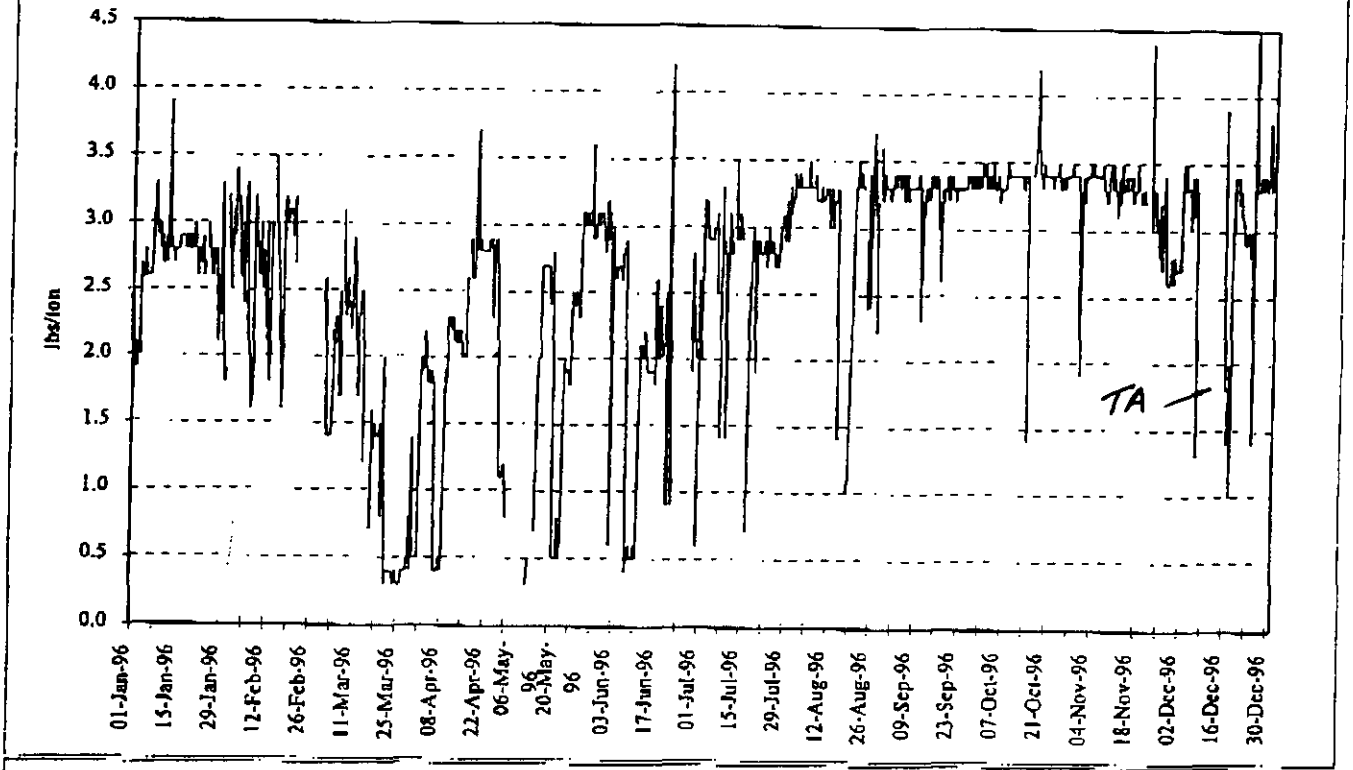


FIGURE 2
Sulfuric Acid Plant # 4

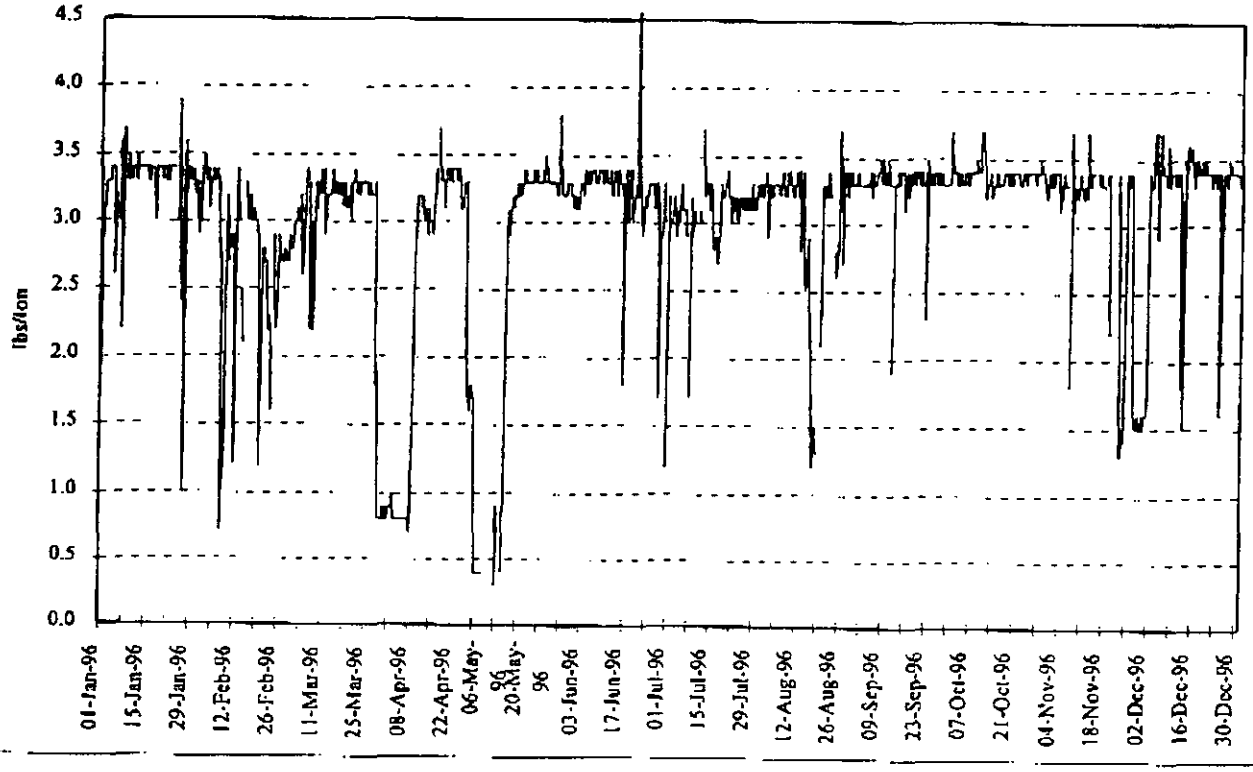


FIGURE 3
Sulfuric Acid Plant # 3

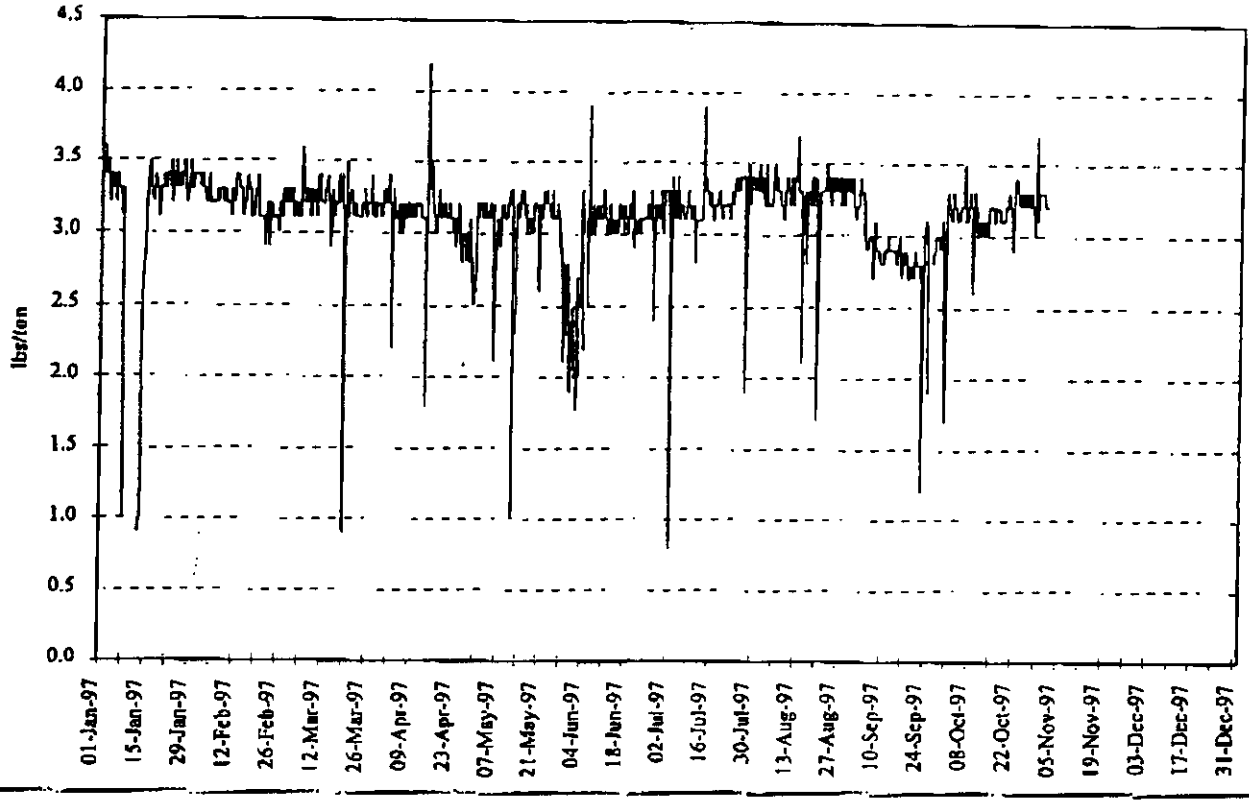


FIGURE 4
Sulfuric Acid Plant # 4

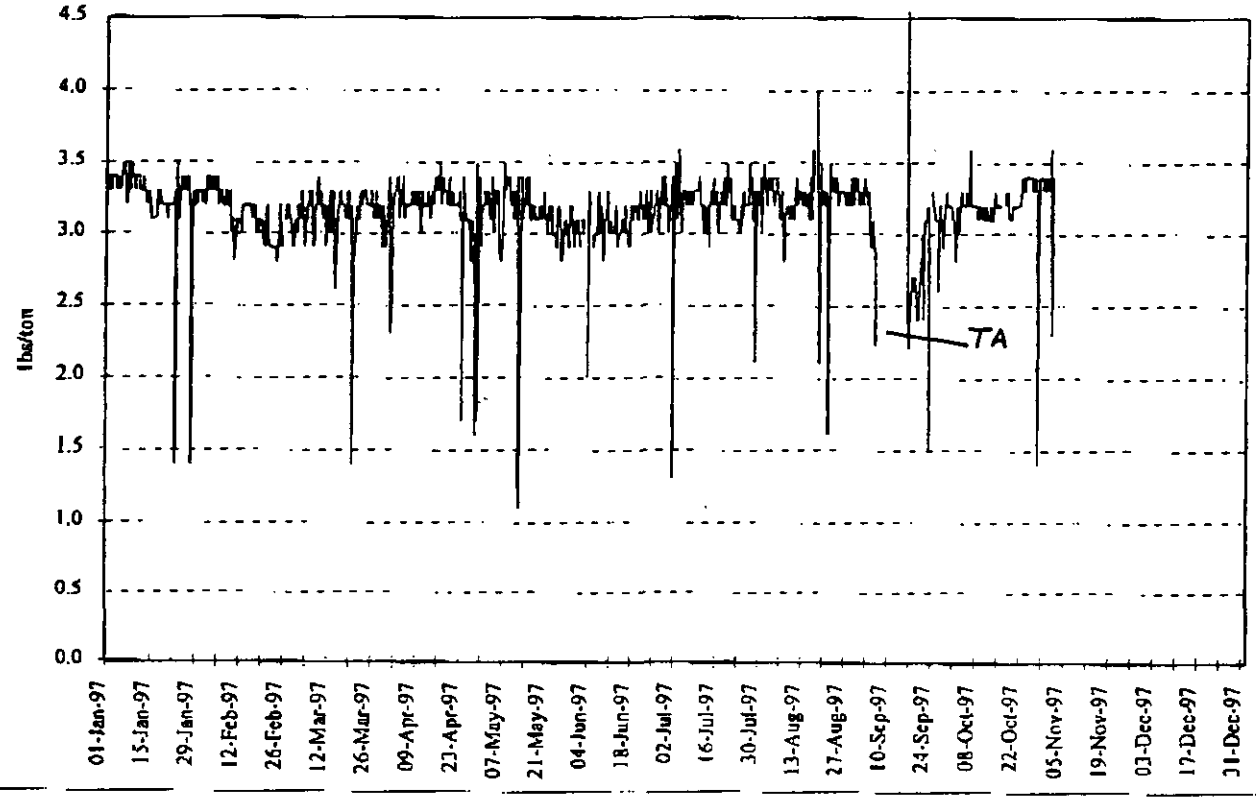


FIGURE 5
Sulfuric Acid Plant # 3
Four day averaged and adjusted production

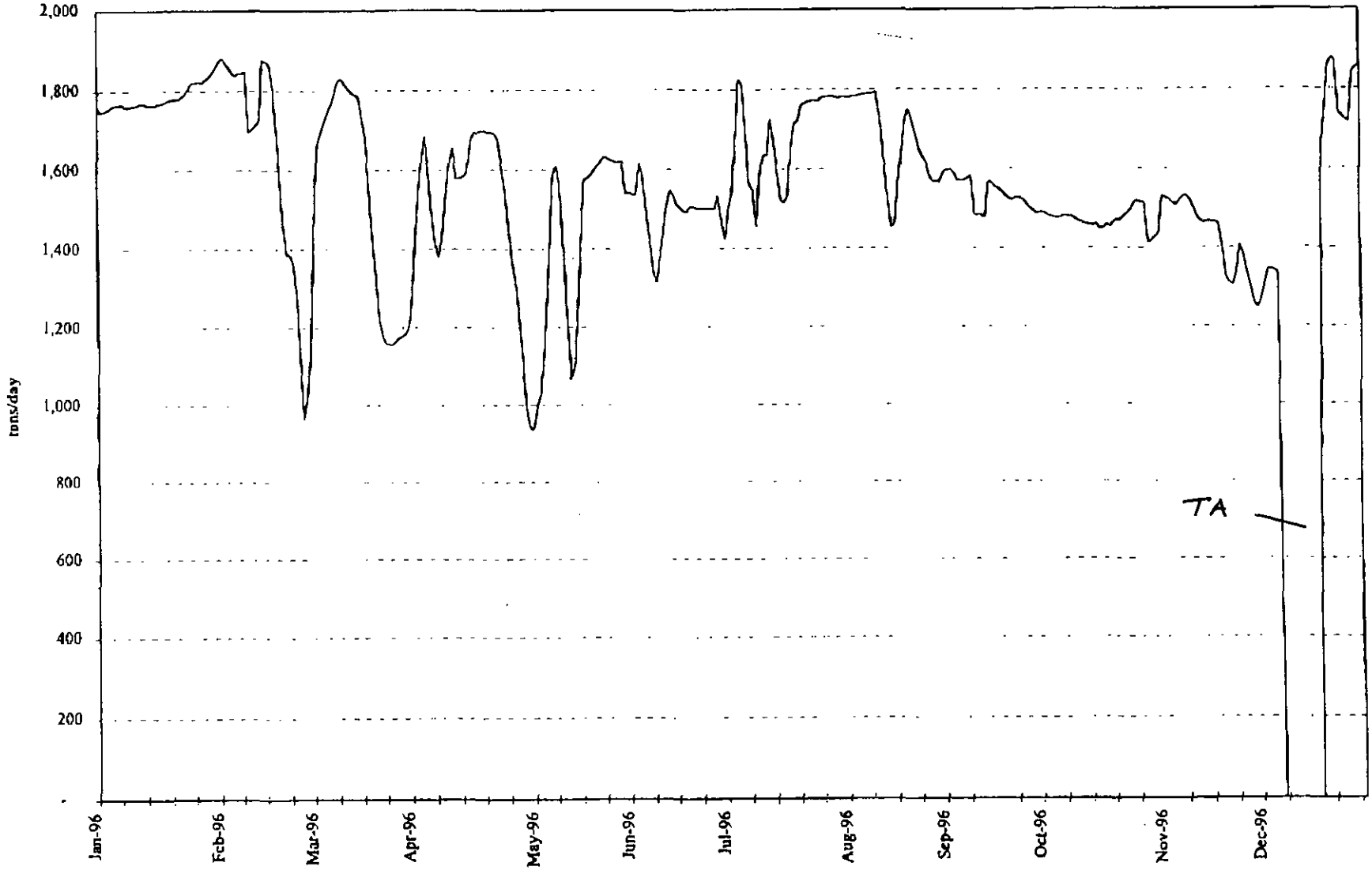


FIGURE 6

Sulfuric Acid Plant # 4

Four day averaged and adjusted production

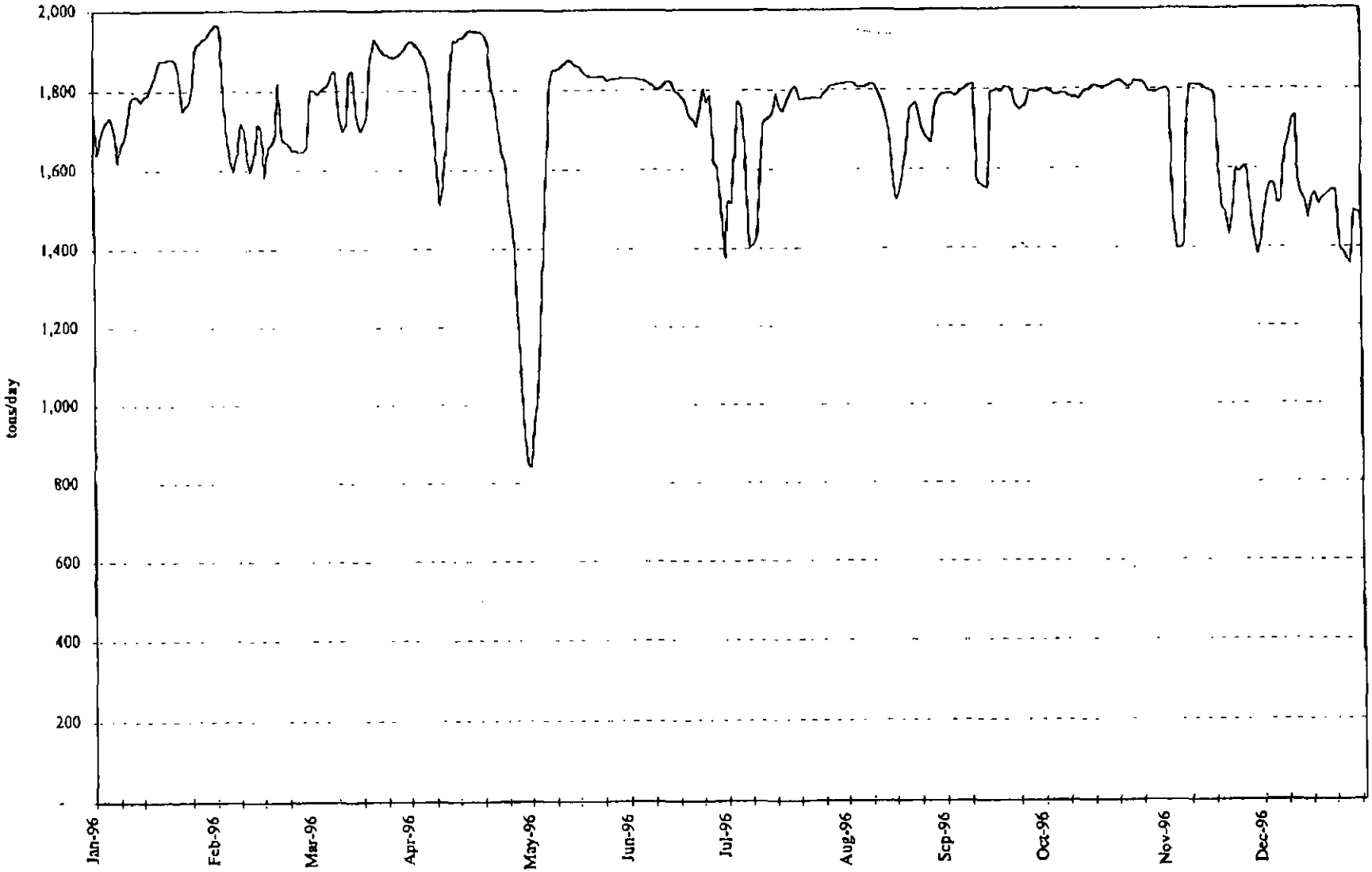


FIGURE 7
Sulfuric Acid Plant # 3
Four day averaged and adjusted production

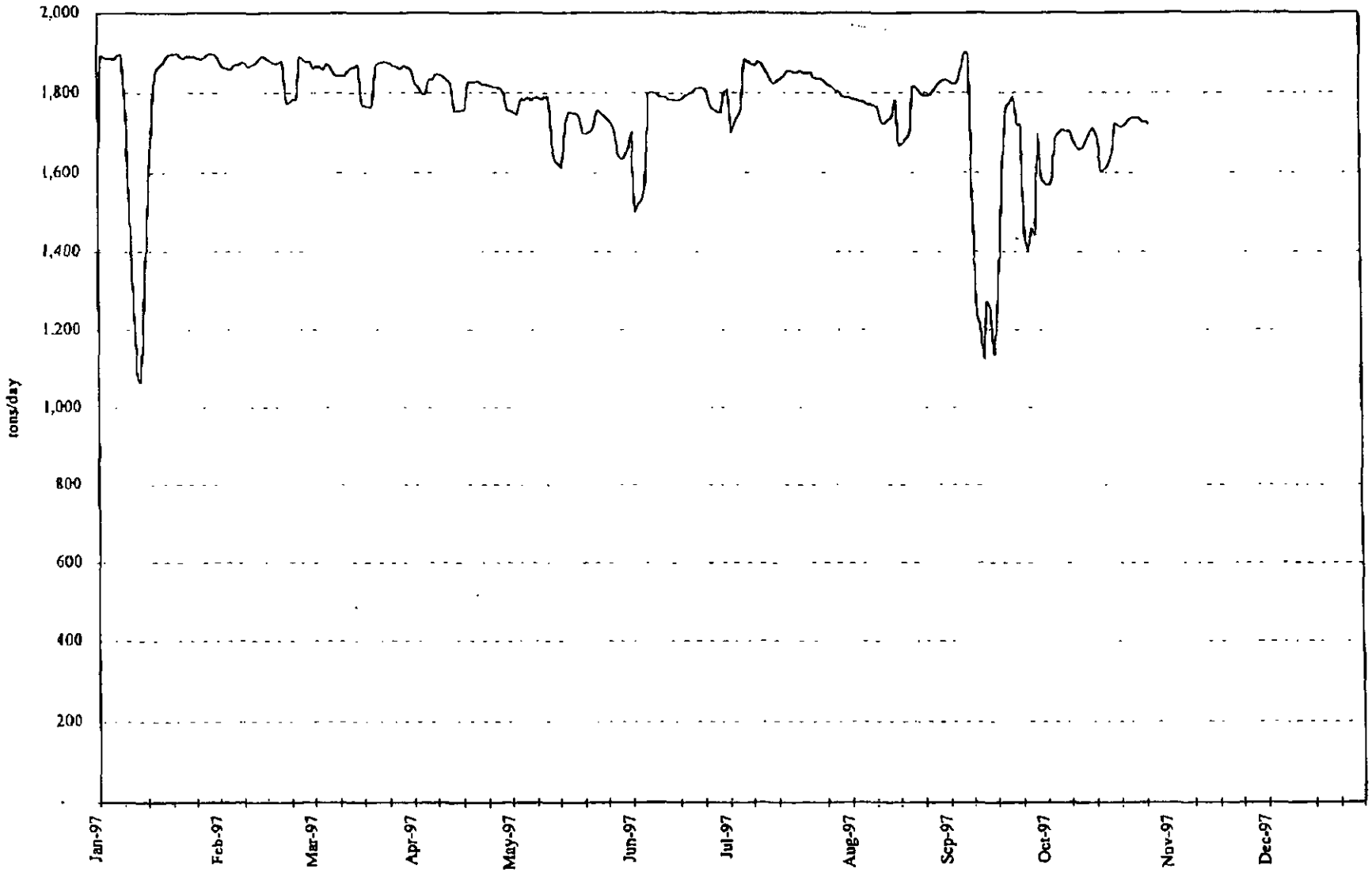


FIGURE 8
Sulfuric Acid Plant # 4
Four day averaged and adjusted production

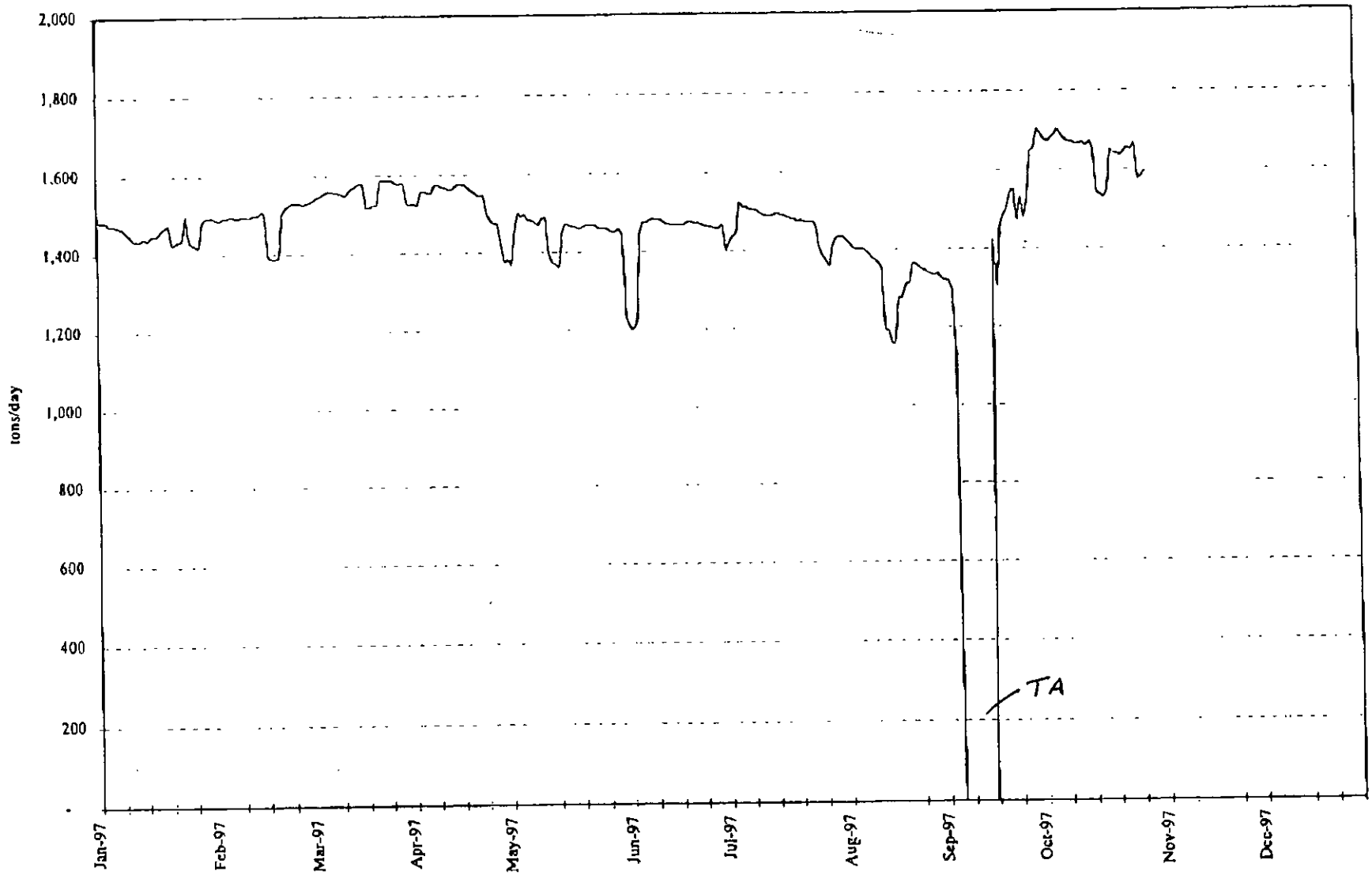


FIGURE 9
Sulfuric Acid Plant # 5 Emissions of SO2

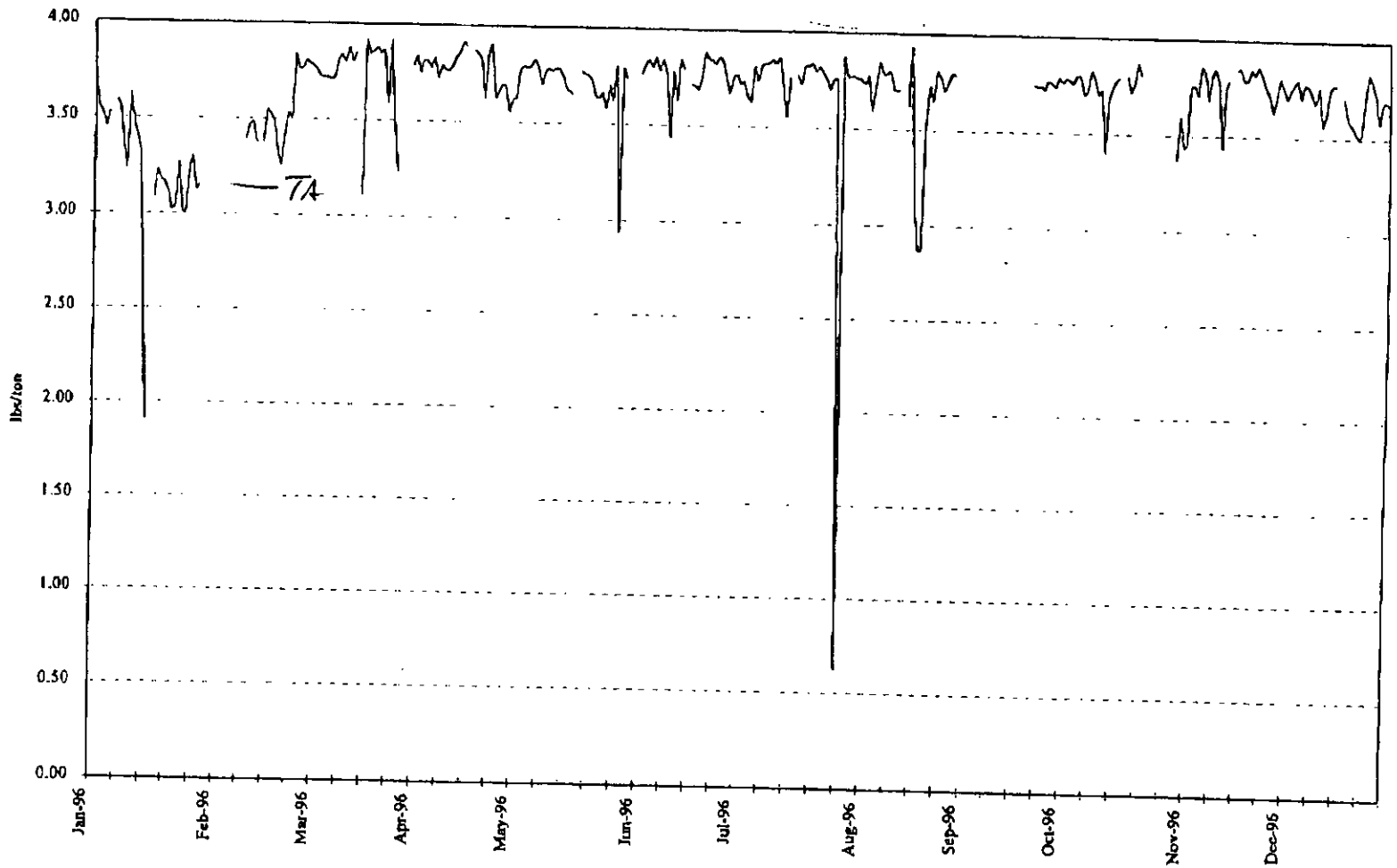


FIGURE 10
Sulfuric Acid Plant # 5 Emissions of SO2

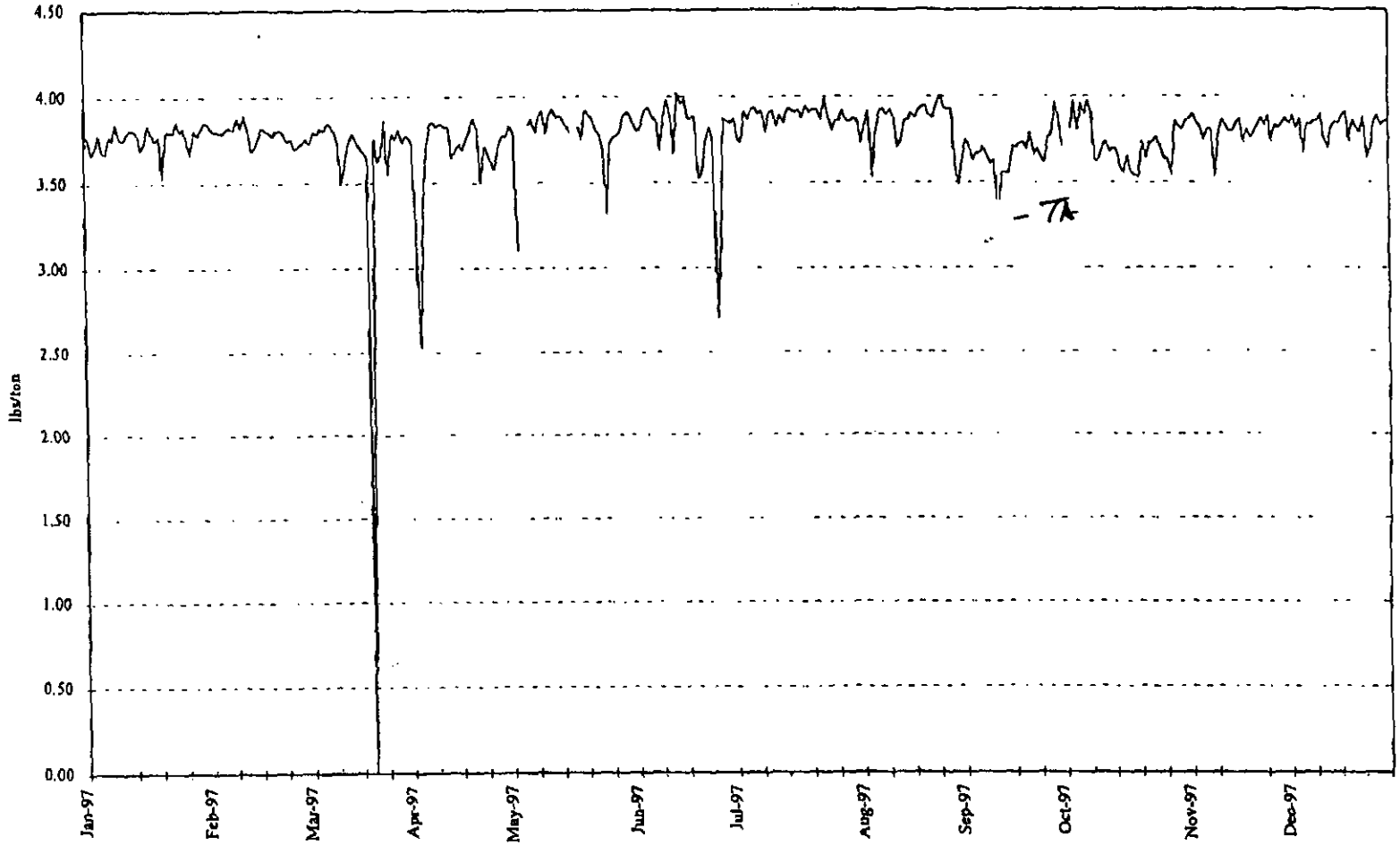


FIGURE 11
Sulfuric Acid Plant # 5
Four day averaged and adjusted production

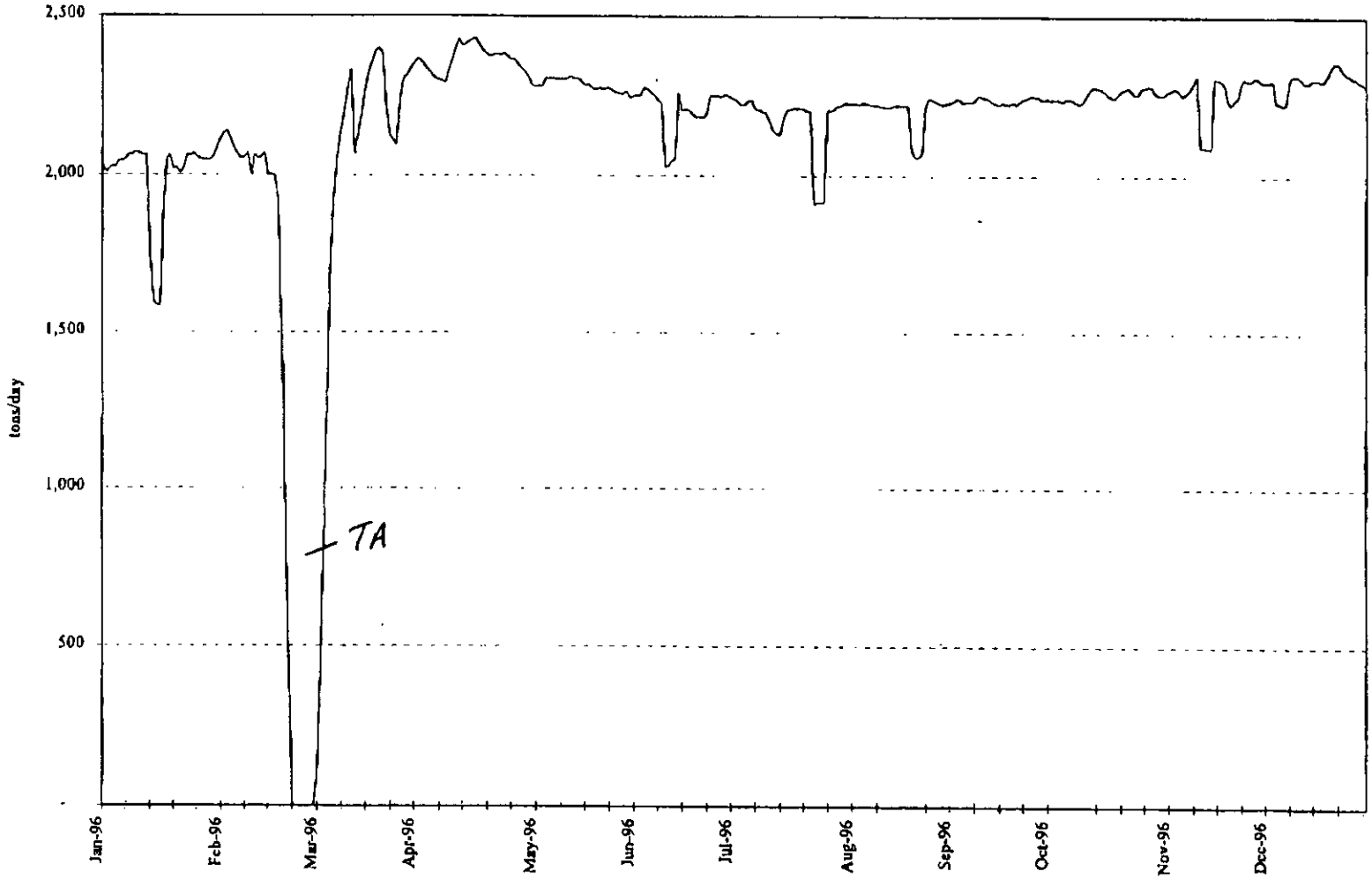
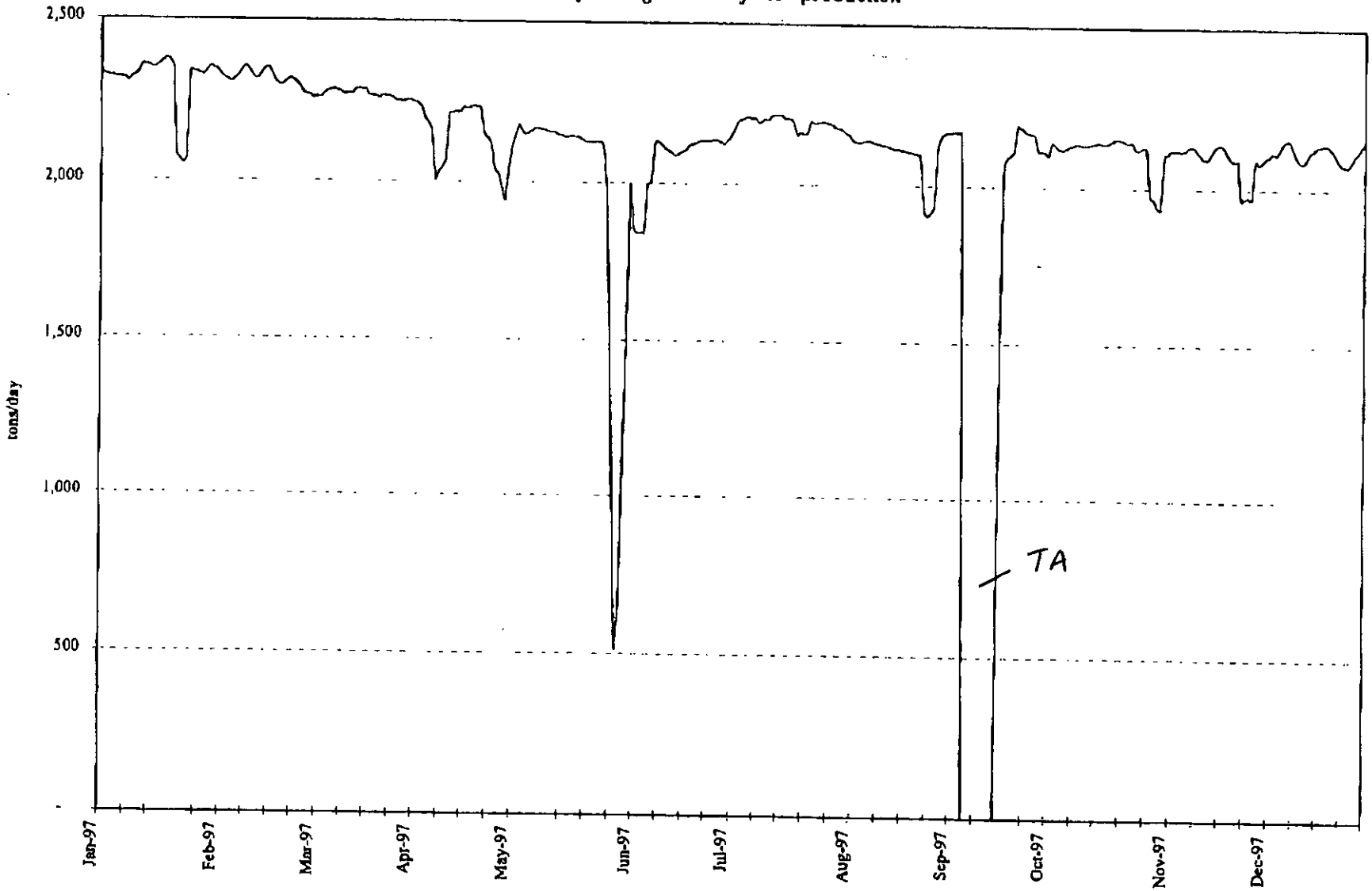


FIGURE 12
Sulfuric Acid Plant # 5
Four day averaged and adjusted production



ATTACHMENT 3

COST ANALYSIS FOR DERATING PLANT TO LOWER EMISSIONS

The size and cost factors used in the following analysis are based on past conversations with experts from Monsanto and Acid Engineering & Consulting and EPA factors from OAQPS Control Cost Manual (EPA 450/3-90-006).

For 3.0 lb/ton:

The plant cost difference can be estimated as follows:

Plant Capacity	=	2750 tpd / 0.84 = 3275 tpd
Sizing Cost Factor	=	(3275/2750)**0.6 = 1.11
Plant Cost Difference	=	$ 48,000,000 x 0.11
	=	$ 5.3 million

The annual cost difference can be estimated as follows:

Difference in Direct Costs:

Operating Labor	=	None
Maintenance & Materials	=	$ 5.3 million x 0.03
	=	$ 159,000
Energy - Fan	=	$ 1758 /day x 365 days/yr
	=	$ 642,000
Waste Disposal	=	None
Total DC	=	$ 801,000

Difference in Indirect Costs:

Overhead	=	$ 159,000 x 0.6
	=	$ 95,000
Admin. Charges, Tax, Insurance	=	$ 5.3 million x 0.04
	=	$ 212,000
Capital recovery	=	$ 5.3 million x 0.163 (10 yrs at 10% int.)
	=	$ 864,000
Total IDC	=	$ 1,171,000
Total Annual Cost	=	$ 1,972,000

KOOGLER & ASSOCIATES

This estimate does not include the loss in income from the loss of production (191,625 tpy acid).

The difference in annual plant SO2 emissions can be estimated as follows:

Emission Diff. = 2750 tpd x 365 days/yr x 1.0 lb/ton x ton/2000 lbs
= 502 tpy

Incremental Cost = $ 1,972,000 / 502 tpy
= $ 3900 per ton SO2 reduced

This value represents the incremental cost as this method of reducing SO2 emissions is in addition to the cost of the double absorption system proposed for the plant.

For 3.5 lb/ton:

The plant cost difference can be estimated as follows:

Plant Capacity = 2750 tpd / 0.92 = 2990 tpd

Sizing Cost Factor = (2990/2750)**0.6 = 1.05

Plant Cost Difference = $ 48,000,000 x 0.05
= $ 2.4 million

The annual cost difference can be estimated as follows:

Difference in Direct Costs:

Operating Labor = None

Maintenance & Materials = $ 2.4 million x 0.03
= $ 72,000

Energy - Fan = $ 1111 /day x 365 days/yr
= $ 406,000

Waste Disposal = None

Total DC = $ 478,000

KOOGLER & ASSOCIATES

Difference in Indirect Costs:

Overhead	=	$ 72,000 x 0.6
	=	$ 43,000
Admin. Charges, Tax, Insurance	=	$ 2.4 million x 0.04
	=	$ 96,000
Capital recovery	=	$ 2.4 million x 0.163 (10 yrs at 10% int.)
	=	$ 391,000
Total IDC	=	$ 530,000
Total Annual Cost	=	$ 1,008,000

This estimate does not include the loss in income from the loss of production (87,600 tpy acid).

The difference in annual plant SO2 emissions can be estimated as follows:

Emission Diff.	=	(2750 tpd x 365 days/yr) x 0.5 lb/ton x ton/2000 lbs
	=	251 tpy
Incremental Cost	=	$ 1,008,000 / 251 tpy
	=	$ 4000 per ton SO2 reduced

This value represents the incremental cost as this method of reducing SO2 emissions is in addition to the cost of the double absorption system proposed for the plant.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

IN REPLY REFER TO

January 7, 1998

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

1050053-019-AC - PSD-FL-243

Dear Mr. Fancy:

Our Air Quality Branch has reviewed the Prevention of Significant Deterioration Application for the replacement of Farmland Hydro's sulfuric acid plant in Polk County. The plant is located 110 km south 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. In addition, we are enclosing the "Interim Visibility Modeling Guidance for Sources Locating or Expanding Near Chassahowitzka Wilderness, Florida." Please provide this document to future PSD applicants. Our Air Quality Branch is compiling a more detailed and comprehensive document addressing visibility analyses that will be available in early 1998.

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 Ms. Ellen Porter of our Air Quality Branch in Denver at 303/969-2617.

Sincerely yours,

A Dale Hall

for Sam D. Hamilton
Regional Director

Enclosures
cc: S. Arif
SWD
EPA
Polk Co
Koogler & Assoc.

RECEIVED
JAN 12 1998
BUREAU OF
AIR REGULATION

Technical Review of Prevention of Significant Deterioration
Permit Application for Farmland Hydro, L.P.'s
Proposed Replacement of a Sulfuric Acid Plant
Polk County, Florida

by

Air Quality Branch, Fish and Wildlife Service - Denver

Farmland Hydro, L.P., is proposing to replace its Sulfuric Acid Plant No. 3 (2,100 tons per day – tpd) in Polk County, Florida, with Sulfuric Acid Plant No. 6 (2,750 tpd) to achieve an increase in acid production. The plant is located 110 km south of Chassahowitzka Wilderness, a Class I air quality area administered by the U.S. Fish and Wildlife Service. The project will result in significant increases in emissions of sulfur dioxide (SO_2), sulfuric acid mist (SAM), and nitrogen oxides (NO_x).

POLLUTANT	EMISSIONS INCREASE (TPY)
SO_2	800
SAM	35.4
NO_x	60

We find the application to be incomplete. Specifically, Farmland has not considered potential emissions increases from other operations at the facility. In addition, Farmland has not adequately justified the conclusions of their best available control technology analysis (BACT). Our reasons are stated below.

Best Available Control Technology (BACT) Analysis

The applicant concluded that PSD review is only required for emissions of SAM, NO_x, and SO_2 from the new plant. However, an increase in sulfuric acid production will result in a corresponding increase in production and emissions (including PM-10 and volatile organic compounds) at other fertilizer operations at this facility. Farmland should consider these corresponding emissions increases in their application.

Sulfur Dioxide: Sulfur dioxide emissions from the acid plant will be controlled by the dual absorption process to a level of 4.0 pounds SO_2 per ton (lb SO_2 /ton) of 100 percent acid produced. This emission level is equal to that adopted by the Environmental Protection Agency (EPA) in 1971 as the New Source Performance Standard (NSPS) for sulfuric acid plants (40 CFR 60, Subpart H). However, it should be noted that more than 12 years have elapsed since the NSPS was last reviewed, and 26 years since it was promulgated. Furthermore, according to EPA policy, the NSPS is merely the minimum level of control that is acceptable as a floor for a proper, "top-down" BACT analysis; the top, or beginning point of the BACT analysis should represent the most stringent level of control feasible. And, recent permit actions indicate that levels of control more stringent than the NSPS are feasible.

For example, a recent permit drafted for Mississippi Phosphates Corporation (MPC) by the State of Mississippi Department of Environmental Quality (MDEQ) proposes a limit of 3.25 lb SO_2/ton. In developing that draft permit, MDEQ relied upon letters from MPC to MDEQ (dated 9/26/97) in which MPC stated that use of 1995 and 1996 test data "results in a calculated SO_2 emission limit of 3.02 lb/ton." In an August 28, 1997, letter to MDEQ, MPC requested a permit limit of 3.16 lb SO_2/ton. Subsequently, MPC proposed meeting a limit of 3.25 lb SO_2/ton. Unless it can be shown that there are extenuating circumstances that make Farmland unable to meet the same limit as MPC, it is reasonable to expect that Farmland perform at least as well.

Following are specific comments concerning the application:

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The use of ammonia scrubbing as used at other sulfuric acid plants cannot be dismissed simply because it produces a waste product. Since most air pollution control systems result in the production of a waste that is either disposed or beneficially used, elimination of such technologies would gut the BACT analysis. A correct top-down BACT analysis allows for consideration of the environmental aspects of potential control technologies in the context of their costs and control efficiencies. Furthermore, the applicant should explain why the additional sulfate generated by scrubbing could not be added to the fertilizer. The applicant should quantify the effects of such additions and the tolerances for sulfate in the product.

In addition, if the applicant cites "cost, reduced plant reliability from the scrubber system, and the environmental liability associated with the waste disposal and accidental release," as justification for eliminating ammonia and all other forms of scrubbing, it must substantiate those assertions with facts and figures.

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Use of high efficiency acid mist eliminators is the predominant control strategy chosen for new or modified sulfuric acid plants regulated under the NSPS. In 1985, EPA also found that all 46 plants built since 1971 incorporate the use of high efficiency acid mist eliminators. However, as with the discussion of SO_2 controls, not only is the NSPS grossly out-of-date, it

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Finally, because FDEP has compiled extensive stack test data on emissions of SO_2, SAM, and NO_x, we suggest that the Florida Department of Environmental Protection perform a statistical analysis of that data to provide additional information regarding the emissions from these sulfuric acid plants.

Class I Increment Analysis

Farmland predicted that the maximum impact to the Class I SO_2 and NO_X increments from this project would be less than the EPA-proposed significant impact levels. Therefore, the project does not contribute significantly to those increments, and cumulative analyses for SO_2 and NO_X are not required. However, as noted above (see BACT Analysis), Farmland should determine if the project is PSD-significant for emissions of PM-10 and volatile organic compounds resulting from the acid production increase. If the project results in significant increases in PM-10 in other parts of the Farmland facility, Farmland should evaluate their contribution to the Class I PM-10 increment.

Air Quality Related Values (AQRV) Analysis

Farmland analyzed potential impacts to vegetation, soils, and wildlife in Chassahowitzka Wilderness. We agree that the potential for impacts to these AQRVs is low because of the distance of the project and the types and amounts of emissions. However, we do not agree with Farmland's logic (p. 46, par. 3) that the potential for impacts to these AQRVs is low

because emissions impacts are less than the EPA-proposed significant impact levels (used to evaluate increment). As we have stated in the past, the AQRV analysis is independent of the Class I increment analysis. A source may have an adverse impact on AQRVs even though its predicted impacts are less than the significant impact levels for increment.

Farmland conducted both a VISCREEN analysis, to assess potential visible plume impacts, and a regional haze analysis. Both analyses predicted that this project would have a low potential to affect visibility at Chassahowitzka. However, we would like to clarify several points regarding these analyses.

First, only sources located less than 50 km from a Class I area should perform a plume impact analysis (VISCREEN). Plumes do not remain coherent beyond 50 km. The attached guidance document, "Interim Visibility Modeling Guidance for Sources Locating or Expanding Near Chassahowitzka Wilderness, Florida," discusses visibility analyses in more detail. Second, Farmland should have considered SAM emissions, as well as SO_2 emissions, in their regional haze analysis. However, because Farmland's predicted impact to regional haze was relatively small (0.14 deciview), it is unlikely that the addition of SAM emissions to the analysis would increase the predicted impact significantly. Therefore, we do not advise Farmland to re-do the analysis.

Please note in the attached visibility guidance document that future sources should compare their contribution to regional haze to the screening level of 0.5 deciview. If their predicted impacts are less than or equal to 0.5 deciview, the impact is considered insignificant and no further analysis is needed. If predicted impacts are greater than 0.5 deciview, the applicant should conduct a cumulative modeling analysis including proposed emissions and all other increment-consuming sources. If the cumulative analysis predicts impacts less than or equal to 1.0 deciview, the impact is considered insignificant and no further analysis is needed. If cumulative impacts are greater than 1.0 deciview, significant haze impacts are possible and FWS will make a case-by-case adverse impact determination regarding the proposed project, considering the frequency, magnitude, and duration of impacts.

In addition to the attached visibility guidance document, our office is compiling a more detailed and comprehensive document addressing visibility analyses that will be available in early 1998.

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

Interim Visibility Modeling Guidance For Sources Locating or Expanding Near Chassahowitzka Wilderness, Florida December 1997

This Interim Visibility Modeling Guidance Document has been developed for use by PSD permit applicants seeking to locate or expand near Chassahowitzka Wilderness, a Class I area administered by the U.S. Fish and Wildlife Service (FWS). A more detailed, comprehensive guidance document will be available in early 1998.

Applicants should assume a background visual range of 65 km for Chassahowitzka Wilderness.

***Sources less than 50 km from a Class I area*:**

Sources ***less than 50 km*** from a Class I area should perform an analysis to assess the potential for visible plumes from their emissions at the Class I area. The recommended models are VISCREEN (Levels 1 and 2) as the screening model and PLUVUE II as the more refined model. If the screening or refined modeling predicts an impact less than a delta E of 2.0 and a contrast of 0.05, no plume impact is expected and no further analysis is required. If the modeling predicts an impact equal to or greater than the 2.0 or 0.05 values, the potential for plume impacts is significant and the FLM will determine on a case-by-case basis whether or not those impacts would be adverse, considering predicted frequency, magnitude, duration, and other factors.

Sources greater than or equal to 50 km from a Class I area:

Sources ***greater than or equal to 50 km*** from a model receptor in a Class I area should perform an analysis to assess the potential for a significant increase in uniform (i.e., regional) haze in the Class I area due to the source's emissions. The source may choose to use a screening model (e.g., ISC) or a more refined model (e.g., Mesopuff or Calpuff). If the predicted impact is less than or equal to 0.5 deciview, the impact is considered insignificant and no further analysis is needed. If the predicted impact is greater than 0.5 deciview, the applicant should conduct a cumulative modeling analysis including the new source's proposed emissions and all other increment-consuming emissions. If the cumulative analysis predicts an impact less than or equal to 1.0 deciview, the impact is considered insignificant and no further analysis is needed. If the cumulative impact is greater than 1.0 deciview, a significant increase in haze is possible and FWS will make a case-by-case adverse impact determination regarding the proposed project, considering the predicted frequency, magnitude, and duration of impacts.

Contact: Bud Rolofson, FWS Air Quality Branch (303) 969-2804

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

December 18, 1997

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Charles W. Jenkins, Manager
Environmental and Safety Services
Farmland Hydro, L. P.
Post Office Box 960
Bartow, Florida 33831

Re: DEP File No. 1050053-019-AC (PSD-FL-243)
Greenbay Facility, New Sulfuric Acid Plant

Dear Mr. Jenkins:

This letter is a follow-up to our letter of November 20, 1997, in which we requested additional information on five items for a new 2750 ton per day (TPD) Sulfuric Acid Plant (SAP). We have finished the completeness review on this project, and require additional information to further process this request. Please provide the following items to the Bureau of Air Regulation:

1. Please provide emissions data for SO_2 in lb/ton of 100% H_2SO_4 for the last two years (monthly CEM averages) of operation for the No. 3 SAP. In providing this data, please present it in a graphical representation against time. On the same graph, indicate the production rate for the plant (monthly averages) and indicate the turn-around date on the time axis.
2. Please indicate the turn-around cycle time for the No. 3 SAP. When was the last turnaround conducted for that plant? Indicate what modifications were done to the plant during the turn-around. If catalysts were screened or replaced, indicate which conversion passes were selected for catalyst screening and/or replacement. Indicate the amount of catalyst replaced, if any. Provide the same information for the other two existing Sulfuric Acid Plants.
3. Please provide the same information as required in Item 1 for the other two existing Sulfuric Acid Plants.

Attached for your review are comments from the U. S. Fish and Wildlife Service. Their main point appears to be that emissions lower than 4 pounds of sulfur dioxide per ton of sulfuric acid are readily attainable. We have not yet received comments from EPA. However, attached are comments they recently provided for a plant modification in Manatee County. Their comments about the Farmland plant are likely to be similar. For your information, attached is product information about cesium-promoted vanadium-containing catalysts retrieved from Monsanto and BASF's websites as well as from Haldor Topsoe.

The Department will resume processing this application after receipt of the requested information. If you have any questions regarding this matter, please call me or Syed Arif at (850)488-1344.

Sincerely,

A A Linero 12/18

A. A. Linero, P.E. Administrator
New Source Review Section

AAL/sa

cc: Brian Beals, EPA
John Bunyak, NPS
Bill Thomas, SWD
Joe King, Polk County
John Koogler, P.E.

U.S.FISH&WILDLIFE SERVICE
AIR QUALITY BRANCH
P.O. BOX 25287, Denver, CO 80225-0287

FACSIMILE COVER SHEET

Date: 12/16

Telephone: (303) 969-2617
Fax: (303) 969-2822

To: Cleve Holladay

From: Ellen Porter

Subject: Farm land Hydro

Number of Pages:
(Including this cover sheet) 11

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

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

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Sincerely,

Sam D. Hamilton
Regional Director

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

Technical Review of Prevention of Significant Deterioration Permit Application for Farmland Hydro, L.P.'s Proposed Replacement of a Sulfuric Acid Plant Polk County, Florida

by

Air Quality Branch, Fish and Wildlife Service - Denver

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

Table 1.a.

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	0.078
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	0.151
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	0.064
36		4	0.028
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	0.009
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 +/- 0.105

Emission Factor @ 95% 0.073 <EF< 0.144

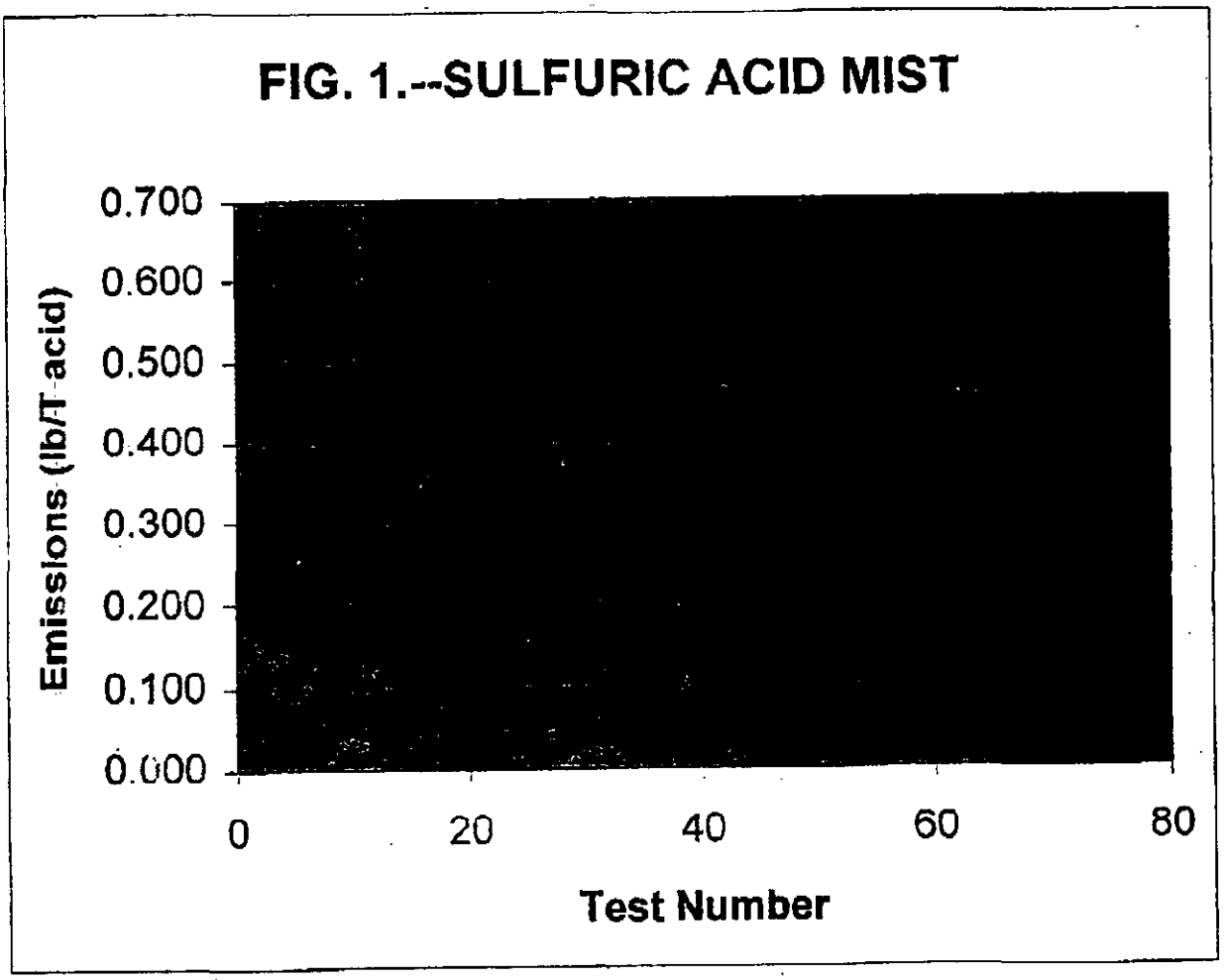


FIG. 1.--SULFURIC ACID MIST
Emissions (lb/T acid)
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
0
20
40
60
80
Test Number

Table 1.b.

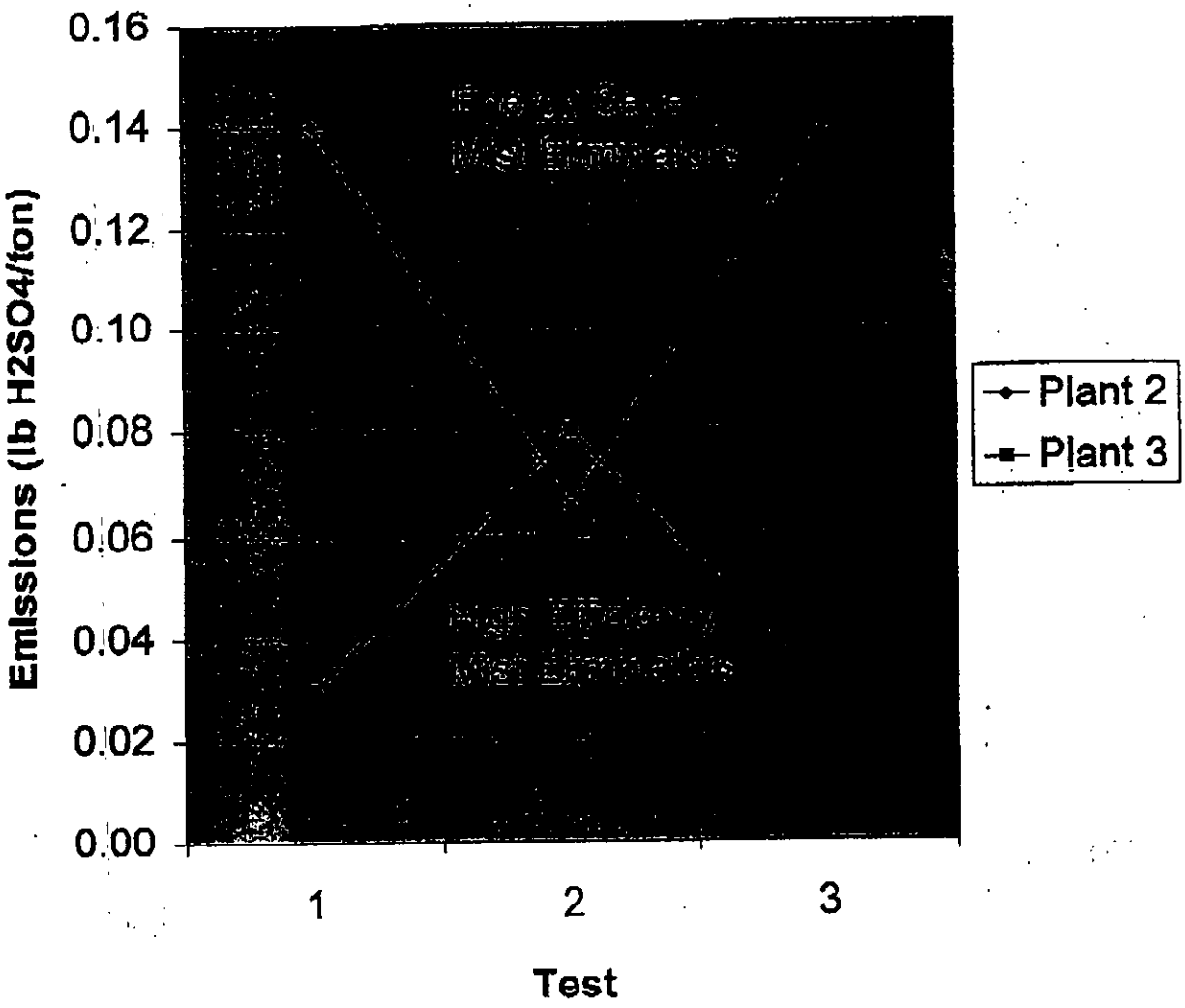
H2SO4 Test Results Minus Outliers

	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	0.083
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

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

Fig. 2--Mississippi Phosphate Sulfuric Acid Emissions



Interim Visibility Modeling Guidance For Sources Locating or Expanding Near Chassahowitzka Wilderness, Florida December 1997

This Interim Visibility Modeling Guidance Document has been developed for use by PSD permit applicants seeking to locate or expand near Chassahowitzka Wilderness, a Class I area administered by the U.S. Fish and Wildlife Service (FWS). A more detailed, comprehensive guidance document will be available in early 1998.

Applicants should assume a background visual range of 65 km for Chassahowitzka Wilderness.

Sources less than 50 km from a Class I area:

Sources ***less than 50 km*** from a Class I area should perform an analysis to assess the potential for visible plumes from their emissions at the Class I area. The recommended models are VISCREEN (Levels 1 and 2) as the screening model and PLUVUE II as the more refined model. If the screening or refined modeling predicts an impact less than a delta E of 2.0 and a contrast of 0.05, no plume impact is expected and no further analysis is required. If the modeling predicts an impact equal to or greater than the 2.0 or 0.05 values, the potential for plume impacts is significant and the FLM will determine on a case-by-case basis whether or not those impacts would be adverse, considering predicted frequency, magnitude, duration, and other factors.

Sources greater than or equal to 50 km from a Class I area:

Sources ***greater than or equal to 50 km*** from a Class I area should perform an analysis to assess the potential for a significant increase in uniform (i.e., regional) haze in the Class I area due to the source's emissions. The source may choose to use a screening model (e.g., ISC) or a more refined model (e.g., Mesopuff or Calpuff). If the predicted impact is less than or equal to 0.5 deciview, the impact is considered insignificant and no further analysis is needed. If the predicted impact is greater than 0.5 deciview, the applicant should conduct a cumulative modeling analysis including the new source's proposed emissions and all other increment-consuming emissions. If the cumulative analysis predicts an impact less than or equal to 1.0 deciview, the impact is considered insignificant and no further analysis is needed. If the cumulative impact is greater than 1.0 deciview, a significant increase in haze is possible and FWS will make a case-by-case adverse impact determination regarding the proposed project, considering the predicted frequency, magnitude, and duration of impacts.

Contact: Bud Rolofson, FWS Air Quality Branch (303) 969-2804

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303-8909

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DEC 18 1997
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AIR REGULATION

4APT-ARB

Mr. Claire H. Fancy, P.E.
Chief
Bureau of Air Regulation
Florida Department of Environmental
Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

SUBJ: PSD Permit Application from Piney Point Phosphates, Inc., Palmetto, Florida (PSD-FL-242)

Dear Mr. Fancy:

This is to acknowledge receipt of an application for a Prevention of Significant Deterioration (PSD) permit for the startup of the existing sulfuric acid plant at the above referenced facility. The application was submitted by a letter dated November 3, 1997, from Mr. Al Linero. The sulfuric acid plant has not been in operation since 1992, and repairs will be made to the plant before startup. No increase in the previous production rate of 2,000 tons/day of 100 percent sulfuric acid is proposed. The proposed repair project will result in a significant net increase in the emissions of SO_2, NO_x, and sulfuric acid mist. The sulfuric acid plant is subject to 40 CFR 60, Subpart H (Standards of Performance for Sulfuric Acid Plants).

Based on the applicant's best available control technology (BACT) analysis, SO_2 emissions from the sulfuric acid plant will be controlled by use of the double absorption process, and sulfuric acid mist emissions will be controlled by the use of fiber mist eliminators. The proposed emission limits are equivalent to the New Source Performance Standards (NSPS) Subpart H emission limits of 4 lb SO_2 and 0.15 lb sulfuric acid mist per ton of 100 percent sulfuric acid produced.

Although previous BACT determinations for double absorption sulfuric acid plants have resulted in selection of the NSPS limits, Piney Point Phosphates should further evaluate the feasibility of achieving lower emission rates. As indicated in the application, recent improvements in plant design and catalyst performance have enabled sulfur burning double absorption sulfuric acid plants to operate at higher production rates and still comply with an SO_2 emission rate of 4.0 lb/ton acid produced. The application indicates that in order to maximize sulfuric acid production, the

sulfur feed rate to the sulfur burner is typically increased until either the sulfuric acid production rate limited by the permit is reached or the SO_2 emission rate limited by the permit is reached. This implies that industry improvements in plant and catalyst design could reduce SO_2 emission rates, provided the sulfuric acid production rates are controlled. Piney Point Phosphates plans to replace the degraded portion of the vanadium containing (VC) pelletized catalyst in Converter 1 with low pressure VC ring catalyst, and all pelletized VC catalyst in Converter 2 will be replaced with low pressure VC ring catalyst. These changes would likely result in a lower SO_2 emission rate, provided the sulfuric acid production rate is not increased. Piney Point Phosphates should provide information concerning the expected maximum sulfuric acid production capacity of the refurbished plant, as compared with the maximum capacity of the existing plant, and the expected effect on SO_2 emissions. Consideration should also be given to the replacement of all pelletized catalyst with ring catalyst in Converter 1 and the associated effect on the SO_2 emission rate.

We recommend that Piney Point Phosphates further evaluate the use of cesium-promoted catalyst in Converter 2. Although cesium-promoted catalyst may have not previously been applied in a sulfur burning double absorption process, the catalyst has been applied in similar double absorption processes, as indicated in the application. The application does not include information to indicate that the use of cesium catalyst is not a feasible option for further reducing SO_2 emissions.

An important part of the BACT review process is the identification of new control technologies which may be applied to the new or modified emission source. The BACT analysis should consider control technologies applied to similar source categories and gas streams, and innovative control technologies. One such control technology, as described in the State's November 17, 1997, letter, is the use of the Centaur Technology which uses activated carbon, which has both adsorptive and catalytic properties, to oxidize SO_2 to H_2SO_4. Use of the Centaur Technology, instead of the second converter at Piney Point Phosphates, may be a viable option for a reduction in SO_2 emissions.

The basis of the sulfuric acid mist emission limit (0.15 lb/ton acid produced) should be provided by the applicant. Test data and documentation from the vendor should be provided to verify the performance of the mist eliminator proposed for the plant.

Thank you for the opportunity to review and comment on the application package. If you have any questions, please contact Keith Goff of my staff at (404)562-9137.

Sincerely yours,

R. Douglas Neeley
Chief
Air and Radiation Technology Branch
Air, Pesticides, and Toxics Management Division

Intro

Enviro-Chem Systems

MONSANTO ENVIRO-CHEM SULFURIC ACID CATALYST

Monsanto has been manufacturing and marketing sulfuric acid catalyst since 1925. The catalyst is sold worldwide and Enviro-Chem provides high quality technical and commercial support before and after the sale. The vanadium-based catalyst is an extremely important "cog" in the many sulfuric acid technologies provided by Monsanto Enviro-Chem.

The sulfuric acid catalyst is used in the oxidation of sulfur dioxide (SO_2) as follows:

$$SO_2 + 1/2\ O_2\ SO_3$$

The sulfur trioxide (SO_3) is then reacted with water to form sulfuric acid (H_2SO_4). The main components of the Enviro-Chem catalyst include: SiO_2 (silica; as a support), vanadium (V), potassium (K) and/or cesium (Cs), and various binders and additives. The reaction shown above actually occurs within a molten salt consisting of potassium/cesium sulfates and vanadium sulfates, coated on the solid silica support. This unique catalyst has proven to be very stable and long-lived in the sulfuric acid production industry. Because of the unique chemistry of this molten salt system, the vanadium is present as a complex sulfated salt mixture and NOT as vanadium pentoxide (V_2O_5). Therefore, the catalyst is more correctly called a "vanadium-containing" catalyst rather than the commonly-used "vanadium pentoxide" catalyst.

Monsanto Enviro-Chem provides a wide variety of sulfuric acid catalyst products:

Rings	**LP-120**	**LP-110**	**LP-220**
Application	First/Second Beds	Third/Fourth Beds	First/Second Beds
Outside Diameter (mm)	12.7	9.5	9.5
Inside Diameter (mm)	5.0	4.0	4.0
Average Ring Length (mm)	14.0	13.0	13.0
Pellets	**T-210**	**T-516**	**T-11**
Application	First/Second Beds	First/Second Beds	Third/Fourth Beds
Diameter (mm)	5.5	8.0	5.5
Crush Strength (kg)	12.0	16.0	12.0
Cesium-Promoted	**Cs-120**	**Cs-110**	**Cs-210**
Shape	Ring	Ring	Pellet
Application	First/Second Beds	Lower Beds	All Beds
Outside Diameter (mm)	12.7	9.5	5.5
Inside Diameter (mm)	5.0	4.0	

The **cesium-promoted catalyst** was developed specifically for lower temperature operations which can lead to greater SO_2 conversion and hence lower emissions to the atmosphere. The cesium salt promoter reduces the required operating temperature for the sulfuric acid catalyst by as much as 40°C (70°F). Higher SO_2 conversion is possible at lower temperatures as long as the catalyst is "active"; the cesium-promoted catalysts are sufficiently active at these lower temperatures (390-410°C/735-770°F) to take advantage of this conversion "opportunity." The cesium/vanadium catalyst can be used in the first bed to reduce the bed inlet temperature (saving energy and

start-up time). The Cs-110 or Cs-210 catalyst can be used in the final catalyst bed (at a low inlet temperature) to maximize the SO_2 conversion and reduce emissions. This unique catalyst was introduced in the late 1980's and has been applied in a variety of situations with significant SO_2 emissions reductions. Although the cesium catalyst is more costly than the standard potassium/vanadium catalysts, many customers have justified the added expense by increased production, higher steam production, and reduced emissions.

Technical service is also a major part of the overall sulfuric acid catalyst story. Enviro-Chem provides catalyst engineering studies to assist the customer in determining the catalyst needs in a specific plant, activity analysis and hardness determinations for used catalyst samples, and on-site converter-heat exchanger testing (called PeGASyS) to fully characterize the sulfuric acid plant operations which assist the customer in maintenance planning. Enviro-Chem has a variety of commercial and inventory locations throughout the world. Technical service functions are centered in St. Louis, MO (U.S.A.) and in Brussels, Belgium.

Sulphuric Acid Catalyst VK69

New Options for Double-Absorption Plants

Since the introduction of the first VK38 catalyst more than 50 years ago, the VK Series has represented Topsøe's heritage and commitment to quality and innovation.

The introduction of the first caesium-promoted vanadium catalyst, VK58, in the late 1980's meant a tremendous step forward in reducing tail-gas emissions from *single*-absorption sulphuric acid plants through operation at hitherto unseen low temperatures.

Other application areas of caesium-promoted catalysts include:

- Handling of strong, oxygen-rich SO_2 gases
- Significant reduction in SO_2 emissions during start-up
- Savings in start-up time and extended autothermal restart time limits
- Overcoming plant constraints

VK69

In 1996 Topsøe introduced VK69, a newly developed caesium-promoted catalyst, optimized for operation in the last pass of *double*-absorption sulphuric acid plants. At these conditions VK69 shows a very significant activity advantage compared to regular catalysts.

Features and Benefits

The improvement in activity has been brought about through physical as well as chemical changes compared to Topsøe's well-known VK58 caesium- promoted catalyst.

Support

VK69 is manufactured by a special extrusion process resulting in a highly porous catalyst.

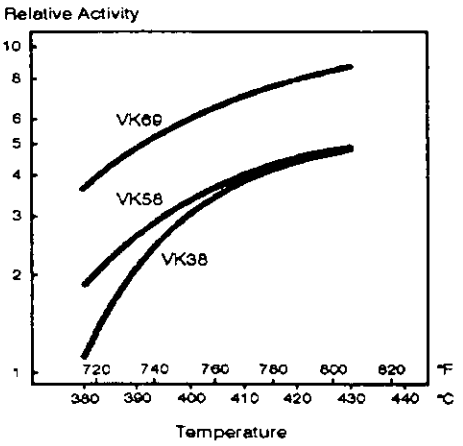
Shape

In gases with low concentrations of sulphur dioxide the rate of oxidation of sulphur dioxide is impeded by intra-particle diffusion. The size and shape of the catalyst particles are hence important for the efficiency of the catalyst.

Topsøe's new 9-mm mini-Daisy shape proves 20 % more efficient compared with smooth 10-mm rings without compromising a low pressure drop.

Chemical Composition

VK69 combines an increased vanadium content with a revised composition of the active phase. Caesium is used to stabilize the vanadium in its active state at low operating temperatures.



Outstanding Activity

The revised support material, the optimum chemical composition, and the mini-Daisy shape together result in a 2-3 times higher activity for VK69 compared to other vanadium catalysts.

Improved Performance

The very high activity of VK69 offers significant performance improvements in terms of:

- Emissions from existing plants can be cut in half without increasing the catalyst volume
- Increased production rate by using higher-strength SO_2 gas without increasing emissions or plant pressure drop

VK69, 9-mm mini-Daisy alongside 10-mm rings and 12-mm Daisy

VK69 - Proven Performance

Reduction of SO_2 Emissions

In a large 3:1 double-absorption plant burning elemental sulphur, VK69 replaced conventional catalyst in the final pass. The table provides the performance of the fourth bed before and after installation of VK69. It is observed that even at a slightly increased acid production rate the SO_2 emission has been reduced by more than 60% to below 100 ppm in the stack.

Catalyst loading in the 4th bed		97,000 litres conventional catalyst	90,600 litres VK69
Acid production rate	MTPD STPD	1460 1608	1490 1641
4th bed inlet temperature	°C °F	440 824	389 733
Overall conversion, %		99.79	99.92
SO_2 in stack gas, ppm		215	80

Capacity Expansion

An increase in acid production rate may often be achieved through an increase in gas flow rate as well as in feed gas SO_2 strength. To maintain the overall conversion efficiency using conventional catalysts, a larger catalyst volume is required. The higher gas flow rate and the increased catalyst volume both contribute to a significant increase in plant pressure drop.

The table shows performance data before and after installation of VK69 in the last pass of a 2:1 double-absorption plant feeding on off-gas from metal-ore roasting. A 14% capacity increase has been achieved solely through an increase in feed-gas SO_2 strength. Even though the oxygen-to-sulphur dioxide ratio is much less favourable this has occured without increasing the SO_2 emission level. The inlet temperature of 375°C (707°F) is remarkable.

		Before installation of VK69	After installation of VK69
Acid production	MTPD STPD	280 308	318 350
Feed gas SO_2 strength, %		7.9	9.3
Feed gas flow rate	Nm^3/hr SCFM	33,900 21,100	32,500 20,200
O_2/SO_2 ratio		2.1	1.7
3rd pass inlet temperature	°C °F	402 756	375 707
SO_2 in stack gas, ppm		310	312

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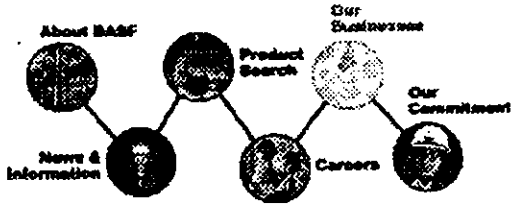
10/97



BASF

CATALYSTS

Manufacture of Sulfuric Acid

[Back to Catalysts Products Page I Back to Catalysts Home]

(For additional data, contact BASF's Catalysts Department)

O 4-110	Vanadium pentoxide type for oxidation of SO_2 to SO_3. Standard catalyst for first pass in SO_2converters.
O 4-111	Vanadium pentoxide type for oxidation of SO_2 to SO_3. Higher activity compared to O 4-110. Standard catalyst for second and higher passes in SO_2 converters. Depending on concentration of SO_2, can also be used in first pass.
O 4-115	Cesium-promoted vanadium pentoxide type for oxidation of SO_2 to SO_3. Allows operation at lower inlet temperatures than standard types. This is advantageous for operating with higher SO_2 content in the feedgas, and for cutting SO_2 emissions.

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- The Return Receipt will show to whom the article was delivered.

...ssee's Address

...icted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Charles W. Jenkins, Mgr.
Farmland Hydro, LP
PO Box 960
Baton, Fl
33831

4a. Article Number
P 265 659 269

4b. Service Type
☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery
12/23/97

5. Received By: *(Print Name)*

8. Addressee's Address *(Only if requested and fee is paid)*
X 960

6. Signature: *(Addressee or Agent)*
X Joan Hicks

PS Form **3811**, December 1994

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Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date 12-19-97	

10-50053-019-AC
PSD-FI-243

PS Form **3800**, April 1995

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

November 20, 1997

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Charles W. Jenkins, Manager
Environmental and Safety Services
Farmland Hydro, L. P.
Post Office Box 960
Bartow, Florida 33831

Re: DEP File No. 1050053-019-AC (PSD-FL-243)
Greenbay Facility, New Sulfuric Acid Plant

Dear Mr. Jenkins:

We received your application on November 20, 1997 for an air construction permit to replace the 2100 ton per day (TPD) No. 3 Sulfuric Acid Plant (SAP) with a new 2750 (TPD) SAP. We are conducting a completeness review at this time. However, we are aware that you wish to know of any information we may require to process this application as soon as we become aware of it. We have requested comments from EPA, the National Park Service, Polk County, and our District office as well as the in-depth review by our engineer and modeler/meteorologist assigned to this application. Additional Department comments will be provided to you by December 19. Any other comments will be forwarded to you as soon as we receive them. An initial review of the application indicates that the following items need to be provided or clarified:

1. Please confirm if the process will be as depicted in Figure 3-1. There have been developments in recent years incorporating more efficient technology which deletes the need for a drying tower, incorporates power generation and utilizes heat recovery towers. We simply want to confirm the chosen technology and to obtain more details on your plans.
2. The Best Available Control Technology should include a review and cost analysis for the "Centaur SO_2 Removal Process" developed by Monsanto in conjunction with Calgon Carbon. Basically, Converter 2 can be replaced with a reactor containing highly activated carbon catalyst/adsorbent. Wet conversion occurs in the bed which retains the acid. The acid is released by sequential back-washing of bed sections. The catalyst can operate at very low temperatures. This can result in reduced pressure drop across the plant as well as lower heat waste, lower emissions, and possibly increased production. Besides elimination of the second converter and its catalyst, it would also eliminate the need for a final tower and some other equipment. Attached is a recent joint press release from Monsanto Enviro-Chem and Calgon Carbon regarding the first commercial sale.

3. Please advise what kind of catalyst will be used in the various conversion passes. Will it be pelletized or ring (or star) catalyst? Please include a technical and cost evaluation for using cesium-promoted vanadium-containing catalyst in the final pass. This allows significant reduction of the operating temperature in the final pass. Monsanto Enviro-Chem introduced such a line of catalyst in 1989 and it has been demonstrated at several double absorption plants. We believe Topsoe and BASF market similar products. This provides an opportunity for reduced emissions, higher steam production, and possibly increased production despite the higher cost.

4. Please advise how long your plants have historically operated between turn-arounds such as those which include catalyst screening and replacement. Provide some information regarding sulfur dioxide emissions and acid production over time following such turnarounds.

5. Please submit cost/technical analyses of scenarios wherein certain plant components (such as the blower or catalyst) are designed (or "overdesigned") such that present production objectives are met and emission levels are lower than projected in the application. Please evaluate scenarios wherein emissions limits of 3.5, 3.0, and 2.5 pounds of sulfur dioxide per ton of sulfuric acid (averaged for periods longer than one day but less than thirty days) are maintained throughout the turn-around cycle of the plant.

We do not recommend processes which result in by-products or wastes and do not expect Farmland Hydro, L. P. to review them further. It appears that these processes are not generally competitive with those which result in production of additional acid.

We are continuing to process the application and will advise you as issues arise. We plan to make an appointment to visit your facility during the course of this review. If you have any questions regarding this matter, please call Syed Arif at (850)488-1344.

Sincerely,

11/20

A. A. Linero, P.E. Administrator
New Source Review Section

AAL/sa

cc: Brian Beals, EPA
John Bunyak, NPS
Bill Thomas, SWD
Joe King, Polk County
John Koogler, P.E.

Calgon Carbon Announces

MONSANTO ENVIRO-CHEM AND CALGON CARBON ANNOUNCE COMMERCIALIZATION OF MAC-100 PROCESS

PITTSBURGH, PA -- October 16, 1997 -- Monsanto Enviro-Chem Systems, Inc. and Calgon Carbon Corporation announced today the full commercialization of the MAC-100 Process utilizing Calgon Carbon's Centaur® Technology to reduce sulfur dioxide emissions from sulfuric acid manufacturing plants. The technology will be applied at the Philippine Phosphate Fertilizer Corporation's new 1,000-ton-per-day facility in the Philippines. Shipments of Centaur activated carbon for the new system began in September. The new plant will be operational in early 1998.

The full commercialization of the new technology follows a successful six-month pilot plant trial at Koch Sulfur Products Co. in Wilmington, North Carolina. The pilot plant, which was built and jointly operated by Monsanto Enviro-Chem and Calgon Carbon, demonstrated the technology's effectiveness in reducing sulfur dioxide emissions at an existing sulfuric acid manufacturing plant.

The MAC-100 Process Technology utilizes fixed beds of Centaur carbon to oxidize sulfur dioxide to sulfuric acid in the pores of the carbon. The dilute sulfuric acid is then recovered and used as make-up in the sulfuric acid manufacturing process. Centaur is manufactured by Calgon Carbon using a patented process which gives the carbon both adsorptive and catalytic properties.

In 1996, Calgon Carbon granted Monsanto Enviro-Chem exclusive worldwide rights to market the technology for reducing sulfur dioxide emissions from sulfuric acid manufacturing plants. Commenting on the Centaur Technology and MAC-100, John Kilkenny, president of Monsanto Enviro-Chem said, "Centaur Technology is definitely more effective in reducing sulfur dioxide emissions and requires lower capital and operating costs than traditional double absorption technology. With the successful completion of the trial demonstration at Koch Sulfur Products Co., we are now aggressively marketing systems utilizing Centaur activated carbon to customers worldwide." Colin Bailey, president and chief executive officer of Calgon Carbon, added, "The pilot plant trial clearly demonstrated the Centaur Technology's superiority over conventional methods of containing sulfur dioxide emissions. With Monsanto Enviro-Chem's position as a world leader in the design and construction of sulfuric acid manufacturing plants, I am confident that the Centaur

Technology will be widely adopted for both retrofit and new facilities."

Monsanto Enviro-Chem Systems, Inc., headquartered in St. Louis, Missouri, is a world leader in the design and construction of sulfuric acid manufacturing plants.

Calgon Carbon Corporation, headquartered in Pittsburgh, Pennsylvania, is a leader in the production, supply and design of products, services, and technologies for the purification, separation, and concentration of liquids and gases.

For more information, please contact Gail Gerono (412) 787-6795

Previous news

P 265 659 255

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PS Form 3800, April 1995
105005 3019-AE
POD-FL-243

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

November 20, 1997

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Charles W. Jenkins, Manager
Environmental and Safety Services
Farmland Hydro, L. P.
Post Office Box 960
Bartow, Florida 33831

Re: DEP File No. 1050053-019-AC (PSD-FL-243)
Greenbay Facility, New Sulfuric Acid Plant

Dear Mr. Jenkins:

We received your application on November 20, 1997 for an air construction permit to replace the 2100 ton per day (TPD) No. 3 Sulfuric Acid Plant (SAP) with a new 2750 (TPD) SAP. We are conducting a completeness review at this time. However, we are aware that you wish to know of any information we may require to process this application as soon as we become aware of it. We have requested comments from EPA, the National Park Service, Polk County, and our District office as well as the in-depth review by our engineer and modeler/meteorologist assigned to this application. Additional Department comments will be provided to you by December 19. Any other comments will be forwarded to you as soon as we receive them. An initial review of the application indicates that the following items need to be provided or clarified:

1. Please confirm if the process will be as depicted in Figure 3-1. There have been developments in recent years incorporating more efficient technology which deletes the need for a drying tower, incorporates power generation and utilizes heat recovery towers. We simply want to confirm the chosen technology and to obtain more details on your plans.

2. The Best Available Control Technology should include a review and cost analysis for the "Centaur SO_2 Removal Process" developed by Monsanto in conjunction with Calgon Carbon. Basically, Converter 2 can be replaced with a reactor containing highly activated carbon catalyst/adsorbent. Wet conversion occurs in the bed which retains the acid. The acid is released by sequential back-washing of bed sections. The catalyst can operate at very low temperatures. This can result in reduced pressure drop across the plant as well as lower heat waste, lower emissions, and possibly increased production. Besides elimination of the second converter and its catalyst, it would also eliminate the need for a final tower and some other equipment. Attached is a recent joint press release from Monsanto Enviro-Chem and Calgon Carbon regarding the first commercial sale.

3. Please advise what kind of catalyst will be used in the various conversion passes. Will it be pelletized or ring (or star) catalyst? Please include a technical and cost evaluation for using cesium-promoted vanadium-containing catalyst in the final pass. This allows significant reduction of the operating temperature in the final pass. Monsanto Enviro-Chem introduced such a line of catalyst in 1989 and it has been demonstrated at several double absorption plants. We believe Topsoe and BASF market similar products. This provides an opportunity for reduced emissions, higher steam production, and possibly increased production despite the higher cost.

4. Please advise how long your plants have historically operated between turn-arounds such as those which include catalyst screening and replacement. Provide some information regarding sulfur dioxide emissions and acid production over time following such turnarounds.

5. Please submit cost/technical analyses of scenarios wherein certain plant components (such as the blower or catalyst) are designed (or "overdesigned") such that present production objectives are met and emission levels are lower than projected in the application. Please evaluate scenarios wherein emissions limits of 3.5, 3.0, and 2.5 pounds of sulfur dioxide per ton of sulfuric acid (averaged for periods longer than one day but less than thirty days) are maintained throughout the turn-around cycle of the plant.

We do not recommend processes which result in by-products or wastes and do not expect Farmland Hydro, L. P. to review them further. It appears that these processes are not generally competitive with those which result in production of additional acid.

We are continuing to process the application and will advise you as issues arise. We plan to make an appointment to visit your facility during the course of this review. If you have any questions regarding this matter, please call Syed Arif at (850)488-1344.

Sincerely,

11/20

A. A. Linero, P.E. Administrator
New Source Review Section

AAL/sa

cc: Brian Beals, EPA
John Bunyak, NPS
Bill Thomas, SWD
Joe King, Polk County
John Koogler, P.E.

Calgon Carbon Announces

MONSANTO ENVIRO-CHEM AND CALGON CARBON ANNOUNCE COMMERCIALIZATION OF MAC-100 PROCESS

PITTSBURGH, PA -- October 16, 1997 -- Monsanto Enviro-Chem Systems, Inc. and Calgon Carbon Corporation announced today the full commercialization of the MAC-100 Process utilizing Calgon Carbon's Centaur® Technology to reduce sulfur dioxide emissions from sulfuric acid manufacturing plants. The technology will be applied at the Philippine Phosphate Fertilizer Corporation's new 1,000-ton-per-day facility in the Philippines. Shipments of Centaur activated carbon for the new system began in September. The new plant will be operational in early 1998.

The full commercialization of the new technology follows a successful six-month pilot plant trial at Koch Sulfur Products Co. in Wilmington, North Carolina. The pilot plant, which was built and jointly operated by Monsanto Enviro-Chem and Calgon Carbon, demonstrated the technology's effectiveness in reducing sulfur dioxide emissions at an existing sulfuric acid manufacturing plant.

The MAC-100 Process Technology utilizes fixed beds of Centaur carbon to oxidize sulfur dioxide to sulfuric acid in the pores of the carbon. The dilute sulfuric acid is then recovered and used as make-up in the sulfuric acid manufacturing process. Centaur is manufactured by Calgon Carbon using a patented process which gives the carbon both adsorptive and catalytic properties.

In 1996, Calgon Carbon granted Monsanto Enviro-Chem exclusive worldwide rights to market the technology for reducing sulfur dioxide emissions from sulfuric acid manufacturing plants. Commenting on the Centaur Technology and MAC-100, John Kilkenny, president of Monsanto Enviro-Chem said, "Centaur Technology is definitely more effective in reducing sulfur dioxide emissions and requires lower capital and operating costs than traditional double absorption technology. With the successful completion of the trial demonstration at Koch Sulfur Products Co., we are now aggressively marketing systems utilizing Centaur activated carbon to customers worldwide." Colin Bailey, president and chief executive officer of Calgon Carbon, added, "The pilot plant trial clearly demonstrated the Centaur Technology's superiority over conventional methods of containing sulfur dioxide emissions. With Monsanto Enviro-Chem's position as a world leader in the design and construction of sulfuric acid manufacturing plants, I am confident that the Centaur

Technology will be widely adopted for both retrofit and new facilities."

Monsanto Enviro-Chem Systems, Inc., headquartered in St. Louis, Missouri, is a world leader in the design and construction of sulfuric acid manufacturing plants.

Calgon Carbon Corporation, headquartered in Pittsburgh, Pennsylvania, is a leader in the production, supply and design of products, services, and technologies for the purification, separation, and concentration of liquids and gases.

For more information, please contact Gail Gerono (412) 787-6795

Previous news

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Charles W. Jenkins, Mgr.
Farmland Hydro
PO Box 960
Bartow, FL 33831

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PS Form **3811**, December 1994 Domestic Return Receipt

Date: 11/20/97 10:56:55 AM
From: Alvaro Linero TAL
Subject: New Sulfuric Acid Plant at Farmland
To: See Below

Farmland has applied to construct a new 2750 TPD sulfuric acid plant at its Green Bay site to replace an existing 2100 TPD plant.

This project is subject to PSD and BACT. It is assigned to Syed Arif. Kim - please log it into ARMS. Send copies of the application to EPA, the SWD, and NPS. I fwe need any more copies, ask Pradeep Raval.

Syed - they submitted $7,250. With the $250 they submitted previously (when they applied to build the plant by a permit amendment) the fee is sufficient. Please indicate so on ARMS.

Syed. It appears to me that they need to evaluate the costs in their BACT determination of the possible use of cesium catalyst in the last pass for additional SO2 reduction. They should also include costs for the Centaur system.

Thanks.

To: Syed Arif TAL
To: Kim Tober TAL
CC: Clair Fancy TAL
CC: Howard Rhodes TAL
CC: Jeffrey E. Brown TAL
CC: Doug Beason TAL

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